





Many more Functions

The Equotip® 3 has many more useful functions. Just to mention a few:

- Several ways of representing measured data.
- Displaying and editing stored series of measurements.
- Direct protocol printout to a USB or serial printer, with extended statistics.
- Customer-defined hardness scale conversions.
- User profiles to make the instrument as simple or as complex as desired. Password protection possible.
- Configurable acoustic signals.
- Configurable power management.
- Fast computer interfaces (USB and Ethernet).
- Multi-language support.
- Context-specific help ( key).
- Background illumination, 5 adjustable levels ( key).

Most of these functions are accessible via the menu structure. Enter menu by pressing the  key. Consult the operating instructions for details.

Structure of the Menu

Main Menu	View	Memory	Config	Help
Direction... F1	Bar graph	Save series 	Language...	About EQUOTIP3...
Material... F2	Basic mode	Set series file name... #	User interface...	Show help index... ?
Scale... F3	Signal graph	Set save folder...	Display...	Show help content... ?
n... F4	Conversion function	Explorer...	System settings ▶	Show system info...
Limits...	Display mean \bar{x}	Properties...	User profiles ▶	
Close F5	Set bar graph range...		Signal compression...	
Remove F6	Multiple series bar graph		Customer conversions ▶	
Comment...	Scale bar width		Calibrate probe...	
Print series ▶			Conversion standard...	

equotip[®] 3

Quick Reference Guide

This Quick Reference Guide is meant to be a brief operation aid. Careful reading of the operating instructions is mandatory.

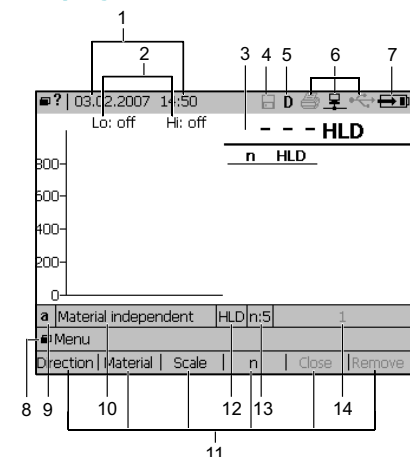
Starting up the Unit

- ▶ Lift the rubber flaps to uncover the connection ports.
- ▶ Connect the impact device to the 20-pole input socket (2) of the indicating device.
- ▶ Press the ON / OFF key until the display activates.
- ↳ While the device is booting, a splash screen appears on the display.
- ↳ The Equotip® 3 is now ready for the first measurement.

If the battery power is low:

- ▶ Connect the mains adapter to the AC power supply outlet and to the power supply jack (6) of the device.
- ↳ The battery will start charging. The green LED turns on.

Display



- 1 Date and time
- 2 Tolerance limits (not set)
- 3 Mean value indicator (disabled)
- 4 Automatic storage (disabled)
- 5 Type of connected impact device (D)
- 6 Interface status (Printer, Ethernet, USB)
- 7 Battery / power supply status (charging)
- 8 Active navigation keys
- 9 Impact direction (automatically detected)
- 10 Material class
- 11 Context-specific function keys
- 12 Hardness scale (HLD)
- 13 Automatic finishing of measurement series after n(5) readings
- 14 Name of measurement series

Equolink 3 Evaluation Software

Equotip® 3 is supplied with the PC evaluation software Equolink 3, offering

- transfer of stored data to a PC or network
- advanced data representation and evaluation
- editing, printing and exporting of measurement series
- upgrade of Equotip® 3 firmware.

Charging the Battery

- ▶ Connect the mains adapter to the AC power supply outlet and to the power supply jack of the instrument.

↳ The battery will start charging. The charging state is indicated by the green status LED.

- ▶ Charge the battery until the status LED goes OFF.

↳ A fully charged battery lasts for approximately 10 hours.

If the power of the rechargeable battery is too low, the battery symbol on the display flashes.

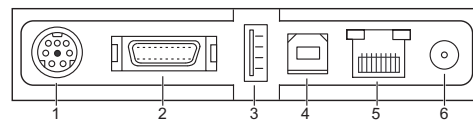
Maintenance and Service

- ▶ Keep the impact device and the indicating device clean.
- ▶ Do not lubricate the impact device!
- ▶ Clean the tube of the impact device from time to time.
- ▶ Check the impact device calibration from time to time. Always recalibrate after changing the impact body.

For further assistance contact our service: www.proceq.com.

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Connection Ports



- 1 RS232 connection for printer
- 2 20-pole input socket for Equotip® impact devices
- 3 USB port (Host) for mouse or printer
- 4 USB port (Device) for PC
- 5 Ethernet connection
- 6 Power supply jack

Measuring Procedure



Arming

- ▶ Depress the loading tube carefully until contact is felt.
- ▶ Allow it to slowly return to the starting position.
- ↳ The device is now ready for hardness testing.



Positioning

- ▶ Hold the impact device near the support ring and place it firmly on the test surface.



Testing

- ▶ Trigger the impact by exerting light pressure on the release button. Take care not to compress the spring.
- ↳ The impact body is released and launched onto the test surface with a defined energy.
- ↳ The result is immediately shown on the display.
- ▶ Repeat the procedure for the next impact.

CAUTION: In order to avoid incorrect readings:

- ▶ Do not perform an impact in an area that has already been deformed by a previous impact.
- ▶ Arm the unit and trigger the impact on two separate positions on the test surface.
- ▶ Medium and light-weight test pieces (see table on p. 104 of the operating instructions) or pieces with protruding parts must be coupled to a large support.



Test Requirements

Surface preparation

- Clean, dry and smooth test surface required.
- The roughness of the finished surface should not exceed the following values:

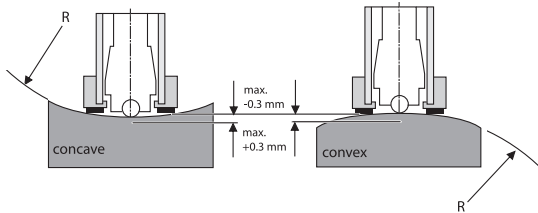
Impact device type	Roughness measure	
	R_t	$R_a = CLA = AA$
D, DC, DL, E	10.0 μm / 400 μin	2.0 μm / 80 μin = N7
G	30.0 μm / 1,200 μin	7.0 μm / 275 μin = N9
C	2.5 μm / 100 μin	0.4 μm / 16 μin = N5

Legend

- R_t = Roughness depth (DIN 4762)
- R_a = Average roughness value (Germany)
- CLA = Center line-average value (Great Britain)
- AA = Arithmetical average (USA)
- N5, N7, N9 = Roughness classification according to ISO/R 1302
- ▶ Avoid heat or surface deformation while preparing the test surface.
- ⚡ Excessive scattering of test results indicates poor surface preparation.

Impact device position and curved areas

- ▶ Avoid tilting or movement of the probe while testing.



Special support rings for testing convex or concave curved surfaces ($R < 30$ mm, 1.2 in) are available.

Impact Direction Compensation

Due to the measurement principle, raw Leeb hardness values depend on the impact direction. With Equotip® 3 impact devices, the instrument is capable of compensating for this effect automatically. In addition, manual setting of the actual impact direction is supported.

- ▶ Press the **F1** key.
- ▶ Select either “Automatic” or one of five fixed impact directions.
- ▶ Confirm your selection by pressing the **✓** key.

The impact direction can be set for individual readings, even later on. Just select the reading and specify the impact direction as described above.

For calibration of the automatic direction compensation refer to the operating instructions.

Conversion to Standard Hardness Scales

The Equotip® 3 provides approximate conversion of measured HL values to all popular standard hardness scales (HB, HV, HRA, HRB, HRC, HS and tensile strength R_m for steel).

CAUTION: Hardness scale conversions are material-specific.

Always specify the material to be tested before setting the hardness scale.

If the desired scale is not available for the material in question, never specify a different material class. Unpredictably large conversion errors may result!

Selecting the material

If the current series is closed (statistics displayed), press **F6** to open a new series or **F5** to reopen.

- ▶ Press the **F2** key.
- ▶ Select the adequate material class.

For more information about material classes press the **?** key or consult the operating instructions.

- ▶ Press the **✓** key to confirm your selection.

Selecting the hardness scale

Ensure that the appropriate material classes are selected!

- ▶ Press the **F3** key.
- ▶ Select the desired hardness scale.
- ▶ Press the **✓** key to confirm your selection.

⚡ All hardness values are displayed in the selected scale.

For specification of customer-generated conversions consult the operating instructions.

Series of Measurements

For reliable results, the mean value of at least 3 to 5 measured values in the test area should be taken.

Defining standard series size

- ▶ Press the **F4** key.
- ⚡ Dialog box “Close series after...” opens.
- ▶ If not yet enabled, select “Automatically close”.
- ▶ In the “after n =” input field, enter the number of required readings by increasing or decreasing the current number with the **+** or **-** key, respectively.
- ▶ Press the **✕** key to close the dialog box.
- ⚡ The series of measurements will automatically be closed once the specified number of measurements has been reached.

If no automatic termination of the series of measurements is desired, select “Manually close ...”.

Deleting readings from a series

- ▶ Use the arrow keys to select the reading to be deleted.
 - ▶ Press the **F6** key.
 - ▶ Confirm by pressing the **✓** key.
- If no reading is selected, pressing **F6** will delete the last value.

Terminating a series manually

You can manually close the current series of measurements at any time.

- ▶ Press the **F5** key.
- ⚡ The current series is closed and the series statistics are displayed.

Extending a closed series

A closed series of measurements can be reopened in order to add more readings.

- ▶ Press the **F5** key.
- ⚡ The current series is reopened. The statistics disappear.

New series

If the current series is closed (statistics displayed), press **F6** or perform the next measurement to open a new series.

Displaying the current mean value

The value displayed on the upper right is either the last single reading (no indicator) or the current mean value of the series (with the mean symbol in front).

- ▶ Pressing the **\bar{x}** key switches between these settings.

Tolerance Limits

Equotip® 3 allows you to specify a tolerance range.

- ▶ Ensure that the desired hardness scale has been selected (for the correct material!).
- ▶ Select menu item “Measurement” -> “Limits ...”.

To set the upper limit:

- ▶ Check “Enabled” in the upper row. Move to the input field and enter the lower limit value in the selected scale using the **+** or **-** key or a soft keypad which is activated by pressing the **☞** key.

To set the lower limit:

- ▶ Proceed the same way with the second row.
- ▶ Press the **☞** key and confirm by pressing the **✓** key.

⚡ The limit(s) are active. Readings outside the specified range will be marked by “+” or “-”.

Storing Data

The Equotip® 3 is equipped with a large storage for measured data, including instrument and probe serial numbers, time stamps, statistics, all relevant settings and an optional comment.

- ▶ To enable storing, just press the **☞** key.
- ⚡ The name of the series is displayed to the right of the first status line (14). The series will be stored under this name as soon as it is closed.

Series of measurements can be given freely selectable alphanumeric names.

In order to change the name of the series:

- ▶ Press the **#** key.
- ⚡ A keypad is displayed.
- ▶ Enter the desired name. (The same name with the last character increased by one will be used for the next series.)

- ▶ Press the **☞** key.

Pressing the **☞** key again disables storing.

Measured data can be stored in a hierarchical directory structure. For details see the operating instructions.