User Manual

English

Hall effect thickness gauge

dmq

QB 7

Models B / E

Heavy duty

www.demeq.com

QB7 User Manual

Hall effect thickness gauge

P/N: QBD 701 – ENG – Rev. 01 – July 2020

Index

Apendix

Thank you for choosing a dmq instrument

And thank you for purchasing a QB7 hall effect thickness gauge.

Company declaration

At Demeq we develop, manufacture and distribute software and quality control instruments offering innovation and solutions that come as a direct result of listening to your needs and demands as a user. We apply some of the latest technology available in the industry to build instruments that are robust, precise and easy to operate.

We are convinced that our products would not be complete without permanent technical and after sales support. So in addition to quality products we offer:

- Quick answers to your inquiries.
- Unlimited access to technical information as well as application notes.
- Firmware and software upgrades at no charge.
- Attention to your inquiries and suggestions.

We hope that the QB7 will meet and exceed your application needs.

General information

Models included in this manual

Information included in this manual applies to QB7 hall effect thickness gauge models QB7 B and QB7 E.

Registered trademarks

dmq is a registered trademark of Demeq S.R.L and its affiliate companies.

Important notice

The information contained in this manual is intended to educate users on the operation of QB7 hall effect thickness gauges. Failure to read and understand this manual can lead to measurement errors. Decisions based on measurements and or results that are erroneous can lead to property damage, personal injury or even death. Demeq S.R.L assumes no responsibility as a result of improper use of our instruments.

User training

Correct use of a QB7 hall effect thickness gauge requires that you take all of the following into consideration:

- Select the sensor tip and target ball best suited for your application.
- Know the specific requirements for the test you will be conducting.
- Make sure that the person operating the unit has been trained on its use.

This manual provides all of the information needed to configure and operate a QB7 hall effect thickness gauge. However there are additional factors that can affect tests done with this instrument. Specific information on those factors is outside the scope of this manual. When in doubt you should always seek expert advice or refer to specific textbooks. Additional information can also be found on the internet and through local government agencies as well as in technical institutes.

Measuring principle

The QB7 uses a strong magnetic field to attract a steel or magnetic ball that when reaching the tip of the probe affects its magnetic field. Using a hall effect sensor the unit measures changes in the magnetic field that are then converted to the thickness values seen on the unit screen.

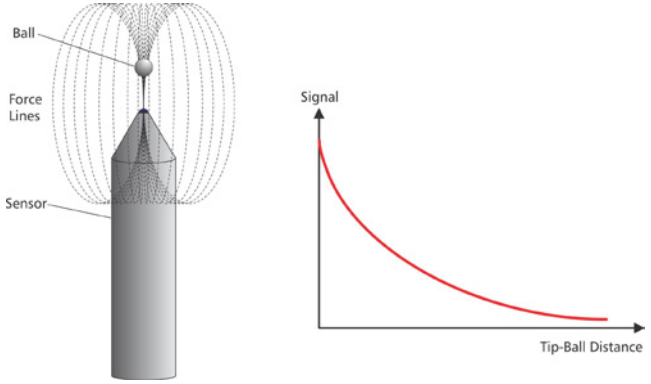


Figure 1: Details on the probe operation

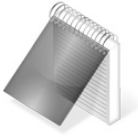
Probe accessories

Target balls

Each QB7 includes a calibration kit with the target ball diameters needed to measure in the range for the QB7 model that you purchased. Also included with the target balls are "zero" calibration fixtures for each ball diameter.

Target balls used in the QB7

Part #	Material	Ball Diameter	Range
QBR301	Steel	1,59 mm 1/16 inch	0 ~ 2.5 mm 0 ~ 100 mils
QBR302	Steel	3,18 mm 1/8 inch	0 ~ 5 mm 0 ~ 200 mils
QBR303	Steel	4,76 mm 3/16 inch	0 ~ 7 mm 0 ~ 280 mils
QBR304	Steel	6,35 mm 1/4 inch	0 ~ 8 mm 40 ~ 320 mils
QBR403	Magnetic (*)	4,76 mm 3/16 inch	2 ~ 16 mm 80 ~ 640 mils
QBR404	Magnetic (*)	6,35 mm 1/4 inch	4 ~ 22 mm 160 ~ 860 mils



Note

Target balls indicated with (*) are magnetic and will only work with the QB7 E – extended range model while the QB7 B model uses steel target balls only.

The graph below shows ball diameters and their measuring ranges.

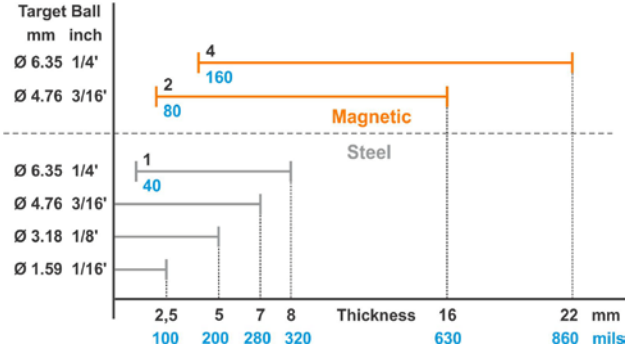
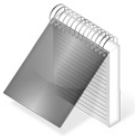


Figure 2: Target ball diameters vs measuring ranges



Note

The sensor QBS201 can be used with steel target balls only while the sensor QBS301 can be used with both steel and magnetic target balls (QB7 E model).

Calibration fixtures

QB7 calibration kits include a set of calibration fixtures designed for specific use with dmq sensors. Available calibration fixtures for different steel target ball diameters are:

Calibration fixtures for steel target balls

Part #	Thickness
QBR201	Zero cal fixture for 1.59 mm or 1/16" target ball
QBR202	Zero cal fixture for 3.18 mm or 1/8" target ball
QBR203	Zero cal fixture for 4.76 mm or 3/16" target ball
QBR101	Cal fixture with 0,25 mm (9,84 mils) shim
QBR102	Cal fixture with 0,50 mm (19,69 mils) shim
QBR103	Cal fixture with 1 mm (39.37 mils) ceramic block
QBR104	Cal fixture with 2 mm (78,7 mils) ceramic block
QBR105	Cal fixture with 4 mm (157.5 mils) ceramic block
QBR106	Cal fixture with 6 mm (236.2 mils) ceramic block
QBR107	Cal fixture with 8 mm (315 mils) ceramic block

Warning

If you use magnetic target balls with calibration fixtures of 0.25 mm (9,84 mils) or 0.50 mm (19,69 mils) take special care as the strength of the ball may damage the calibration shims.

Calibration fixtures allow measurements of a known thickness while positioning the target ball so that it remains stable and perpendicular to the sensor tip in order to minimize measurement errors.
Figure 3 below shows how the calibration fixtures are used.

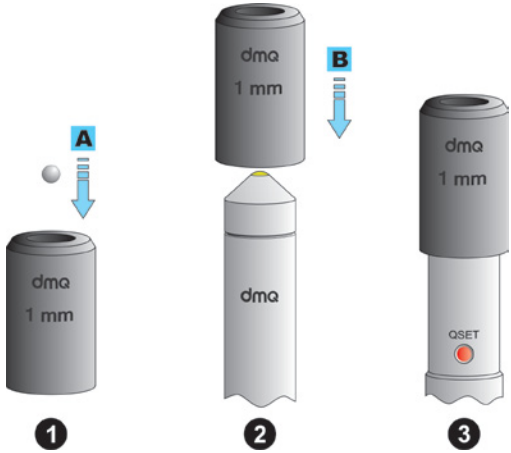


Figure 3: Use of the calibration fixtures

First place the target ball inside the adapter (fig. 3-1) then place the adapter with the target ball over the sensor (fig. 3-2), be careful when doing this as the probe may attract the entire calibration fixture abruptly to the tip of the sensor causing the calibration shims to get damaged. Figure 3-3 shows the calibration fixture ready to be used to calibrate the specific thickness value.

If you have an extended range model (QB7 E) additional calibration fixtures are included for magnetic target balls.

Calibration fixtures for magnetic target balls

Part #	Thickness	Magnetic target ball
QBR108	10 mm (395 mils)	4,76 mm - 3/16 inch 6,35 mm - 1/4 inch
QBR109	14 mm (550 mils)	4,76 mm - 3/16 inch 6,35 mm - 1/4 inch
QBR110	18 mm (710 mils)	6,35 mm - 1/4 inch
QBR111	22 mm (860 mils)	6,35 mm - 1/4 inch

Important

Keep in mind that the QBR104 calibration fixture (2 mm or 78,7 mils) is the "zero" for the 4,76 mm (3/16") magnetic target ball and the QBR105 calibration fixture (4 mm or 157,5 mils) is the "zero" for the 6,35 mm (1/4") magnetic target ball.

Target ball selection

Special attention is needed when choosing the target ball size as a correct selection will allow for easier operation and is important for obtaining precise and reliable results. Here are some things to consider when selecting the targer ball size that is best suited for your application:

- Maximum expected test piece thickness
- What accuracy is required
- Minimum test piece curvature
- Material elasticity (because larger diameter balls generate a higher force of attraction this may cause "softer" materials to compress as a result of the force which will result in erroneous or incorrect thickness values that are less than

the real value).

- Hardness of the test piece surface as the surface may get scratched with the use of magnetic target balls (unlike steel target balls that turn, magnetic target balls are displaced without turning) which may scratch the test piece surface due to friction.

Using the sensor

Even though use of the hall effect sensor is pretty straight forward certain considerations are needed to obtain accurate and repetitive measurements.

What can affect measurements

QB7 sensors are highly sensitive devices that can be affected by changes in the environment and other factors explained herein:

Changes in temperature and magnetic field

Using the QSet button (see page XV) you can adjust the sensor for changes in temperature as well as for changes in the magnetic field that may occur when the sensor is used without the sensor stand (changes in the magnetic filed may occur when the sensor is used in different positions).

Presence of ferrous or magnetic materials near the sensor

Hall effect sensors are highly sensitive to variations in the magnetic field that can be affected by ferrous or magnetic elements in the surroundings. So with the exception of the target ball make sure that none of these elements are present when conducting measurements.

Surface roughness and or surface test piece finish

If the test piece surface has a rough or irregular finish the ball may begin to oscillate as it is being displaced which will in turn result in unstable measurements and in thickness values that are generally higher than the real test piece thickness.

Vertical surface measurements

When measuring vertical surfaces with high thickness values, the target ball may fall off the center of the sensor tip due to gravity which will in turn result in thickness values that are greater than the real thickness of the test piece being measured.

Target ball is out of center

Another important factor that needs to be considered when measuring is the position of the target ball as it relates to the sensor tip. In order to obtain accurate measurements the target ball must be aligned to the tip of the sensor as seen in the figure below.

Figure 4: Correct and incorrect ways of measuring

Figure 3 shows several alignment possibilities for the target ball where ❶ this is the correct way of measuring because you can see that the ball is perfectly alligned with the sensor tip. The rest of the images show how not to measure:

❷ : Error due to an inclined surface

❸ : Error due a curved surface

❹ : Error due to an obstruction in the surface

❺ : Error due to an obstruction in the tip of the sensor

Use of the sensor without the sensor stand

Because temperature is a factor that can affect measurements when using the sensor without the sensor stand (handheld) we recommend that the sensor be held from the bottom as seen in the figure below.

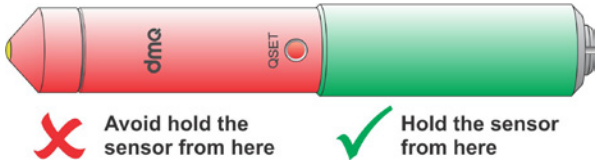


Figure 5: Holding sensor area when the sensor is handheld

The QSet button

The QSet button located in the QB7 sensor is readily accessible so that you can compensate for environmental changes (temperature and magnetic field) quickly and easily. The QSet button can also be set for additional functions as explained in chapter 3.4.6, page 40.

When the QSet button is pressed the screen unit will show a flashing coupling indicator meaning that the sensor is being adjusted. This process lasts a few seconds and ends as soon as the coupling indicator remains static again.

Figure 6: QSet button

Connecting the sensor to the unit

When the sensor is connected to the unit a window is displayed showing sensor information while an auto QSet adjustment is executed in the background.

Figure 7: Window with sensor information

Important

When pressing the QSet button and or connecting the sensor to the electronic unit make sure that the sensor tip is away from ferrous elements or magnetic fields.

Important: Security information

QB7 hall effect thickness gauges are for industrial use only and must not be used for medical applications or otherwise.

The QB7 operates with 2 rechargeable type AA cells so when replacing these batteries make sure you do so using the same type cells, current and polarity.

Precautions when using magnets

The following precautions should be taken into consideration when using magnetic balls as well as the QB7 sensor because of the strong magnetic field that the sensor has in order to attract steel balls when measuring:

Do not bring magnets close to people that use pacemakers or other type of implanted electronic devices as this may alter their normal operation and put lives at risk!

Keep magnets away from children and adults that suffer from mental illnesses.

Do not burn rare earth magnets as they may release toxic vapors.

Do not bring magnets close to diskettes, hard disks, magnetic cards, magnetic strips or any other storage device that is supported magnetically as this may alter contents or erase them completely.

About software

Because software is complex in nature and it is never 100% error free you should always check that the operations required for your intended application are working correctly.

Warranty

Demeq provides a 3 year limited warranty on electronic units that is automatically extended to 5 years when you register your unit while a 6 (six) month warranty is offered on probes.

Please remember to register your unit at:
http://www.demeq.com

Our limited warranty covers manufacturing and or material defects only. Failure caused by accidents, normal wear of components or improper use are not covered under warranty.

In the event that warranty service becomes necessary please contact your local distributor or Demeq directly. We will solve your issue in the shortest time possible and please remember that shipping charges for warranty repairs or parts under warranty are always the customer's responsibility.

1 First steps

1.1 Knowing the QB7

1.1.1 Front panel

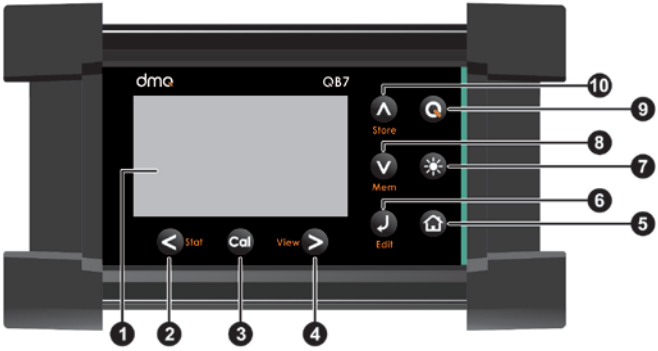


Figure 1.1: Front panel

1. Graphic LCD display with RGB backlight illumination
2. Scroll left key / View partial statistics (Stat)
3. Calibration key
4. Scroll right key / Change measuring modes / screens (View)
5. Menu key / Exit and return to measuring screen / Exit and return to menu (Home)
6. Enter key / Change values in the measuring screen (Edit)

7. Set backlight illumination (On, Off, Auto)
8. Scroll down key / Quick access to screens with memory options (Mem)
9. Q key: On Off (hold for 2 seconds) / Special functions
10. Scroll up key / Store measurement manually (Store)

1.1.2 Connectors

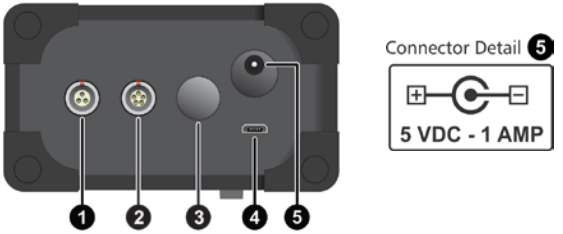


Figure 1.2: Connectors

1. Lemo 0B - 3 pin for external pedal (optional)
2. Lemo 0B - 5 pin for hall effect sensor
3. Bluetooth antenna
4. Micro USB connector for connect to a PC / Battery charger
5. External power supply / Battery charger

1.2 Rechargeable battery

1.2.1 Battery level indicator

The QB7 operates on (2) "AA" rechargeable batteries that can be charged using the USB connector in the unit. Depending on the current released by the charger and the state of the battery the unit adjusts for different charges:

Figure 1.3 Battery state icons

When the unit is not being charged the battery indicator shows the battery level (Normal).

If the unit is connected to an external power supply in permanent mode the battery state will show the "Slow Charge" icon in screen.

1.2.2 Charging the battery

The QB7 can be charged with a cable connected to a USB port in a PC or with a standard 5V power supply that has a micro USB connector, using a 1,5 amp (or more) power supply and a cable shorter than 1 meter long (about 3 feet) you will be fast charging the batteries. Note that the charger can be connected while the unit is in operation.

A full "fast charge" takes about 3 hours while a slow charge can take up to 10 hours. Once batteries are charged the unit will automatically stop the charging cycle.

1.3 Special keys

1.3.1 The "Q" key

The Q key has three functions:

1. When the unit is off, press Q for 2 seconds to power on the unit.
2. When the unit is on, press Q for 2 seconds to power off the unit.
3. With the unit on, making short presses to the Q will activate special functions described in each chapter of this manual.

1.3.2 Color backlight illumination

Backlight illumination options can be changed from any screen in the unit.

Press ☀ to change backlight illumination settings.

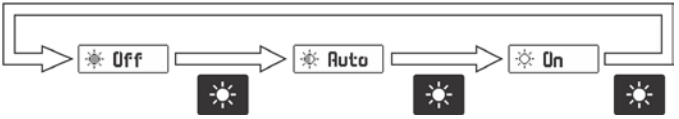


Figure 1.4: Backlight illumination options

The color of the backlight can be changed, for more information see page 30.

Because the use of the backlight reduces battery life, when batteries are running low the backlight illumination will be automatically turned off in order to extend battery life.

2 Measuring with the QB7

The QB7 can display measurements in 3 different modes or screens that show specific information. To switch screens press the > key.

2.1 Measuring screen modes

2.1.1 Large numbers screen (Easy reading)

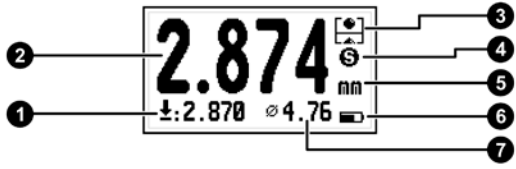


Figure 2.1: Large numbers mode

1. Minimum thickness / Differential / Percentage depending on selected mode (*Page 38*)
2. Thickness measurement displayed in real-time
3. Icon indicating unit condition (*Page 11)*
4. Target ball type indicator: S=Steel, M=Magnetic
5. User selected measuring unit
6. Battery level indicator / charger
7. Diameter of the target ball being used

2.1.2 Regular numeric screen mode-1 (Datalogger)

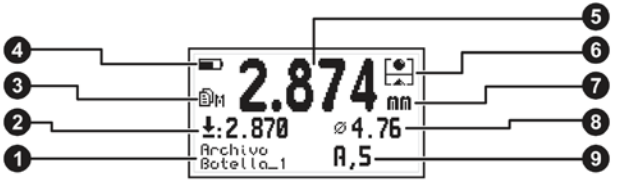


Figure 2.2: Screen mode-1

1. Name of the open file where values are being stored
2. Minimum thickness / Differential / Percentage depending on selected mode (*Page 38*)
3. Datalogger mode indicator: X: Off - M: Manual - A: Auto
4. Battery level indicator / charger
5. Thickness measurement displayed in real-time
6. Icon indicating unit condition *(Page 11*)
7. User selected measuring unit
8. Diameter of the target ball being used
9. Location of the last saved value (Column, Row)

2.1.3 Regular numeric screen mode-2 (Statistics)

Figure 2.3: Screen mode-2

10. Average thickness / Differential / Percentage depending on selected mode (*Page 38*)
11. Minimum measured value
12. Measurement range (Maximum – Minimum)
13. Maximum measured value

2.1.4 Regular numeric screen mode-3 (Wall tester)

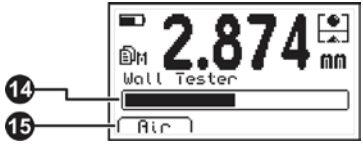


Figure 2.4: Screen mode-3

14. Ferrous content indicator
15. Option to zero / reset wall tester (air)

Because the presence of ferrous materials will affect measurements the wall tester is a unique QB7 feature that allows you to check ferrous content on the material being measured.

In order to conduct the test you need to hold the sensor in the air, press < to zero the sensor and bring the sensor to the wall that you want to measure (without a ball). If the bar does not move this means that the material can be measured and if the bar moves this indicates the presence of ferrous content which will affect measurements. On the other hand if the bar is filled completely the wall cannot be measured using a hall effect thickness gauge.

To change between all three numeric screen modes press Q with short touches.

2.1.5 Graphic screen mode

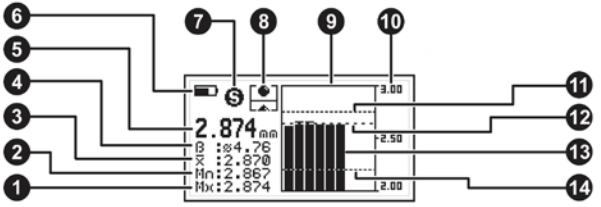


Figure 2.5: Screen in graphics mode

1. Maximum measured thickness
2. Minimum measured thickness
3. Average thickness / Differential / Percentage depending on selected mode (*Page 38*)

4. Diameter of the target ball being used
5. Thickness measurement displayed in real-time
6. Battery level indicator / charger
7. Target ball type indicator: S=Steel, M=Magnetic
8. Icon indicating unit condition *(Page 11)*
9. Graphic of the last N values stored in the Datalogger / Real-time graphic of values being measured *(Pages 10 and 38)*
10. Reference edge of the graphic
11. Line indicating high alarm setting *(Page 26)*
12. Line indicating average bars
13. Histogram of values / Real-time graphics
14. Line indicating low alarm setting *(Page 26)*

2.2 Use of keys in measuring screens

Keys have the following functions in all measuring screens:

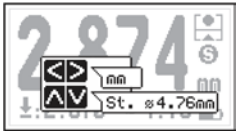
: Manually store measurements in the Datalogger.

: Change measuring modes / screens.


: Exit the measuring screen and enter the main menu.

: Access the quick memory options menu.

: Press to access the select / edit mode where a "floating window" appears to adjust the measuring unit and the ball size.



To change the unit press the < > keys.
To change the target ball size press the ∧ ∨ keys.

Figure 2.6 Floating window in select / edit mode

To save and exit press ↵ or to exit without saving press ⌂.

< Stat : Starts statistical values.

Cal : Enter calibration mode for the selected ball.

☀ : Change backlight illumination.

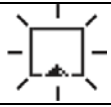
⏻ : Press for 2 seconds or more to turn the unit off. With short touches from screen mode-2 (Statistics) you can view screen mode-1 (Datalogger) and screen mode-3 (Wall tester). And in the Graphics mode a short touch changes from a histogram to real-time graphics.

Figure 2.7 Histogram and real-time graphics screens

2.3 Icon indicating unit condition

This icon is a quick and easy way for the user to know the condition of the unit as well as the sensor.

The following table shows all possible unit conditions:

Icon	Unit / probe condition
	Sensor is disconnected (the icon is dotted).
	The sensor does not have a target ball within a distance that can be measured.
	Indicates that the target ball is within the measuring range.
	A flashing icon indicates that a QSET sensor adjustment is underway (make sure that ferrous and or magnetic elements are not close to the sensor).
	The sensor was not adjusted correctly (presence of a ferrous and or magnetic element close to the sensor when running the QSET adjustment).
	Indicates that a measurement is frozen and in this state the unit will not measure. To enter and exit this state do short touches on the < key.

2.4 Target ball selection

You should always select the target ball that is best suited for your application.

In choosing the right target ball the following needs to be considered:

- Measuring range for the intended application
- The shape (curvature) of the test piece

For the measuring range that corresponds to each target ball please refer to the probe range table. Generally speaking larger target balls allow for wider measuring ranges and on the other hand if the test piece has closed curvatures or narrow spaces smaller target balls need to be used so that the ball can follow the shape of the test piece therefore avoiding erroneous measurements.

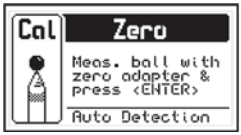
Each QB7 model allows specific target accessories such as balls, rods, coins and other measuring accessories and at the same time target balls can be steel or magnetic. While steel target balls are typically used for thin walls and the measuring range begins at 0 (zero), magnetic target balls are used to measure thicker walls and don't usually measure from 0 (zero).
In the QB7 target ball sizes can be selected from the measuring screen (page 10) as well as in the configuration menu (page 36) or when the "Auto" function (page 36) is activated target ball sizes are automatically detected.

2.5 Calibration

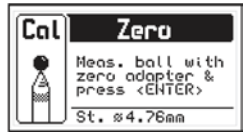
The QB7 can be calibrated with up to 8 calibration points depending on the intended level of accuracy and time that can be dedicated to this process. Minimum calibration is a 3 step process that involves measuring a target ball with a zero calibration fixture, leaving the

probe empty and then measuring the minimum posible thickness for the selected target ball. The QB7 must be calibrated for each target ball size when the target ball is changed.

To begin the calibration process press the Cal key and the unit will display one of the 2 messages that appear in figure 2.8 asking you to measure a target ball with its corresponding zero adapter and then pressing the ↵ key. If the unit was set to AutoBall (see Select Ball page 36) it will first detect the target ball automatically (figure 2.8a) and then display its diameter (figure 2.8b). To cancel the calibration press ⌂.



Auto Detection (a)



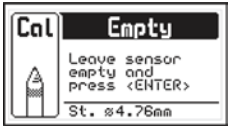
Ball diameter (b)

Figure 2.8 Zero calibration

Important

For target balls that don't measure from 0, "zero" calibration must be done with the minimum thickness that can be measured for that ball (see chart in page VIII). So for instance a 6,35 mm or 1/4" ball must be calibrated using a 1 mm or 39,3 mils calibration fixture.

When the unit is not configured for auto detection it will always show a preset target ball diameter (figure 2.8b).

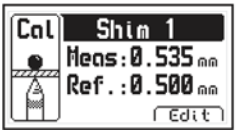


The unit will then display a message asking that you leave the sensor empty (without a target ball) and press ↵.
To cancel the calibration press ⌂.

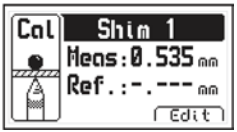
Figure 2.9 Probe calibration without a ball

As mentioned before you can do up to 8 calibration points using calibration fixtures that have the closest values to what you will be actually measuring but you need to conduct at least 1 calibration point to finish with the minimum calibration process.

After you press ↵ in the empty sensor calibration step the unit display will show "**Shim 1**" (see figure 2.10 "Without EZ-Cal") where you now need to measure a calibration fixture of a known thickness that will appear in "**Meas:**". Once a stable measurement is displayed press > to edit the "**Ref:**" value so that it matches the thickness of the calibration fixture that you are using.



With EZ-Cal activated



Without EZ-Cal

Figure 2.10 Use of reference calibration blocks

When the unit is measuring and EZ-Cal (see page 42) is activated reference values will be automatically displayed and can be edited using the > and in the Edit EZ-Cal menu reference values can also be changed using the ∧-∨ keys to scroll the list of preset

values.

With EZ-Cal activated | Without EZ-Cal activated

Figure 2.11 Editing calibration points

With EZ-Cal activated you can press the key to copy the measured value (Meas.) in the reference field (Ref.) so that you can edit from here.

Once the reference value has been adjusted you can continue to calibrate on additional calibration points by pressing the or you can end the calibration process pressing .

Important

The unit does not allow you to calibrate 2 points with the same thickness value. If this is the case the unit will advise that the calibration point is not accepted rejecting the entry of a repeat value.

2.6 Changing the sensor tip

When the sensor is displaced to conduct thickness measurements the tip naturally undergoes wear because of abrasion and because of the force exherted by balls. Even though dmq sensor tips are hard coated to ensure durability, over time the tip will begin to wear affecting the accuracy of the QB7. If this happens the tip needs to be replaced and calibration is needed for the new tip. And since special tips for specific applications are also available calibration is also needed when changing tips. In other words in order to ensure accuracy calibration must always be done when replacing or changing tips.

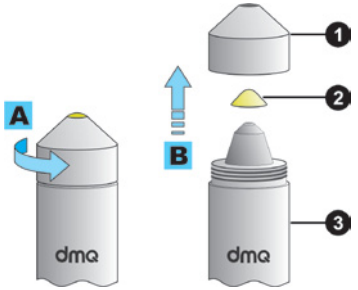


Figure 2.12 Sensor head details

1. Threaded cap
2. Interchangeable tip
3. Sensor body

To replace or change the tip (2) simply unscrew and take off the cap (1), replace or change the old tip for a new standard or special tip and gently screw the cap back making sure the tip sits in position.

In order to make sure the tip (2) is properly placed you can gently screw and unscrew the cap (1) until the tip falls into position. Always replace or change tips with the sensor in a vertical position as seen in figure 2.12 and hand tighten the cap.

Important

Tighten the threaded cap manually as no tools are needed.

Making sure that the interchangeable tip sits correctly on the tip of the sensor is necessary ir order for the sensor to work properly.

2.7 Sensor tip calibration

The accuracy of the sensor can be affected by small constructive differences in the tips and for this reason alone everytime the tip is replaced or changed you should always run the tip calibration procedure.

Calibrating the tip is a simple and quick process that for the standard tip requires the use of a 4.76 mm or 3/16' Ø ball and the zero calibration fixture. For optional tips a different ball size may be needed.

2.7.1 Tip cal menu

Cfg.Measure » Tip Adjust

When choosing the **Adjust** tip option a menu as seen in figure 2.13 will be displayed with the option to begin the adjustment process for a tip and memories of tips that where previously adjusted.

Figure 2.13 Adjust tip menu

2.7.2 Tip adjustment

After a new tip has been placed press ↵ in the **Adjust Tip** option to begin the process of adjusting the tip. The first step is to simply remove the target ball from the zero calibration fixture, press > and wait.

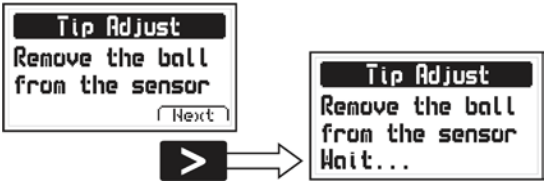


Figure 2.14 First step for adjusting the tip

For the second step the unit will ask that you zero the sensor using the 4,76 mm or 3/16' Ø target ball. Here you need to place the target ball in the calibration fixture, press > and wait.

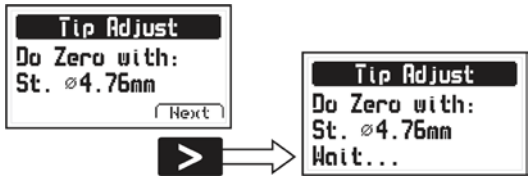


Figure 2.15 Second step for adjusting the tip

For the third and last step the unit will ask that you remove the target ball and press > to finalize the adjustment process.

If the adjustment was successful the unit will display a message saying that the tip has activated auto target ball detection mode to automatically detect the target ball size during calibration. This feature may be turned on or turned off automatically depending on the type of tip that is being adjusted. A message is displayed at the end of the adjustment process as seen in figure 2.16. Generally speaking adjusting both our narrow and chisel tips (optional) will turn off the auto target ball detection feature.

Figure 2.16 Auto target ball mode status message

The message will last only a couple of seconds afterwhich the tip adjustment process will have ended.

Important

Before conducting the tip adjustment process check to make sure that the sensor is nowhere near ferrous elements or magnetic fields.

The tip adjustment process cannot be interrupted once it begins so if you wish to cancel simply go through with the process without placing target ball over the sensor as required in the second step of the tip adjustment process.

2.7.3 Tip calibration memory

Once a tip has been adjusted you can save its calibration which is particularly useful when using different sensor tips that may be required for specific applications. Simply change tips and open the calibration memory to reload a saved calibration.

The **Adjust Tip** menu has 3 (Mem) options to save 3 adjustements.

Press ↵ on the memory that you would like to open and a screen as shown in figure 2.17 will be displayed.

Figure 2.17 Tip calibration memory screen

The 3 options that appear on the tip memory screen are explained herein:

Option	Access Key	Function
Open	<	Opens the memory adjustment that you select overwriting the existing adjustment.
Save	Cal	Saves the current adjustment.
Name	>	Opens the text editor so that you can edit the memory name (see page 23).

Also in the Tip Calibration Memory screen you will see what memory is currently being used by the instrument with "Open: Yes" (memory being used) or "Open: No" (memory closed).

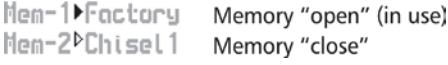


Figure 2.18 Details in the Adjust tip menu

The triangle to the right of Mem-1 or Mem-2 as seen in figure 2.18 above also indicates if the memory is being used (triangle is painted) or if the memory is closed (triangle is empty).

3 Menu system and editing

3.1 Basic rules on the user interface

3.1.1 Using the menu system

The instructions explained in this chapter apply to all of the menus in the unit.

To scroll QB7 menu options use the ∧-∨ cursor keys. When you reach the end of the menu and move to the next menu option it becomes circular as shown herein.

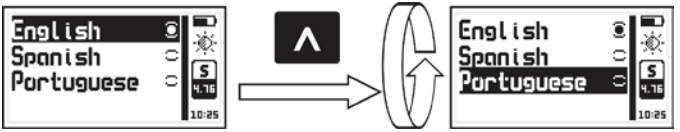


Figure 3.1: Example of how a circular menu works

To select a menu option press ↵ and to exit and return to the previous menu press ⌂.

To go to the measuring screen press ⌂ from the main menu, or press Cal from any other menu in the unit.

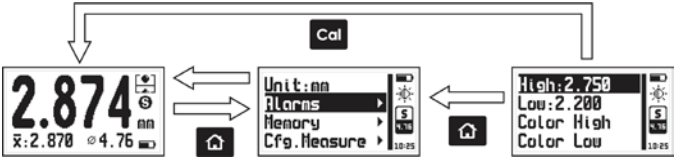


Figure 3.2: Ways of going to the measuring screen

3.1.2 Text editor

The text editor is used to input, modify and delete; letters, numbers and symbols.

Figure 3.3: Alphanumeric editor screens

1. Selected key
2. Cursor
3. Text to be edited
4. Virtual keyboard

Use the cursor keys to scroll the virtual keyboard until you find the character that you want to use and press ↵ to select.
Press the ⌂ key to move to the upper case virtual keyboard and to the numbers and symbols keyboard as seen on figure 3.3.

There are 4 keys that are common to all virtual keyboard screens:

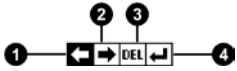


Figure 3.4: Common virtual keyboard keys

1. Move cursor to the left
2. Move cursor to the right
3. Delete character on which cursor is on
4. Enter and exit

Press the key to open the direct access keyboard to the most commonly used virtual keyboard keys. Each virtual key corresponds to a key on the front panel of the unit as follows:

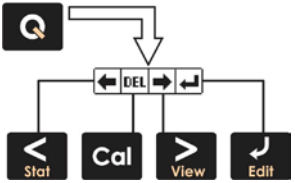


Figure 3.5: Quick access keys for the virtual keyboard editor

Stat : Move cursor to the left

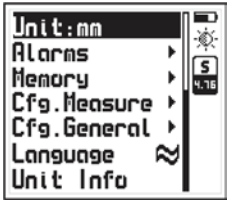
Cal : Delete character on which cursor is on

View : Move cursor to the right

Select : Enter and exit

To close the direct access keyboard and continue using the virtual keyboard press .

3.2 Main menu



The main menu is the first list of options you see when you exit the measuring screen and includes some of the most important settings.

Press [⌂] from the measuring screen to access this menu.

Figure 3.6: Main menu

Note: *The "Memory", "Cfg.Measure" and "Cfg.General" options are explained later on in this manual.*

3.2.1 *Changing the measuring unit*

Unit

Press [↵] on the **Unit** option located in the main menu to open the list of available units.

Use the [∧]-[∨] keys to scroll the menu.

Press [↵] to select the hardness unit.

Press [⌂] to save and exit this menu

Figure 3.7: Unit menu

3.2.2 *Alarm settings*
Alarms

The QB7 has high and low alarm conditions that alert the operator when a measurement is greater than the value set for the high alarm and or when a measurement falls below the value set for the low alarm.

Press ↵ on **Alarms** to open the alarm menu options.

Press ↵ on **High** or **Low** to open the numbers editor where you can set alarm values using the cursor keys.

Press ↵ to save the alarm value that you entered and to return to the previous menu.

Figure 3.8: Alarm menu options

Alarm types that you can choose from include:

Color High: Set a display color for the high alarm.

Color Low: Set a display color for the low alarm.

Beep: Audible intermittent alarm type.

Back Color: Activates Color High and Color Low alarm types.

Screen: Visible alarm that causes measurements to be displayed in dotted instead of regular numbers.

Light: Visible alarm that activates the display backlight illumination causing it to flash.

3.2.3 *Select language*
Language

Press ↵ on language (which is also identified with a flag) to view available language options.

Use the cursor keys to navigate available language options and press ↵ to select. Press ⌂ to save and exit this menu.

Figure 3.9: Language menu options

3.2.4 *Unit information*
Unit Info

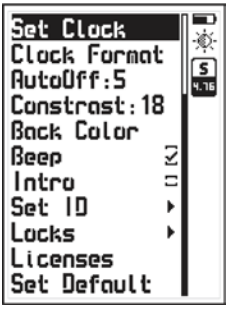
Select **Unit Info** to view information including owner data, software and hardware versions and other complimentary information for your unit.

Figure 3.10: Unit information screens

To switch information screens press the < > keys and press ⌂ to return to the main menu.

3.3 General Configuration
Cfg.General

Press ↵ on the **Configure** option to open the general configuration options menu.



Use the ∧ - ∨ keys to scroll the menu.

Press ↵ to select any of the menu options.

Press ⌂ to exit and to return to the previous menu.

Figure 3.11: General configuration menu

3.3.1 *Set time and date*
Cfg.General » Set Clock

Choose **Set Clock** to open the time and date editor.

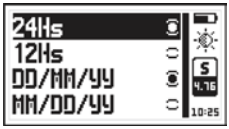
Use the cursor keys to set the time and press ↵ to save and enter the date editor screen. Set the date and press ↵ to save and exit.

Figure 3.12: Time and date edit screens

3.3.2 *Date and time format*

Cfg.General » Clock Format

Choose **Clock Format** to open the menu that allows you to set the time format (12Hs or 24Hs) and the date format (D/M/Y – M/D/Y).



Press ↵ on the options that you wish to use and press ⌂ to save and exit.

Figure 3.13: Date and time format menu options

3.3.3 *Set AutoOff time*

Cfg.General » AutoOff

The unit will shutdown automatically if no key is pressed or no measurement is made after a time set by you.

Press ↵ on **AutoOff** to set the time for the unit to automatically shut down.

Press the ∧-∨ keys to set the time and press ↵ to save and exit.

Press ⌂ to exit without changes.

Figure 3.14: AutoOff time setting screen

3.3.4 *Adjust display contrast*

Cfg.General » Contrast

Contrast settings allow you to turn the unit screen lighter or darker where 1 is the lightest and 32 is the darkest.

Press ↵ on **Contrast** and use the ∧ ∨ keys to change the contrast on your screen.
Press ↵ to save or press ⌂ to exit without making changes.

Figure 3.15: Contrast setting screens

Tips

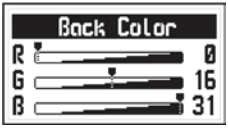
Contrast on LCD screens can change with temperature. Use the contrast option to compensate for changes caused by temperature to maintain optimal viewing conditions.

3.3.5 *Set display color*

Cfg.General » Back Color

Press ↵ on **Display Color** to change the background color on your QB7 display using three bars that represent three basic colors; R: red, G: green and B: blue.

Use the ▲-▼ keys to adjust colors individually (the color you selected will have a flashing indicator) and then use the Q key to adjust another color.



Press ↵ to save and exit or press ⌂ to exit without changes.

Figure 3.16: Display background color settings screen

3.3.6 *Beep activation*

Cfg.General » Beep

Beep refers to the sounds that the unit makes when keys are pressed and when the audible alarm is active.

Press ↵ to enable or disable the beep option.

3.3.7 *Introduction screen*

Cfg.General » Intro

The introduction screen is the first screen that you see when the unit is turned on and can include owner information such as name, telephone number and e-mail.

Press ↵ to enable or disable this option.

3.3.8 *Owner information*

Cfg.General » Set ID

This option allows you to enter owner information (same information that will appear on the introduction screen).

Press ↵ on **Set ID** and enter the factory default password which is 12345 and press ↵ again to access owner info menu options.

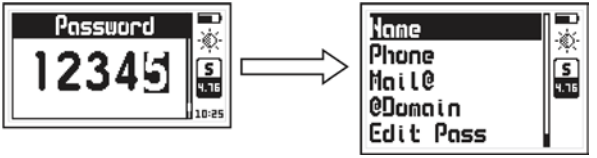


Figure 3.17: Enter password and owner information menu

The owner information that can be entered / changed includes the following:

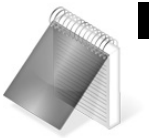
Name: Set or change the owner name.

Phone: Set or change the telephone number.

Name@: Set or change the e-mail (before the @).

@Domain: Set or change the domain for the e-mail (after the @).

Edit Pass: Change the password used to access this menu.



Notes

For more information about the use of the text editor refer to page 23.

When showing user information the e-mail address is displayed as "Name@Domain".

Important

The factory default password is 12345. You can change this password after adding your user information.

3.3.9 *Lock configurations*

Cfg.General » Locks

Specific configuration options on the QB7 can be locked in order to avoid unwanted changes. Use of the locking options for example allow a supervisor to optimize unit configuration settings required for a specific test and then pass the unit on to an operator for him or her to conduct the actual measurements knowing that the unit has been properly configured and that the settings cannot be changed.

Press ↵ on **Locks** and enter your password. Then press ↵ again to view the configuration options that can be locked.

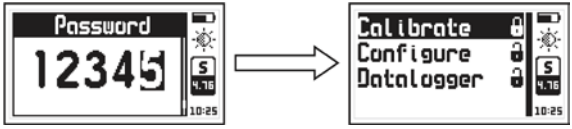


Figure 3.18: Lock configuration options

Each option is followed by a lock indicating whether the feature is locked (closed lock) or unlocked (open lock).

Press ↵ on each of the following options to lock or unlock:

Calibration : Lock or Unlock probe calibration.

Configure : Lock or Unlock the measuring configuration options.

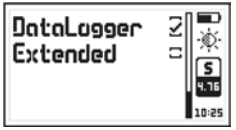
Datalogger : Lock or Unlock Datalogger configuration options.

3.3.10 *Model upgrade license*

Cfg.General » Licenses

A QB7 B can be upgraded to a QB7 E with the purchase of an upgrade license and an upgrade calibration kit. In order to issue a model upgrade license we will ask you for the unit serial number.

Press ↵ on **Licenses** to view the license available for your unit.



Press ↵ to view the available license (checkmarks indicate active licenses) or press ⌂ to return to the previous menu.

Figure 3.19: Model upgrade license screen

When you checkmark the license a screen will show where you have to enter the upgrade license number using the cursor keys and the pressing ↵ to confirm.

Figure 3.20: Enter upgrade license number screen

After you enter the new license number the unit will respond with one of the following messages:

Wrong license password message

Correct license password message

Figure 3.21: Response messages after a license is entered

If the license number that you entered is correct the unit will show an updated license screen where the newly purchased license appears followed by a checkmark.

3.3.11 *Set factory defaults*

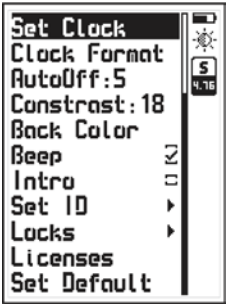
Cfg.General » Set Default

Choose **Set Default** to return to the original factoryault general configuration options.

Press ↵ and a confirmation screen will appear. Press < to confirm and return to the previous menu or press > to exit without making changes.

Figure 3.22: Set factory default settings confirmation screen

3.4 Measuring configuration options
Cfg.Measure



Choose **Cfg.Measure** in the unit main menu to view all available measurement configuration options.

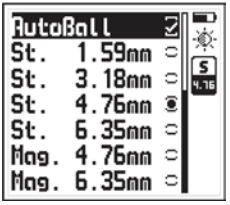
Use the ∧ - ∨ keys to scroll the menu and press ↵ to select a specific option. . To exit the menu press ⌂.

The **Adjust Tip** option is explained in section 2.7.1

Figure 3.23: Measuring configuration menu

3.4.1 *Target ball selection*
Cfg.Measure » Select Ball

Press ↵ in **Select Ball** to select the target ball (target disk or wire) that you will be using to measure.



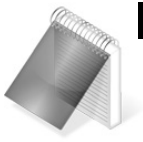
Use the ∧ - ∨ keys to scroll the menu and press ↵ to select.

To exit the menu press ⌂.

Figura 3.24: Target ball selection menu

When using a standard tip on dmq hall effect sensors the unit can automatically detect the target ball. You can enable or disable **AutoBall** which is the first item in the target ball selection menu (see figure 3.24) by placing a checkmark on this option. When AutoBall is enabled the unit automatically recognizes the target ball during calibration.

With narrow and chisel type tips the AutoBall option cannot be enabled and will appear with irregular letters.



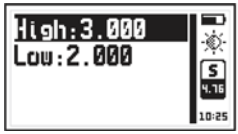
Note

The options that appear in the target ball selection menu are determined by your unit model. Figure 3.24 shows the menu that appears for a QB7 E (extended range model).

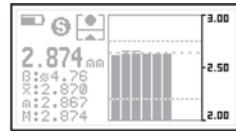
3.4.2 *Set histogram range*

Cfg.Measure » Histo Range

Here you can set high and low measuring ranges that will be represented on the vertical axis of the graphical measuring screen.



Adjust range screen



Graphic representation

Figure 3.25: Adjust histogram range and graphic representation

3.4.3 *Set histogram size*

Cfg.Measure » Histogram

In this option you can set the number of bars to be displayed in the histogram for up to 16 bars. By default the graphic measuring screen in the QB7 shows a histrogram with 5 bars corresponding to the last 5 measurements.

Press ↵ on **Histogram** to open the editor where you can set the number of bars and press ↵ to save and ⌂ to exit.

Figure 3.26: Adjust histogram dimension screen

3.4.4 *Set measuring mode*

Cfg.Measure » Measure

Press ↵ on **Measure** to open the measure modes options menu.

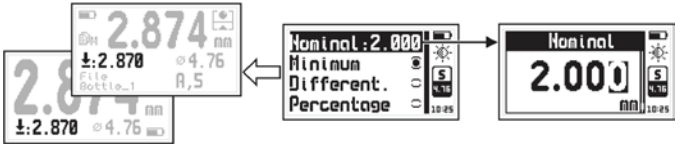


Figure 3.27: Measure modes menu and set nominal value screen

The modes in which measurements are represented are:

Minimum : The unit displays the minimum value or average value to the screen mode being used.

Differential : A value is displayed that is the result derived from:

Differential = Measurement – Nominal

Percentage : A value is displayed that is the result derived from:

Percentage = (Measurement / Nominal) * 100

The nominal value is a reference value that can be set for the test piece. To change this value press ↵ on **Nominal** and press ↵ to save or press ⌂ to exit without making any change.

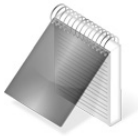
3.4.5 *Measuring refresh rate*
Cfg.Measure » Refresh

Press ↵ on **Refresh** to select the unit measuring speed.

Use the ∧ – ∨ keys to scroll the menu and press ↵ to select.

To exit the menu press ⌂.

Figure 3.28: Measuring refresh rate menu

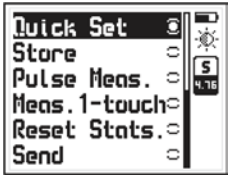


Note

When the memory is set to "Auto" capture mode (see page 57) and it is set to "Save every" (see page 58) less than 5 measurements, the refresh speed will be lower.

3.4.6 *Select QSet button function*
Cfg.Measure » QSet

Press ↵ on **QSet** to select the function that you want to activate when pressing the QSet button located on the QB7 sensor.



Use the ∧ – ∨ keys to scroll the menu and press ↵ to select.

To exit the menu press ⌂.

Figure 3.29: QSet button functions selection menu

Quick Set : Runs a thermal and magnetic "zero" on the sensor.

Store : Saves the current measurement in the datalogger.

Pulse Meas. : Hold QSET button to enable measurements.

Meas. 1-touch : Press QSET button to enable and disable single measurements.

Reset Stats. : Resets real time statistics.

Send : Sends the current measurement via RS232.

Important

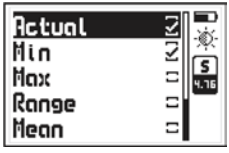
When running Quick Set using the QSet button or an external pedal (optional), always make sure that ferrous or magnetic elements are not close to the sensor.

3.4.7 *Select external pedal function*
Cfg.Measure » Pedal

Press ↵ on **Pedal** to select the function that you want to activate when stepping on the optional external pedal available for the QB7. The functions that can be assigned to the pedal are the same functions available for the QSet button (see section 3.4.6).

3.4.8 *Configure send in RS232*
Cfg.Measure » Config.Send

Press ↵ in **Config.Send** to select what information will be sent via RS232 when the QSet button or external pedal is set to "Send".



Use the ∧ - ∨ keys to scroll the menu and press ↵ to select.

To exit the menu press ⌂.

Figure 3.30: Information selection menu for transmission

The format of data sent in ASCII 9600-8N1 is:

U N:XXXXX m:XXXXX M:XXXXX R:XXXXX A:XXXXX 0

Where:
U is the unit: M:metric, I:imperial
N is the actual measurement (place a checkmark in "Actual" to select)
m is the minimum value (place a checkmark in "Min" to select)
M is the maximum value (place a checkmark in "Max" to select)

R is the range value (place a checkmark in "Range" to select)
A is the average value (place a checkmark in "Average" to select)
XXXXX is the value in ASCII as seen in the unit screen

The information package is closed with a null character (0).

3.4.9 *Hold last measurement*

Cfg.Measure » Hold last

When placing a checkmark on **Hold last** the unit will keep showing the last measured value even when the probe is lifted. When this option is unchecked the display will show "--.--" meaning that the sensor isn't measuring.

Press ↵ to check or uncheck this option.

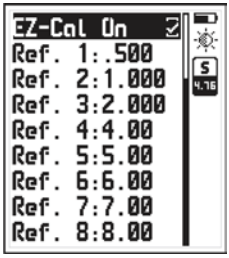
Hold last checked Hold last unchecked

Figure 3.31: Hold last screens

3.4.10 *EZ-Cal calibration editor*

Cfg.Measure » Edit EZ-Cal

Press ↵ on **Edit EZ-Cal** to enter the EZ-Cal menu where you can edit calibration reference values.



Use the ∧ – ∨ keys to scroll the menu and press ↵ to select.

To exit the menu press ⌂.

Figure 3.32: EZ-Cal calibration menu

To activate EZ-Cal during the calibration procedure press ↵ in the **EZ-Cal On** option (first item in the EZ-Cal edit calibration menu, see figure 3.32). To edit calibration reference values press ↵ on the value that you want to edit in order to set the calibration sequence that you will be using for the unit.

3.4.11 Probe information

Cfg.Measure » Probe info

Here you can view information on the sensor connected to the unit. Press any key to exit this screen.

Figure 3.33: Probe information screen

4 Using the Datalogger

4.1 Understanding how data is organized

In order to optimize the use of the Datalogger in your QB7 you first need to understand how data is organized. Up to 8 individual files with alphanumeric names can be used to store data. Each file contains a grid with columns and rows and each grid contains columns identified with consecutive letters (A, B, …AA, AB…) that store a number of values set in Group (N). Each value is identified with a column letter and a row number.

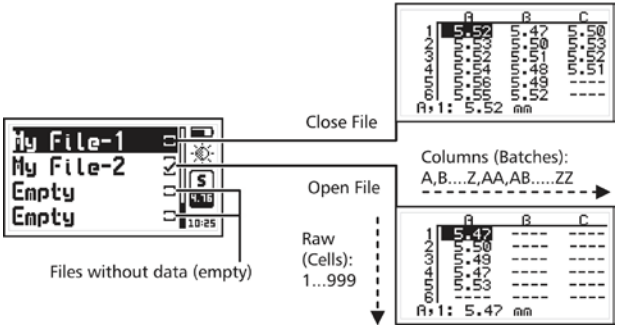
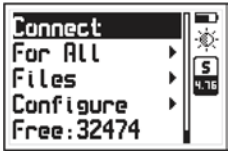


Figure 4.1: Understanding how data is organized

With this grid structure the position of the value being stored is always represented as a "Batch, Cell" so for example F,7 means that the value is in column / batch F, row / cell 7.

4.2 Memory menu

Memory



Select **Memory** from the main menu to view all menu options for the Datalogger. This chapter explains how to create, organize and view files.

Figure 4.2: Memory menu options

4.3 Creating a new file

Press ↵ on **Files** and use the cursor keys to see the list of files in the unit.

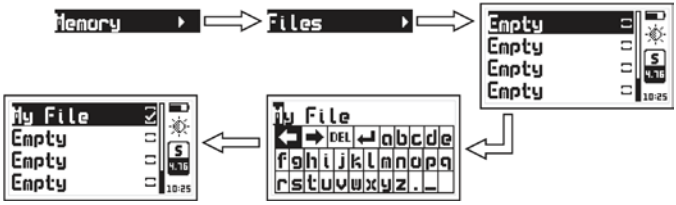


Figure 4.3: Creating a new file

Select a file that appears as **Empty** and press ↵ to name the file with up to 10 alphanumeric characters.

After you enter a name a checkmark will appear meaning that a new file has been created and is ready to be used. Remember that only one file can be open at any given time so when a new file is created any open file is automatically closed. Once a file has been closed it cannot be reopened and new values can no longer be stored. In closed files values can only be viewed.

When you create a new file and another file is already open a warning screen will ask if you want to close the last file.

Press < to confirm that you want to close the open file and open a new one or press > to cancel and return to the menu.

Figure 4.4: Close file confirmation screen

4.4 Actions over single files

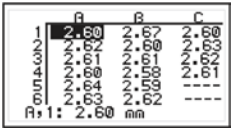
Memory » File » Name

Press ↵ on any file that is not empty and a menu will open with all available options for that file.

Figure 4.5: Single file actions menu

4.4.1 *View data in a single file*

Memory » File » Name » View Data

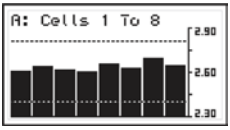


Press ↵ on **View Data** to see values stored in the file.

Press ⌂ to exit the file.

Figure 4.6: View data within a file

To move within the grid use the cursor keys and press the ✣ key to go to the last column that contains data.



Press ↵ on any value within a column to open a histogram representing all values within the column.

Press ⌂ to exit the histogram and return to the grid.

Figure 4.7: Histogram of a column of values

High and low thickness alarms can be seen in the histogram as horizontal dotted lines.

4.4.2 Use of the Q key in a grid

Press Q to open the quick access menu that allows you to go directly to a position within the grid.

Select the **Row**, **Column**, and **Cell** using the < ^ > keys.

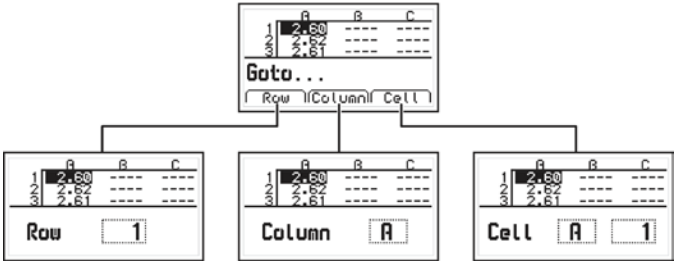


Figure 4.8: Quick access options from within a grid

Row: Enter a row number using the cursor keys so that when you press ↵ the grid will position itself directly on that row.

Column: Enter the column letter using the cursor keys so that when you press ↵ the grid will position itself on that column.

Cell: This is a combination of (column and row) so that you can go to a specific cell after you enter the row number and column letter.

4.4.3 The Q key in a histogram

Press the Q key in the histogram to open the quick access menu that allows you to obtain statistical information for the group of values being displayed.

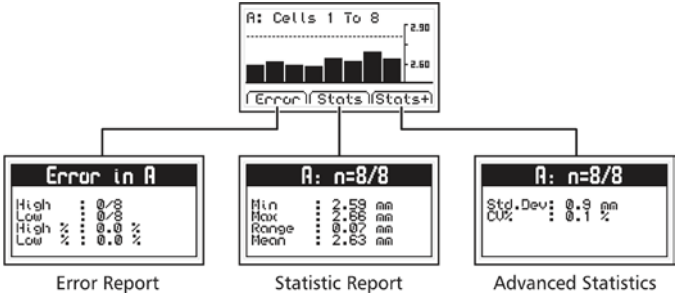


Figure 4.9: Quick access options within a histogram

Error: Displays the number of errors and error percentage values in the batch based on the high and low alarm settings.

Stats: View statistical information for the batch including Min., Max., Range and Mean values

Stats+: View the standard deviation and the percentage (coefficient variation) for the batch.

4.4.4 Rename a file

Memory » Files » Name » Rename

Press ↵ on **Rename** to open the text editor and change the name of the file.

4.4.5 *Send data from a single file*

Memory » Files » Name » Send

Press ↵ on **Send** to values from a single file to a PC using Windows HyperTerminal. Files can also be sent to a printer using an RS232 connection. This option does not work in USB mode.

4.4.6 *View file size*

Memory » Files » Name » Size

Press ↵ on **Size** to view the number of values within a single file (the size of the file is expressed as a percentage of total unit memory). You can also view the date and time in which the file was created.

4.5 Actions over all files

Memory » For All

Press ↵ on **For A**ll to open the menu for actions that will affect all files stored in the unit memory.

.Figure 4.10: Actions over all files menu

4.5.1 *Send all files*

Memory » For All » Send All

Press ↵ on **Send All** to send all files stored in the unit memory to a PC using Windows HyperTerminal Files can also be sent to a printer using an RS232 connection. This option does not work in USB mode.

4.5.2 *Erase all files*

Memory » For All » Erase All

The **Erase All** action permanently deletes all files stored in the unit memory and recovers 100% of the memory capacity.

Before files are actually deleted a screen will be displayed asking you to confirm or to cancel this action.

Press **>** to cancel and return to the previous menu or press **<** to begin deleting all files.

Figure 4.11: Erase all confirmation screen

When the erase all action has been confirmed the following screens will be displayed:

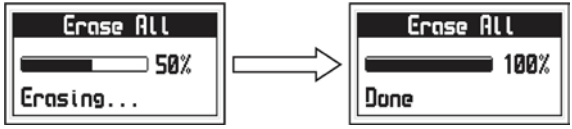


Figure 4.12: Erase all progress screen

Once the memory has been erased files will be shown with the name **Empty** and in the measuring screen the datalogger will be displayed as **No File**.

4.6 Direct memory access (Mem key)

From the measuring screen press V to view all direct memory access options.

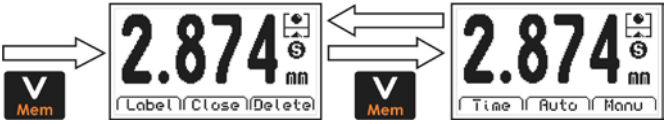


Figure 4.13: Direct memory access options

A total of 6 options are available that are grouped in two screens. To access these options use the < - ^ - > keys. To switch screens press V as seen in figure 4.13.

The options in the first screen (left screen in figure 4.13) are:

Label: Allows you to tag a value with a number from 0 to 65535 so that it can be easily identified in the grid that you open in DataCenter. Tags are not seen in the grids displayed in the unit.

Close: Close the current file and open a new one.

Delete: Delete the last stored value.

The options on the second screen (right screen in figure 4.13) are:

Time: Inserts the time when the value was stored (only visible in DataCenter).

Auto: Activates the auto capture mode.

Manu: Activates the manual capture mode.

4.7 Connecting to a PC with DataCenter

Memory » Connect

Press ↵ on **Connect** to enter Waiting: USB mode.

Press > to exit and cancel the connection.

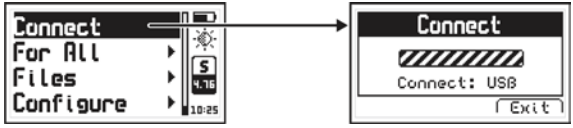


Figure 4.14: Connecting to a PC

With the unit waiting to connect plug the USB or RS232 cable depending on the unit and PC software configurations and click the <Connect/Disconnect> icon in DataCenter.

When a successful connection is established the files in the unit memory will appear in DataCenter. To view their contents simply double click on each file.

Additional information on dmq DataCenter software is included in the dmq pendrive that you received with your QB7.

Important

In order to establish a successful connection between your QB7 and your PC both DataCenter and the QB7 need to be configured with the same interface (USB, RS232 or Bluetooth).

4.8 Datalogger configuration

Memory » Configure

In the memory menu press ↵ on **Configure** to open the Datalogger configuration options menu.

Figure 4.15: Datalogger configuration menu

4.8.1 *Configure communication*

Memory » Configure

The first two options in the Datalogger configuration menu are **Mode** and **Send** which allow you to select how the unit will communicate with a PC and if you will be sending data to a PC or to an external printer.

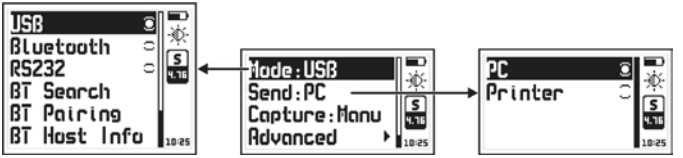


Figure 4.16: Configure communications options

Press ↵ on **Mode** to select the type of connection.

USB: Select USB to connect to a PC using a USB cable (included). Requires having dmq DataCenter installed in your PC.

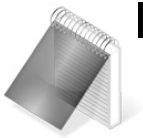
Bluetooth: Choose Bluetooth for a wireless connection. Requires having dmq DataCenter installed in your PC.

RS232: Select RS232 to connect to a PC or printer using an RS232 cable (optional).

Press ↵ on **Send** to select whether you will send files to a PC or to a printer.

PC: When using an RS232 cable the unit sends data in an optimal format for Windows HyperTerminal (38400-8-N-1).

Printer: Using an RS232 cable and printer the unit sends data in an optimal format for mini-printers of 40 columns (9600/8-N-1).



Notes

The printer option does work in USB.

The selection to send to a PC or to a printer will not affect communications with DataCenter.

4.8.2 *Search for Bluetooth device*

Memory » Configure » Mode » BT Search

In order to send data via Bluetooth you first need to establish a connection with the device that will receive data sent from the QB7. To begin the connection process place the QB7 close to the device that you will be connecting to and press ↵ on **BT Search**.

In order for the QB7 to find a device make sure that the Bluetooth option in the device that you want to connect to is enabled.

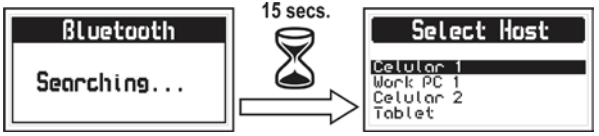


Figure 4.17: Searching for Bluetooth devices

Once the search has begun the unit screen will show Searching… (as seen in figure 4.17) and in approx 15 seconds the unit will show all available Bluetooth devices that are close to the unit. Use the ^ - v keys to select the device that you want to connect to and press ↵ to finish.

From this point forward each time the unit is set to communicate via Bluetooth a connection will be established with the same device.

Using the **Send** option (see page 50) you can receive data with any Bluetooth device capable of showing ASCII chains.

4.8.3 *Show receiving device*

Memory » Configure » Mode » BT Host Info

Press ↵ on **BT Host Info** to see the "identity" of the device that you are connecting to via Bluetooth.

Figure 4.18: Bluetooth receiving device identity

4.8.4 *Pair Bluetooth device*

Memory » Configure » Mode » Pair BT

Press ↵ on the **Pair BT** option and wait for the QB7 to be found by the device that you want to pair the unit to and once the pairing process is done press > to exit. The Bluetooth password for the QB7 is 1234.

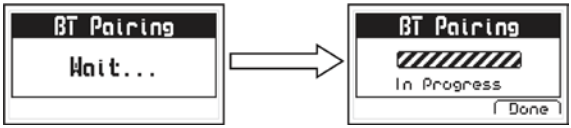
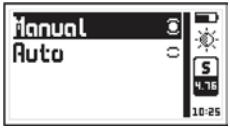


Figure 4.19: Pairing Bluetooth screens

4.8.5 *Data capture modes*

Memory » Configure » Capture



Press ↵ on **Capture** to select the mode in which values will be stored in the Datalogger.

Figure 4.20: Memory capture options

The QB7 has two modes in which to capture or store values:

Manual: Press the ∧ key to store values.

Auto: Measurements are automatically stored in the Datalogger and you can also store values manually pressing the ∧ key.

4.8.6 *Advanced memory config options*

Memory » Configure » Advanced

This menu includes advanced datalogger configuration options.

Figure 4.21: Advanced configuration options

When **History** is checkmarked changes in calibration, target ball and any other actions that affect measurements will be saved in the unit memory. This information allows you to have better control over the testing conditions and is only visible in DataCenter.
Activation of the History function will increase memory usage in the datalogger.

Press ↵ on **Clock** to select how date/time will be registered in the datalogger each time that a new file is opened. This information can only be viewed in DataCenter.

4.8.7 *Store every X measurements*

Memory » Configure » Advanced » Sto.Every

Press ↵ on **Sto.Every** to set the number of values to be taken before an actual value is saved in the datalogger when using the Continuos saving mode (see Data capture modes page 55).

4.8.8 *Enable or disable history*

Memory » Configure » Advanced » History

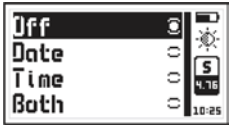
When a checkmark is placed in the **History** option the unit saves all changes that can affect measurements (calibration, target ball, etc.). This information allows for better control over the conditions in which testing was made. History information is only visible in DataCenter.

Keep in mind that use of the history option reduces the memory capacity on the datalogger.

4.8.9 *Configure time and date options*

Memory » Configure » Advanced » Clock

Press ↵ on **Clock** to set the time and date options that will be recorded by the datalogger each time a new batch is opened. This information is only visible DataCenter.



Press ∧-∨ to scroll menu options and ↵ to select and exit. To exit without making changes press ⌂.

Figura 4.21: Date and Time datalogger record selection

Off: The Datalogger does not record date and time.

Date: When a new batch is opened the Datalogger records the date.

Time: When a new batch is opened the Datalogger records the time.

Both: When a new batch is opened the Datalogger records the date and time.

Tips on how to measure correctly

When selecting the QB7 model that is right for your application as well as the correct target ball consider all of the following:

- Expected maximum test piece thickness
- Accuracy required on your measurements
- Minimum test piece curvature
- Material elasticity as larger diameter target balls as well as magnetic target balls will exhert a greater attraction force to the tip of the sensor possibly causing soft materials to compress which will result in thickness measurements lower than the real thickness.
- Test piece surface hardness should also be considered since the use of magnetic target balls could leave marks on the surface because unlike steel target balls that turn, magnetic target balls are "pushed".

When measuring thick test pieces or in order to obtain higher accuracies use the QSet button frequently (even before each measurement) remembering to always remove the target ball from the tip of the probe.

Accuracy

The accuracy for the QB7 depends on the target ball used and the type of calibration. Smaller target balls usually result in lower accuracies and on the other hand the more calibration points that are added in the calibration process will result in higher accuracies.

The following table shows accuracy levels in each case:

Accuracy levels for each target ball type and diameter

Part #	Description	Simple Calibration	Multipoint Calibration
QBR301	Steel target ball 1,59 mm (1/16 inch)	4%	3%
QBR302	Steel target ball 3,18 mm (1/8 inch)	4%	2%
QBR303	Steel target ball 4,76 mm (3/16 inch)	3%	1%
QBR304	Steel target ball 6,35 mm (1/4 inch)	3%	1%
QBR403	Magnetic target ball 4,76 mm (3/16 inch)	3%	2%
QBR404	Magnetic target ball 6,35 mm (1/4 inch)	3%	2%

Note: The QBS201 sensor can be used with steel target balls only.

Taking care of the probe

- Do not expose the probe to temperatures above 60°C (140°F).
- Do not bring the probe close to ferrous and or magnetic elements.
- Do not use tools to tighten or loosen the probe holding tip head on the probe as this is something that is done manually.

Technical Specifications

Measuring Principle	Hall Effect through magnetic attraction
Probe	Stainless steel probe with interchangeable titanium tips
Target ball types and diameters	Steel: 1,59 mm (1/16"), 3,18 mm (1/8"), 4,76 mm (3/16"), 6,35 mm (1/4") Magnetic: 4,76 mm (3/16"), 6,35 mm (1/4")
Calibration	Up to 8 points
Units	Milimeters, thousands of an inch
Resolution (entire range)	Metric : 0 ~ 2,999 mm :0,001 mm 3 ~ 25 mm : 0,01 mm Imperial : 0 ~ 119,9 mils : 0,1 mils 120 ~ 1000 mils : 1 mils
Measuring range	0 ~ 22mm (0 ~ 870 mils)
Accuracy	±1 to 4% depending on the target ball and calibration
Realtime statistics	Maximum, Minimum, Average, Range
Alarms	Minimum and maximum with audible and visual alerts
Languages	English, Spanish, Portuguese
Datalogger	Up to 32500 values in 8 files Manual and continuous capture modes Alphanumeric filenames Date and time registration View grid and graphics with statistical calculations
PC connection	USB, Bluetooth and RS232
Display	Graphic 128 x 64 pixel display with contrast adjustment and color backlight illumination.
Keypad	Touch with flexible dome.

Power	2 "AA" Ni-MH rechargeable cells via USB
Battery life	25 hs with a full charge
Operating temp.	-10°C to 50°C (14°F to 122°F)
Dimensions	195 x 112 x 65 mm (7.67" x 4.40" x 2.55")
Weight	830g (29.27oz) with batteries

Table 1: Measuring ranges by target ball

Part #	Target ball type and diameter	Range
QBR301	Steel target ball 1,59 mm (1/16 inch)	0 ~ 2,5 mm (0 ~ 100 mils)
QBR302	Steel target ball 3,18 mm (1/8 inch)	0 ~ 5 mm or (0 ~ 200 mils)
QBR303	Steel target ball 4,76 mm (3/16 inch)	0 ~ 7 mm (0 ~ 280 mils)
QBR304	Steel target ball 6,35 mm (1/4 inch)	1 ~ 8 mm (40 ~ 320 mils)
QBR403	Magnetic target ball 4,76 mm (3/16 inch)	2 ~ 16 mm (80 ~ 630 mils)
QBR404	Magnetic target ball 6,35 mm (1/4 inch)	4 ~ 22 mm (160 ~ 860 mils)

Note: The QBS201 sensor can be used with steel target balls only.

Additional information

Unit maintenance

The QH7 was developed and manufactured for years of trouble free operation and even though the unit does not require special care the following precautions should be considered:

- Avoid contact with corrosive and abrasive substances.
- Do not clean the unit with solvents.
- Do not leave the unit display exposed to direct sunlight for prolonged periods of time as this could damage the display.
- When replacing rechargeable batteries make sure you use type "AA" Nickel-Metal batteries and observe the polarity.
- Always remove connectors by pulling from the connectors themselves and not from the cables.
- Do not twist or strangle cables.
- Do not expose the unit to temperatures below -10°C (14°F) or above 50°C (122°F).
- Do not bring the sensor close to ferrous and or magnetic elements except for the materials needed to measure that where included with the unit.

QB7 accessories

Part #	Description
QBK201	Steel target ball kit includes 1.59 mm or 1/16" (100 pcs), 3.18 mm or 1/8" (100 pcs), 4.76 mm or 3/16" (40 pcs), 6.35 mm or 1/4" (20 pcs)
QBR301	1.59 mm or 1/16" steel target balls (100 pcs)
QBR302	3.18 mm or 1/8" steel target balls (100 pcs)
QBR303	4.76 mm or 3/16" steel target balls (40 pcs)
QBR304	6.35 mm or 1/4" steel target balls (20 pcs)
QBK203	Magnetic target ball kit includes 4.76 mm or 3/16" (40 pcs), 6.35 mm or 1/4" (20 pcs)
QBR403	4.76 mm or 3/16" magnetic target balls (40 pcs)
QBR404	6.35 mm or 1/4" magnetic target balls (20 pcs)
QBR201	Zero cal. fixture for 1.59 mm or 1/16" target ball
QBR202	Zero cal. fixture for 3.18 mm or 1/8" target ball
QBR203	Zero cal. fixture for 4.76 mm or 3/16" target ball
QBR101	Calibration fixture with 0.25mm (9.48 mils) ref.
QBR102	Calibration fixture with 0.5mm (19,6 mils) ref.
QBR103	Calibration fixture with 1 mm (39,3 mils) ref.
QBR104	Calibration fixture with 2 mm (78,6 mils) ref.
QBR105	Calibration fixture with 4 mm / (157 mils) ref.
QBR106	Calibration fixture with 6 mm / (236 mils) ref.
QBR107	Calibration fixture with 8 mm / (314 mils) ref.
QBR108	Calibration fixture with 10 mm / (393 mils) ref.
QBR109	Calibration fixture with 14 mm / (551 mils) ref.
QBR1010	Calibration fixture with 16 mm / (630 mils) ref.
QBR1011	Calibration fixture with 18 mm / (709 mils) ref.
QBR1012	Calibration fixture with 20 mm / (787 mils) ref.
QBR1013	Calibration fixture with 22 mm / (866 mils) ref.

QB7 accessories (continue)

QBA400	Foot switch with cable and Lemo connector
QBL701	Upgrade license (from QB7 B to QB7 E)
QBK103	Upgrade calibration kit for QBL701

For more information on accessories available for your QB7 please contact Demeq at infodemeq@demeq.com

Error messages

Under abnormal conditions an error message may appear on the unit screen and should be treated as informational only.

If an error message is displayed follow the instructions described below and if the problem persists please go to the "Support" section in http://www.demeq.com

Figure A.2: System error message

Error 1	Internal Error
Cause	Internal Error
Solutions	Turn off the unit and power back on. If the problem persists please contact us.

Error 2	Attempt to overwrite a value.
Cause	This error can happen when the unit is turned off correctly (removing batteries) and when the unit is turned back on you try to save value in the Datalogger.
Solution	Download the existing values in the Datalogger to a PC and erase the memory.

If a message appears with a different number please contact us.

Proper disposal

English
Consumers are legally required to dispose of batteries at suitable collection points, vending points or dispatch bays. The crossed-out wheeled bin means that batteries must not be disposed of in the household waste. Pb, Cd and Hg designate substances that exceed the legal limits.

Español
Los usuarios estan obligados por ley a depositar las pilas viejas en un punto de recogida adecuado, punto de venta o centro de envio. El contenedor de basura tachado significa que la pilas no deben desecharse en la basura domestica. Pb, Cd y Hg designan sustancias que se encuentran por encima de los valores establecidos por ley.

Deutsch
Verbraucher sind gesetzlich verpflichtet Altbatterien zu einer geeigneten Sammelstelle/Verkaufsstelle/Versandlager zu bringen. Die durchgestrichene Mulltonne bedeutet: Batterien und Akkus durfen nicht in den Hausmull. Pb, Cd und Hg bezeichnet Inhaltsstoffe die oberhalb der gesetzlichen Werte liegen.

Français
La legislation exige des consommateurs le depot des piles usagees dans un lieu de collecte approprie, un point de vente ou un entrepot d'expedition. La poubelle barree signifie qu'il est interdit de jeter les piles et les batteries avec les ordures menageres. Pb, Cd et Hg designent les substances dont les valeurs depassent les limites legales.

Italiano
Per legge, i consumatori sono obbligati a depositare le batterie esaurite presso i punti di raccolta, i punti di vendita o i magazzini di spedizioni. Il simbolo del contenitore dei rifiuti sbarrato indica che e vietato smaltire le batterie con i rifiuti domestici. Pb, Cd e Hg indicano le sostanze presenti con valori superiori alla norma.

Our website: www.demeq.com

Our website is a powerful customer support tool where you will find the latest information as it relates to your QB7 including:

- Manuals and brochures
- Firmware and software updates
- New accessories

Technical support

Our service department is committed to providing prompt and courteous service. Should you encounter any trouble with your QB7 please visit the "Support" section in http://www.demeq.com

P/N QBD701-ESP Rev 1