



TESA
TECHNOLOGY

User manual

TWIN-TESTRONIC display

04430015: TWIN-T40



Version 1, October 2022

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1 INTRODUCTION

1.1 Acknowledgements

Dear user,
 We would like to thank you for choosing TESA as your metrology partner. We appreciate the confidence you have placed in us by purchasing this high-quality display. The entire TESA team would like to welcome you to the large family of TESA product users.

Your TESA team

1.2 Warning

All technicians and operators must have read this Quick Start Manual before setting up, using or maintaining this instrument. Failure to follow certain instructions or recommendations can result in malfunctions or taking the device out of service.

1.3 Copyright (document)

The contents of this document are subject to change without notice. All rights reserved ©2021 Hexagon AB and/or its subsidiaries and qualified representatives. The French version is the reference language. All other language versions are only translations.

1.4 Patented design

The design of this device is protected by patent registered under the reference DM212520.

1.5 Icons

Different types of icons are used in this manual. They indicate important information that must be taken into account to operate this measuring instrument correctly.

Position	Meaning
	Failure to follow these instructions can lead to incorrect results.
	Indicates help for more efficient use.

2 SPECIFICATIONS

2.1 Specifications

- Normal operating conditions:
20 °C ± 1 °C, relative humidity 40 < RH < 65 %, non-condensing.
- Limiting operating conditions:
10 °C < T° < 40 °C, humidity < 80 %, non-condensing.
- Storage conditions:
-10 °C < T° < 60 °C, humidity < 80 %, non-condensing.
- Margin of error (@20 °C, RH = 50 %, based on reference calibrations):
± (0.2 % of measured value + 0.3 µm)
- Zero drift (@20 °C and 50 % RH):
0.15 µm/°C max.
- Dimensions (mm): 190 x 112 x 119
- Weight (kg): 1.2
- IP protection level (IEC 529):
IP65 for the front panel, IP20 for the rest
- Main power supply (input)
Input: 100-240 V/50-60 Hz, 3.6 A
Output: 24 V DC/0.75 A 818W)
Power consumption: 5 W without device



For optimum performance, users are required to carry out regular calibrations to compensate for any drift due to temperature, humidity or other external factors.

3 PRESENTATION

3.1 General description



No.	Designation
1	TLC cap
2	7" touch screen
3	1x RS-232 serial port D-sub 9S
4	1x TESA-BUS port D-sub 9S
5	4x USB-A 'host' for measuring instruments
6	4x DIN 45322 connectors for TESA half-bridge probes
7	Connector for 15–24 V power supply
8	2x USB-A 'host' for peripherals (keyboard, USB stick, QR code reader)
9	1x USB-B 'device' (HID keyboard output + firmware update)
10	1x Ø 2.5 jack plug, port for foot switch
11	ON/OFF switch

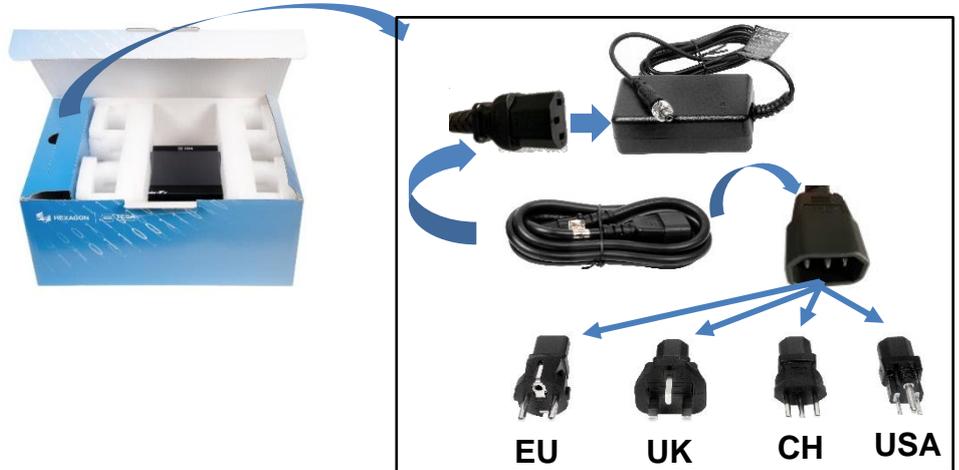
3.2 Delivery contents

Qty.	Designation
1x	Display
1x	Power supply
1x	Power supply cable
4x	Power cable connectors: 1xEU, 1xUSA, 1xCH, 1xUK
1x	Self-test report
1x	Calibration certificate
1x	Instructions for use
2x	Packaging foams

4 UNPACKING

We recommend keeping the original packaging in case of shipment to another site to avoid any damage.

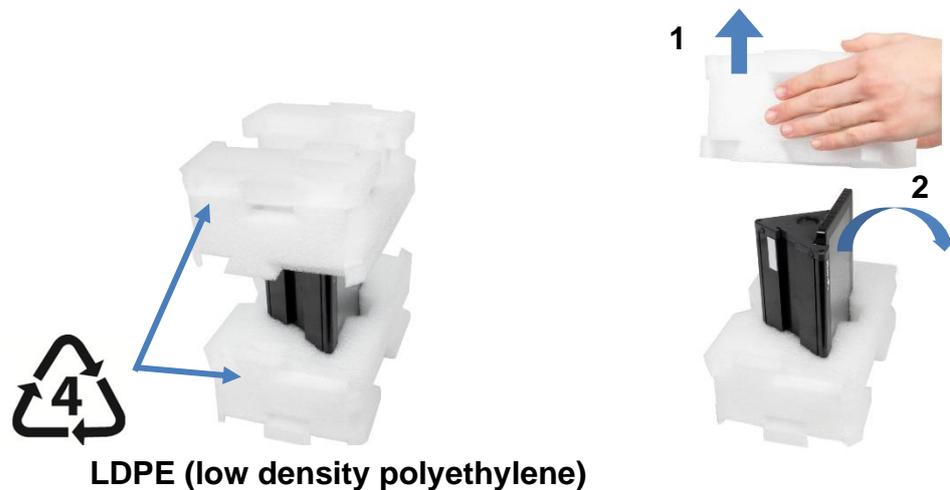
4.1 Step 1



4.2 Step 2



4.3 Step 3



We recommend keeping the original packaging to avoid damage in case you need to send the product to another location.

5 INSTALLATION, SAFETY AND MAINTENANCE

5.1 Thermal stability



The display should be switched on 30 minutes before starting measurement.

5.2 Cleaning

Use a dry, lint-free cloth only to clean the instrument. Do not use aggressive solvents.

5.3 Unauthorised intervention on the device



The warranty period is automatically invalidated if the device is opened by an unauthorised person.

5.4 Recycling



Do not dispose of this type of equipment in household waste. Follow the regulations for end-of-life electronic equipment.

5.5 Compatibility

- **DIN 45322 ports (item 6, page 5) compatible with:**
 - all TESA half-bridge probes (not compatible with DC and USB versions).
- **USB-A host for outputs (item 9, page 5) compatible with:**
 - QR code reader (from Datalogic Heron HD3430, configured as USA keyboard, others to be checked)
 - USB keys (Verbatim StoreN'Go 32 GB or TOSHIBA transmemory U301 OK, others to be checked)
 - USB foot switch (TESA article 04761071)
 - keyboards (QWERTY type, USA)
- **USB-A host for inputs (item 5, page 5) compatible with:**
 - TESA callipers with TLC port (+ TLC-USB cable, TESA item 04760181)
 - TESA digital comparators with Opto port (+ Opto-USB cable, TESA item 04761062)
 - TESA digital micrometers with Opto port (+ Opto-USB cable, TESA item 04761062)
 - most Mahr® and Sylvac® instruments (+ manufacturers' cables) – to be verified.
- **Ø 2.5 jack plug (item 10, page 5) compatible with:**
 - foot switch (TESA item 04768000)



Hub not permitted on USB ports.

5.6 DIN mounting rail

The TWIN-T40 is suitable for mounting on standard DIN rails of width 35 mm and height 7.5 mm. It is recommended to use DIN rail mounting to ensure proper mounting.



6 USER MANUAL

6.1 Starting up

The instrument is switched on by pressing the switch, item 11, page 5.

6.2 Measurement screen

After the installation phase, the measurement screen is displayed (factory setting):

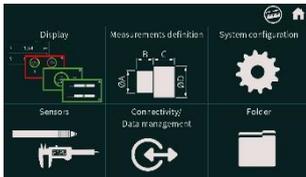


Press the  button to display the "Zero" and "Init. Dyn." buttons.

The "Zero" button is used to set the values to zero.
Press the "Zero" button for a second time to display the raw probe value.

The "Init. Dyn." button resets the value if the dynamic operating mode is selected (Min, Max, etc.).

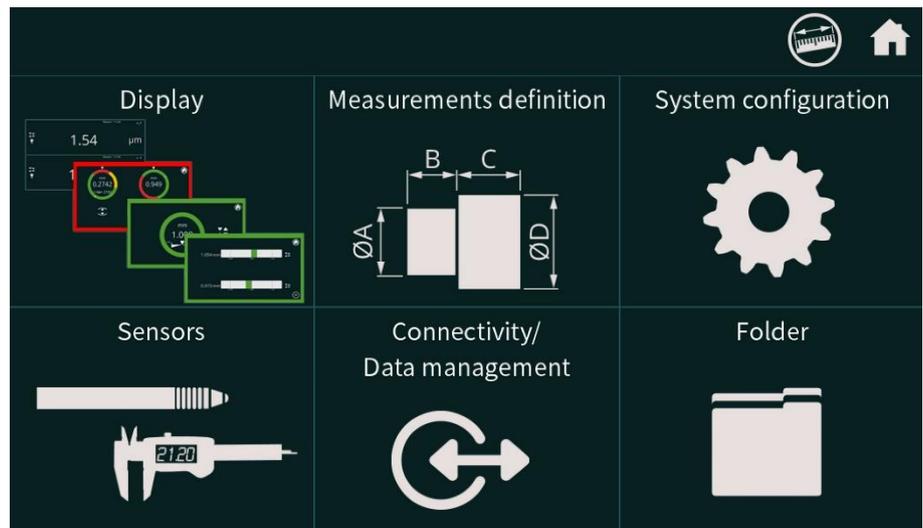
6.3 Home screen



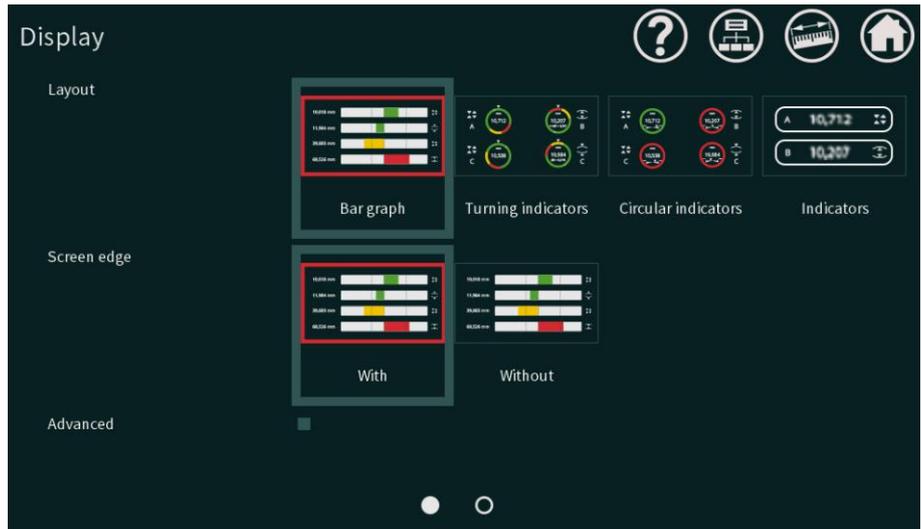
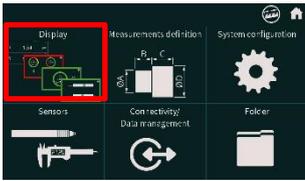
Press  to go to the home screen with access to all the settings:



To return to the measurement screen, press .



6.4 Display types



Bar graph:

Option to choose to display the screen border in the colour of the measurement result tolerance (green, yellow, red).



Rotating indicators:

If the result of the measurement is out of tolerance, a value appears to indicate the value difference to bring the measurement back to the nominal value.



Dial indicators:

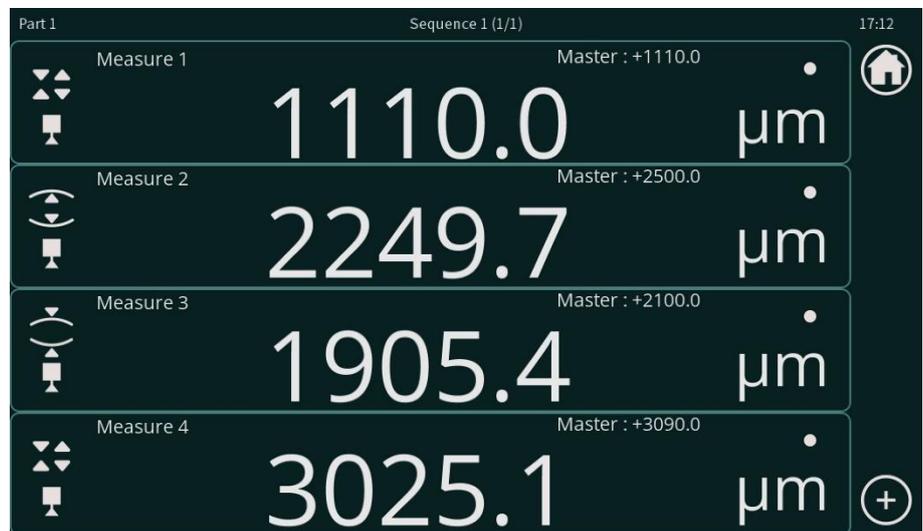
A cursor shows the current visual position within the tolerance range.



Numerical indicators:

Each measurement displayed can be activated to change the following information:

- Direct access from the measurement screen to changes of the dynamic modes (min, max, max-min, median, (max-min)/2).
- Direct access from the measurement screen to changes of the calibration value.

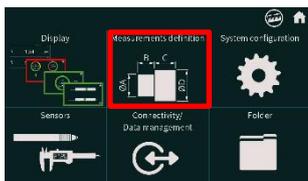


The active measurement is shown on a green background. Once active, the dynamic mode and calibration value can be changed
Click on the measurement again to deactivate the green background.

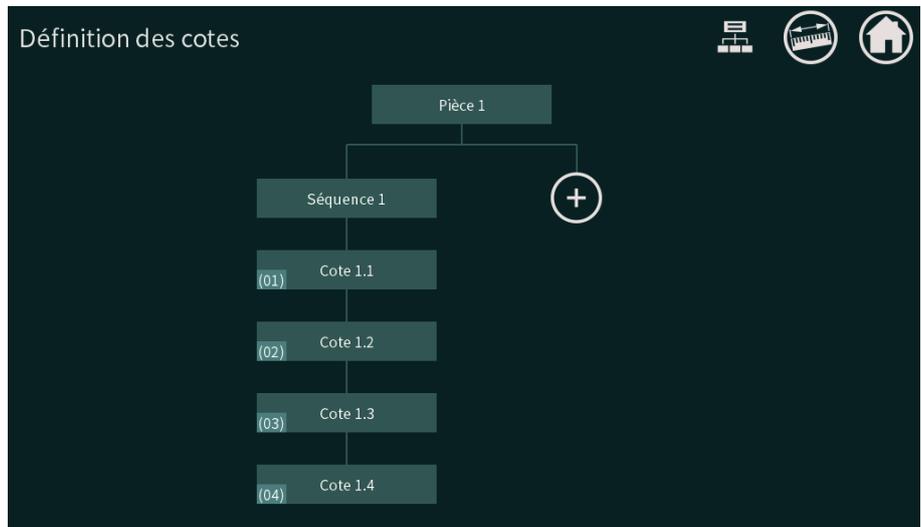


Select the required display type and press on to confirm.

6.5 Definition of the measurements



To define the measurements and measurement sequences, press on . The view represents the control of the part in sequence.



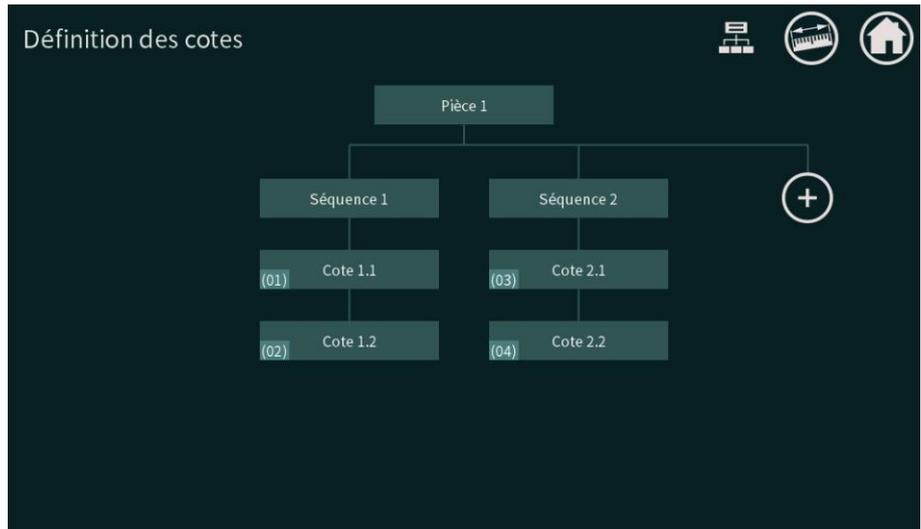
View with factory settings

By pressing the different blocks, the default name can be changed.

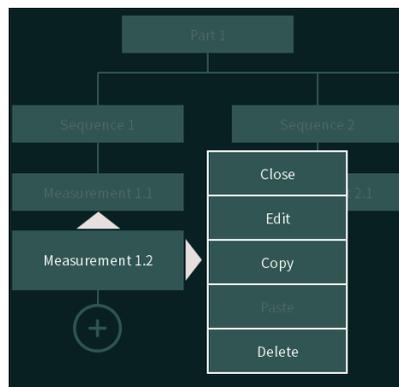
If a measurement and an additional sequence are available, press on to add a sequence with a new measurement.

Each measurement has a multi-measurement number (displayed at the bottom left of each box). This number is used to call the measurement from ASCII commands.

A maximum of 4 measurements and 4 sequences can be displayed.



View with 2 measurements per sequence

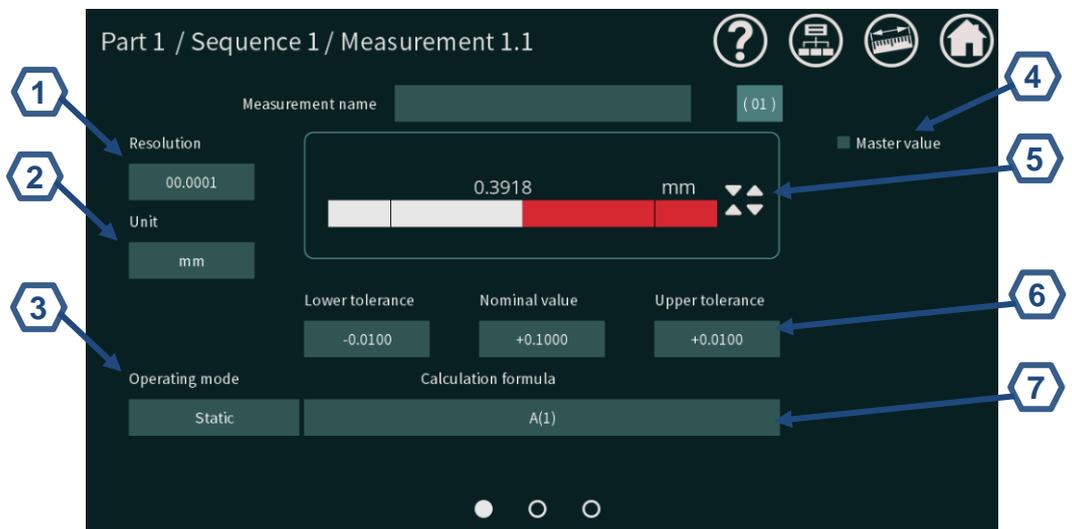


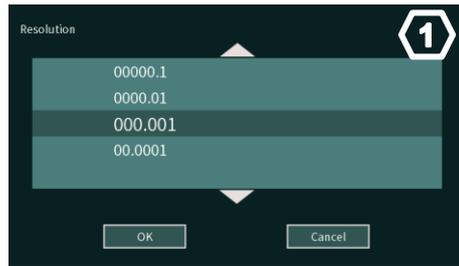
Press on the required measurement to move it or to modify it.

Press the arrow to the right of the box to move the measurement into the following sequence.

Press the arrow above the box to move the measurement above the measurement in the same sequence.

6.5.1 Measurement settings





The resolution is based on 6 digits.

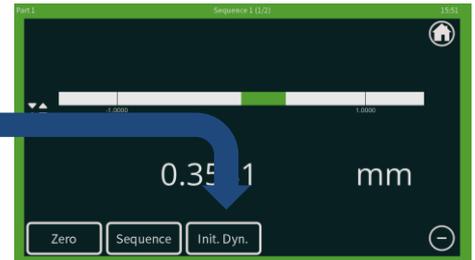


The choice of unit allows the definition of length, angle and customised units.



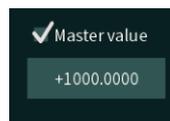
Choice of operating mode:

- **Static**: continuously displays the value of the measurement
- **Min**: displays the minimum value of the measurement
- **Max**: displays the maximum value of the measurement
- **Max-Min**: displays the difference between the maximum and minimum values
- **Median**: displays the value $(Max+Min)/2$
- **(Max-Min)/2**: displays the value $(Max-Min)/2$
- **Average**: displays the average value as a function of time



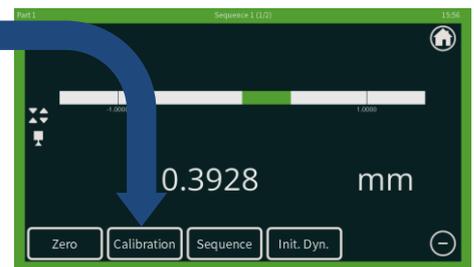
The button on the measurement screen **Init. Dyn.** allows the value to be reset if the dynamic operating mode is selected (min, max, etc.).

4



Once activated, the master value can be accessed by pressing the **Calibration** button on the measurement screen.

On the measurement screen, the  icon changes to  after pressing **Calibration**.



5

Type of measurement:

The colour code of the tolerances changes according to the type of measurement.



Distance measurement

Internal Ø measurement

External Ø measurement

Angular measurement

6

Tolerances

In this example, the required measurement is $10_{-0.1}^{+0.2}$

Lower tolerance	Nominal value	Upper tolerance
-0.1000	+10.0000	+0.2000

7

Calculation formula

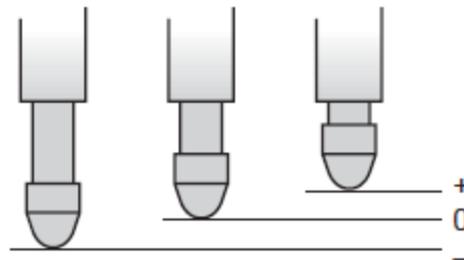
The calculation formulae are used to define the calculation or the port to be displayed of the various measuring instruments connected to the display.

Input A(): Values of the connected DIN probes

Input U(): Values of the USB inputs connected to read external instruments

Input T(): Values of the instruments connected via the TESA-BUS

Input M(): Value of the measurement (e.g. Measurement 01)



Note on probes:

Change of display to the positive side due to positive polarity +A or +B when the probe axis returns into the probe body

6.5.2 Sorting of the measurement

To access the "Sorting of the measurement" screen, slide to the first "Setting the measurement" screen.

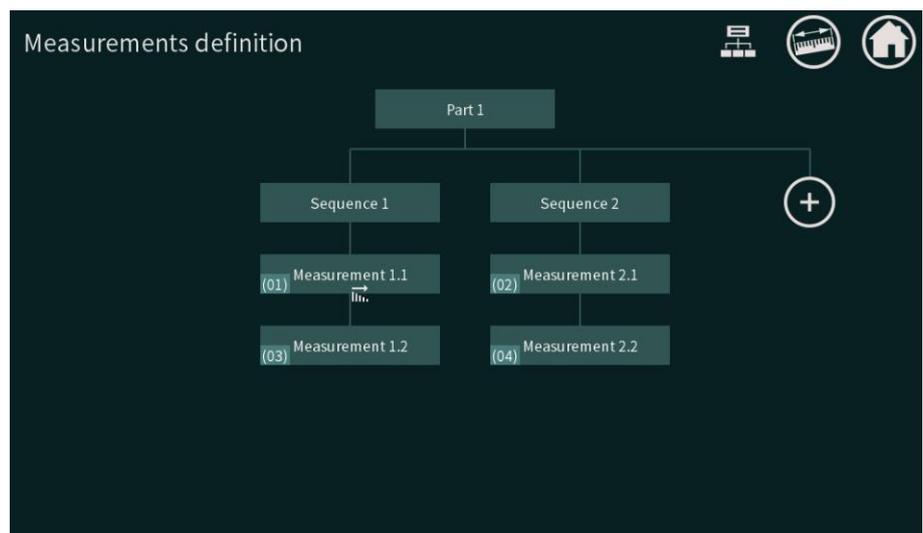


To add up to 16 classes, press the button.

When choosing an N-class display, each class creates a default interval that is equal to the tolerance interval of the measurement divided by the number of classes.

For each class, it is possible to change:

- The designation (name)
- The colour
- The lower and upper tolerances.



The icon for measurements defined with sorting of the measurements is displayed below the measurement name, with the logo

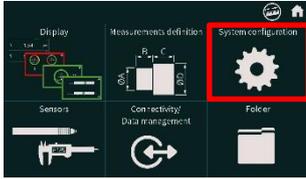
6.5.3 Advanced settings of measurements

The advanced measurement options can be accessed by sliding to the second setting screen.

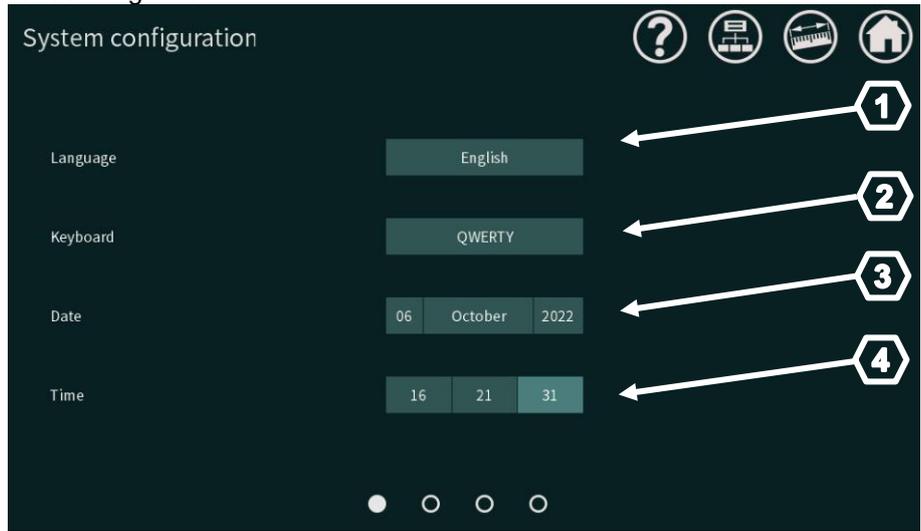


Hidden option: Allows the measurement on the measurement screen to be hidden

6.6 System configuration



Transferable option: Allows the measurement to be made transferable if a function has been defined for sending data.



6.6.1 Language

1. Language selection

6.6.2 Keyboard

2. Selection of keyboard type

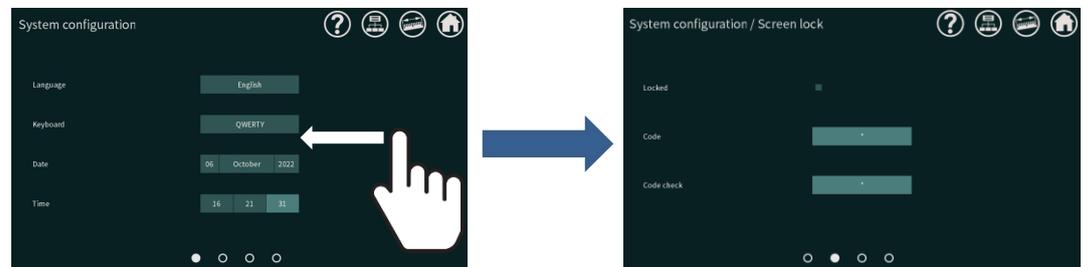
6.6.3 Date

3. Setting the date

6.6.4 Time

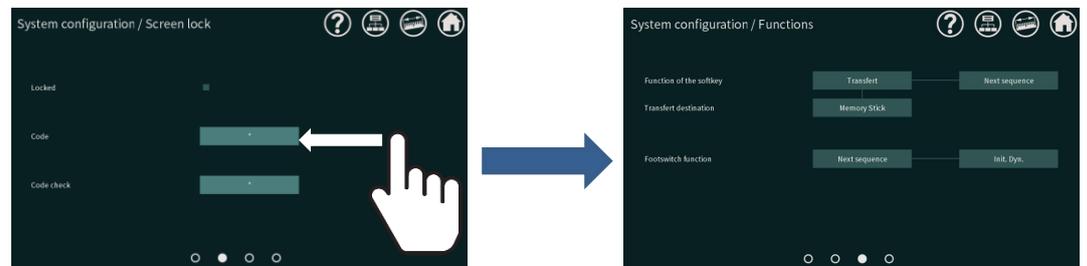
4. Setting the time

6.6.5 Screen lock option



The measurement settings can be locked with a 4-digit code; this option can be accessed by sliding to the previous screen

6.6.6 Configurable buttons and foot switches



Slide from the first to the second screen to see all available configurations.

The attributable functions are identical for the following actuators:

- 1x softkey available on the measurement screen
- 1x foot switch connected by jack plug
- 2x foot switches connected via USB port



Choice of functions:

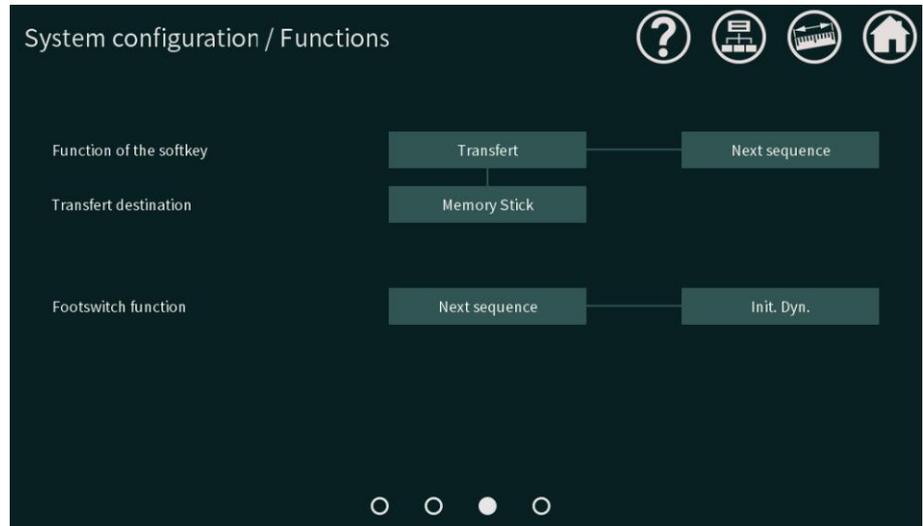
- **Zero:** Zeroing the measurement
- **Cancel zero:** Suppressing the zeroing action to return to the previous value (raw probe value)
- **Calibration:** Setting the value of the measurement default
- **Init. Dyn.:** Initialisation of the dynamic value
- **Next sequence:** Action to move to the next sequence
- **Transfert:** Sending the measurement to the defined destination
- **USB device reading:** Querying the value of the selected USB input

Destination of values for the "Transfer" selection:

- **RS-232:** Sending of values via the RS-232 D-sub 9p output
- **TLC:** Sending values via the TLC output on the side of the display
- **PC keyboard:** Sending of values via USB A-B cable in an active field, without the need to install drivers (HID type)
- **USB stick:** Saving the values in a CSV file on the USB stick

In addition to the function assigned to the actuator, an automated sequence can be configured to add an action after the first assigned function.

The list of functions for the automated sequence is identical to the first function.



Example of the sequence via softkey:

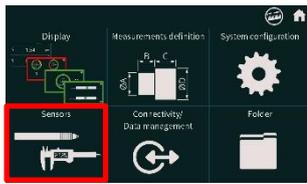
Pressing the softkey displayed on the measurement screen:

1. Transfer of the measurement to the USB stick
2. The measurement screen automatically changes to the following sequence

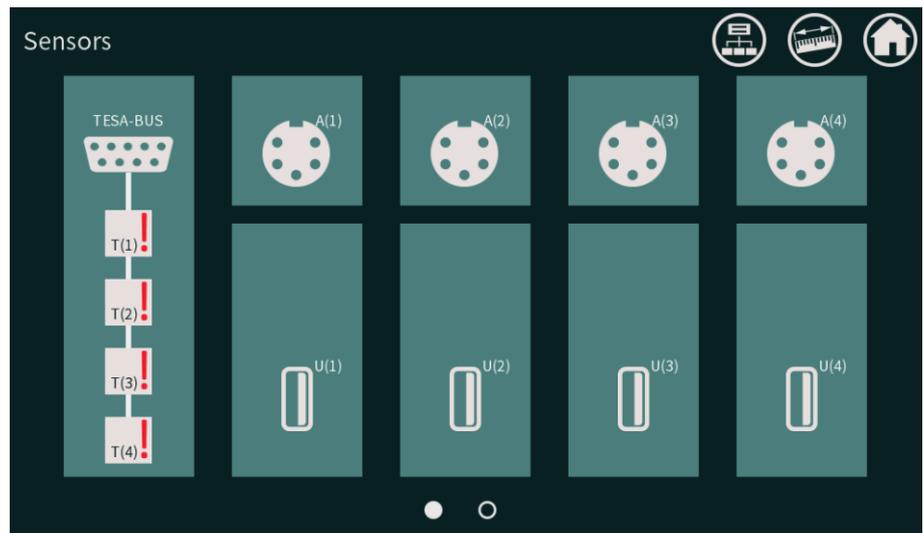
Activation of the foot switch jack plug ('jack footswitch' in figure):

1. The measurement screen changes to the following sequence
2. The displayed dynamic value is automatically initialised.

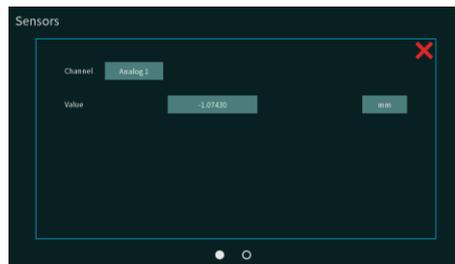
6.7 Sensors



The "Sensors" screen shows all connected devices with their parameters.



View of the connections for the TWIN-T40



View of the sensor input DIN 45322



View of the USB input

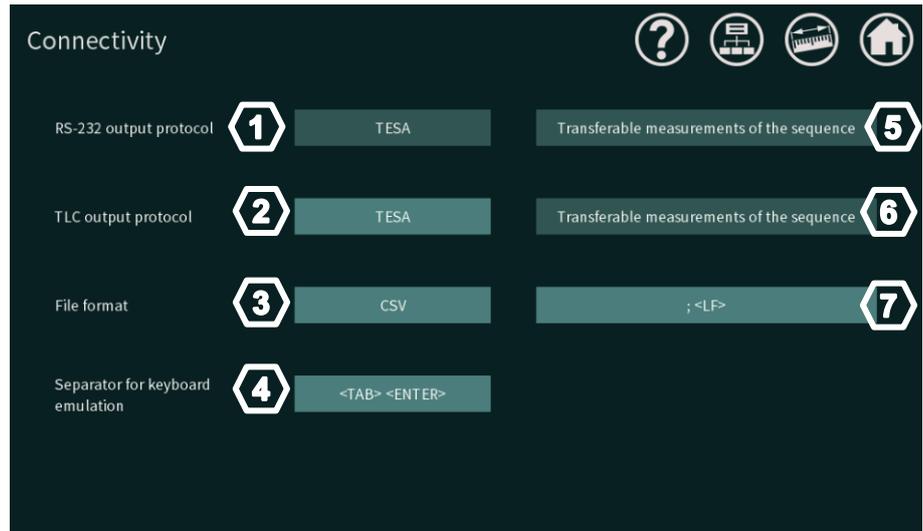
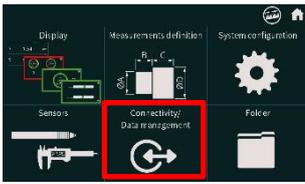
The displayed value is the raw value of the probe, ideal when several probes are mounted in order to identify them.

The probe input can be read continuously by activating the checkbox next to "Continuous reading".

When attaching a probe, ideally set the value as close to 0 as possible to improve the accuracy of the probe.

If an exclamation mark appears against an input, this is because no probe from a TESA MODULE has been assigned to this input. To assign it, please click on the field with the exclamation mark, provided that a TESA MODULE for the connection of probes has been connected to the display.

6.8 Connectivity

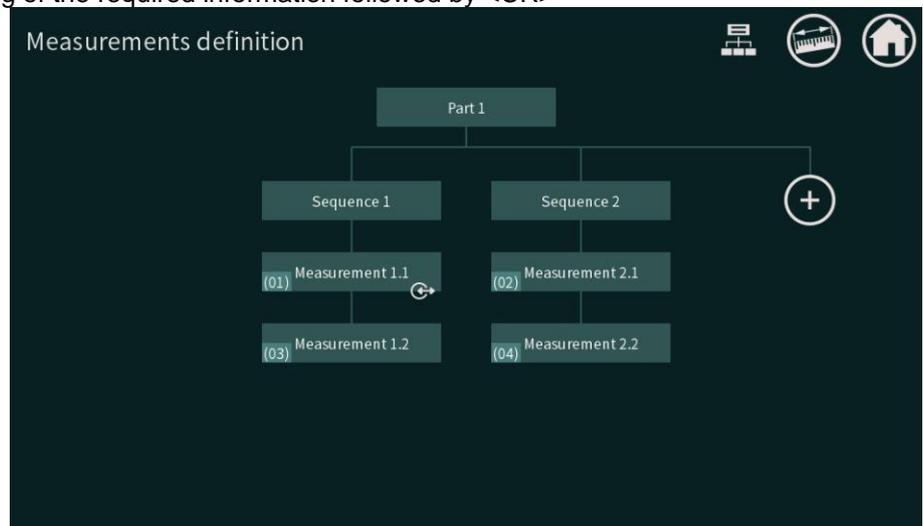


1. Definition of the RS-232 output protocol:
 - TESA
 - Modbus integer
 - Modbus real
2. Definition of the TLC output protocol: TESA (default setting)
3. File format: CSV (default setting)
4. Separator for the keyboard emulator: <TAB><ENTER> (default setting)
5. Definition of the values sent on the RS-232 output protocol:
 - Transferable measurements of the sequence
 - Measurements of the sequence
 - Transferable measurements of the part
 - Measurements of the part
 - Rating X.X (according to the active measurements in the sequences)
6. Same as point 5.
7. Format of the data sent in the CSV file: ;<LF>

Characteristics of the TESA protocol:

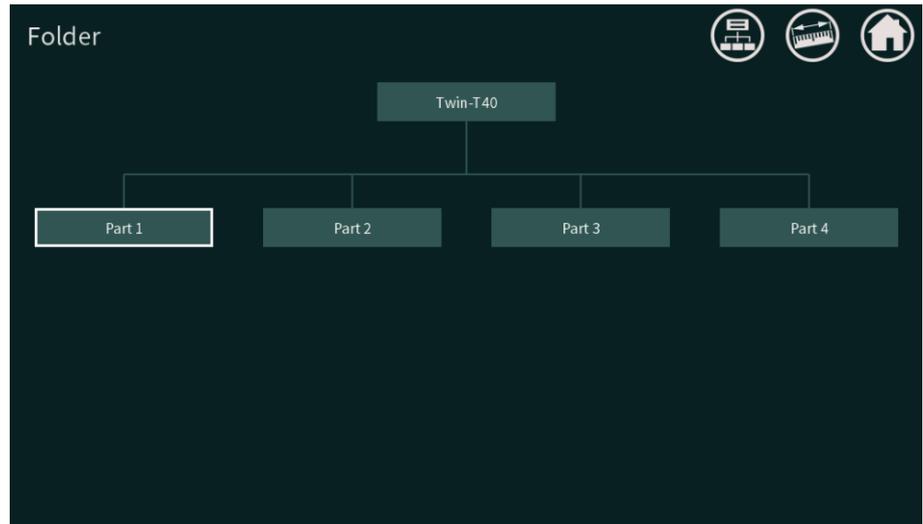
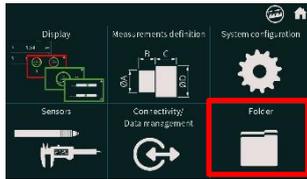
Speed of transmission: 4800 baud	Start bit: 1
Character output: 7-bit ASCII code	Stop bit: 2
Parity: even	

Sending of the required information followed by <CR>



The icon for measurements defined as transferable is displayed below the measurements designation, together with the logo.

6.9 File



4 measurement programs can be stored on the TWIN-T40 display and can be selected on this page.
Press the required box and then press "Select".

6.10 Modbus protocol

The list of registers is available on request. Please contact TESA.Service@hexagon.com

Modbus is a communication protocol for connecting to PLCs. This protocol is based on a master/slave architecture. Modbus allows simple, reliable and fast communication between the PLC and the display.

The following functionalities are available:

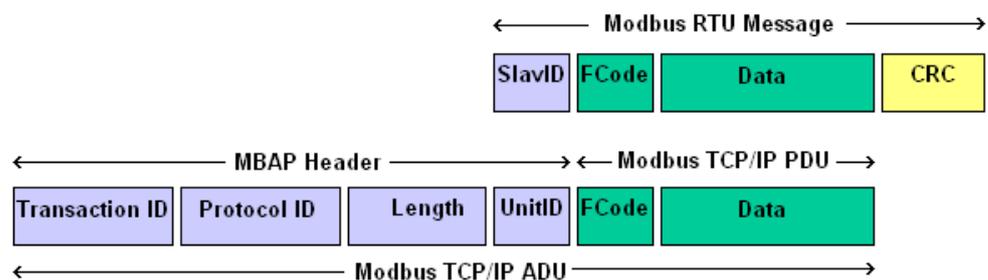
- Reading of the current values on the display
- Calibration
- Reading/programming of the tolerance, standard, formula, etc.

Connection:

1. USB to D-SUB 9P connection cable, TESA item 04761063. Connect to the RS 232 port
2. Setting of the display:
 - a. Enter the 'Connectivity/Data management' menu
 - b. Select the RS-232 output protocol, Modbus Real format
3. Restart the display to take the new settings into account

Communication settings:

- Write codes: 3, 6 and 16
- SLAVE ID = 1
- Serial port connection type
- 9600 baud/8 bits/No parity/1 stop bit
- Delay between pulses: 20 ms
- The data is in Big-Endian format (high weightings at top)
- Register based on 0



6.11 TESA-MODUL

The TESA-MODUL allows the addition of functionality via different module models. All modules are connected over the TESA-BUS according to the following procedure.

1. Connect the module via the TESA-BUS connector using a D-sub 9p/f to D-sub 9p/m cable (04761052). The LED on the module flashes.
2. Enter the "Sensors" menu.
3. Press the "TESA-BUS" connector.
4. Press the "+" button. Confirm with "Yes" in the screen that opens.
5. Press the **Id** button of the TESA-MODUL to be added to your configuration.
6. The newly added module now appears on the screen (TM X.X box)



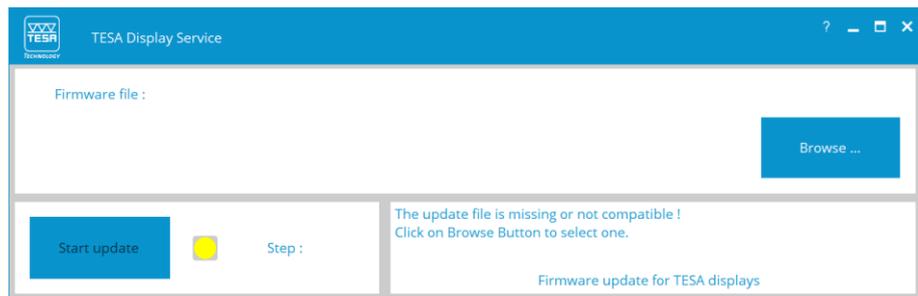
Please read the instructions for use for the TESA-MODUL, which are available on the tesatechnology.com website for technical information on each module.

6.12 Updating the firmware

If improvements to the instrument's functionality are made, the firmware can be made available by the TESA Service team if required.

To update the firmware, use the **TESA Display Service** software that is available in the download section of our website.

1. Open the TESA Display Service software.
2. Click on "Browse..." to select the .bin file for the latest firmware update.
3. A new window will open for the rest of the procedure.



4. Connect the display to the main power supply. Keep the display switched off.
5. Connect the USB A-B cable (04760151) between the display and your computer.
6. Connect the foot switch jack plug ('jack footswitch' in figure) (04768001).
7. Press and hold the foot switch (jack footswitch in figure). While holding it down, start the display with the main switch to enter update mode. The foot switch can now be released. The display remains off.
8. Press the "Start update" button of the program to start the firmware update.
9. Once the update is complete, a window opens asking the user to disconnect the USB A-B cable and restart the display via the main switch.



To check the update, restart the display. Click on the TESA logo on the start-up screen. A window will appear with the current firmware version.

6.13 Calibration mode

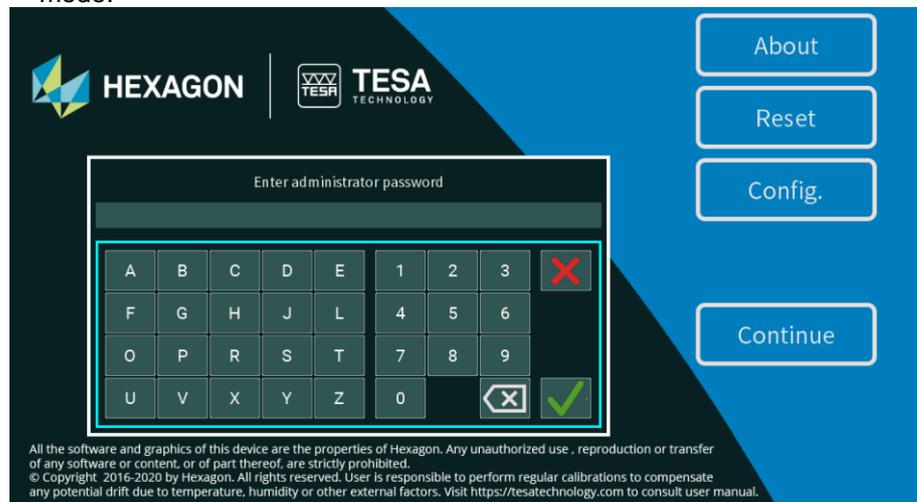
Calibration mode allows the user to calibrate the probe inputs without having to send the instrument to a service partner.

Other options are available to reset the display to factory settings.

1. When starting the display, press the TESA logo.



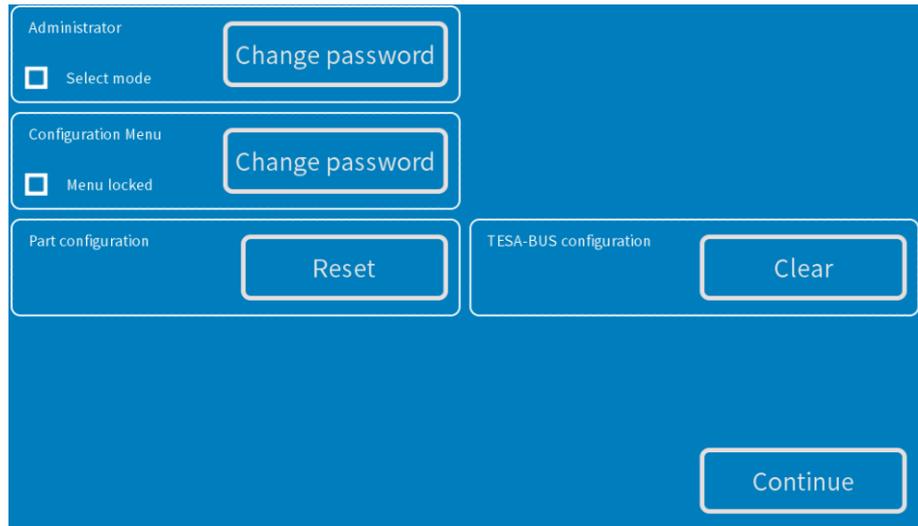
2. Press the "Config" button. A window opens. Validate to start administrator mode.



The following passwords are set by default and cannot be changed.

Default password:

- TWIN-T20: 1020
- TWIN-T20 nano: 1021
- TWIN-T40: 1022



To select a mode, tick the box of the required mode and press the "Continue" button.

Password:

To change the password, press "Change password" on the required mode.

Part configuration:

This mode allows the user to initialise all the functions of the display to factory mode.

TESA-BUS configuration:

This mode enables all existing configurations of the TESA MODULE to be deleted via the TESA-BUS

Configuration menu:

This mode can be used to lock all menu configurations.
Only the measurement screen is available.

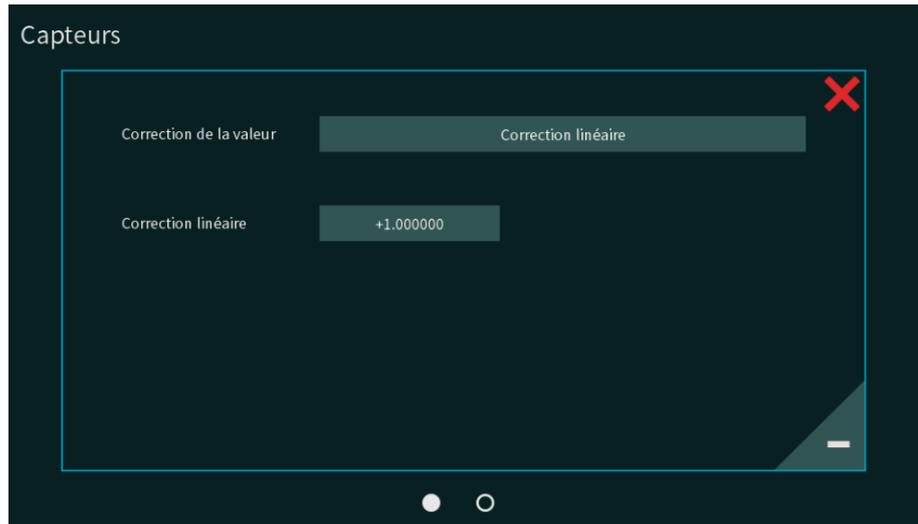
The default password is "0000".

Administrator mode

This mode allows access to the calibration mode for probe inputs

This calibration is an additional correction of the existing factory calibration, valid for each sensor input of the display

This mode is recommended if the probe deflection is known or if the probe and display require additional accuracy.



Value correction:

Press the  symbol to access the value correction menu

Linear correction:

Addition of a linear correction factor:
 Displayed value = gross value x linear correction factor

Available for TWIN-T20 nano and TWIN-T40

Multiple point linearisation:

Correction of values at multiple defined points (max. 32 points)

Available for the TWIN-T20 nano

Multiple point calibration:

Correction of values at multiple defined points (max. 32 points)

Available for the TWIN-T40

6.14 List of errors

The following errors may occur:

Error 1	Unknown probe error
Error 2	Lost sensor configuration
Error 3	Required probe configuration
Error 4	Probe overspeed error
Error 5	Probe not connected
Error 6	Reference mark not detected

6.15 QR code reading

The display can be used to connect a QR code reader to define the actions. The actions included in the QR codes are linked to the ASCII commands available for the displays.

6.16 ASCII (RS-232) protocol

The list of ASCII commands is available in the Annex.

ASCII communication protocol on the RS-232 output makes it possible to interrogate the display via commands.

The following functionalities are available:

- Instant reading of displayed measurements
- Initialisation of the dynamic value
- Changing the unit

Characteristics of the TESA protocol:

- Speed of transmission: 4800 baud
- Character output: 7-bit ASCII code
- Start bit: 1
- Stop bit: 2
- Parity: even

All commands end with <CR><LF>.

6.17 Trigonometric functions

Trigonometric functions are available for angle calculations with sine, cosine and tangent functions.

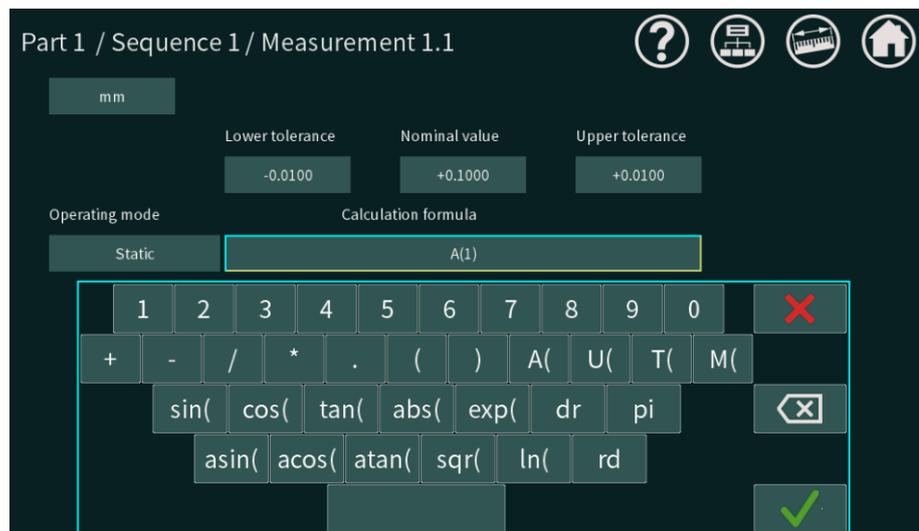
The constant "dr" is used to change from degrees to radians.

The constant "rd" is used to change from radian to degree.

Example formula:

sin(A1)xdr = result in radians

Asin(A1)xrd = result in degrees



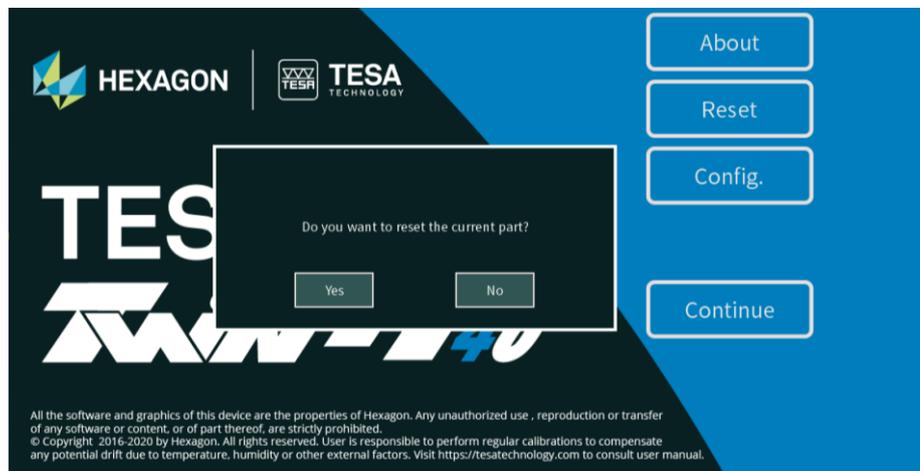
6.18 Reset to factory settings

Resetting to factory settings initialises all settings to the default values – to the same condition as when the display was first unpacked from its original packaging.

1. When starting the display, press the TESA logo.



2. Press the "Reset" button. A window opens. Confirm to start the reset to factory settings.
The display restarts automatically.



7 RIGHTS TO FONTS

<p>7.1 Noto</p>	<p>This device can use the following font: Noto. This font is part of the Noto project and is made available under the SIL Open Font license, version 1.1. See google.com/get/noto for more information on this project. A copy of the SIL Open Font licence is included in Annex A. The SIL Open Font licence can also be found with a FAQ section on the website: http://scripts.sil.org/OFL</p>
<p>7.2 Open sans</p>	<p>This device can use the following font: Open sans. This font was created by Steve Matteson and is available under the Apache license, version 2.0. See the website http://fonts.google.com/specimen/Open+Sans for more information on this font. A copy of the Apache licence is included in Annex B. The Apache licence can also be found at http://www.apache.org/licenses/</p>

8 DECLARATION OF CONFORMITY

We hereby certify that this equipment has been manufactured and tested in our workshops. We declare on our sole responsibility that this equipment complies with the standards and technical specifications indicated in our commercial documents (start-up manual, website). We also certify that the metrology equipment used to control this equipment meets the requirements of the national reference standards. The traceability of the measured values is guaranteed by our quality assurance system.

In conformity with:  

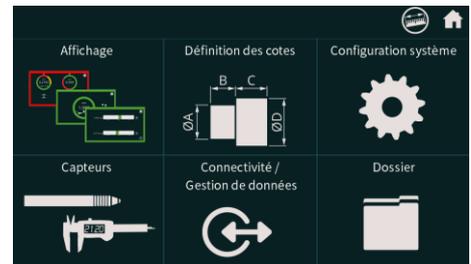
Quality assurance

9 FREQUENTLY ASKED QUESTIONS

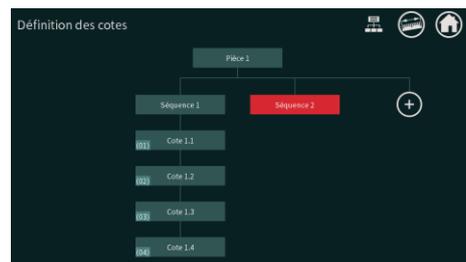
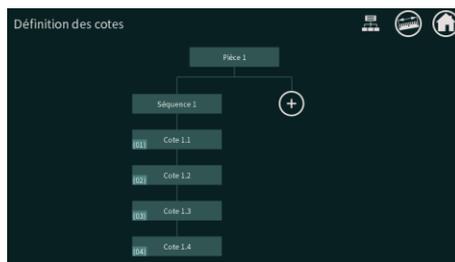
9.1 How can a sequence be added?



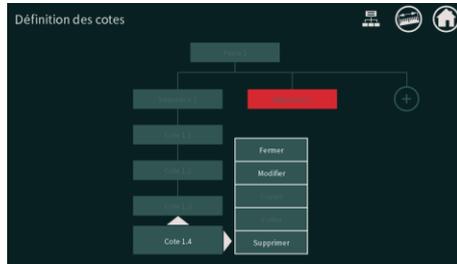
Select the  button on the measurement screen



Select the "Measurements definition" menu

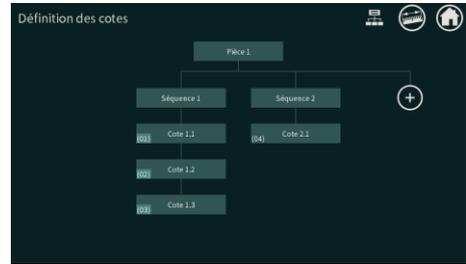


Here is the factory configuration with 4 measurements displayed in a sequence



Press the measurement to be moved to sequence 2. An arrow appears on the right of the box. Press to move the measurement.

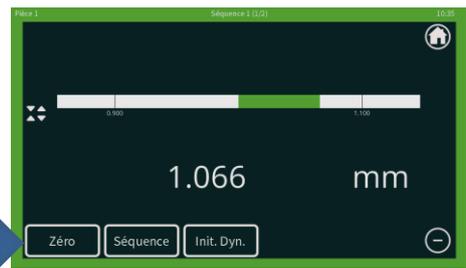
To add a sequence, press the  button to display the new sequence that appears in red.



This is the new view with the measurement moved to sequence 2.

Press the  button to return to the measurement screen.

9.2 How can the user move from one sequence to another?



Press the  button to display the sequence buttons.

Press the sequence key to move to the next sequence.

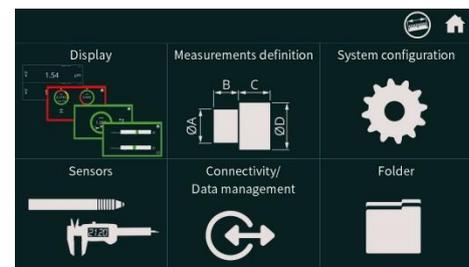
The current sequence is displayed at the top of the window.

 **A simple press on the screen allows you to move on to the next sequence**

9.3 How can a language be changed?



Select the  button on the measurement screen



Select the "System configuration" menu



Press the first field at the top of the screen.



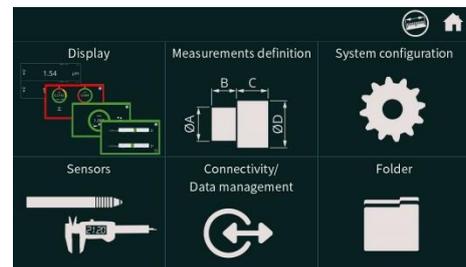
A drop-down menu appears to display the available languages.

The sending of a measurement is possible, provided it is set up to be transferable. The destination of the shipment must also be defined.

9.4 How can the user send a value?



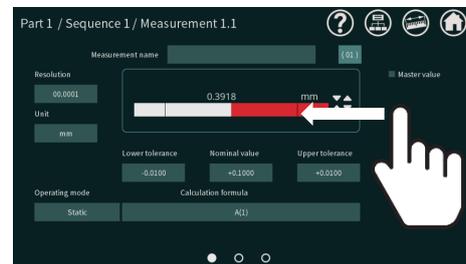
Select the  button on the measurement screen



Select the "Measurements definition" menu



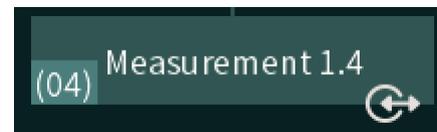
Press on the measurement you wish to transfer and choose "Modify".



Slide right 2x to reach the advanced measurement menu.



Tick the "Advanced" box and tick the "Transferable" box.

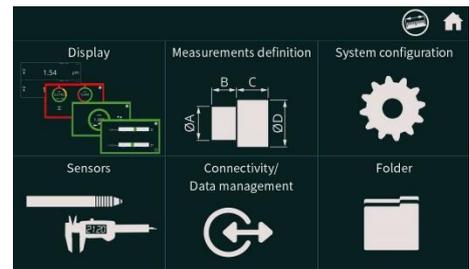


If the user goes back to the "Measurements definition" view, the transferable measurement has the send data logo visible.

Setting the softkey displayed on the measurement screen for sending data:



Select the  button on the measurement screen



Select the "System configuration" menu



Slide right 2x to reach the menu



Select the "Softkey function" field and choose "Transfer" from the drop-down menu.



Once selected, the transfer destination must be defined.
Choose the destination and return to the measurement screen.



Press the  button to display the available buttons.
The "Function" button for sending the defined measurement appears.

ANNEX A: SIL OPEN FONT LICENSE V1.1

SIL OPEN FONT LICENSE Version 1.1 - 26 February 2007

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ANNEX C: ASCII COMMANDS

?	Requests the first value displayed																											
ID?	Requests the item number of the display																											
VER?	Requests the firmware version																											
SN?	Requests the serial number of the display																											
00	Reading of all transferable measurements																											
01	Reading of measurement no. 1 Response: 01=XX.XXX																											
02	Reading of measurement no. 2 Response: 02=XX.XXX																											
03	Reading of measurement no. 3 Response: 03=XX.XXX																											
04	Reading of measurement no. 4 Response: 04=XX.XXX																											
INITDYN	Initialisation of the dynamic mode value																											
MM	Sets the display to metric units (mm) Only for the galvanometer display of the TWIN-T20																											
IN	Sets the display to imperial units (inch) Only for the galvanometer display of the TWIN-T20																											
UM	Sets the display to micrometre (µm) units Only for the galvanometer display of the TWIN-T20																											
UNI?	Requests the current unit																											
MES0/1/2/3	Selection of the type of measurement 0: DIST / 1: INT / 2: EXT / 3: ANGLE																											
MES?	Request the type of measurement, internal or external (DIST, INT, EXT, Angle), response 0 to 3																											
PRE xxx	Defines the offset value																											
PRE?	Requests the current offset value																											
PRZ	Zeroing of the displayed value (max ± 200 µm)																											
RNG x	Definition of the measurement scale Only for the galvanometer display of the TWIN-T20 <table border="1" data-bbox="667 1261 1189 1328"> <thead> <tr> <th>x=</th> <th>0</th> <th>1</th> <th>2</th> <th>3</th> <th>4</th> <th>5</th> <th>6</th> <th>7</th> </tr> </thead> <tbody> <tr> <td>In metric (µm)</td> <td>±5000</td> <td>±2000</td> <td>±500</td> <td>±200</td> <td>±50</td> <td>±20</td> <td>±5.0</td> <td>auto</td> </tr> <tr> <td>In inches (in/1000)</td> <td>±200</td> <td>±100</td> <td>±20</td> <td>±10</td> <td>±2.0</td> <td>±1.0</td> <td>±0.20</td> <td>auto</td> </tr> </tbody> </table>	x=	0	1	2	3	4	5	6	7	In metric (µm)	±5000	±2000	±500	±200	±50	±20	±5.0	auto	In inches (in/1000)	±200	±100	±20	±10	±2.0	±1.0	±0.20	auto
x=	0	1	2	3	4	5	6	7																				
In metric (µm)	±5000	±2000	±500	±200	±50	±20	±5.0	auto																				
In inches (in/1000)	±200	±100	±20	±10	±2.0	±1.0	±0.20	auto																				
RNG?	Requests the scale value (0 to 6) Only for the galvanometer display of the TWIN-T20																											
RST	Reset – sets the display to the factory configuration																											
STO0/1	Disables/enables retention of last value Only for the galvanometer display of the TWIN-T20																											
TOL xxx xxx	Defines limit tolerances (max/min)																											
TOL?	Requests limit tolerances (max/min)																											
MEM x	Sets the dynamic mode <table border="1" data-bbox="486 1579 1002 1646"> <thead> <tr> <th>x=</th> <th>0</th> <th>1</th> <th>2</th> <th>3</th> <th>4</th> <th>5</th> </tr> </thead> <tbody> <tr> <td>mode</td> <td>normal</td> <td>max</td> <td>min</td> <td>diff</td> <td>Median (max+min)/2</td> <td>(Max- min)/2</td> </tr> </tbody> </table>	x=	0	1	2	3	4	5	mode	normal	max	min	diff	Median (max+min)/2	(Max- min)/2													
x=	0	1	2	3	4	5																						
mode	normal	max	min	diff	Median (max+min)/2	(Max- min)/2																						
MEM?	Requests the current mode																											
CLR0/1	Unlocks/locks access to the configuration																											