FENIX 300 SERIES

Rockwell | Brinell | Universal Hardness Testers

USER **MANUAL**

INNOVATEST®
Advanced Hardness Testing Solutions

USER **MANUAL**

FENIX 300 SERIES

Rockwell | Brinell | Universal Hardness Testers

Thank you for buying this advanced INNOVATEST® hardness testing instrument.

The product meets the applicable DIN, ISO-EN, ASTM and JIS standards.

Products and/or product specifications can change due to new technologies and continuous development.

We reserve the right to change or modify specifications of products without prior notice.

INNOVATEST Europe BV assumes no responsibility or liability for any errors or omissions in the content of this instructions.

Please contact our sales office for up-to-date information.

INNOVATEST Europe BV
Borgharenweg 140
6222 AA Maastricht
The Netherlands
Phone: +31 43 3520060
Fax: +31 43 3631168
info@innovatest-europe.com

Date of release : October 2020
Document number : UMF300 Version 01 (Original Instructions)

Read the “User Manual” thoroughly before usage, and properly operate the product.
In order to use the product safely, do not ignore visual cautions, warnings or safety symbols.

Please refer to the limited guarantee and responsibility issues in the INNOVATEST® guarantees conditions.

Table of Contents

1 INTRODUCTION

This user manual contains essential information for the operator to make (safe) use of the hardness tester. This manual includes a description of the system functions, capabilities, safety provisions and instructions for the further life cycle of the machine.

1.1 GENERAL INSTRUCTIONS

⚠ WARNING

Before using, servicing or transporting the machine, read the "Safety chapter" of this manual thoroughly. In case of doubt, the manufacturer should always be consulted.

The user manual contains important warnings to use the **FENIX 300** series (model **300RS**, **300XL**, **300U, 300RS-IMP**) also referred to as **"machine"** hereinafter, safely, professionally and economically. By following this information, hazards can be avoided, repair costs and downtime can be reduced and the reliability and service life of the machine can be increased.

The user manual must always be accessible and available to the user. Always keep a copy of this manual with the machine! Before you work with the machine or carry out any maintenance or repairs, you must first read the relevant chapter of this manual completely.

Text indicated as following: **"EXAMPLE"**, refers to a button or selector in the hardness testing software.

1.2 TARGET GROUPS

The **user / owner** is, as legal person, responsible for the intended use of the machine and for the training and deployment of the authorized persons. The user/owner keeps a record of qualifications and competences of these authorized persons.

Professional is a person who, based on their professional training, knowledge and experience, is able to assess the assigned tasks and is able to identify possible hazards. Furthermore, they are aware of the applicable standards and conventions. The competence level of persons and therefore the qualification assessment is done by the user/owner.

Educated / trained person is a person who has been trained in the assigned tasks and the possible hazards concerning improper use. Furthermore, this person is aware of the implemented protective devices and safety measures. The competence level of persons and therefore the qualification assessment is done by the user/owner.

Assembly, disassembly, maintenance and repair may only be carried out by **professionals**. Normal use can be carried out by **educated / trained persons**. The legally permissible minimum age is to be observed.

1.3 LIABILITY AND DISCLAIMER

All indications and instructions for operation, maintenance and repair are given with due regard to our current experience and insight. The original of this user manual was written in the English language and checked by INNOVATEST® in terms of content. This user manual has been compiled with the utmost care. Should you nevertheless detect imperfections and / or errors, we ask you to inform us in writing. Your suggestions are well appreciated and will help us to improve the manual in the future.

1.4 REORDER

This user manual will be supplied as an electronic copy. Also, a hard copy can be ordered, please note that there are costs associated with hard copies of this manual. A hard copy can be reordered at the address below:

INNOVATEST Europe BV
Borgharenweg 140
6222 AA Maastricht
The Netherlands
+31 43 3520060
www.innovatest-europe.com

1.5 COPYRIGHT

1.6 INTENDED USE

The intended use of the machine is the hardness testing of products. The machine is to be used in an industrial or laboratory setting. The machine is intended to be used by non-disabled trained full aged people. The machine may only be operated as described in this manual. The manufacturer is not liable for the damage caused by incompetent use (unintentional use). Only use the machine when it is technically in good working order and use it according to the intended use, paying attention to the safety and potential hazards referred to in this manual.

- Manufacturer responsibilities expire when:
- Not or insufficiently complying with the information in this manual.
- Using spare parts or parts not approved by the manufacturer.
- The machine is operated incorrectly.
- Removing, manipulating or not using safety features.
- Changing functions of the machine.
- Unauthorized modifications to the machine are applied.
- Maintenance is not carried out according to instructions.
- The machine is used unintentional.

1.7 IMPROPER USE

Dangers and hazards can occur due to unintentional or improper use of the machine. The limits stated in the documentation may not be exceeded under any circumstances.

1.8 LAYOUT OF THE USER MANUAL

This FENIX 300 series user manual may only be used with INNOVATEST® equipment covered by this user manual. This complete user manual consists of:

- This FENIX 300 series user manual.
- Hardness testing software user manual:
  (FENIX 300RS/U/XL): I-TOUCH user manual
  (FENIX 300RS-IMP): IMPRESSIONS LT user manual
- FENIX 300 series unpack instruction (attached to the packaging).
- Declaration of Conformity.

2

DESCRIPTION AND FUNCTION

FENIX 300RS, 300XL and 300U

The FENIX 300 series hardness testers offer utmost quality and durability. The hardness tester main body is constructed around a rigid C-frame made out of massive steel bars. Due to the amazing workpiece height of 470 mm, the FENIX 300XL provides many application options.

The FENIX 300U model is the Universal version, very convenient for the user that does not would like to change the testers set-up for testing one part with different methods. All models have been developed for use in general metal workshops, laboratories, schools, universities and for industries that use hardness testers on a regular basis during an 8 hours shift.

FENIX 300RS-IMP

The IMP version of the FENIX 300RS combines the excellent force application and measuring system with an advanced machine controller running on Windows 10. Make connection to your network by WIFI or LAN, connect to a printer, a Quality system or MS application; the IMPRESSIONS™ LT system offers great flexibility.

2.1 IDENTIFICATION

This manual belongs to the FENIX 300 series.
The type / identification plate with the CE mark is placed on the back of the machine and is shown in the following figure:

3
SAFETY

A first requirement for the safe handling and trouble-free operation of this machine is knowledge of the basic safety instructions.

Throughout this manual, warnings, cautions and notes have been used to direct the attention to:

- Potentially hazardous or dangerous situations.
- Actions that could lead to potentially hazardous or dangerous situations.

Definitions

WARNING:
Situation, operation or action that could potentially harm the professional or educated/trained person (operator) or lead to potentially dangerous situations for the professional or educated/trained person (operator).

CAUTION:
Situation, operation or action that could damage the machine.

NOTE:
Text with higher priority than plain text but not being a warning or caution.

3.1 USED SYMBOLS

The following symbols are used on the machine or in this manual:


This symbol indicates a **WARNING** or **CAUTION**.


This symbol indicates hazards that could be dangerous for the environment.


This symbol indicates an electricity hazard


This symbol indicates that for disposal certain regulations must be considered.
All electrical and electronic products and batteries must be taken to a separate collection point at the end of their working life. Do not dispose of these products as unsorted municipal waste: take them for recycling. For information on your nearest recycling point, check with your local waste authority.

3.2 FUNDAMENTAL SAFETY REQUIREMENTS

WARNING
The machine complies with the essential health and safety requirements of the EC. Nevertheless, dangerous situations can arise.

1. To ensure safety, all persons who come into contact with the machine must take note of the contents of this user manual. Only then possible risks can be reduced to a minimum.
2. It is not allowed to use the machine for any other purpose provided by the manufacturer. Unintended use can lead to unexpected risks.
3. Local applicable safety regulations and laws must always be followed. The same applies to environmental regulations.
4. If the personnel detect any errors or dangers, the user/owner or his authorized representative must be informed immediately.
5. When several people are working on the machine, good cooperation and precise coordination is necessary.
6. The professional knowledge and sense of responsibility of the employer and the employee largely determine the safe and efficient use of the machine.
7. Safety devices, such as protective covers/safety switches, must never be removed or bridged during normal use of the machine.
8. If disassembly of safety devices during installation, inspection, maintenance or repair is necessary, the reassembly and inspection of the safety devices must be done immediately after the completion of these activities.
9. Work on the technical equipment (e.g. electrical) may only be carried out by the relevant professional personnel.
10. When handling oils, greases and other chemical substances, the safety regulations applicable to that product must be observed! Contact with chemicals should be avoided as much as possible. Before working with these materials, the instructions on the package must be read and followed. This applies to all chemicals, including cleaning agents.
11. When handling electric motors, be aware these can get warm during use. Let the motors cool down before you work on them. If this is not possible, appropriate safety measures should be taken, for example the use of gloves.
12. Untrained persons or persons present during a general training, may only perform work under the permanent supervision of a competent person.
13. All safety and hazard warnings on the machine must always be kept in a legible condition.
14. Hot parts should not come into contact with explosive or highly flammable chemicals.

3.3 SAFETY PROVISIONS

⚠ WARNING
All safety provisions must be kept in perfect condition.

3.3.1 SAFETY DEVICES

Safety devices may in principle only be removed/deactivated by authorized persons and only if this is absolutely necessary. Immediately after carrying out this work, the safety devices must be mounted/activated again and checked for their functionality. Only the original fixing material of the safety devices may be (re)used for this purpose.

3.3.2 EMERGENCY STOP

Emergency is a situation of (potential) danger to a person or the machine.
In an emergency, one of the emergency stop devices must be operated, causing the machine to stop immediately. In all other cases, the machine must be switched off in a normal way.

One major emergency stop device is:
- Manually operated
- Red/yellow in color
- Located at the front of the machine, in reach for the operator.

When activating the emergency stop devices, the following functions or machine parts are affected:
- All electrical components are disabled.
- All motorized drives: stop moving.
- Lights may be kept on.

To reset the emergency stop, turn the emergency stop button until it unlocks.
When resetting the emergency stop devices, only the following functions or machine parts will be switched on:
- Motorized drives: only manual control enabled.
- Lights on.

By using an emergency stop, under certain circumstances, an undefined (switched-off) condition can occur. Therefore, the machine must be checked before a restart. Before the machine can be started permanently, the emergency stop device must be reset.

3.3.3 FIXED GUARDS

The fixed guards on drives such as a belt drive, chain drive and gear drive are fitted with fasteners. These safety features prevent contact with these moving parts and therefore protect against severe injuries.
Removing fixed guards or operating the machine without these guards is not permitted!

4 INSTALLATION

For the execution of the activities described in this chapter, qualified persons with relevant professional knowledge are required. The machine must always be easily accessible, in a way that operation, maintenance and troubleshooting can be carried out easily and safely.

The required space must be considered, as indicated in the chapter **"10 technical specifications"**.

For detailed unpacking instructions refer to the dedicated unpacking instruction.
After unpacking, store the original packaging. Avoid shipping or transporting the machine without the complete and original packing materials.

Install the machine according the conditions described in this chapter in order to make full use of its functions and performances and to avoid defects or inaccuracy of any kind.

4.1 LIGHTING

The machine may only be used in an environment where sufficient lighting is available, in accordance with the ergonomic regulations.

4.2 VIBRATION

NOTE: *Vibrations reaching the machine can result in inaccurate measurements in particular during low force Hardness tests.*

To avoid unwanted vibrations reaching the machine, the following points must be considered:

- Install the machine in a place free from floor vibrations.
- Install the machine on a solid work bench.
- Do not install the machine in a place where many people come and go.
- Do not install the machine near equipment generating vibrations.
- Install the machine on ground level of a building if possible.
- Do not install the machine in a building near a road with heavy traffic.
- Do not install the machine in a building where a crane, vibration generator or similar equipment is installed.

4.3 WIND, SOUND AND HUMIDITY

To avoid environmental factors such as wind, sound and air humidity affecting the hardness measurement, the following points must be considered:

- Do not install the machine near an air conditioner or similar equipment.
- Do not install the machine in a room with excessive air circulation.
- Do not install the machine near an entrance or an exit.
- Do not install the machine near sound generating equipment.
- The ambient temperature should be between 10 °C and 35 °C.
- The recommended ambient temperature is: 23 ± 2 °C.
- The relative humidity in the room should be ≤70% ± 10%.

4.4 WORKBENCH

Place the machine on a sturdy and stable workbench, cabinet, desk or table which can carry the weight of the machine. For the weight and installation area needed see the **technical specifications** of the machine.

⚠ CAUTIONS

When carrying or moving the machine, make sure not to hit any objects and the machine does not tilt by 30 degrees or more.

When carrying or moving the machine, make sure you do not touch the indenter holder.

4.5 INSTALLATION

Before starting the installation, please check the following:

- The assembly and/or mounting of machine parts.
- Electrical connectors on the machine.
- The supporting surface has to be distributed evenly along all supporting points, avoiding critical tension.

⚠ WARNING

In case of doubt, the manufacturer should always be consulted.

4.5.1 LEVELING

The machine is equipped with a unique load application system which is not sensitive for incorrect leveling. Nevertheless, to eliminate possible wear and tear of the mechanical structure of the machine we advise to verify your machine is correctly leveled.
Your machine is standard equipped with 4 adjustable vibration dampers.
Install the dampers on the machine, if not installed yet, and use a correct tool to adjust the height of each damper.

Adjustable vibration damper

4.5.2 ELECTRICAL CONNECTIONS

This section describes the correct way of connecting electrical components of the machine.

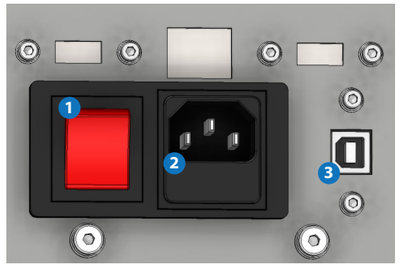
⚠ CAUTION

Make sure that the power requirement of the machine is in compliance with the local power mains to which the machine will be connected. The voltage details can be found on the reference label on the back of the unit.

⚠ WARNING

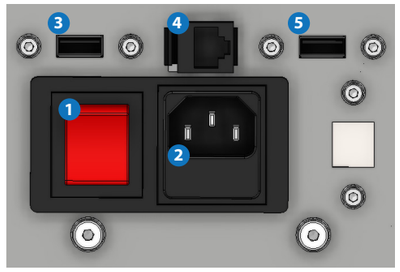
Connecting your machine to an incorrect main power supply could cause severe damage to the machine and could create fire.

4.5.2.1 FENIX 300RS/U/XL



1. ON/OFF Power switch
2. Fuses
3. USB B (for data transfer to a PC)

4.5.2.2 FENIX 300RS-IMP



1. ON/OFF Power switch
2. Fuses
3. USB A 3.0 (BIOS camera)
4. UTP Network Connection
5. USB A 2.0 (Bluetooth, USB Stick, Wireless keyboard/mouse)

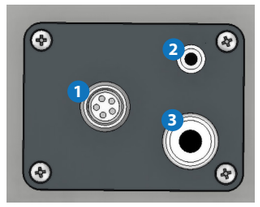
4.5.3 INSTALLATION OF VISUALS

4.5.3.1 (FENIX 300U) ELECTRONIC EYEPIECE

The eyepiece microscope can be found in the accessory box. Please handle this part with care as it is a sensitive part of the machine. Remove the lens tube protection cover. Gently insert the eyepiece optical tube in the lens tube of the tester.

While inserting the eyepiece move the eyepiece gently, without excessive friction, around its center position so that it fits without using force. Leave the eyepiece in a horizontal position and move it to a vertical position. Turn the eyepiece several times around its center and leave it in a horizontal position with the data cable coming out on the right side.

Connect the eyepiece cables to the connectors on the left side of the tester



1 = Digital eyepiece connection
2 = Object light connection
3 = Ring light connection

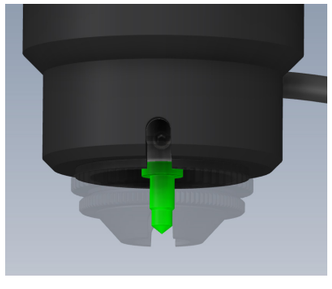
4.5.3.2 (FENIX 300RS-IMP) BIOS

The Brinell Indent Optical Scanner can be found in the accessory box. Please handle this part with care as it is a sensitive part of the machine. Connect the BIOS to a free USB A 3.0 connector on the back of the tester.

4.5.4 INSTALLATION OF INDENTERS

The FENIX 300 can be equipped with pre-installed indenters, following customer's needs.
Indenters for this machine have specific dimensions and quality approvals. Replacing the indenters by non-genuine indenters (non INNOVATEST®) can lead to severe damage to the machine (which is not covered by guarantee). Always use original INNOVATEST® parts.

NOTE: I*f a clamping nose is installed, then first remove it, to be able to access the indenter holder screw. When using a large indenter, it may be needed to use the larger (optional) clamping nose, see chapter* **"5.1.1 Clamping devices".**



Use a soft cloth to wipe any dirt or debris from the indenter holder or shoulder. The shank surface must face the screw hole in the indenter holder when being inserted. Insert the shank into the holder, entirely and securely. Before testing a specimen, install an anvil and run a test on a test block to securely seat the indenter.

4.5.5 INSTALLATION OF ANVILS/CLAMPS/FIXTURES/VICES/SAMPLE HOLDER

An anvil supports the specimen during a hardness test. Use a V-type anvil for cylindrical specimens. Use a flat type anvil for flat specimens. Please make sure to use the appropriate anvil.

The anvil can be installed as following:

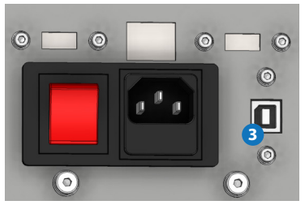
- Be sure that there is enough room between the indenter and the spindle, to install the anvil.
- Use a soft (fiber-free) cloth to wipe any dirt or debris from the mat surfaces of the anvil and spindle.
- Carefully place the anvil into the spindle.
- Before testing a specimen, perform a few hardness tests on a test block, to securely seat the anvil.

4.6 BASIC SETTINGS

It is not allowed to modify settings without the written permission of the manufacturer. In addition, program changes (software) of programmable control systems are not allowed. Should, after agreement, changes be necessary, they must be done by a qualified professional.

4.6.1 (FENIX 300RS/U/XL) INSTALLATION OF DATA THE OUTPUT OPTION

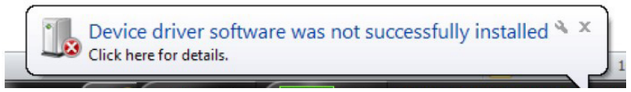
It is possible to connect the machine to a PC and transfer measurement data to the PC, on which the data can be ported to Excel. Hereinafter a description will follow on "how to set-up the machine" for this purpose.



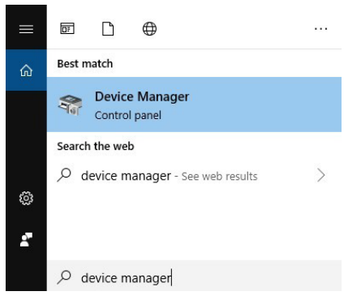
3 = USB-B port (for data export)

Installing software drivers

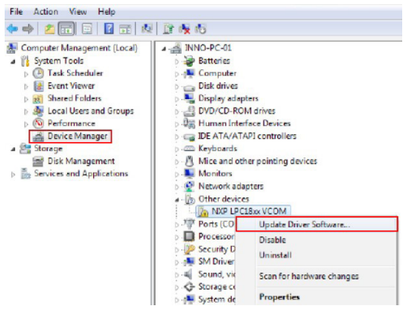
Connect the machine to a PC with a USB B cable.
Use the USB B connector on the back of the machine.



Windows will try to automatically install the drivers and show the progress in a balloon. However windows will not be able to find the correct drivers automatically.



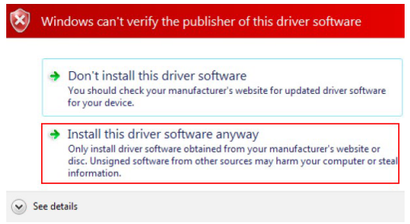
In windows® open the search bar and type:
"DEVICE MANAGER". Double click on the device manager.



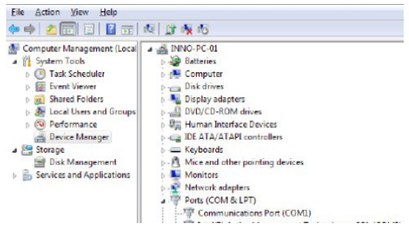
Click with the right mouse button on **"NXP LPC18XX VCOM"** and select **"UPDATE DRIVER SOFTWARE…".**

A popup will appear. Select **"BROWSE MY COMPUTER FOR DRIVER SOFTWARE".**

Navigate to the directory with the drivers for "NXP LPC18xx VCOM" Click on **"NEXT"**.

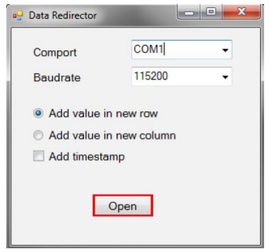


Next a windows security window will popup.
Select **"INSTALL THIS DRIVER SOFTWARE ANYWAY"**.



Write down which COM port has been assigned to the LPC USB VCom Port in the Device Manager.

The driver is now correctly installed.



Output data from tester to Excel with Data Redirector

Start the program "Data Redirector".

The COM port can be different for each PC. Use the COM port which you wrote down earlier.

Set the baud rate to 115200.

- If each measurement should be inserted in a new row, select **"ADD VALUE IN NEW ROW"**.
- If each measurement should be inserted in a new column, select **"ADD VALUE IN NEW COLUMN"**.
- If also a timestamp should be inserted with each measurement, select the box **"ADD TIMESTAMP"**.
- Select **"OPEN"** to start Excel.

After each measurement the selected cell in Excel will be updated with the measured value.

TIP!
If only the value, without the scale (e.g. HRC), is needed, add a row with following formula:
=LEFT(A1, LEN(A1)-4)

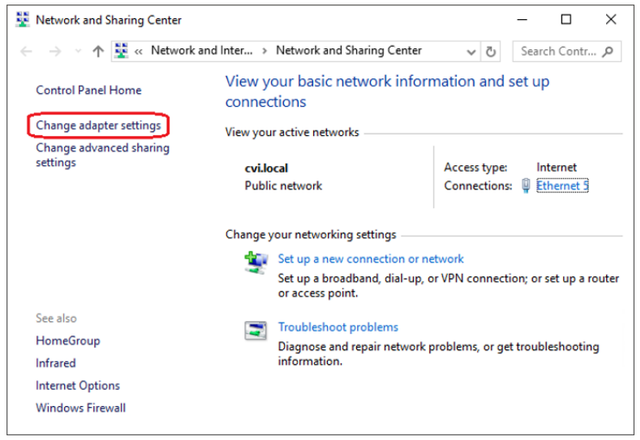
A1 is the cell which contains the measured value. -4 is the number of characters you wish to strip.

4.6.2 (FENIX 300RS-IMP) WINDOWS 10: SETTING A FIXED IP-ADDRESS

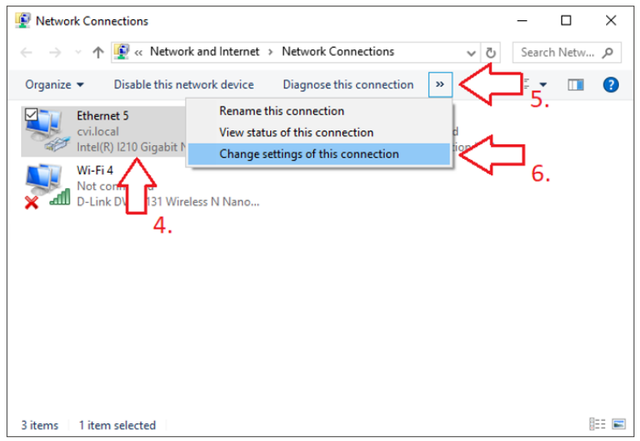
Windows 10 is by default configured to use a dynamic IP address (DHCP).
This network settings may be changed to use a fixed IP address.

1. Click with the right mouse button on the network icon

2. Select Open Network and Sharing Center

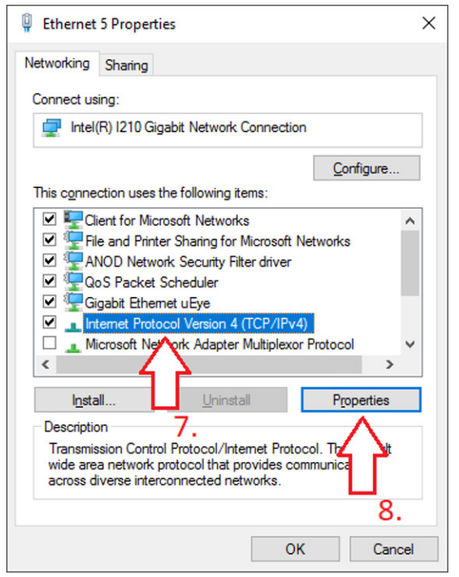


3. Select Change adapter settings

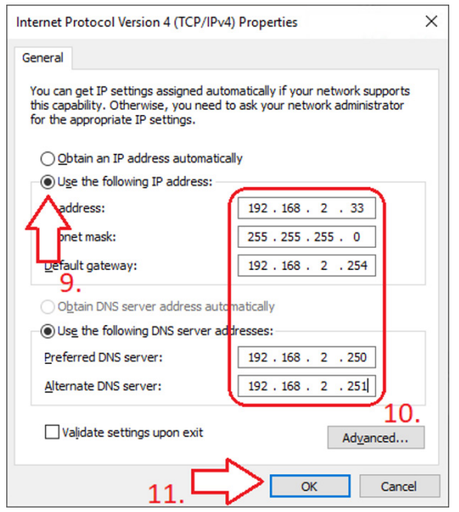


4. Select the connected Network Adapter
5. Click on the arrows to expand the settings bar

6. Select Change settings of this connection



7. Select Internet Protocol Version 4 (TCP/IPv4)
8. Click on the Properties button



9. Select Use the following IP address
10. Fill in the desired IP address, subnet mask, gateway and DNS server
11. Click on the OK button
12. Close all dialog windows

5
OPERATION

This section describes the basic (hardware) controls of the machine and gives some basic instructions on how to get started.

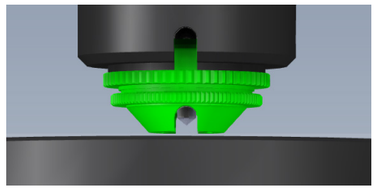
5.1 MACHINE OVERVIEW

1. LCD touch screen.
   ⚠ **CAUTION:** *Do not use any sharp objects to operate the touch screen.*
2. USB port
   for import/export of measurements.
3. Adjustable clamping nose.
   Houses the indenter.
4. Work light.
5. Workpiece stage
6. Spindle protection cover.
7. Elevator spindle screw
8. Emergency switch.
   In an emergency the emergency switch must be operated, causing the machine to stop immediately.
9. Adjustable vibration dampers
10. Digital eyepiece*
11. Microscope*
    with build-in object light
12. Objective*
    with attached ring-light
13. Sliding table*
14. Sliding table fixture*

* FENIX 300U only

5.1.1 CLAMPING NOSE

The machine is (optional) equipped with a nose clamp that provides adjustable pressure on the workpiece surface and presses the workpiece firmly to the stage or anvil. The clamp also protects the indenter against unwanted damage.



Standard clamping nose:

Clamping nose for 1/2" ball indenter:

5.2 POWER ON THE MACHINE

NOTE:
Make sure that the emergency stop switch on the front side of the machine is not activated when switching ON the machine, this will result in not powering up or failure messages. To unlock the emergency stop, see chapter ***"3.3.2 Emergency stop".***

⚠ ***WARNING***
Do not operate the machine during initialization and keep your hands away from motorized parts (e.g. turret, stage and spindle).

1. Switch on the machine using the red ON/OFF button on the back panel, see chapter "**4.5.2 Electrical connections**"
2. The machine will start the initialization. During this initialization several system-functions and parameters will be checked, in case there are any problems, a message will appear on the user interface.

5.3 STARTING HARDNESS TESTING SOFTWARE

1. When there are no issues during initialization, the dedicated INNOVATEST® hardness testing software will be started.

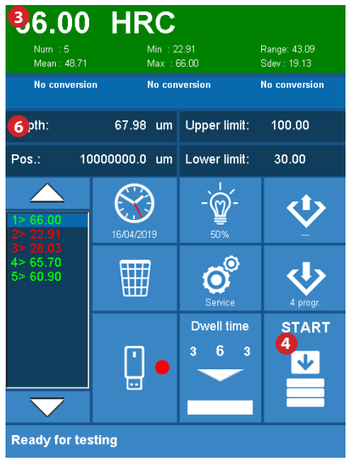
5.4 PERFORMING A BASIC HARDNESS TEST

⚠ ***WARNING***

To prevent injury, keep your hands away from the moving spindle underneath the tester. For more detailed information concerning the user interface and advanced (software) controls, please see the dedicated software user manual. Some items in the hardness testing software user manual may differ or are disabled, depending on the type of your machine series.

(FENIX 300RS/U/XL) Rockwell measurement:

1. Position the sample on the test table under the indenter.
2. Move the spindle up (rotate spindle screw clockwise), till sample is close (about 1 mm) to indenter. The sample may firmly touch a clamp, but not touch the indenter.



3. Select the desired Rockwell scale in the software:

4. Press (software) button **"START"**;
   - **"STOP"** button available to stop/abort the indentation process.

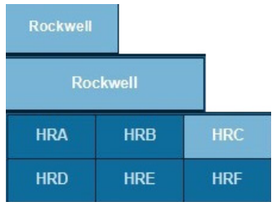
5. (Re)move the sample:
   When using a clamp, first move spindle down, to release the sample.
6. After the indentation cycle, the Rockwell depth and calculated hardness value (3) are shown on the screen and saved in the batch list.

NOTE: *For a Rockwell test on the FENIX 300U, we advise to remove the sliding table, and use a fixed anvil for accurate Rockwell measurements.*

(FENIX 300RS-IMP) Rockwell measurement:

1. Position the sample on the test table under the indenter.
2. Move the spindle up (rotate spindle screw clockwise), till sample is close (about 1 mm) to indenter. The sample may firmly touch a clamp, but not touch the indenter; force indicator should still be 0 kgf.

3. Select the desired Rockwell scale in the software:

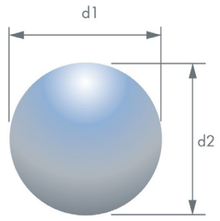


4. Press (software) button **"START"**;
   - **"STOP"** button available to stop/abort the indentation process.
   - Watch **"FORCE"** for applied forces during indentation process.
5. Remove the sample:
   When using a clamp, first move spindle down, to release the sample.
6. After the indentation cycle, the Rockwell depth and calculated hardness value are shown on the screen and saved in the batch list.

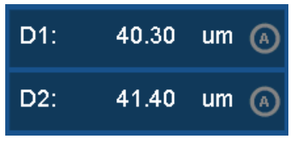
(FENIX 300RS/XL) Brinell measurement (with an Analogue microscope):

Follow the instruction as described for Rockwell test above (1-5), while now selecting a Brinell scale (3).

7. Look through the analogue eyepiece and measure the horizontal (d1) and vertical (d2) diagonals of the indentation:



8. Enter the diameters in the diameter entry fields (6):



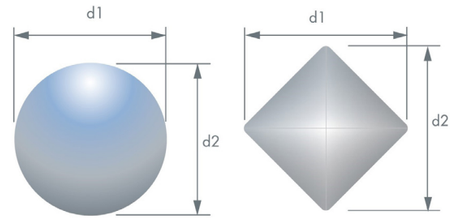
9. The hardness value will be calculated based on the given diameters and shown on the screen (3).

NOTE: *Software must be configured for Analogue eyepiece; see software user manual.*

(FENIX 300U) Vickers/Brinell measurement (with Digital eyepiece):

Follow the instruction as described for Rockwell above (1-5), while now selecting a Vickers or Brinell scale (3).

7. When using the sliding table, move the upper part of the sliding table with the workpiece under the digital eyepiece.
8. Look through the digital eyepiece and move the elevator spindle up to bring the surface of the workpiece into focus.
9. Adjust the light levels in the digital eyepiece: **Object- and Ring-light**.
10. Measure the horizontal and vertical diagonals of the indentation:



11. After each measurement, press the button on the eyepiece, to transfer the data to the software.
12. The hardness value will be calculated based on the given diameter(s) and shown on the screen.

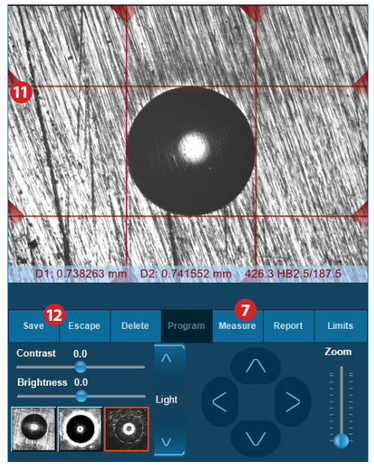
NOTES:

- *Software must be configured for Digital eyepiece; see software user manual.*
- *For Vickers and Brinell measurements the use of the clamping nose is not recommended.*
- *Before making a Vickers or Brinell indentation you can first focus on the sample with the digital eyepiece and look for a perfect spot before testing. Now slide the table, without moving the sample, towards the indenter.*

(FENIX 300RS-IMP) Brinell measurement (with BIOS):

Follow the instruction as described for Rockwell above (1-5), while now selecting a Brinell scale (3).

7. Press the **"MEASURE"** button (on BIOS or screen):
   - Software switches to optical measurement view
   - Camera of BIOS turns on.



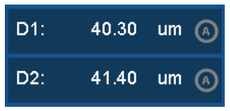
8. Place the BIOS (Brinell Indent Optical Scanner) over the indentation.
9. Adjust the light levels, dependant of workpiece surface, so the specimen is clearly visible, meaning not too bright nor too dark.
10. Press the **"MEASURE"** button (7) to start measuring the indent.
11. Change the measuring lines in case of wrong detection.
12. The hardness value will be calculated based on the given diameters and shown on the screen. Press **"SAVE"** to accept values. Decline the measurement with **"ESCAPE"**

5.4.1 ADDITIONAL SETTINGS BEFORE STARTING AN INDENT:

(FENIX 300RS/U/XL) I-TOUCH:

- Apply scale conversion if needed by touching **"CONVERSION"** field. Three conversions possible.

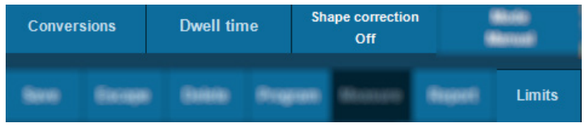
- Set the Dwell times to desired values with a short push on the **"DWELL TIME"** icon.
  For measuring the hardness on cylindrical samples, we need to apply a Shape correction:
- Make a long push on the **"DWELL TIME"** icon, select the shape, and enter the sample diameter.
- Enter tolerance "LIMIT" if required:
  Activate limits by long press on field



- You can adjust the light intensity by pushing the light icon.

(FENIX 300RS-IMP) IMPRESSIONS LT:

- Set up the hardness **"CONVERSIONS"** (up to five scales simultaneously)
- Verify the **"DWELL TIME"**, if available for hardness scale.
- For measuring cylindrical samples, **"SHAPE CORRECTION"** is required:
  Select the shape (convex, concave, cylindrical) and enter the sample diameter.
- Enter the tolerance **"LIMITS"** of the hardness values, if required.



You can adjust the workpiece light intensity by pushing **"UP"** or **"DOWN"** in the **"LIGHT"** button.

5.4.2 REPORT AND EXPORT POSSIBILITES

(FENIX 300RS/U/XL) I-TOUCH:
Press the USB icon in the software to export the data to USB in TXT format.

- Locations for a USB stick are aside the screen, and on back of the tester.
- The green dot indicates that a USB stick is present and ready to use.

Use tool "Data Redirector" on a connected PC to receive measurement data in Excel.

(FENIX 300RS-IMP) IMPRESSIONS LT:

- For report as PDF, select **"REPORT"**, **"PRINT"**.
- For export in CSV format, select **"REPORT"**, **"EXPORT"**.

5.5 EXIT HARDNESS TESTING SOFTWARE

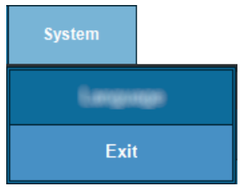
Exit the hardness testing software by following instructions as in dedicated software manual:

(FENIX 300RS/U/XL) I-TOUCH:

1. Because I-TOUCH is a so-called embedded program, the software will stop during turning off of the machine.

(FENIX 300RS-IMP) IMPRESSIONS LT:

1. Select **"EXIT"** in the **"SYSTEM"** menu to exit the IMPRESSIONS™ software and return to Windows©.



⚠ WARNING
Do not turn off the machine in this state.

2. Shut down Windows via shortcut on taskbar

5.6 POWER OFF THE MACHINE

Turn off the machine with the main **ON/OFF switch** on the back of the machine.
See chapter **"4.5.2 Electrical connections"**.

6
PROBLEM MESSAGES

Problem	Possible cause	Possible solution
Lighting lamp does not switch ON (power is not turned ON).	• Power is not supplied. • Fuse has burnt out. • Defective lamp/LED.	• Check power mains & supply. • Replace fuse. • Replace lamp.
User interface LCD does not light up.	• Power is not supplied. • Fuse has burnt out. • Mains Cable is connected improperly or broken. • LCD defective.	• Check mains cable otherwise contact service representative. • Contact service representative. • Contact service representative. • Adjust the indentation position.
No indentation is made.	• Indenter tip is chipped off. • Hardness tester is faulty. • Indenter shaft curve. • Abnormal position of Indentation.	• Contact service representative. • Replace indenter. • Contact service representative • Contact service representative • Adjust the indentation position.

If proposed solution does not solve the problem, contact your service representative.

Abnormal hardness value.	• When using a digital eyepiece and the eyepiece is not zeroed properly after powering ON, the measurement of the diameter will be incorrect. • Indenter tip is dirty. • Installed in bad conditions.	• Switch OFF the device, wait for a few seconds and switch it ON again. Then execute the zeroing process in the software. • Wipe indenter. • Improve installation conditions.
Irregular indentation shape.	• Indenter tip is dirty. • Indenter tip is chipped off. • Specimen surface is coarse (or dirty). • Specimen is tilted. • Specimen is curved (spherical or columnar). • Hardness tester is faulty (such as indenter shaft is broken).	• Clean Indenter tip. • Replace indenter. • Polish specimen surface. • Make specimen surface in parallel with fine adjustment stage. • Make an indentation at highest position, if specimen curved. • Contact service representative.

6.2 SOFTWARE

The machine's software has a central control. In this control several problems can be detected and registered. A message is displayed on the user interface when a problem occurs. Based on these messages, problems can easily be found and solved. However, not all problems are detected by the control system. These are more complex malfunctions or malfunctions that occur rarely.

NOTE:
For more detailed information concerning the user interface and advanced (software) controls, please see the dedicated software user manual. Some items in the software user manual may differ or are disabled, depending on the type of your machine series.

7

MAINTENANCE

This chapter describes the procedures for maintenance. Regular maintenance and inspection of the machine is of great importance. This reduces potential downtime and increases operational safety.

⚠ WARNING

Assembly, disassembly, maintenance and repair may only be carried out by a professional.

Consider safe and environmentally friendly disposal of operating and auxiliary materials as well as replacement parts. Harmful substances must be disposed in such a way that there is no danger to people and the environment. Leakage of hazardous substances also leads to an environmental hazard. The locally applicable regulations must be observed.

7.1 CLEANING

⚠ WARNINGS

When using cleaning agents, the instructions on the packaging must be observed.

Avoid contact with chemicals as much as possible. For example, if your hands come into direct contact with chemicals, clean them immediately.

⚠ CAUTIONS

Avoid contact of electric live parts with liquids as this can lead to "short circuits".

Avoid using compressed air to clean the machine. Although dirt particles are blown away with compressed air, there is a risk that these dirt particles enter vital parts (e.g. bearings). This can result in increased wear, tear and malfunction.

The machine must be kept clean during operation.

- Keep the surfaces of the machine clean.
- Make sure the surrounding is clean, meaning free of packaging materials, chemicals, tools, brooms, vacuum cleaners etc.

The following is to be observed:

- Avoid aggressive and/or abrasive cleaning agents.
- Do not use wire brushes or other hard tools.
- Always use fiber-free cloths for cleaning the machine.
- Use a soft brush in combination with a vacuum cleaner to remove dust.

Procedure:

1. Before cleaning the machine with cleaning agents, cover all openings in which no cleaning agent may enter (for safety and/or functional reasons). This especially applies to all electrical components. Do not use water or a steam cleaner/high-pressure cleaner for cleaning.
2. After cleaning, the protective covers, previously applied to openings, must be removed.
3. After cleaning, check the machine for any damage or defects. Fix any defects immediately.

⚠ WARNING

Any defects observed must be repaired before using the machine.

7.2 MAINTENANCE GENERAL

⚠ WARNINGS

If it is necessary to dismantle safety devices during installation, maintenance or repair, the reassembly and inspection of the safety devices must be done immediately after the completion of these activities.

The machine must be disconnected from the mains during all maintenance, repairs and inspections.

When handling oil, grease and other chemical substances, the safety regulations applicable to that product must be observed!

Loosened connections during the maintenance or repairs must always be tightened.

Instructions for handling the machine:

1. Installation, inspection, maintenance or repairs on the electrical equipment of the machine must be performed by qualified personnel in accordance with technical regulations.
2. When installing, inspecting or maintaining live parts, a second person must be available, who can handle the emergency stop in case of an emergency. Only use voltage isolated tools!
3. Before connecting or disconnecting cables, make sure that the power is switched OFF, to prevent electric shock or malfunction of the machine.
4. Disassembly of springs or parts subject to mechanical stress must be carried out with caution, the mechanical energy stored in these parts can cause injury.

7.2.1 PERIODICAL INSPECTION

Part	To be checked	Action & tool	Precaution
Indenter	Indenter tip dirty	Wipe indenter Soft fiber-free cloth (e.g. micro-fiber, cotton)	Do not bend the indenter shaft
Lens[A]	Lens surface polluted	Wipe lens Lens brush, Lens cleaning tissue or Lens cloth (microfiber)[B]	Do not scratch the lens
Anvil[A]	Rust	Remove rust Rust solvent and a Soft cloth (e.g. microfiber, cotton)	Do not bring stage into contact with turret, etc.
Test block	Rust	Replace test block	Do not use a rusted or expired test block

A) *Depending on the configuration of the machine*

B) *Only use special lens products and take notion of the instructions on the packaging of the lens cleaning product.*

7.2.2 FORCE CALIBRATION

If the application forces of your machine need to be recalibrated, please seek advice from you supplier or contact the service department of INNOVATEST® directly, hence for the calibration of the application force specific equipment is required.

7.2.3 (FENIX 300U) OPTICS CALIBRATION

During the assembly process, the lens(es) on your machine have been calibrated. Replacing lens(es) requires calibration of the lens(es). Such calibration can only be done by your supplier. Contact your supplier or the service department of INNOVATEST® directly.

7.3 REPLACEMENT OF THE FUSE(S)

⚠ CAUTION

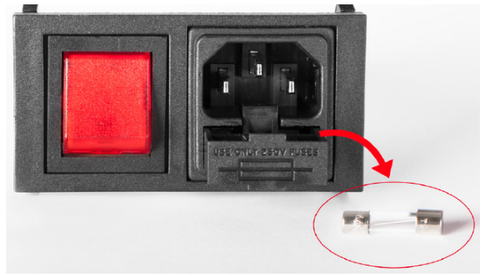
Only use fuses with the correct ***(specified ratings)***.

For this machine the fuse dimensions and ratings are:
5x20mm
3.15AT, 250V

Replacement procedure

- Turn off the machine and disconnect the main power cable.
- Pull out the fuse holder using a small flat-headed screwdriver.

- Inside the fuse holder a spare fuse is stored.
- Replace the broken blown fuse with the new fuse.



- Reconnect the main power cable and turn on the machine again.

7.4 SPARE PARTS

⚠ CAUTION

Only use spare parts or parts approved by the manufacturer.

Spare parts must meet the technical requirements specified by the supplier. This is always guaranteed with original spare parts. The installation and/or use of spare parts not supplied by the supplier can potentially affect certain machine properties and active and/or passive safety provisions, negatively. For ordering spare parts you can contact your supplier. After replacing parts, always perform a functional test.

7.5 FUNCTIONAL TEST

To verify the machine is in good working order, perform a functional test when in doubt and after, maintenance, repairs or replacing any parts. A functional test is performed on a valid and certified test block and by following the instructions of chapter **"5.4 Performing a basic hardness test"**. The measured hardness value should match the hardness value of the test block.

8

DECOMMISSIONING OR DISPOSAL

This section gives some guidance for the decommissioning or disposal of the machine.

8.1 DECOMMISSIONING

NOTE:
The machine has different hazardous parts that must be handled with care. Therefore, please note the following comments.

Consider:
- Government regulations, inspections of certain authorities.
- Conditions and/or status for exterior or interior configurations, depending on condition.
- Instructions for temporary decommissioning:
  1. Planning.
  2. Sequence.
  3. Special procedures.
- Work to be performed during decommissioning.
- Special measures for continuity.
- Special measures for safety and the environment.

The following must be observed:
1. All electrical parts must first be completely de-energized and discharged before disassembly.
2. Disassembly of springs or parts subject to mechanical stress must be carried out with caution, the mechanical energy stored in these parts can cause injury.
3. Batteries that may have been used in the machine must be disposed of separately according to local regulations.
4. In addition, instructions mentioned in the other manuals, which are part of this user manual, are to be observed, see chapter **"1.8 layout of the user manual"**.

The following actions should be carried out:
- Disconnect from all supply connections.
- Releasing all attachments from the floor, wall or ceiling.
- Fixation of individual parts.

8.2 DISPOSAL

For disposal certain regulations must be considered. All electrical and electronic products and batteries must be taken to a separate collection point at the end of their working life. Do not dispose of these products as unsorted municipal waste: take them for recycling. For information on your nearest recycling point, check with your local waste authority.

The following actions should be carried out:
- Remove and destroy the reference label with the CE marking, at the backside of the unit.
- Complete removal/disposal of machine parts.

9

TRANSPORT AND STORAGE

This section gives some guidelines in the event the machine needs to be transported or stored.

9.1 TRANSPORT/MOVEMENT

Transport or movement of the machine must be performed by authorized, trained and experienced personnel, capable of transporting or moving the machine (e.g. a specialized industrial moving company).

⚠ WARNINGS

Use only undamaged transportation equipment and tools that are suitable for the load.

Cabling should be stored and fixated to prevent hazards and damage during transport.

Care and cleanliness are required.

⚠ CAUTIONS

When carrying or moving the machine, make sure not to hit any objects and the machine does not tilt by 30 degrees or more.

When carrying or moving the machine, make sure you do not touch any objectives/indenters.

The below indicates important lifting information, relevant for transport or moving the machine:

- Dedicated unpacking instruction
- Center point of gravity; see chapter **"10.1 Technical drawing".**
- Machine weight; see chapter **"10 Technical specifications".**

9.2 PACKAGING

After unpacking, store the original packaging. Avoid shipping or transportation of the machine without the complete and original packing materials.

When the machine is equipped with a motorized XY-stage, be sure the transportation safety strip is placed correctly to the machine, otherwise the load application system could be damaged (see the dedicated unpack instruction).

To avoid possible damage, the packaging of the different parts must be carried out professionally. The measures taken in this context must fulfill the following objectives, depending on the situation (outdoors or indoors):

- Protection against rain during transport.
- Protection against damage caused by doors, walls and other objects.
- Protection against high (air)humidity (risk of corrosion due to condensation!).

9.3 STORAGE

When storing the machine, the following points must be considered:

- Protect the corrosion-sensitive parts (bare metal).
- Store the machine only in dry rooms.
- Store the machine in a way that any damage is avoided.
- Store the machine including all parts, avoiding important parts are missing when putting it back into operation.

10

TECHNICAL SPECIFICATIONS

Hardness scales	(scales available depends on hardness tester configuration)			
Vickers		HV1 HV2.5 HV3 HV4 HV5	HV10 HV20 HV25 HV30 HV40 HV50	HV100 HV120
Knoop	HK1 HK2.5 HK3 HK4 HK5			
Brinell	HBW1/1 HBW1/2.5 HBW1/5 HBW1/10 HBW1/30	HBW2.5/6.25 HBW2.5/7.8125 HBW2.5/15.625 HBW2.5/31.25 HBW2.5/62.5 HBW2.5/187.5	HBW5/25 HBW5/31.25 HBW5/62.5 HBW5/125 HBW5/250	HBW10/100 HBW10/125 HBW10/250
Rockwell (Regular)	HRA HRF HRH HRL HRR	HRD HRB HRE HRM HRS	HRC HRG HRK HRP HRV	
Rockwell (Superficial)	HR15N HR15T HR15W HR15X HR15Y	HR30N HR30T HR30W HR30X HR30Y	HR45N HR45T HR45W HR45X HR45Y	
Carbon	HR2.5/7	HR5/7 HR5/15 HR5/20 HR5/40 HR5/60 HR5/100 HR5/150	HR10/20 HR10/40 HR10/60 HR10/100 HR10/150	
HVD	HV5	HV10 HV20 HV25 HV30 HV40 HV50 HV60	HV100 HV120 HV125 HV150	
HBD	HB1/5 HB1/10 HB1/30	HB2.5/6.25 HB2.5/7.8125 HB2.5/15.625 HB2.5/31.25 HB2.5/62.5 HB2.5/187.5	HB5/25 HB5/31.25 HB5/62.5 HB5/125	HB10/100 HB10/125 HB10/250
Conversions	Conversions to other hardness scales according to ASTM E140, ISO 18265 and GB/T 1172			
Standards	ISO 6506 ISO 4545 ISO 6507	ASTM E10 ASTM E92 ASTM E384		

Test forces	
Force application	Fully automatic, closed loop, force feedback, loading, dwell, unloading
Test forces	1kgf – 250kgf
Test force tolerance	0.5 %
Dwell time settings	Adjustable 1 to 99s.
Indenters	Certified indenters (ISO / ASTM) available at choice

Head	
Indenter holder	Single position
Clamp	Holder for exchangeable clamps
Light	Adjustable and dimmable

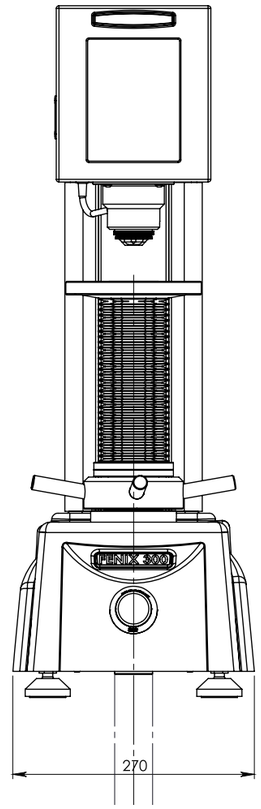
System	
Electronic system per model	**FENIX 300RS/XL/U:** Embedded **FENIX 300RS-IMP:** Windows 10
Screen(s)	6.5" portrait mode capacitive touch screen
Display resolution	0.01 HR
Statistics	Total test, max., min., average, range, standard deviation, all in real time after each test.
Software	**FENIX 300RS/XL/U:** I-TOUCH™, work-flow system & tester control **FENIX 300RS-IMP:** IMPRESSION™ LT, work-flow system & tester control
Data storage	Internal and external
Data output	**FENIX 300RS/XL/U:** TXT **FENIX 300RS-IMP:** CSV, PDF
Connectivity	**FENIX 300RS/XL/U:** USB A, USB B **FENIX 300RS-IMP:** UTP network, USB A 3.0, USB A 2.0

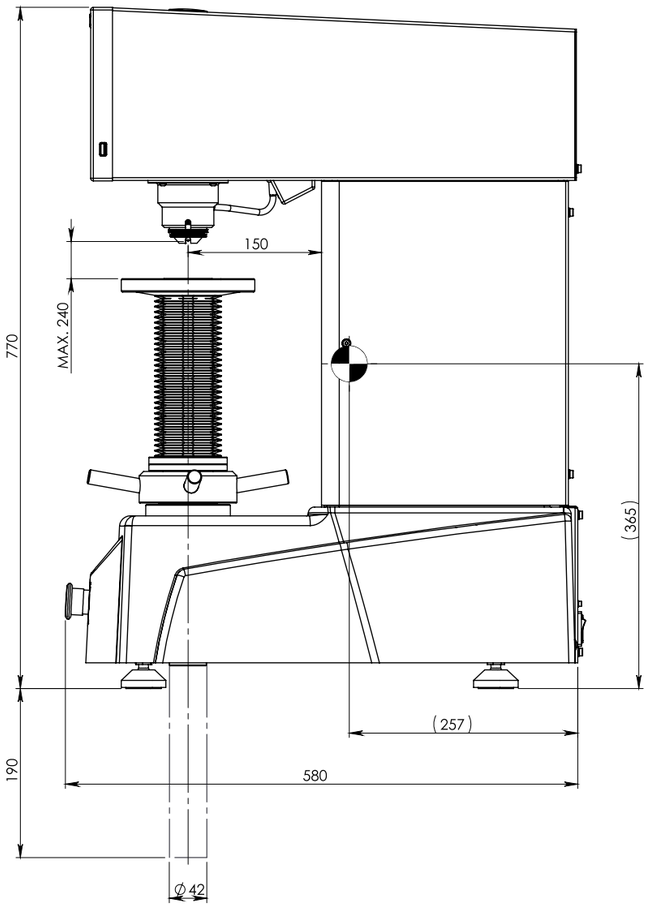
General	
Dimensions	**FENIX 300RS(-IMP)**: W 270 x D 580 x H 770 mm **FENIX 300XL**: W 440 x D 580 x H 1000 mm **FENIX 300U**: W 325 x D 640 x H 770 mm
Weight	**FENIX 300RS(-IMP):** 115 kg **FENIX 300XL:** 140 kg **FENIX 300U:** 115 kg
Power supply	100 – 240 VAC, 50/60Hz, single phase
Operating temperature	10 – 50 °C
Power consumption	100 W
Humidity	10 – 90 %, non-condensing
Fuse size/rating	5x20 mm, 3.15AT, 250V
Noise emission	< 70 dB(A)

10.1 TECHNICAL DRAWING

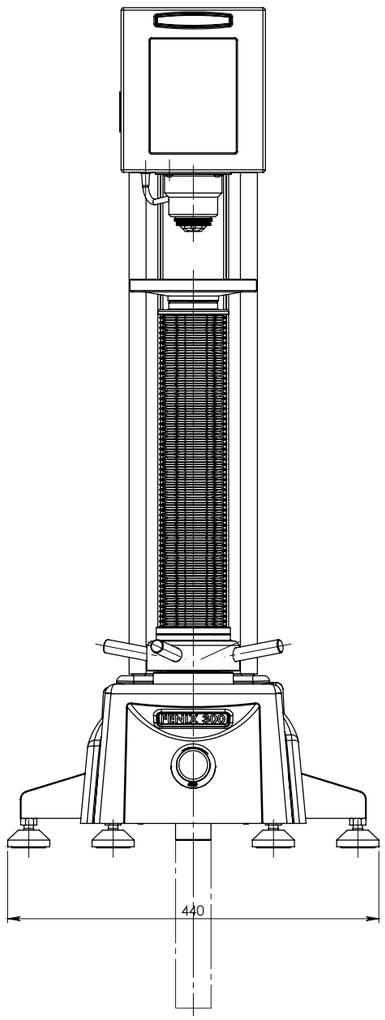
All dimensions in these drawings are in mm, approximate. Working heights and or workpiece accommodation varies depending on the stages and/or (stage) accessories used.

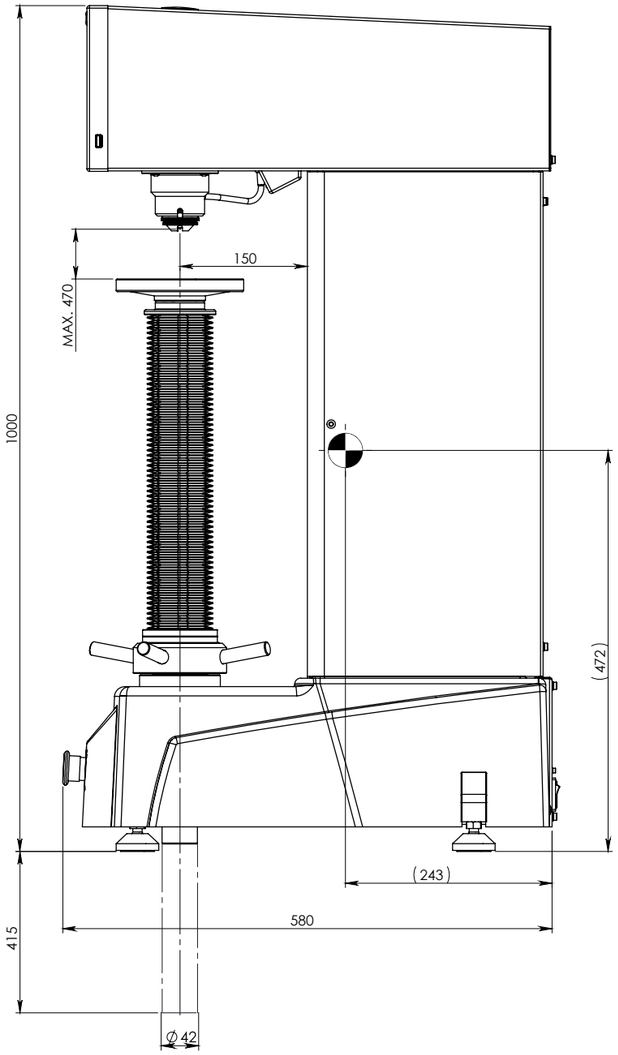
FENIX 300RS/300RS-IMP





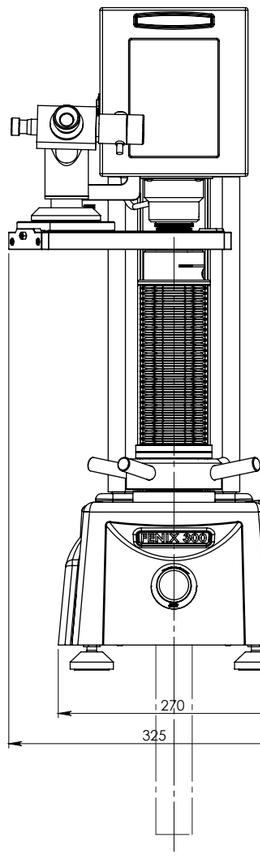
FENIX 300XL

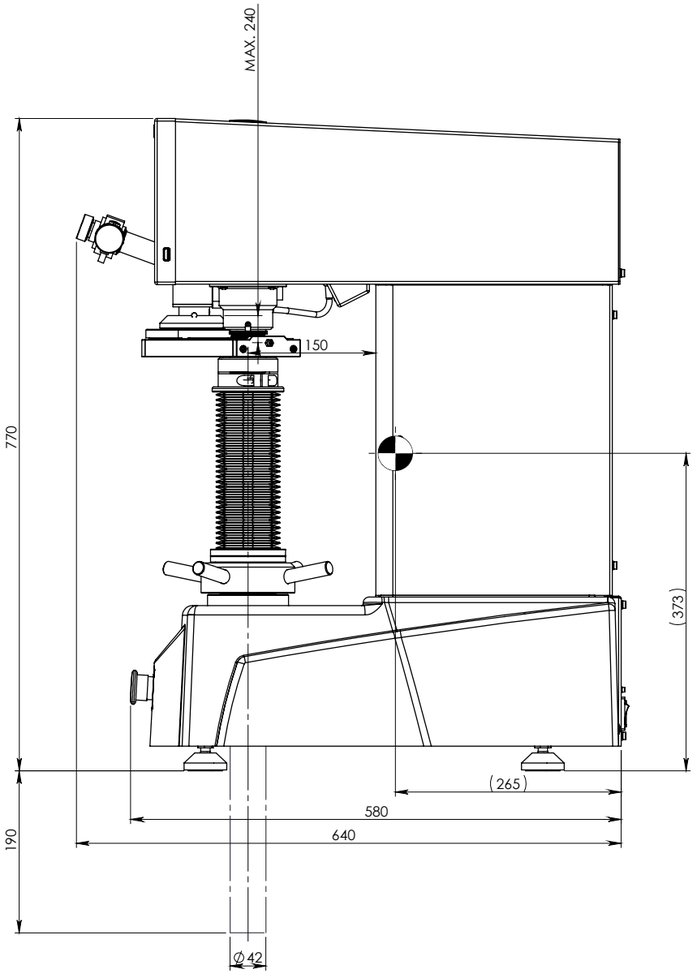




10. TECHNICAL SPECIFICATIONS

FENIX 300U





10.2 STANDARD DELIVERY AND (OPTIONAL) ACCESSORIES

- Power cable
- Four adjustable vibration dampers
- User manual
- Fuses

10.3 OPTIONAL ACCESSORIES

- (FENIX 300RS): Analogue Brinell indent measuring microscope
- Nose clamp large indenter
- (FENIX 300RS-IMP): Brinell Indent Optical Scanner (BIOS)
- (FENIX 300RS-IMP): Wireless keyboard & mouse
- INNOVATEST calibration certificate
- Certified indenters
- Certified hardness reference blocks
- Anvils
- Testing tables
- etc.

For detailed information about available accessories, please contact the sales office of INNOVATEST Europe BV for up-to-date information.

INNOVATEST®
Advanced Hardness Testing Solutions

EC DECLARATION OF CONFORMITY

MANUFACTURER
INNOVATEST Europe BV
Borgharenweg 140
6222 AA Maastricht
The Netherlands

Declares fully under own responsibility that the Hardness Tester:

Make:	INNOVATEST Europe BV
Product name:	FENIX 300 series
Model:	FENIX 300RS, 300U, 300XL, 300RS-IMP
Serial number:	300xx(x)(r)mmyyssssss

(300xx(x)=model, (r)=hardware revision, mmyy=manufacturing month year, ssss=IDnr.: 01000 and up)

To which this declaration refers,
is in accordance with the provisions of the Directive(s):

2006/42/EC	**Machinery directive**
2014/30/EU	**Electromagnetic Compatibility**

And is in compliance with the following standard(s) or other standard documentation:

- EN ISO 12100:2010
- EN ISO 13850:2015
- EN 60204-1:2006/AC:2010
- EN 55011-1:2009/A1:2010
- EN 61326-1:2013
- EN 61000-3-2:2014
- EN 61000-3-3:2013
- EN 61000-4-2:2009
- EN 61000-4-3:2006
- EN 61000-4-4:2012
- EN 61000-4-5:2014
- EN 61000-4-6:2014
- EN 61000-4-8:2010
- EN 61000-4-11:2014/A1:2017

Authorized person to compile the technical file:
Edwin Lansink
Borgharenweg 140
6222 AA Maastricht
The Netherlands

Place and Date	Edwin Lansink
Maastricht, 1- 08 -2018	R&D Manager/CTO

CE

EN Original

NOTES

NOTES

Distributor :

CORPORATE HEAD OFFICE

INNOVATEST Europe BV
Manufacturing, Distribution & Service
Borgharenweg 140
6222 AA MAASTRICHT
The Netherlands

Phone: +31 43 3520060
Fax: +31 43 3631168
info@innovatest-europe.com
www.innovatest-europe.com

INNOVATEST Deutschland GmbH
Sales & Service
Phone: +49 245 670 59 500
info@innovatest-deutschland.com
www.innovatest-deutschland.com

INNOVATEST Shanghai Co,. Ltd.
Sales & Service
Phone: +86 21 60906200
info@innovatest-shanghai.com
www.innovatest-shanghai.com

INNOVATEST USA Company
Sales & Service
Phone: +1 267 317 4300
info@innovatest-usa.com
www.innovatest-usa.com

INNOVATEST Polska sp. z.o.o
Sales & Service
Phone: +48 697 099 826
info@innovatest-polska.pl
www.innovatest-polska.pl

INNOVATEST Japan Co., Ltd.
Sales & Service
Phone: +81 3 3527 3092
info@innovatest-japan.com
www.innovatest-japan.com

INNOVATEST South East Asia
Sales & Service
Phone: +65 6451 1123
info@innovatest-singapore.com
www.innovatest-singapore.com