User Manual

Ultrasonic Velocity Gauges

dmq

QSV Models B / DL / DLC

QSV User Manual

Ultrasonic Velocity Gauge

P/N: QSD 101 – ENG – Rev 2 – 2012

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Appendix

Tips on how to measure correctly

Technical specifications

Additional information

Thank you choosing dmq

And thank you for purchasing a QSV ultrasonic velocity gauge.

Company Statement

At dmq 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 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 a great product we offer:

- Quick answers to your inquiries.

- Unlimited access to technical information as well as application notes.

- Special offers for registered customers.

- Firmware and software upgrades at no charge.

- Attention to your inquiries and suggestions.

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

General information

Models included in this manual

The information included in this manual applies to the QSV ultrasonic velocity gauge only.

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 the QSV velocity gauge. 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 the improper use of our instruments.

Applicable standards

- ASTM E797

User training

The user must be trained in ultrasonic testing procedures and on how to properly configure the unit for testing. All of the following should be taken into consideration:

- Understand the theory on sound wave propagation.

- Select the transducer that is best suited for your application.

- Know the specific requirements for the test you will be conducting.

This manual provides all of the information needed to configure and operate the QSV velocity 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 on measuring the sound velocity of materials using an ultrasonic velocity gauge. Additional information can also be found on the internet and through local government agencies as well as in technical institutes.

Measuring Principle

The QSV operates with dual crystal transducers that use the "pitch-catch" principal. Dual crystal transducers use two piezoelectric crystals whereby one crystal is excited with short electrical pulses from the unit sending short acoustic waves into the test piece. The second crystal then receives the acoustic waves reflected at the end of the test piece. The frequency of the acoustic waves changes between 2 and 10 MHz depending on the probe being used.
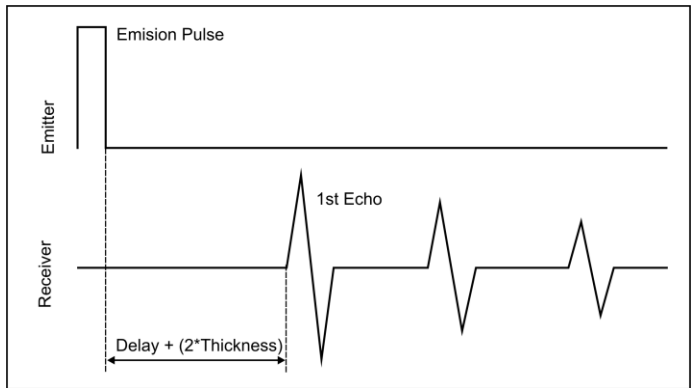

Figure 1: Transducer signals (acoustic wave representation)

Testing Limitations

In ultrasonic testing information is obtained from measuring sound waves. Users must be very careful when making assumptions in regards to the entire test piece condition when there are areas that have not been inspected. In large and massive test pieces it would be practically impossible to test the entire piece and therefore conclusions for the whole piece based solely on the areas that have actually been inspected, should only be done by experienced operators.

Critical Operating Procedures

In order to minimize test result errors the following must be observed:

1. Zero calibration

Before taking actual measurements the unit and transducer have to be calibrated. Calibration of the transducer is also known as zero calibration or delay calibration (*Page 11*). If the unit and transducer are not calibrated, or calibrated incorrectly, the resulting measurements will be unreliable. Each and every time a transducer is changed it must be calibrated to the unit.

2. Material sound velocity calibration

Because the sound velocities in materials will often vary significantly from published values, best results are obtained when the instrument is calibrated on a reference test block made from the same material as that of the actual test piece. The block should be flat, of a smooth finish, and be as thick as the maximum thickness of the test piece.

Careful consideration by the user must be made when evaluating the accuracy of a thickness value because considerable changes in the sound velocity of a material may have occurred as a result of a treatment. So for example a test piece made of steel that has been thermally treated, will look the same as a regular test piece made of untreated steel, but the sound velocities vary significantly. Instruments should be calibrated before and after testing to minimize errors.

3. Transducer selection

Transducers must be in good condition and show no visible signs of excessive wear or defects on their surface. Badly worn transducers can provide erroneous measurements.

The thickness of the material being tested must be within the specified thickness range of the transducer and the temperature of the material must also be within the specified temperature range of the transducer.

4. Use of couplants

Calibration as well as actual testing should be performed under similar coupling conditions. Couplant must be applied in an even and consistent manner to minimize variations in couplant layers that may result in testing errors. The amount of couplant should be kept to a minimum and consistent pressure should be applied on the transducer when measuring.

5. Conditions under which "Doubling" may occur

Doubling refers to a thickness measurement that displays a reading that is twice or even three times the real test piece thickness. Doubling often may happen when trying to measure below and above the specified range for the transducer and when using worn transducers. When in doubt, the test piece thickness must be measured using other methods and or instruments and the unit must then be calibrated using reference test blocks of known thickness values that are made of the same material as the actual test piece. This is very important when measuring unknown test pieces for the first time.

6. How temperature may affect calibration

When possible calibrate your instrument on-site using a test block that is at the same temperature as the test piece in order to minimize errors.

Important Safety Information

QSV ultrasonic velocity gauges are for industrial use only and cannot be used in medical applications. The QSV operates on two AA size batteries. We strongly recommend that you use only top brand name alkaline batteries.

Disposal of your QSV gauge and its components must be done in compliance with all applicable regulations.

About the Software

Because of its complexity level, software is never really completely error free. For this reason in software controlled instruments always make sure that the operations required for your application are in correct working order.

Warranty

Demeq S.R.L provides a limited warranty for a period of 2 (two) years on electronic units and for 6 (six) months on transducers from the date of purchase and may be extended for up to 5 years.

Every instrument undergoes thorough testing during manufacturing as well as before shipping. In the event warranty service where to become necessary, dmq and or your local distributor or representative will make a reasonable effort to replace your defective unit with another new or used unit, while your instrument undergoes warranty repair.

1 First steps

1.1 Know the QSV

1.1.1 Front panel
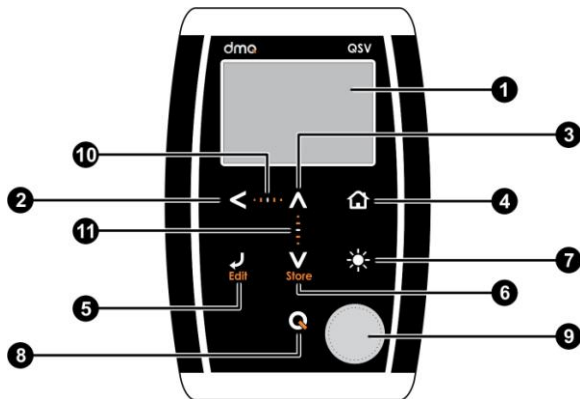
Figure 1.1: Front of the unit

1. Graphic LCD display with LED backlight illumination
2. Move Left key
3. Move Up key
4. Menu key / Enter and exit measure screen / Exit and return to menus (Home)
5. Enter key / Edit values on the measure screen (Edit)
6. Move Down key / / Manually store a value (Store)

7. Change backlight illumination key (On, Off, Auto)

8. The **Q** key: Power On and Shutdown (touch and hold for 2 seconds) / Make quick and short touches to activate special functions and features

9. Calibration block

10. Horizontal scrolling center point (lock and unlock keypad on measure screen)

11. Vertical scrolling center point (adjust LCD contrast)

1.1.2 Connectors
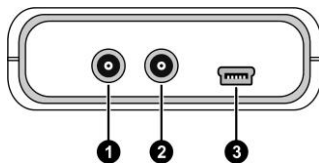
Figure 1.2: Unit connectors

1. Receiving transducer connector (Type Lemo 00)

2. Emitting transducer connector (Type Lemo 00)

3. USB mini connector to connect to PC using a USB cable (supplied with the unit). This same USB connector is also used to connect the digital caliper interface so that the caliper and the unit can communicate.

1.2 Install or replace batteries

The QSV is powered by 2 (two) AA batteries that are placed in the battery compartment located in the back of the unit. To access to the battery compartment slide the cover as shown in figure 1.3-1 and gently push the extraction ribbon upward and slightly towards the right to release the batteries (figure 1.3-2).

When you install new batteries, first insert the positive end of each battery so that it coincides with the positive pole inside the battery compartment as you see in figure 1.4-1. Always leave the extraction ribbon underneath the batteries.
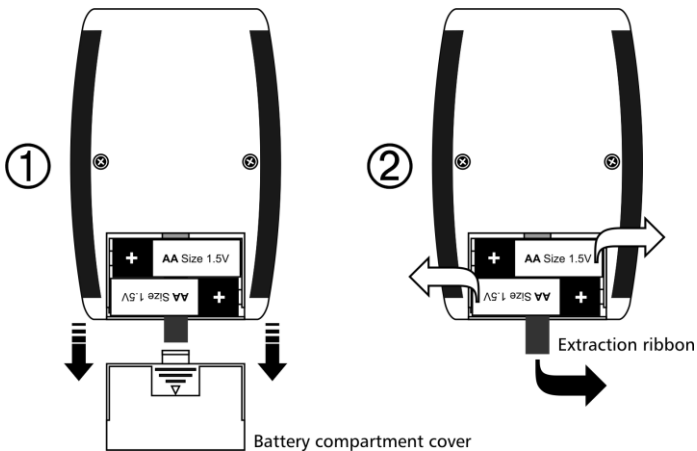
Figure 1.3: Removing batteries
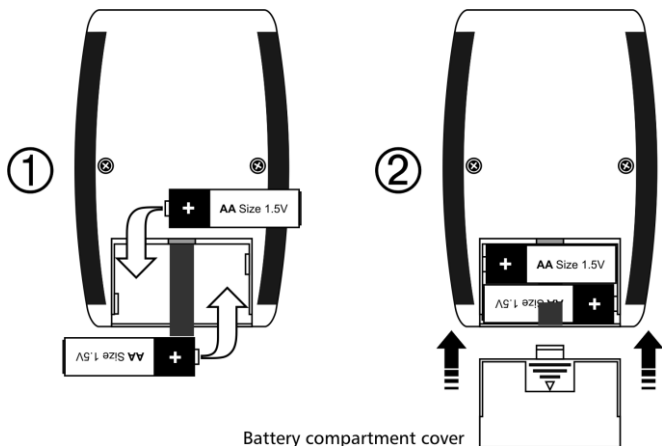
Figure 1.4: Replace / Insert batteries
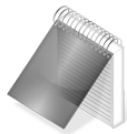
Notes

Use new alkaline top brand batteries only.

Do not mix new and old batteries. Always replace both batteries.

Rechargeable batteries type NiMH can be used but will result in less time of continuous operation.

Important

Do not remove batteries while the unit is powered as this may affect the Data logger *(See Appendix: "Additional information, Error Messages")*

1.3 Connecting the transducer

The QSV has two type Lemo "00" connectors located on top of the unit. Because this is the standard for most dual crystal probes, you could basically connect any probe to your QSV. Keep in mind that the gain may need to be adjusted when changing probes.
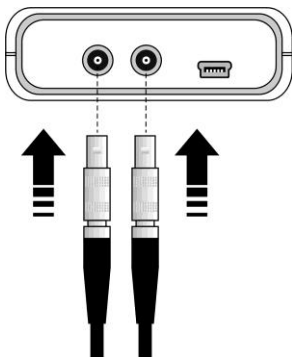
To connect the probe, simply align any of the male connectors located at the end of the transducer cable to any of the female connectors located on the gauge and press gently until connected.

To release the probe hold the knurled section on the male connectors and pull gently away from gauge until released.

Figure 1.5: Connecting the transducer

1.4 The "Q" key

The has three functions:

- When the unit is off, touch for 2 seconds to power on the unit.

- When the unit is on, touch for 2 seconds to shutdown the unit.

- With the unit on, making short touches to the will activate special functions described in later chapters of this manual.

1.5 Display backlight illumination and contrast

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

1.5.1. Display backlight illumination

Touch to change the backlight illumination settings.
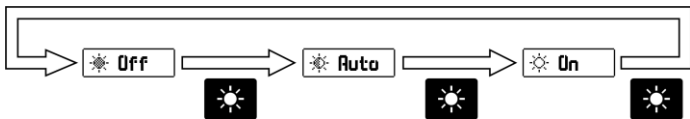
Figure 1.6: Backlight illumination options

1.5.2. Display contrast
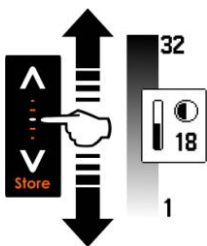
The display contrast on all dmq units is digital. Touch the white dot located in the center of the vertical scrolling bar between the [∧]-[∨] keys and a contrast window will open. Move your finger towards the top and or bottom of the dotted line to adjust the contrast on your display.

Figure 1.7: Display contrast adjustment

1.6 Locking and unlocking the keypad

To lock the keypad place your finger on the white dot located in the center of the horizontal scrolling bar between the [<]-[∧] keys. Move your finger to the right following the dotted line and a window on the unit display will open with the word Lock. Continue moving your finger in the same direction until you enter locked mode. The window on the display will close and the locked keypad indicator will show on the top right of the unit screen.
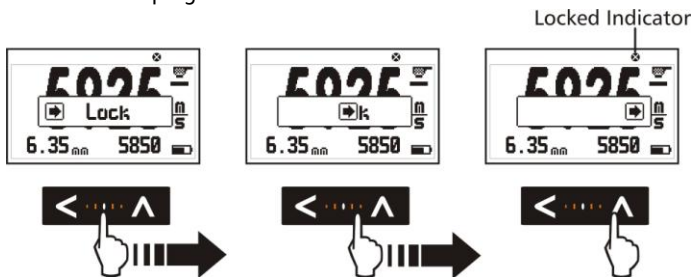
Figure 1.8: Locking the keypad

Sliding the finger to the left will unlock the keypad.
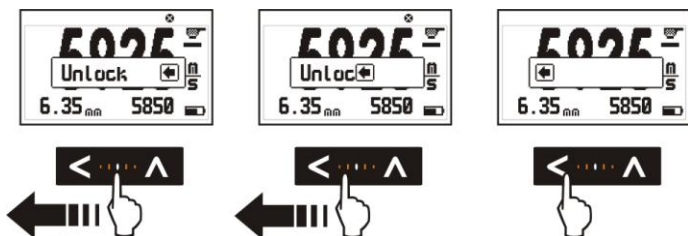
Figure 1.9: Unlocking the keypad

Important

The keypad can only be locked and unlocked in the measuring screens.

2 Measuring with the QSV

2.1 Measuring screen
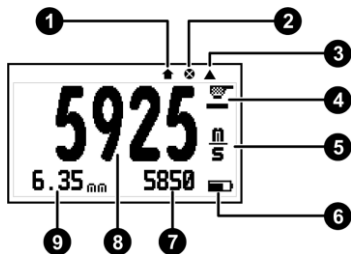
Figure 2.1: Measuring screen

1. Icon indicating that a value was stored
2. Locked keypad icon indicator *(Page 8)*
3. Inactive calibration disk indicator *(Page 16)*
4. Coupling level indicator
5. Unit
6. Battery level Indicator
7. Minimum measured value
8. Velocity measured in the unit that you selected
9. Thickness of the test piece being measured

2.2 Keys in the measuring screen

Keys in the measuring screen have the following functionality:

 : Touch to exit the measure screen and enter the main menu.

 : Touch to manually store the measurement in the memory.

 : Touch to activate the Select / Edit mode. Two flashing arrows will appear over the fields of velocity and thickness.

- Touch to select velocity.

- Toque to select test piece thickness.

Always use the keys to edit the values in any given field and touch to save.

Figure 2.2: Measuring screen in select / edit mode
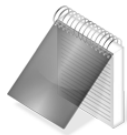
Notes

The velocity field can only be edited if an actual measurement was taken. If the velocity is 0 this field cannot be edited.

When a measurement was taken and the velocity is changed, a new thickness measurement for the new velocity is automatically displayed.

Tips

Touch the [Q] when editing velocity and a screen will appear with the most commonly used materials and their velocities as seen in (*Figure 2.3*).
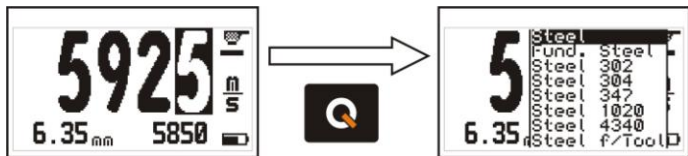
Figure 2.3: Materials velocity list table

Use the [∧]-[∨] keys to scroll the list and touch [↵] to select or touch [⌂] to exit and return to the edit velocity field.

[Q] : With a short touch the minimum measured value is reset to 0. Touch for 2 or more seconds to shutdown the unit.

[☼] : Changes the backlight illumination.

∧
┊ Adjust display contrast.
∨

Echo   Store
[< ···· ∧] : Lock and unlock the keypad.

2.3 Zero calibration (Auto)

The QSV uses a zero (delay) calibration procedure that is activated by simply coupling the transducer over the calibration disk located in front of the unit.

Figure 2.4: Zero calibration procedure

When this automatic procedure ends, the unit is calibrated to measure steel which is the default material velocity used in this calibration method.

Tip

In order to measure the thickness of the calibration disk without activating the automatic calibration procedure simple touch the edge of the disk until an icon appears as shown in *(Figure 2.1, 3. Inactive calibration disk indicator, Page 9)* While still touching the edge of the disk, couple the transducer to obtain its thickness measurement. When the transducer is coupled you no longer need to touch the edge of the disk.

2.4 Measuring the material velocity

2.4.1 Measuring with the caliper connected to the unit

With a QSV-DLC you can connect a caliper to the unit that is used to measure the test piece thickness. In order to measure sound velocity you must always know the part thickness. The measuring procedure is explained below:

- Measure the test piece thickness with the caliper connected to the QSV. The value in the caliper will appear in the unit display.

- Touch the ![Q key] key to save the thickness value from the caliper to the unit. At this point in time changing the thickness value of the caliper will no affect the saved measurement.

- Measure the sound velocity placing the transducer on the exact same place where the thickness measurement was taken with the caliper.
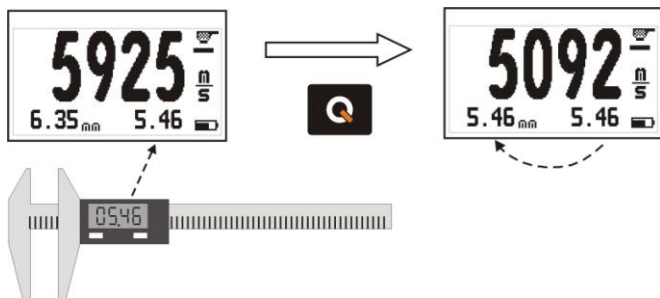
Figure 2.5: Using a caliper to measure thickness

The thickness that you saved to the unit will only be changed when a new thickness is measured with the caliper and saved.

2.4.2 Measuring velocity using a known thickness value

If you do not know the velocity of the material but you know the material thickness you can set the velocity using the material thickness value by doing the following:

- Measure the material for which you already know the thickness.

- Lift the transducer and touch [⤶] to enter the Select / Edit mode.

- Touch [V] to edit the thickness measurement field.

- Use the cursors to set the velocity and touch [⤶] to confirm or touch [⌂] to cancel.

When editing the thickness value observe that the velocity will change accordingly.
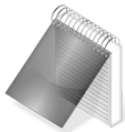
Note

When changing the material velocity using a known thickness value the unit must have already been calibrated for the transducer being used *(Page 11)*.

2.5 Measuring thickness with a known velocity

If you know the velocity of the material you will be measuring you can manually enter the velocity by doing the following:

- Go to the measuring screen.

- Touch to enter the Select / Edit mode.

- Touch to edit the velocity field.

- Use the cursors to set the velocity and touch to confirm or touch to cancel.

Tips

Touch the when editing velocity and a screen will appear with the most commonly used materials and their velocities. Use the cursor keys to scroll the list and touch to select or touch to exit and return to the edit velocity field.

3 Menu system and editing

3.1 Instructions on using the menu system

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

To scroll QSV 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 below.
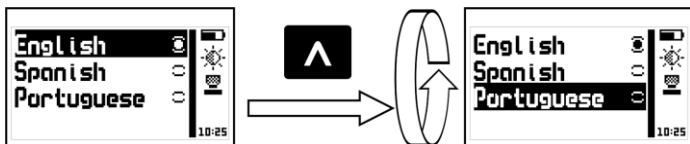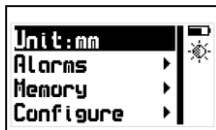

Figure 3.1: Example of how a circular menu works

To select a menu option touch [↵] and to exit and return to the previous menu touch [⌂]. To go to the measuring screen touch [⌂] from the main menu.

Figure 3.2: The "Home" key from the measuring screen

3.2 Main menu

The main menu is the first list of options that appears when you exit the measure screen and it includes the most important settings.

Touch 🏠 from the measuring screen to access this menu.

Figure 3.3: Main menu

Each main menu option is explained in the following items.

3.3 Change measuring unit   Unit

Touch 🔾 on **Unit** in the main menu to open the list of available units.

Use the ∧-∨ keys to scroll the menu.

Touch 🔾 to select the unit and touch 🏠 to save and exit this menu.

Figure 3.4: Units menu

3.4 Alarm Settings   Alarms

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

Touch 🔾 on **Alarms** to open the alarm menu options.
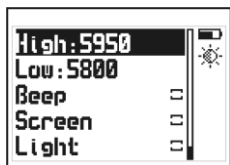
Touch [icon] on **High** or **Low** to open the numbers editor where you can set alarm values using the cursor keys.

Touch [icon] to save the alarm value that you entered and to return to the previous menu.

Figure 3.5: Alarm menu options

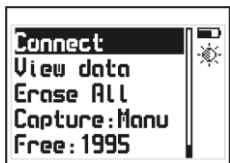Any of the following alarm types can be selected:

<u>Beep</u>: Audible intermittent alarm type.

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

<u>Light</u>: Visible alarm that activates the display backlight illumination causing it to flash.

3.5 Memory menu   Memory

Select **Memory** from the main menu to view all menu options for the Data logger. The QSV can store up to 5000 values that can be viewed on the unit display and or transferred to a PC via USB using dmq DataCenter.

Figure 3.6: Memory menu options

3.5.1 Connect to a PC with DataCenter   Connect

Touch [icon] on **Connect** to enter the "waiting to connect" mode.

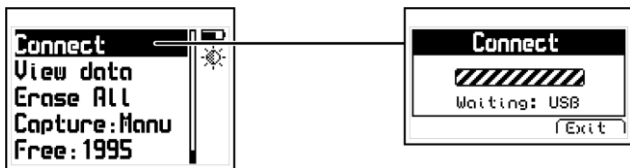Touch [icon] to exit and cancel the connection.

Figure 3.7: Connecting to a PC

With the unit in "waiting to connect" make sure that the USB or the RS232 cable (depending on the type of connecting cable that you are using) is properly connected to both the unit and the PC and click on <Connect> in DataCenter.

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

For additional information on dmq DataCenter software refer to the manual included in the CD that you received with your QSV or download the manual at http://www.demeq.com/Download.html

3.5.2 View stored values   View Data

Touch on **View Data** to view the contents of the file. Touch to exit the file.

Figure 3.8: File view in a grid format

The QSV stores values in groups of 100 measurements. This means that every 100 measurements, a new lot is created (lots are indicated by letters).

3.5.3 Erase memory

Erase All

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

Before files are deleted, a screen will be displayed asking you to confirm or to cancel this action.
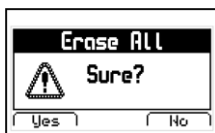
Touch **>** to cancel and return to the previous menu or touch **<** to begin deleting all files.

Figure 3.9: Erase All confirmation screen

When the erase all action has been confirmed the following screens will be displayed:
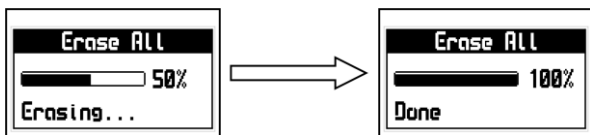
Figure 3.10: Erase All progress screens

After this process is completed all of the cells in the grid will be empty.

3.5.4 Capture modes   Capture

Touch on **Capture** to select the mode in which values will be stored in the Data logger.

Figure 3.11: Memory capture modes menu

The QSV has the following capture modes:

Manual: Touch the key to store values.

Auto: When the transducer is coupled measurements are continuously stored.

3.5.5 Available memory   Free

Free memory is followed by a number representing the remaining memory that is available to store data and is represented in number of cells.

Touch on **Free** to view the remaining number of free cells and the free memory space as a percentage of the unit total memory.
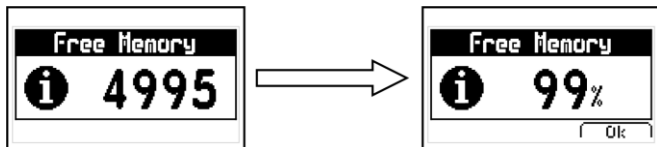
Figure 3.12: Remaining memory screens

3.6 Caliper selection   Caliper

This menu gives you two options for use of a caliper connected to the QSV. Enable **Activate** by touching the key to use the caliper and manually save thickness measurements from the caliper to the QSV.

Figure 3.13: Caliper options menu

In **Auto Thickness** mode the measurements that you take with the caliper are automatically saved to the unit until the transducer is coupled. To enable this option touch .

A caliper can only be used with the QSV DLC model.

3.6.1 Connecting the caliper

To connect the caliper to the QSV electronic unit use the interface cable (provided with the unit) and connect one end of the cable to unit and the other end to the caliper.
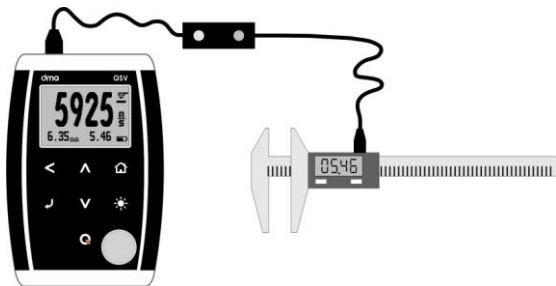
Figure 3.14: Connecting the caliper to the QSV

The cable has two LEDS indicating the connection has been established.
The QSV will read values obtained with the caliper when the same measuring unit (metric / inch) is set on both the unit and the caliper.

3.7 General configuration options   Configure

Touch [⏎] on the **Configure** option located on the main menu to open the general configuration options menu for the QSV that includes measurement related settings such as Gain and other more general settings such as Keypad Sensitivity and AutoOff time.

Figure 3.15: General configuration options menu

3.7.1 Select language   Language

Touch [⏎] on **Language** (which is also identified with a flag) to view available language options.

Use the cursor keys to scroll available language options and touch [⏎] to select.

Touch [🏠] to save and exit this menu.

Figure 3.16: Language menu options

3.7.2 Set keypad sensitivity   `Key Sens.`

This option allows you to set the keypad sensitivity. The higher the number is that you set here, the more sensitive the keypad will be.

Touch on **Key Sens**. and use the - keys to change the keypad sensitivity. Touch to save and the keypad will already be working with the new sensitivity level.
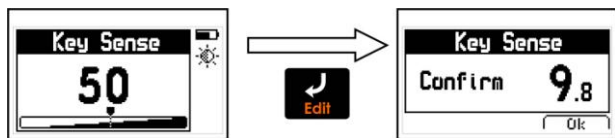
Figure 3.17: Key sensitivity and confirmation screens

To confirm the change in sensitivity touch . If you touch any other key or the counter that appears on your screen reaches 0.0, the sensitivity will return to its previous setting.

The factory default setting is 50. Under special conditions we suggest that the sensitivity level be changed.

Tips

If the unit will be operated using security gloves we recommend that the sensitivity level be raised.

To make the keypad "harder" simply lower the sensitivity level.

In applications where the front of the unit may be exposed to water and or vapors the sensitivity should be lowered.

3.7.3 Adjust gain

Touch on **Gain** to change the gain level (signal sensitivity). The higher the gain the more sensitive the unit will be making it easier to measure lower thickness values. But excessive gain can also cause erroneous measurements.

The gain is typically adjusted when changing transducers.
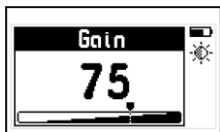
Touch the   keys to adjust the gain value and touch to save and exit.

Touch to exit without making changes.

Figure 3.18: Adjust gain level

3.7.4 Adjust pulser excitation voltage

Touch on **Pulser** to adjust the transducer pulser excitation level.
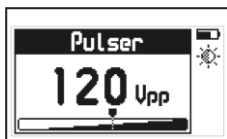
Touch the   keys to adjust the tension and touch to save and exit. To exit without changes touch .

Figure 3.19: Transducer pulser excitation tension editor screen

Considerations when adjusting the pulser excitation tension:

Higher excitation levels mean that more energy is applied to the emission crystal in the transducer which allows for better penetration in high attenuation and large or thick materials.

When measuring small or thin materials high tensions produce saturated echoes that can affect measurement results.

Avoid high tensions especially in small diameter transducers as this could damage the transducer. For the standard 5MHz transducer the tension should not exceed 150V. Large diameter transducers can be set to higher tensions.

3.7.5 Set auto-off time   AutoOff

The unit will shutdown automatically if no key is touched or no measurement is made when you set the auto-off time.

Touch 🔘 on **AutoOff** to set the time before the unit automatically shutdown.

Touch the △ - ▽ keys to set the time and touch 🔘 to save and exit.

Touch 🏠 to exit without making changes.

Figure 3.20: AutoOff time

3.7.6 Adjust display contrast   Contrast

Use this setting to adjust the screen contrast making it lighter or darker where 1 is the lightest and 32 is the darkest.

Touch 🔘 on **Contrast** and use the △ - ▽ keys to change the contrast on your screen.

Touch [button] to save or touch [button] to exit without making changes.

Figure 3.21: Screen contrast settings

Tips

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

3.7.7 Beep Activation   Beep

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

Touch [button] to enable or disable the beep option.

3.7.8 Hold last value   Hold last

When you enable the **Hold last** option the last measured value will be displayed on the unit screen even when the transducer is not coupled. When hold last is disabled and the transducer is not coupled the unit display will read "-----".

Touch to enable or disable this option.

Hold Last modo On
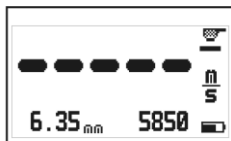
Hold Last modo Off

Figure 3.22: Measuring screen with hold last enabled or disabled

3.7.9 Model upgrade licenses

Licenses

QSV models can be changed with the purchase of model upgrade licenses available from dmq.

In order to purchase a license you must provide all of the following information:

- Unit model

- Unit serial number

- The type of license that you would like to purchase

Touch on **Licenses** to view all licenses available for your unit, active licenses are indicated with checkmarks.

To enter the new license number that you purchased from dmq touch or to exit and return to the previous menu touch .

Figure 3.23: License status screen

Use the cursor keys to enter the license number and touch 🔄 to save.

Figure 3.24: Enter new license number screen

After entering your new license number the unit will respond with one of the following messages:

Wrong register
password message

Success register
password message

Figure 3.25: Response messages after a license is entered

If the license number that you entered is correct the unit will show an updated license screen that will include your newly activated license (now followed by a checkmark).

3.7.9 Unit information

<div align="right">Unit Info</div>

Touch on **Unit Info** to view the hardware and software versions in your unit.

To view different unit information screens touch the - keys.

To return to the main menu touch .

```
dmq QSV-DL
Serial:10001
Hard:001-001
Date:28/01/10
```
```
Soft:1.01.001
     28/01/10
OS:  1.01.001
     28/01/10
```
```
VM:  001.019
KDev:00012
UDev:00002 (C)
     00014 (V)
```

Figure 3.26: QSV unit information screens

Tips on how to measure correctly

Do not measure outside the thickness range specified for the transducer that you are using.

Use just enough coupling gel to ensure stable measurements. Avoid using excessive coupling gel as it may be added to the thickness value of the actual test piece being measured.

Always do the zero calibration using the calibration disk located in the front of the unit particularly when changing transducers.

Know the velocity of the material you will be measuring or have a reference test piece made of the same material you will be measuring and of a known thickness value so that you can precisely determine the material velocity based on its thickness.

Gain levels are set from factory with the optimal values that correspond to the transducer that was shipped with your unit. When a transducer is changed gain will usually need to be adjusted to optimize transducer functionality.

Technical Specifications

Measuring principal	Pulse-Echo
Measuring range	100 m/s a 19999 m/s
Transducer frequency	2 to 10 MHz
Measuring frequency	4 Hz
Pulser tension	Adjustable 20 V to 210 V
V-Path	Automatic correction.
Units	Millimeters and Inches.
Resolution	1 m/S from 100 to 19999 m/s
	0,1 in/ms from 4,0 to 787,0 in/ms
Material thickness	1 to 500 mm
	0,040 to 19,68 in
Calibration	Auto 1-Point..
Alarms	Minimum.
	Audible and visual.
Languages	English, Spanish, Portuguese.
Data logger	Up to 5000 values.
	Manual and Continuous capture modes.
	View data in grid or graphic formats.
Display	Graphic LCD 128 x 64 pixels with LED backlight illumination and digital contrast adjustment.
Keypad	Touch-sense with no mechanical parts and sensitivity adjustment.
Battery life	100 hours with 2 each type AA batteries
Operating temp.	- 10°C to + 50°C
Enclosure	High impact ABS with rubber sides. Size is 78 x 117 x 24 mm.
Weight	200 g with batteries

Additional information

Unit maintenance

The QSV 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 solar light for prolonged periods of time as this could damage the display.

- Remove the batteries if the unit will be stored for an extended period of time.

- Remove the transducer using the connectors and not the cable.

- Do not twist or strangle transducer cable.

- Do not expose the unit to temperatures below -10°C / 14°F or above 50°C / 122°F.

QSV Accessories

dmq part No.	Description
QSM 300	Small high impact carrying case
QSC 003	InSize caliper interface cable
QSC 004	Mitutoyo caliper interface cable
QSS 201	2Mhz transducer – 15 mm diameter
QSS 501	5Mhz standard transducer – 10 mm diameter
QSS 701	7Mhz transducer – 5 mm diameter
QSR 161	6 step calibration block (mm)
QSR 141	4 step calibration block (in)
QSG 001	Coupling gel (small)
QSG 002	Coupling gel (large)
QAC 002	RS232 cable to connect to a PC
QAC 003	RS232 cable to connect to a printer

Error messages

Error messages may eventually open on your unit screen and are informational only. If one of these messages opens on your display follow the instructions described below and if the problem persists please send us a detailed report at www.demeq.com/form_Support.html

Figure A.2: System error message

Error 1	Internal Error
Cause	Internal Error
Solutions	Shutdown the unit, wait a few seconds, and power back on. Contact dmq.

Error 2	Attempt to store a value over an existing value.
Cause	Improper unit shutdown (Example: Removing batteries) and powering the unit back on to store values in the Data Logger.
Solution	Download Data Logger values to PC or printer and erase memory.

If a message with a different number where to appear please contact dmq.

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 QSV including:

- Application notes

- Manuals and brochures

- New accessories

Technical support

Our service department is committed to providing prompt and courteous service. Should you encounter any issues with your QSV please send us a detailed description of your problem to www.demeq.com/form_Support.html