

FORCEMETRE

OPERATING MANUAL



VOH SA

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1 General

1.1 Guarantee

VOH SA guarantees this product against all fabrication defaults, or functional problems that may arise from normal usage during a period of two years from the initial date of installation. If a problem arises during the period of guarantee and the product is determined to be defect or irreparable, VOH SA will repair or replace the product (the necessary action to be determined by VOH). If the product is defect, please call the Client Services line of VOH at +41(32) 945 17 45.

The guarantee does not apply if VOH SA can prove the defect is result of usage not conforming to the proper application of the equipment.

The responsibility of VOH SA is limited to the repair and/or replacement of the product within the scope of conditions described below:

The product features warranty seals. Any breakage or break of these seals will void the warranty.



Figure 1: Warranty seal

VOH SA IS NOT RESPONSIBLE FOR ANY LOSS OR DAMAGE OF THEIR PRODUCTS, INCLUDING DAMAGES THAT MAY COME AS A RESULT OF USAGE WITH ADD-ONS OR ACCESSORIES DIRECTLY OR INDIRECTLY IN INFRACTION OF THE GUARANTEE, EXPLICIT OR IMPLICIT, AND/OR AND OTHER FAILURE OF THIS PRODUCT. THIS GUARANTEE IS THE UNIQUE AND SOLE GUARANTEE VOH SA OFFERS ON THIS EQUIPMENT.

The following guarantee only applies to the purchasing client, and is non-transferrable. If you have any questions concerning the parameters of this guarantee please write to VOH SA at the following address:

VOH SA
La Praye 5a
CH-2608 Courtelary

Téléphone : +41(32) 945 17 45
Fax : +41(32) 945 17 55
E-Mail : customer-service@voh.ch
Internet : <http://www.voh.ch>

1.2 Security

Attention:

- Do not use the FORCEMETRE if it has been damaged. Prior to starting up the machine, first inspect its control box and electrical connections.
- The FORCEMETRE must be used in accordance with the specified guidelines of the fabricator (VOH SA).
- Do not use the FORCEMETRE in an unclean environment.
- Only personnel who have been properly formed in its procedure should use the FORCEMETRE.

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Warning!!!

- Please carefully read the information contained in this manual before using the device. Improper use could severely damage the system or result in incorrect measurements.
- Before connecting the device for the first time, verify that the voltage corresponds to the suggested voltage for the device.
- In the instance that the machine is not used for a prolonged period of time, disconnect the power cable.
- Do not under any circumstances take apart the machine. Only the manufacture, VOH SA, is entitled to repair or replace defective components.
- This product should only be stored and employed at a room temperature not falling below 10°C or exceeding 40°C (104 °F).

1.3 Transport

This device is not intended for frequent displacement and/or transport. If it is necessary to move the device, be sure to properly protect against unwanted shocks that may damage the device. It is suggested that when transported, shock-preventative packaging is used.

1.4 Storage

The FORCEMETRE must be stored in a dry place, protected from humidity and dust. The storage temperature should not fall below 10°C (50° F), or surpass 40°C (104 °F).

2 Product description

The FORCEMETRE is a device permitting the accurate combined measurement of force and displacement. This will help qualifying in micro-assembly.

	Technical Specifications	
	Dimensions and weight of the bracket	100mm x 120mm x 205mm (width x depth x height) / 2 kg
Dimensions and weight of display	180mm x 135mm x 100mm (width x depth x height) / 0.5 kg	
Alignment between broch and base	+/-0.015mm	
Clearance around the broch	0.005mm	
Space under the broch	35.85mm	
Space under the broch with the extension	24.85mm	
Space under the broch with Horia cleat	22.62mm	
Space under the broch with Horia cleat and extension block	11.62mm	
Course	25mm	
Stroke / precision of the mechanical stop	15mm / +/- 0.01mm	
Base diameter	50mm	
Broch and base adjustment diameter	4mm H6	
Force measurement	0.5 – 50 N	
Precision of force measurement	+/- 0.5% (+/- 0.25 N)	
Precision of distance measurement	+/- 0.003mm	
Sensor deformation under 50N	< 0.01mm	

3 Contents and additional options

Description
FORCEMETRE Bracket 50N
Shim
HMI Control Panel FORCEMETRE
4GB SD Card
Universal Stylus pen for touch screen
Power supply 24VDC, 60W
Power supply cord for CEE devices
SUB-D 15 cord (HMI <-> Bracket)

**FORCEMETER
content
VOH 17.01765**

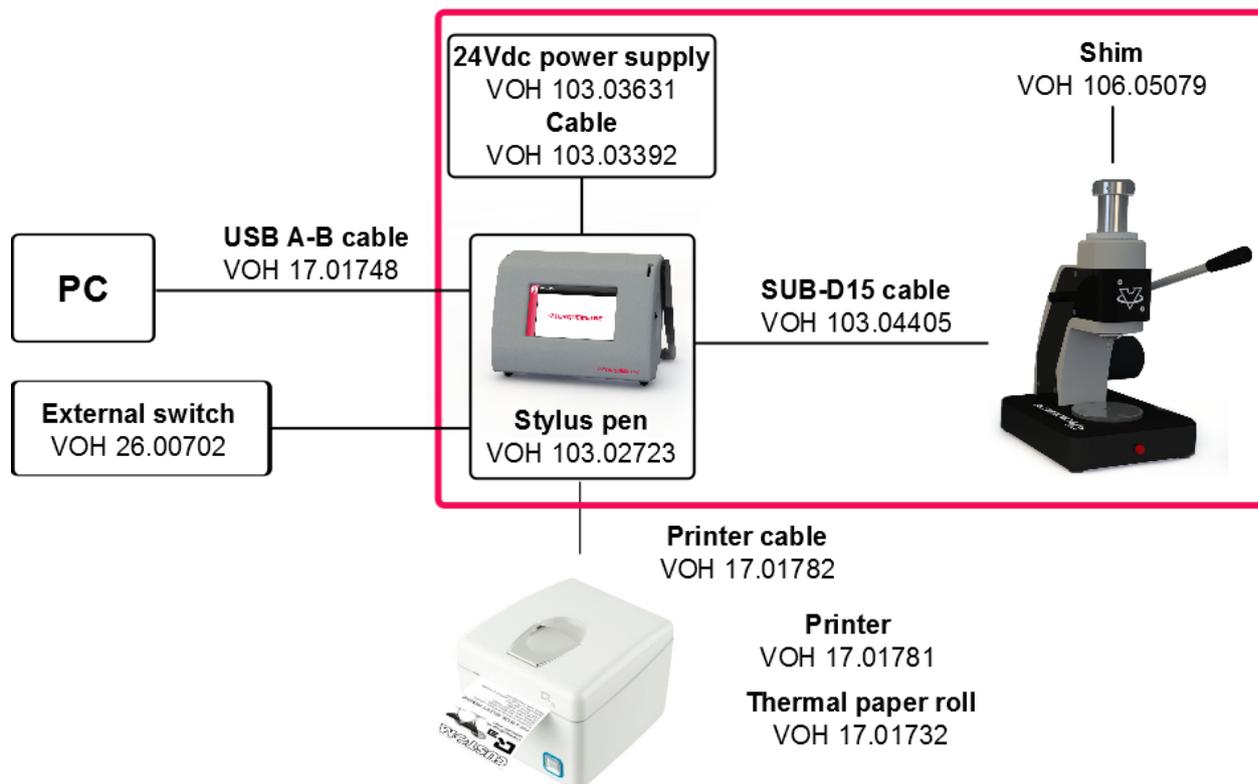


Figure 2: FORCEMETRE and additional devices

3.1 Bracket

The bracket contains the necessary elements to test the combined measurement of force and displacement. The bracket is compatible with Horia cleat \varnothing 4mm.



3.2 HMI Control Panel

The control box or HMI panel allows the control of the bracket, the creation and modification of tests, analysis of test results and the transfer of results to a printer or a computer via serial communication. The control panel can be navigated using a touchscreen, which functions with a stylus (included) or by touching the screen with one or more fingers. A SD reader (card included) allows the User to import and export programs stored in the memory of the HMI control panel, as well as a history of completed test results. The switch on the right side of the box powers the system.



Figure 3: HMI FORCEMETRE

3.3 HMI Panel connectors

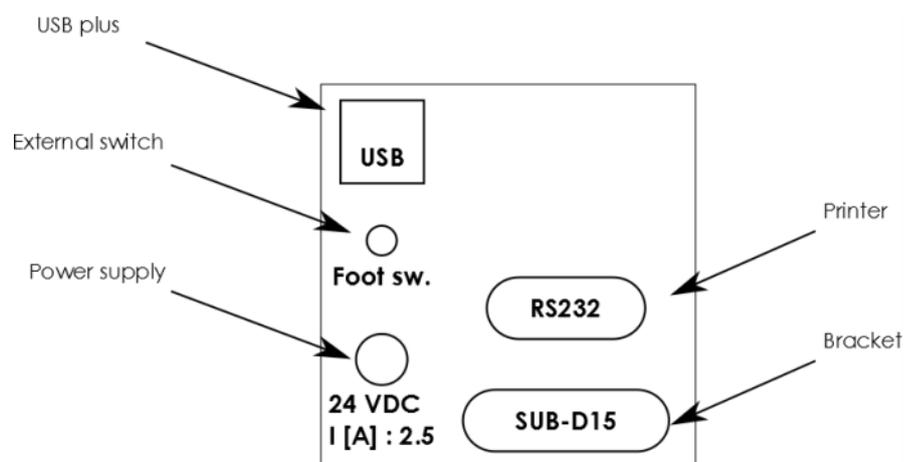


Figure 4: HMI FORCEMETRE connectors

4 Start up procedure

To begin using the FORCEMETRE

- 1) Plug the bracket into the HMI using the sub-d15 cable provided.
- 2) Plug the power supply 24VDC, 60W to the HMI.
- 3) Turn on the switch located on the right side of the HMI.

Options:

- Connect the Q3 printer using the provided cable to the RS232 port (printer and cable not included)
- Connect the external push button on the Foot sw. (external push button not provided)
- Connect the HMI to a PC using the USB A-B (not included)

5 User Interface (HMI)

The HMI facilitates the overall navigation and control of the FORCEMETRE. The potential functions of the aforementioned device, and the guidelines for their practical application are detailed below:

5.1 Functions

The FORCEMETRE functions using a three-tier system of access:

- User: open access
- Administrator: password protected access
- SAV: password protected access

The diagram below depicts the basic functions of the device.

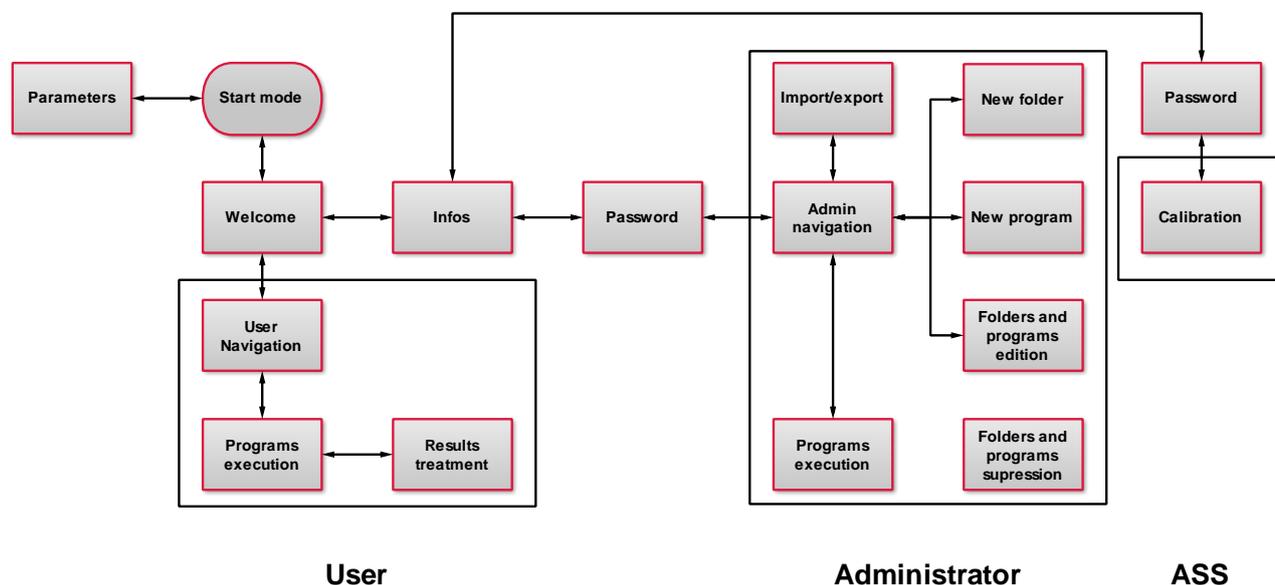


Figure 5 : Diagram of general functions of the HMI FORCEMETRE

5.2 Device settings

To access device settings, it is necessary to click on the Settings icon while the device is booting.

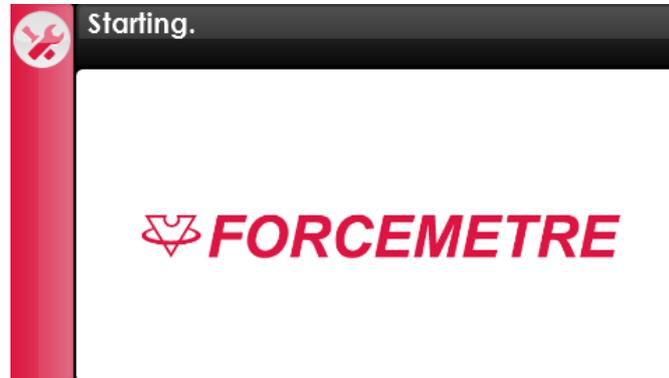


Figure 6: Screen during booting (settings icon at top left)

From the settings screen, Users can modify language, date and time, as well as change the password for Administrator Mode.

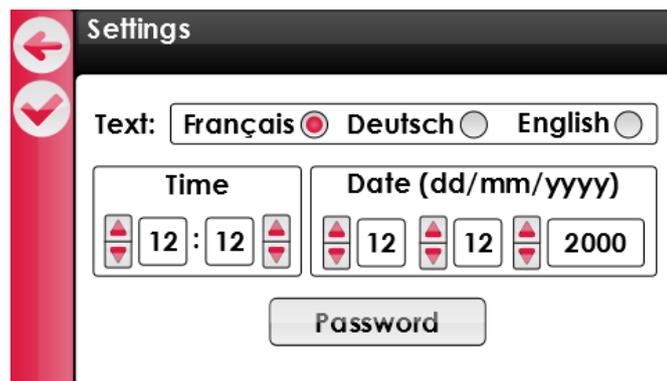


Figure 7: FORCEMETRE Settings

5.3 Welcome screen

5.3.1 Administrator Mode access

Once the FORCEMETRE has completed booting, a home will appear. Touch the information icon to access Administrator Mode. Touch anywhere else on the screen to access basic User Mode.



Figure 8: Home screen (information icon at top left)

To sign in to Administrator Mode, first select the information icon. A selection of information relative to the different functions of the device will appear on the screen. Select the Administrator Mode icon to access the password login screen.

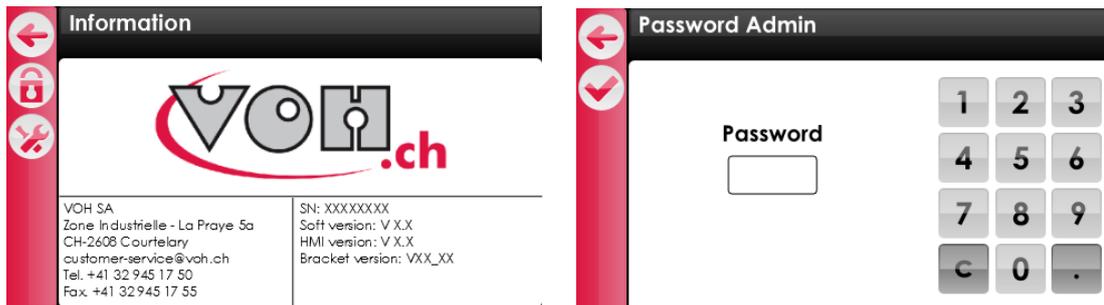


Figure 9: Administrator Mode access

Icon	Name	Function
	Administrator	Access Administrator Mode
	SAV	Access SAV Mode (VOH only)

Default password for Administrator Mode: 1234

SAV Mode access is reserved for VOH.

5.4 Administrator Mode

Administrator Mode permits the User to create, manage, and import/export folders or existing tests. An example of typical navigation in Administrator Mode is presented below:

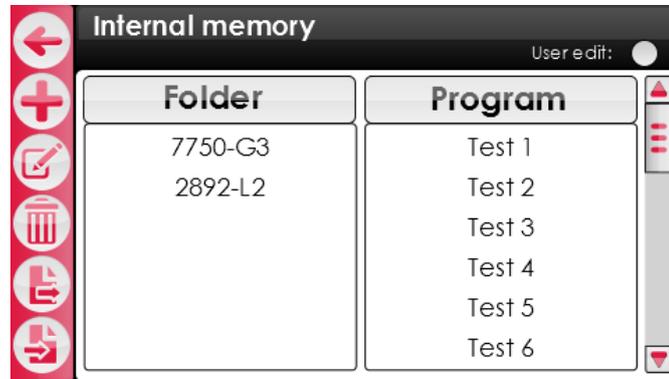


Figure 10: Administrator menu

All icons related to the functions of the FORCEMETRE are located on the column on the left-hand side of the screen.

Icon	Name	Function
	Back	Return to the previous page
	Add	Create a new folder (if the folder column is selected) / Create/Add a new program if a specific folder is selected
	Edit	Edit the name of a folder, or selected test
	Trash	Delete a folder/file or selected program
	Export	Export file(s)
	Import	Import file(s)
	User edit	Activate test edition in User mode

Additionally, it is possible to regulate and authorize certain capabilities for the modification of programs within the User Mode with the « User-Edit » button, located on the top-right of the screen. If the button is activated (red), the User can modify settings within the program they are currently using.

To navigate, a simple click on the « dossier » or « Folder » permits the User to select and view the programs it contains. The selected column will appear red.

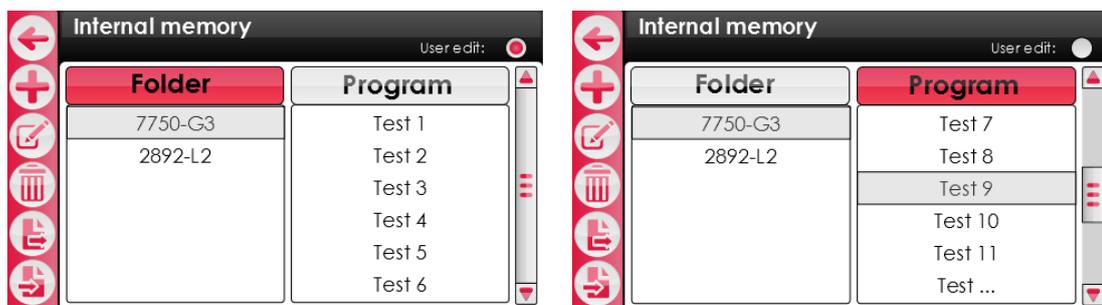


Figure 11: Selecting folders and programs

To launch a test in Administrator Mode, double-click on the program to bring it up onto the screen.

5.4.1 Creating and editing files

To create a new folder, first click on the top of the column « dossier » and the header will appear highlighted in red. Warning! If a specific folder and not the entire column is selected, the device will propose to create a program and not a new folder.

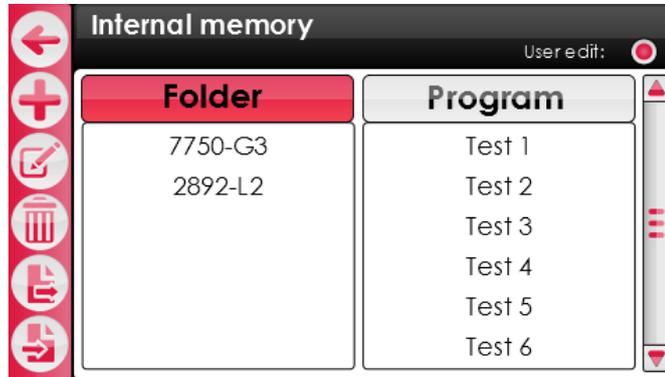


Figure 12: The selected column appears highlighted in red

Once the column has been selected, click on the « Add » button, which looks like a + sign, to introduce a new dossier name. Once you have completed adding the name using the touchscreen keyboard, simply click on the check-mark icon and the dossier has been created.

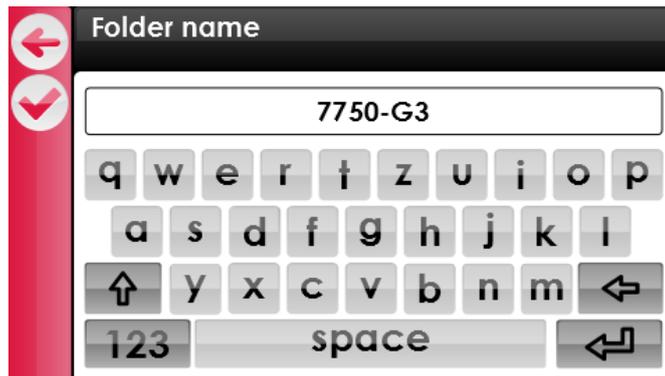


Figure 13: Type the name of your new folder

If an Administrator wants to modify the name of a folder, it is necessary to select the folder in question and push the « Edit » button.

5.4.2 Creating and Editing a Test

In Administrator Mode, first select a dossier, and then click on the « Add » button. This will create a new test. It will then be necessary to name the test.

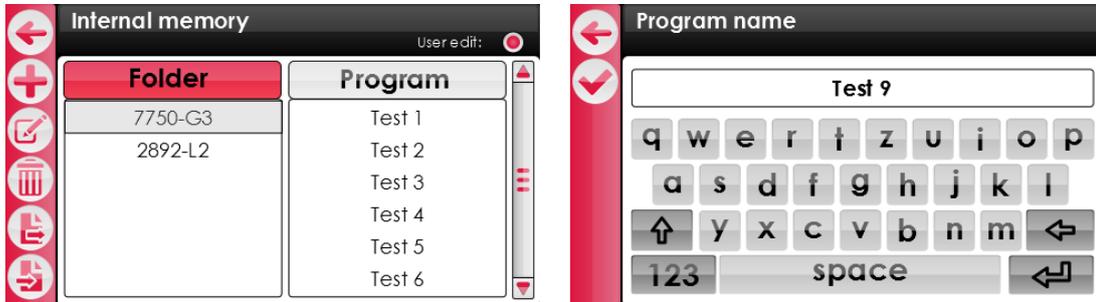


Figure 14: Creating a new test/ Selecting test type

Once the new test has been named and created, the navigation screen will reappear. To edit a test, double-click on the test in question to open it.

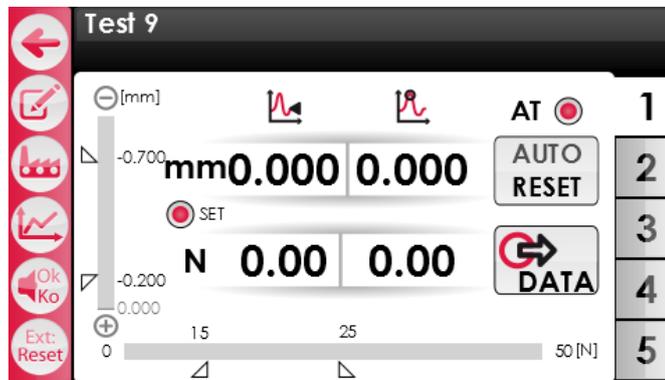


Figure 15: Test programming screen

Each test is composed of 5 sets of settings (the 5 tabs on the right-hand side of the screen) that can be optionally activated. Each of the tabs is individually programmable, making it possible to execute five diverse functions within the same test. To edit the parameters of a tab, select the tab and then click on the « Edit » icon. The following screen will appear.

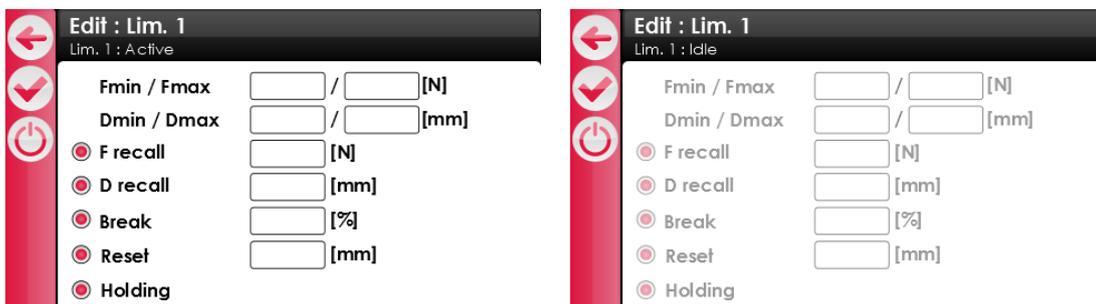


Figure 16: Example of parameters on an active / inactive tab

Icon	Name	Function
	Back	Return to the previous page
	Add	Create a new folder (if the folder column is selected) / Create/Add a new program if a specific folder is selected
	Switch	Enable/disable tab

The possible programmable parameters and functions, and their uses are explained in the below table:

Illustration	Explanation
Fmin / Fmax <input type="text"/> / <input type="text"/>	Input the force tolerance range
Dmin / Dmax <input type="text"/> / <input type="text"/>	Input the displacement tolerance range
<input checked="" type="radio"/> F recall <input type="text"/> [N]	Can be activated or deactivated. When activated, the lever will be pulled back if the force measured exceeds the specified value
<input checked="" type="radio"/> D recall <input type="text"/> [mm]	Can be activated or deactivated. When activated, the lever will be pulled back if the measured displacement exceeds the specified value
<input checked="" type="radio"/> Break <input type="text"/> [%]	Can be activated or deactivated. When activated, it slows the operator's movement. 100% is the maximal brake factor value.
<input checked="" type="radio"/> Reset <input type="text"/> [mm]	Can be activated or deactivated. When activated, the lever is pulled back when the measured value is xxmm above the contact point.
<input checked="" type="radio"/> Holding	Can be activated or deactivated. When activated, the lever is hold in position during an operation.

It is possible to modify test parameters in Administrator Mode, or in User Mode if the « User edit » function is activated.

Distance values are taken from the reference point (point 0.000). This reference is taken when the first contact is detected. In standard mode, this reference is taken for each measure. In SET mode, the reference will be taken once and used as long as the program is active. The limits can therefore be above, below or around the reference.

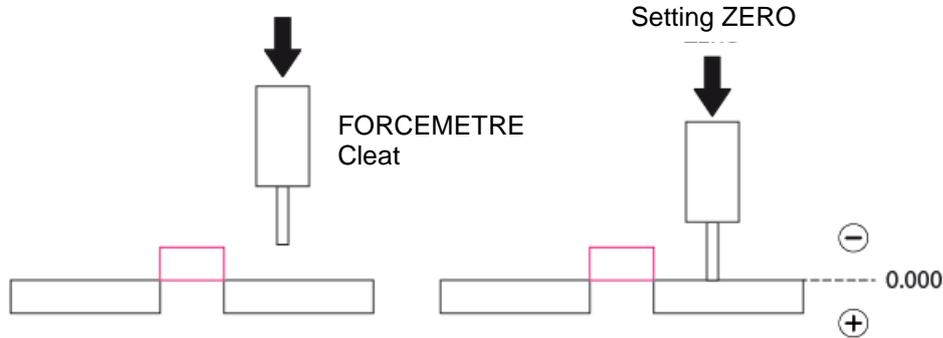


Figure 17 : Reference and sign convention



Figure 18 : Distance limits edition

The SET mode allows the user to set a reference prior to realizing an operation. In order to set a reference, activate the SET radio and follow the instruction displayed on the screen. To save the reference, lower the lever in order to touch the surface you want to use as a reference. Then, pull the lever up. The reference is then saved and the FORCEMETRE is to be used normally.

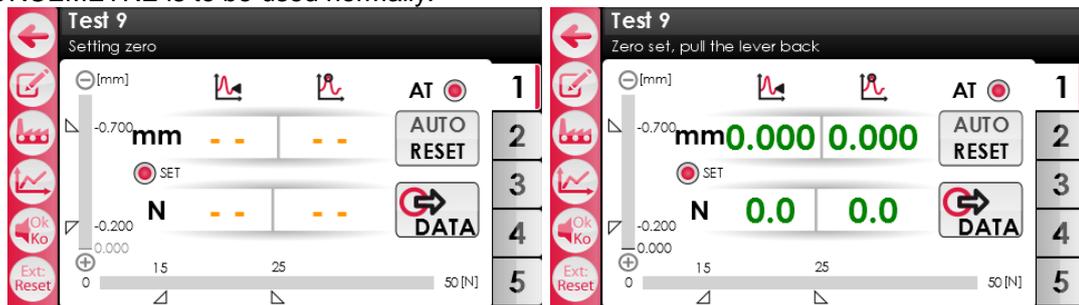


Figure 19 : Zero point setting in SET mode

Note:

The reference (or zero point) is saved as long as the program is active. When the user quits the program, the reference is erased.

A more detailed description of the test functions can be found in paragraph 5.5 of this User Guide.

5.4.3 Export/Import of Programs

The FORCEMETRE HMI offers the possibility to Users running Administrator Mode to import and export folders, and transfer them from one device to another. The buttons for import and export are located at the bottom left-hand side of the screen.

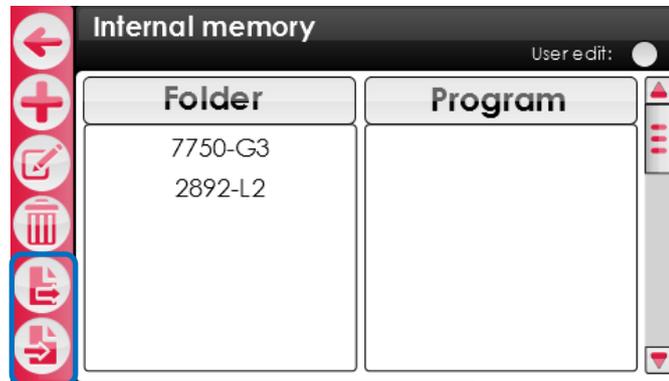


Figure 20: Export/Import buttons, bottom left

By selecting one of the icons, it is possible to import or export complete folders. To import or export a file, click first on either the « Export » or « Import » icon, then select the dossier(s) to transfer. Then, click again on the « Export » or « Import » icon located on the left-hand column.

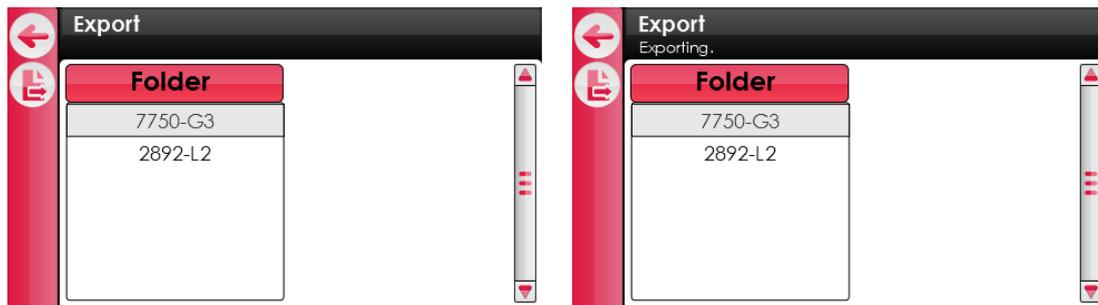


Figure 21: Exporting a folder

During the export/import of a folder, the message « Export en cours... »/« Import en cours... » will appear in the black header at the top of the screen. When the operation is complete, one touch on the back icon will permit the User to return to the main menu. The selected folder(s) will have been copied onto the external SD card (export) or to the internal memory of the device (import). The SD card is located on the left-hand side of the HMI control panel, and can be removed and inserted into another HMI FORCEMETRE to share the folders and programs.

5.5 Test screen

The test screen will appear the same in Administrator mode as in User mode. The available functions are also identical as long as « User Edit » is activated. Access to tests in both Administrator mode and User mode takes place using the following menus.

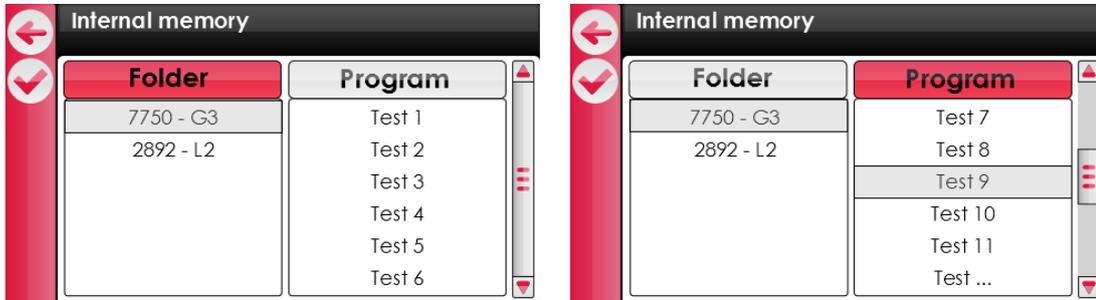


Figure 22: User/Administrator Menus

It is possible to open a test in two different ways. Either, the User taps two times on the test in the Programs column, or the User can select the desired test, and touch the check mark on the left of the screen. In User Mode, the test screen appears as follows:

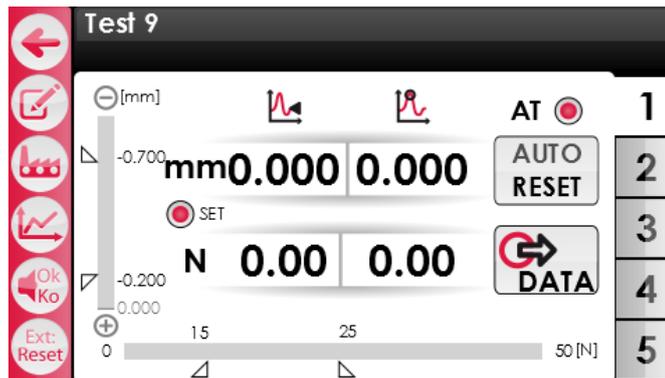


Figure 23: Test screen

The icons situated on the left sidebar propose the following functions:

Icon	Name	Function
	Back	Return to the previous page
	Edit	Edit the parameters of the open/selected tab
	Switch mode	Switch between Production Mode and Control Mode
	Graph	Display the graph of the most recently completed operation
	Switch buzzer	Select the buzzer's function 1) Signal when the minimal force is reached and when $F_{\text{measured}} > F_{\text{max}}$ 2) Signal when $F_{\text{measured}} > F_{\text{max}}$ 3) No signal
	Switch ext	Select the external switch function 1) Reset 2) Change tolerance 3) Send data
	Auto-Reset Auto-Tol	AR: Activate auto-resent in Control Mode. When the lever rises, the measurements will reset to zero. AT: Activate auto-tol in Production Mode. When the lever rises, the consequent tolerance is displayed.
	SET mode	Activates the SET mode

The following information will also be displayed during the operation:

Illustration	Explanation
	Display of force measurements (inferior) and displacement (superior). The left-hand column corresponds to the instantaneous value, whereas the right-hand column corresponds to the maximum value measured during the test.
	Display of displacement and force measured during the operation with graphs. The specified tolerances are also shown on both axes. The bar graph uses colors in function of the operation results. <ul style="list-style-type: none"> : Tolerance not attained : Tolerance attained : Tolerance exceeded

The status of the test will be determined based on the measurements of force and displacement relative to the specified tolerances. The conditions will result in a status of OK or KO:

Force		
$F_{\text{measured}} < Tol_{\text{min}}$	$Tol_{\text{min}} < F_{\text{measured}} < Tol_{\text{max}}$	$F_{\text{measured}} > Tol_{\text{max}}$
KO	OK	KO

Displacement		
$D_{\text{measured}} < D_{\text{min}}$	$D_{\text{min}} < D_{\text{measured}} < D_{\text{max}}$	$D_{\text{measured}} > D_{\text{max}}$
KO	OK	KO

		Force status		
		KO	OK	KO
Displacement status	KO	KO	KO	KO
	OK	KO	OK	KO
	KO	KO	KO	KO

5.5.1 Control Mode and Production Mode

The FORCEMETRE has two distinct modes while working with tests. The Control Mode and Production Mode. The specificities and differences of these two modes will be presented in this section.

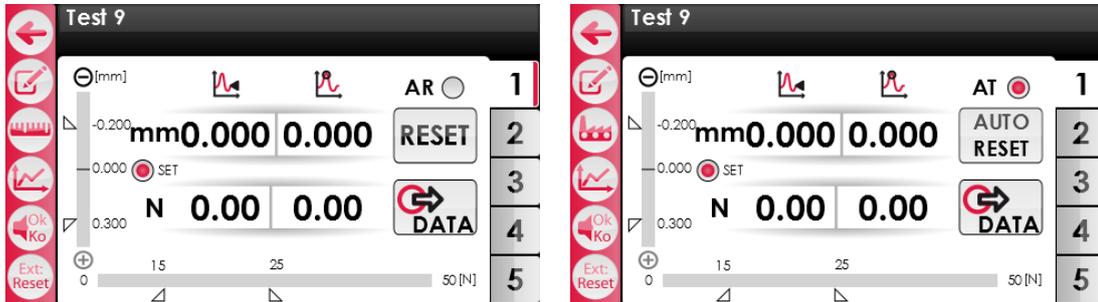


Figure 24: Control Mode and Production Mode

When operating in Control Mode, the User must choose to activate or deactivate Auto-Reset (AR). When activated this function enables the automatic reset to zero of measured values when the lever is raised to its initial position. Please note that the execution of an auto-reset will send data to PC and printer. It is no longer possible to display graphs of completed operations once auto-reset has been engaged.

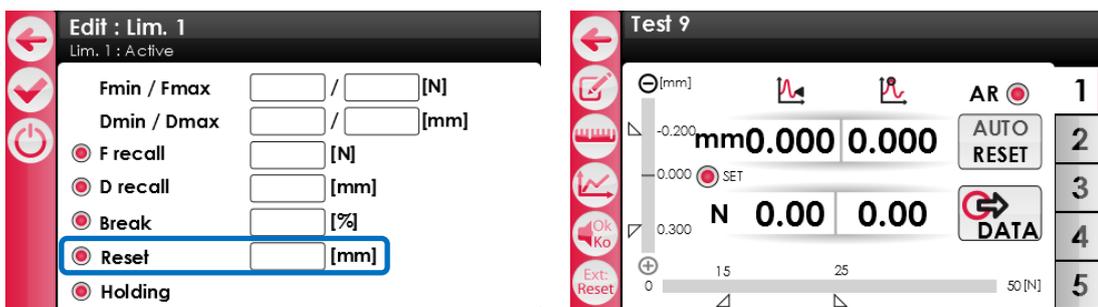


Figure 25: Parameter Reset activated and AR activated

When operating and Production Mode, the User can choose to activate or deactivate the automatic tolerance change (AT). When activated, (and the Reset tab is also activated) tolerance change will occur in sync with the resetting to zero of values when the lever is raised. It is important to note that in Production Mode, Auto-Reset is systematically present. Consequently, it is not possible to display graphs in Production Mode if the Reset is activated in the Settings tab.

The FORCEMETRE can be connected to a ticket printer (custom Q3 VOH 17.01781). The tickets are then printed either by:

- 1) By pushing on the DATA icon, following the completion of a measurement when Auto-Reset is deactivated—the information will also be sent to the SD card.
- 2) Automatically following each completed measurement (when Auto-Reset is active) the data will be sent to the SD card.



The printed tickets appear as such:

Date : 21.03.2013
SN potence : xxxxxxxx
EM : xxx
Programme : Nom du programme
Tol.1:xx-xx [mm] / xx-xx [N]
Tol.2:xx-xx [mm] / xx-xx [N]
Tol.3:xx-xx [mm] / xx-xx [N]
Tol.4:xx-xx [mm] / xx-xx [N]
Tol.5:xx-xx [mm] / xx-xx [N]

Tol.	Val. [mm]	Val. [N]	OK/KO	Heure
1	001	25	KO	09:52
2	001	30	OK	09:54
3	001	40	OK	09:56

Signature opérateur :

5.5.2 Displaying Graphs

The FORCEMETRE is designed to produce graphs summarizing the executed tests (as long as no reset / auto-rest has been made).

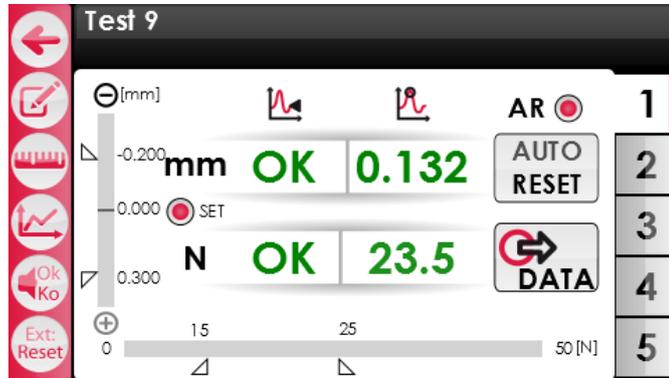


Figure 26: Measurement complete

Once the measurements have been completed, the status of the measurements of displacement and force (OK/KO) will appear in the instant value fields. To bring up a graph of the completed operation, a User must simply press on the graph icon on the left.

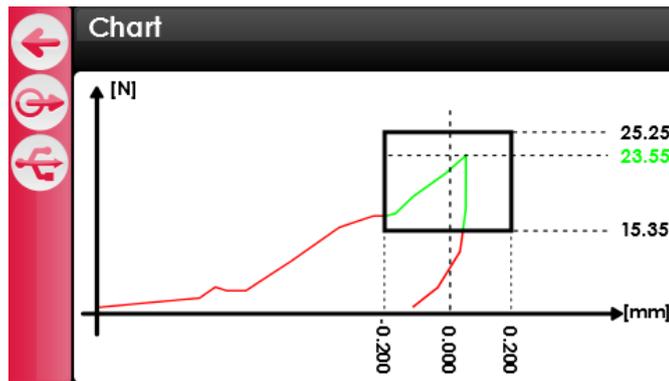


Figure 27: Chart sample

The chart displays displacement on the X axis and strength on the Y axis. The limits are displayed as a black window. The strength/displacement characteristic is plotted in red if outside of the limits window and green if within the limits window. The maximal strength value is displayed on the right hand side (green if within the limits/red if outside the limits).

The USB icon () allows the user to transfer the chart DATA to a computer (through a USB cable and serial connection). The data can be used to generate the chart. Details of the transfer procedure can be found in the section 5.6 Transfer of information via USB. The chart DATA can also be saved onto the external SD card by pressing the DATA button (.

5.6 Transfer of information via USB

To transfer results onto an external support or drive, the process is detailed for you below :

- Download PuTTY.exe (<http://the.earth.li/~sgtatham/putty/latest/x86/putty.exe>)
- Start PuTTY.exe

NOTE : No installation is necessary to use putty.exe

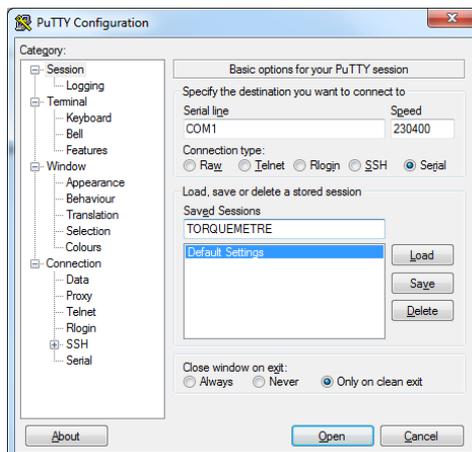
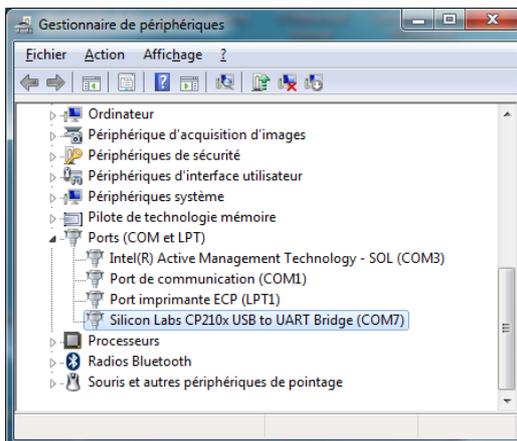


Figure 28: PuTTY.exe

- Select « Session » in the left-hand column
- Select « Serial » on the right part of the window
- In the field « serial line » enter the details of the COM port which the VISIOTEST is connected: in the peripheral device management (configuration panel -> system -> material), search for « Ports (COM and LPT) » and then « Silicon Labs CP210x USB to UART Bridge (COMxx) -> the xx and the port COM number, 7 in the below example:



- In the field labeled « Speed » enter 230400
- Select « Serial » in the left-hand column

The following screen appears:

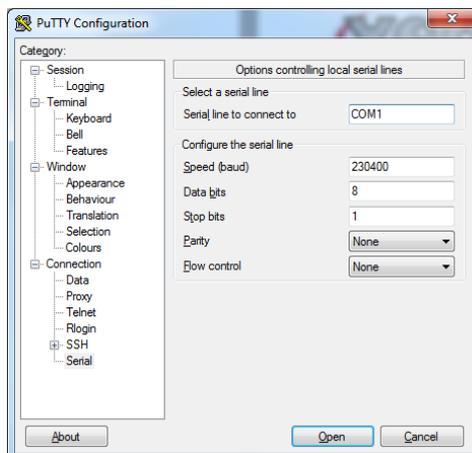
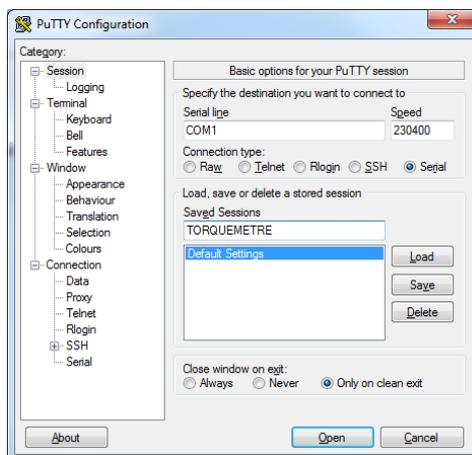


Figure 29: Configuration of the serial port

- Enter the following parameters: Speed 230400, Data bits: 8, Stop bits: 1, Parity: none, Flow control: none. NOTE: the serial port number (here in the example COM1) may vary.
- Return to Session (left hand column). Select « Serial » on the right side of the window
- It is also possible to save the configuration, by naming it and clicking SAVE
- To activate the serial port, and/or configure it, simply click on « Open ».



aFigure 30: Save configuration

5.7 Error messages and Troubleshooting

N°	Observed effect	Solution
1	The bracket is not responding	Hold down the bracket's reset button for 5 seconds, and then push quickly a second time.
2	HMI Control panel not responding	Shut down and restart.

6 Exclusion of responsibility and/or guarantee

Damages provoked by use, transport, or storage not in accordance with the specifications described in this guide will not be included in the guarantee from the manufacturer. Any modifications of the device, and/or opening of the machine are forbidden and immediately negate the guarantee. The guarantee expires when it is evident the fault is with the User, and not a fault in manufacture.

7 Representation/Distribution

