



72DL PLUS

Precision Thickness Gauge

User's Manual

10-014357-01EN — Rev. 3
September 2022

This instruction manual contains essential information on how to use this Evident product safely and effectively. Before using this product, thoroughly review this instruction manual. Use the product as instructed. Keep this instruction manual in a safe, accessible location.

EVIDENT SCIENTIFIC INC., 48 Woerd Avenue, Waltham, MA 02453, USA

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This document was prepared with particular attention to usage to ensure the accuracy of the information contained therein, and corresponds to the version of the product manufactured prior to the date appearing on the title page. There could, however, be some differences between the manual and the product if the product was modified thereafter.

The information contained in this document is subject to change without notice.

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Important Information — Please Read Before Use

Intended Use

The 72DL PLUS is designed to perform nondestructive inspections on industrial and commercial materials.



WARNING

Do not use the 72DL PLUS for any purpose other than its intended use. It must never be used to inspect or examine human or animal body parts.

Instruction Manual

This instruction manual contains essential information on how to use this product safely and effectively. Before using this product, thoroughly review this instruction manual. Use the product as instructed. Keep this instruction manual in a safe, accessible location.

IMPORTANT

Some of the details of components illustrated in this manual may differ from the components installed on your device. However, the operating principles remain the same.

Device Compatibility

Only use this device with the approved ancillary equipment provided by Evident. Equipment provided by Evident and approved for use with this device is described later in this manual.



CAUTION

Always use equipment and accessories that meet Evident specifications. Using incompatible equipment could cause equipment malfunction and/or damage, or human injury.

Repair and Modification

This device does not contain any user-serviceable parts. Opening the device might void the warranty.



CAUTION

In order to prevent human injury and/or equipment damage, do not disassemble, modify, or attempt to repair the device.

Safety Symbols

The following safety symbols might appear on the device and in the instruction manual:



General warning symbol

This symbol is used to alert the user to potential hazards. All safety messages that follow this symbol shall be obeyed to avoid possible harm or material damage.



High voltage warning symbol

This symbol is used to alert the user to potential electric shock hazards greater than 1000 volts. All safety messages that follow this symbol shall be obeyed to avoid possible harm.

Safety Signal Words

The following safety symbols might appear in the documentation of the device:



DANGER

The DANGER signal word indicates an imminently hazardous situation. It calls attention to a procedure, practice, or the like, which, if not correctly performed or adhered to, will result in death or serious personal injury. Do not proceed beyond a DANGER signal word until the indicated conditions are fully understood and met.



WARNING

The WARNING signal word indicates a potentially hazardous situation. It calls attention to a procedure, practice, or the like, which, if not correctly performed or adhered to, could result in death or serious personal injury. Do not proceed beyond a WARNING signal word until the indicated conditions are fully understood and met.



CAUTION

The CAUTION signal word indicates a potentially hazardous situation. It calls attention to an operating procedure, practice, or the like, which, if not correctly performed or adhered to, may result in minor or moderate personal injury, material damage, particularly to the product, destruction of part or all of the product, or loss of data. Do not proceed beyond a CAUTION signal word until the indicated conditions are fully understood and met.

Note Signal Words

The following note signal words could appear in the documentation of the device:

IMPORTANT

The IMPORTANT signal word calls attention to a note that provides important information, or information essential to the completion of a task.

NOTE

The NOTE signal word calls attention to an operating procedure, practice, or the like, which requires special attention. A note also denotes related parenthetical information that is useful, but not imperative.

TIP

The TIP signal word calls attention to a type of note that helps you apply the techniques and procedures described in the manual to your specific needs, or provides hints on how to effectively use the capabilities of the product.

Safety

Before turning on the device, verify that the correct safety precautions have been taken (see the following warnings). In addition, note the external markings on the device, which are described under “Safety Symbols.”

Warnings



WARNING

General Warnings

- Carefully read the instructions contained in this instruction manual prior to turning on the device.
- Keep this instruction manual in a safe place for further reference.

- Follow the installation and operation procedures.
- It is imperative to respect the safety warnings on the device and in this instruction manual.
- If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment could be impaired.
- Do not install substitute parts or perform any unauthorized modification to the device.
- Service instructions, when applicable, are for trained service personnel. To avoid the risk of electric shock, do not perform any work on the device unless qualified to do so. For any problem or question regarding this device, contact Evident or an authorized Evident representative.
- Do not touch the connectors directly by hand. Otherwise, a malfunction or electric shock may result.
- Do not allow metallic or foreign objects to enter the device through connectors or any other openings. Otherwise, a malfunction or electric shock may result.

**WARNING****Electrical Warning**

The device must only be connected to a power source corresponding to the type indicated on the rating label.

**CAUTION**

If a non-approved power supply cord not dedicated to Evident products is used, Evident will not be able to ensure the electrical safety of the equipment.

Battery Precautions**CAUTION**

- Before disposing of a battery, check your local laws, rules, and regulations, and follow them accordingly.

- Transportation of lithium-ion batteries is regulated by the United Nations under the United Nations Recommendations on the Transport of Dangerous Goods. It is expected that governments, intergovernmental organizations, and other international organizations shall conform to the principles laid down in these regulations, thus contributing to worldwide harmonization in this field. These international organizations include the International Civil Aviation organization (ICAO), the International Air Transport Association (IATA), the International Maritime Organization (IMO), the US Department of Transportation (USDOT), Transport Canada (TC), and others. Please contact the transporter and confirm current regulations before transportation of lithium-ion batteries.
- For California (USA) only:
The device may contain a CR battery. The CR battery contains perchlorate material, and special handling may be required. Refer to <http://www.dtsc.ca.gov/hazardouswaste/perchlorate>.
- Do not open, crush, or perforate batteries; doing so could cause injury.
- Do not incinerate batteries. Keep batteries away from fire and other sources of extreme heat. Exposing batteries to extreme heat (over 80 °C) could result in an explosion or personal injury.
- Do not drop, hit, or otherwise abuse a battery, as doing so could expose the cell contents, which are corrosive and explosive.
- Do not short-circuit the battery terminals. A short circuit could cause injury and severe damage to a battery making it unusable.
- Do not expose a battery to moisture or rain; doing so could cause an electric shock.
- Only use an external charger approved by Evident to charge the batteries.
- Only use batteries supplied by Evident.
- Do not store batteries that have less than 40 % remaining charge. Recharge batteries to between 40 % and 80 % capacity before storing them.
- During storage, keep the battery charge between 40 % and 80 %.
- Do not leave batteries in the 72DL PLUS unit during device storage.

Regulations for Shipping Products with Lithium-Ion Batteries

IMPORTANT

When shipping a Li-ion battery or batteries, be sure to follow all local transportation regulations.



WARNING

Damaged batteries cannot be shipped through normal routes — DO NOT ship damaged batteries to Evident. Contact your local Evident representative or material disposal professionals.

Equipment Disposal

Before disposing of the 72DL PLUS, check your local laws, rules, and regulations, and follow them accordingly.

BC (Battery Charger - California, USA Community)



The BC marking indicates that this product has been tested and complies with the Appliance Efficiency Regulations as stated in the California Code of Regulations Title 20, Sections 1601 through 1608 for Battery Charger Systems. The internal battery charger within this device has been tested and certified pursuant to the California Energy Commission's (CEC) requirements; this device is listed on the online CEC's (T20) database.

CE (European Community)



This device complies with the requirements of directive 2014/30/EU concerning electromagnetic compatibility, directive 2014/35/EU concerning low voltage, and directive 2015/863 which amends 2011/65/EU concerning restriction of hazardous substances (RoHS). The CE marking is a declaration that this product conforms to all the applicable directives of the European Community.

UKCA (United Kingdom)



This device complies with the requirements of the Electromagnetic Compatibility Regulations 2016, the Electrical Equipment (Safety) Regulations 2016, and the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012. The UKCA marking indicates compliance with the above regulations.

RCM (Australia)



The regulatory compliance mark (RCM) label indicates that the product complies with all applicable standards, and has been registered with the Australian Communications and Media Authority (ACMA) for placement on the Australian market.

WEEE Directive



In accordance with European Directive 2012/19/EU on Waste Electrical and Electronic Equipment (WEEE), this symbol indicates that the product must not be disposed of as unsorted municipal waste, but should be collected separately. Refer to your local Evident distributor for return and/or collection systems available in your country.



China RoHS

China RoHS is the term used by industry generally to describe legislation implemented by the Ministry of Information Industry (MII) in the People's Republic of China for the control of pollution by electronic information products (EIP).



The China RoHS mark indicates the product's Environment-Friendly Use Period (EFUP). The EFUP is defined as the number of years for which listed controlled substances will not leak or chemically deteriorate while in the product. The EFUP for the 72DL PLUS has been determined to be 15 years.

Note: The Environment-Friendly Use Period (EFUP) is not meant to be interpreted as the period assuring functionality and product performance.



电器电子产品有害
物质限制使用
标志

本标志是根据“电器电子产品有害物质限制使用管理办法”以及“电子电气产品有害物质限制使用标识要求”的规定，适用于在中国销售的电器电子产品上的电器电子产品有害物质使用限制标志。

（注意）电器电子产品有害物质限制使用标志内的数字为在正常的使用条件下有害物质等不泄漏的期限，不是保证产品功能性能的期间。

产品中有害物质的名称及含量

部件名称		有害物质					
		铅及其化合物 (Pb)	汞及其化合物 (Hg)	镉及其化合物 (Cd)	六价铬及其化合物 (Cr(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
主体	机构部件	×	○	○	○	○	○
	光学部件	×	○	○	○	○	○
	电气部件	×	○	○	○	○	○

产品中有害物质的名称及含量

部件名称	有害物质					
	铅及其化合物 (Pb)	汞及其化合物 (Hg)	镉及其化合物 (Cd)	六价铬及其化合物 (Cr(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
附件	×	○	○	○	○	○
本表格依据 SJ/T 11364 的规定编制。 ○：表示该有害物质在该部件所有均质材料中的含量均在 GB/T26572 规定的限量要求以下。 ×：表示该有害物质至少在该部件的某一均质材料中的含量超出 GB/T26572 规定的限量要求。						

Korea Communications Commission (KCC)



Seller and user shall be noticed that this equipment is suitable for electromagnetic equipment for office work (class A) and it can be used outside the home. This device complies with the EMC requirements of Korea.

The MSIP code for the device is the following: R-R-OYN-72DLPLUS.

이 기기는 업무용 환경에서 사용할 목적으로 적합성평가를 받은 기기로서 가정용 환경에서 사용하는 경우 전파간섭의 우려가 있습니다.

EMC Directive Compliance

This equipment generates and uses radio-frequency energy and, if not installed and used properly (that is, in strict accordance with the manufacturer's instructions), may cause interference. The 72DL PLUS has been tested and found to comply with the limits for an industrial device in accordance with the specifications of the EMC directive.

FCC (USA) Compliance

NOTE

This product has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the product is operated in a commercial environment. This product generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instruction manual, might cause harmful interference to radio communications. Operation of this product in a residential area is likely to cause harmful interference, in which case you will be required to correct the interference at your own expense.

IMPORTANT

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the product.

FCC Supplier's Declaration of Conformity

Hereby declares that the product,

Product name: 72DL PLUS

Model: 72DL PLUS-MR/72DL PLUS-CW

Conforms to the following specifications:

FCC Part 15, Subpart B, Section 15.107 and Section 15.109.

Supplementary information:

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference.
- (2) This device must accept any interference received, including interference that may cause undesired operation.

Responsible party name:

EVIDENT SCIENTIFIC INC.

Address:

48 Woerd Avenue, Waltham, MA 02453, USA

Phone number:

+1 781-419-3900

ICES-001 (Canada) Compliance

This Class A digital apparatus complies with Canadian ICES-001.

Cet appareil numérique de la classe A est conforme à la norme NMB-001 du Canada.

Warranty Information

Evident guarantees your Evident product to be free from defects in materials and workmanship for a specific period, and in accordance with conditions specified in the Terms and Conditions available at <https://www.olympus-ims.com/en/terms/>.

The Evident warranty only covers equipment that has been used in a proper manner, as described in this instruction manual, and that has not been subjected to excessive abuse, attempted unauthorized repair, or modification.

Inspect materials thoroughly on receipt for evidence of external or internal damage that might have occurred during shipment. Immediately notify the carrier making the delivery of any damage, because the carrier is normally liable for damage during shipment. Retain packing materials, waybills, and other shipping documentation needed in order to file a damage claim. After notifying the carrier, contact Evident for assistance with the damage claim and equipment replacement, if necessary.

This instruction manual explains the proper operation of your Evident product. The information contained herein is intended solely as a teaching aid, and shall not be used in any particular application without independent testing and/or verification by the operator or the supervisor. Such independent verification of procedures becomes increasingly important as the criticality of the application increases. For this reason, Evident makes no warranty, expressed or implied, that the techniques, examples, or procedures described herein are consistent with industry standards, nor that they meet the requirements of any particular application.

Evident reserves the right to modify any product without incurring the responsibility for modifying previously manufactured products.

Technical Support

Evident is firmly committed to providing the highest level of customer service and product support. If you experience any difficulties when using our product, or if it fails to operate as described in the documentation, first consult the user's manual, and then, if you are still in need of assistance, contact our After-Sales Service. To locate the nearest service center, visit the Service Centers page on the Evident Scientific Web site.

Introduction

The 72DL PLUS thickness gauge is a portable nondestructive testing (NDT) instrument designed primarily for the precise and reliable measurement of material thickness on a wide range of materials.

The 72DL PLUS gauge offers advanced conventional ultrasonic performance featuring a large dynamic range and superior measurement resolution. The 17.78 cm (7 inch), full color liquid-crystal display touch screen provides a resolution of 800 × 480 pixels with transfective technology and a wide viewing angle for high visibility. The touch screen can simultaneously display the measurement of up to 6 layers.

The 72DL PLUS gauge uses a single element transducer for a variety of applications. Evident offers a standard frequency option, a high-frequency option, and a multilayer software option to solve diverse applications based on a wide range of material thicknesses. The software user interface (UI) provides an intuitive way to access the full functionality of the instrument. The 72DL PLUS gauge can be used both indoors and outdoors, and by placing on a work surface or by using a four-point chest harness.

Before you operate the 72DL PLUS gauge, Evident recommends that you have a thorough understanding of the principles and limitations of ultrasonic nondestructive testing and that you seek adequate training. Evident assumes no responsibility for incorrect operational procedure or misinterpretation of test results.

Although the 72DL PLUS gauge continuously self-calibrates, you must be aware of the regulatory requirements. Evident offers calibration and documentation services. Contact Evident or your local representative with any special requests.

1. Package Contents

A complete 72DL PLUS package contains a precision thickness gauge and several key accessories.

1.1 Unpacking the Instrument

The 72DL PLUS precision thickness gauge and accessories are shipped in an industrial transport case.

To unpack the instrument

1. Open the transport case, locate the shipping papers, documentation, and USB drive, and then remove them from the case.
2. Remove the 72DL PLUS gauge and all of the accessories.
3. Inspect the 72DL PLUS gauge and all accessories for damage, and report any problems to Evident immediately.

1.2 Case Contents

The 72DL PLUS gauge comes standard with several key accessories (Table 1 on page 23).

Table 1 Case contents

Factory part number	Item number	Description	Quantity
600-BAT-L-2 ^a	U8760058	Lithium-ion battery	1

Table 1 Case contents (continued)

Factory part number	Item number	Description	Quantity
EP-MCA-x ^b	N/A	AC charger/adapter with power cord	1
10-014356-01EN		<i>72DL PLUS Precision Thickness Gauge: Getting Started Guide (EN)</i>	1
10-014357-01EN	N/A	USB drive containing <i>72DL PLUS Precision Thickness Gauge: User's Manual</i>	1
EPLTC-C-USB-A-6	U8840031	USB cable, Mini A to Mini B	1
BCM-74-2DS	U8800182	Transducer cable, BNC to microdot, 0.6 m (2 feet), double shielded (high-frequency models only)	1

- a. Ships installed in the instrument battery compartment
- b. The AC charger/adapter power cord varies by outlet configuration. The exact part number for each power cord also varies by outlet configuration.

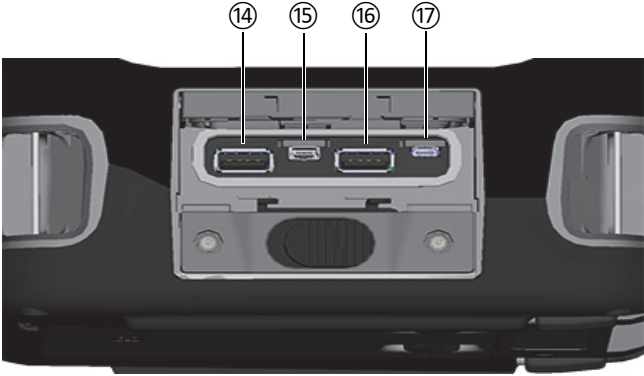
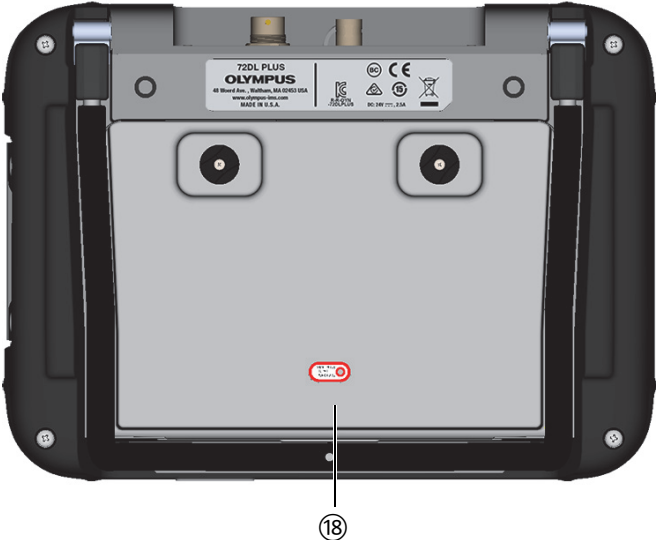
1.3 72DL PLUS Components

Table 2 on page 25 lists the 72DL PLUS precision thickness gauge components.

Table 2 72DL PLUS precision thickness gauge components

Component key		72DL PLUS – All models
72DL PLUS (front)		
1	Adjustment knob	
2	User interface display	
3	Home key	
4	Save/Send key	
5	Calibration key	
6	Play/Pause key	
7	Function key	
8	Power indicator	
9	Power key	
72DL PLUS (top)		
10	Transducer receive only connector	
11	Transducer transmit/receive connector	
12	Transducer high-frequency transmit/receive connector (high frequency model only)	
13	19-pin accessory connector	
14	DC power connector (12 VDC)	

Table 2 72DL PLUS precision thickness gauge components (continued)

Component key		72DL PLUS – All models
72DL PLUS (right side)		 <p>A photograph of the rear panel of the 72DL PLUS precision thickness gauge. Four ports are highlighted with numbered callouts: 14 (USB A), 15 (USB Mini-B), 16 (USB A), and 17 (Micro HDMI). The ports are arranged horizontally in a recessed area.</p>
14	USB A connector	
15	USB Mini-B connector	
16	USB A connector	
17	Micro HDMI connector	
72DL PLUS (rear)		 <p>A photograph of the back of the 72DL PLUS precision thickness gauge. The battery compartment cover is visible, with a red latch and a small red circle containing the number 18. The cover also features a label with the model name '72DL PLUS', the 'OLYMPUS' logo, and various regulatory symbols (CE, RoHS, etc.).</p>
18	Battery compartment cover	

2. Overview

The 72DL PLUS precision thickness gauge has a complement of connections intended to maximize the usability of the instrument. This chapter describes the location of the controls, connectors, and attachment points on the 72DL PLUS gauge.

2.1 External Connectors

The external connectors are located at the top of the 72DL PLUS gauge (Figure 2-1 on page 27).

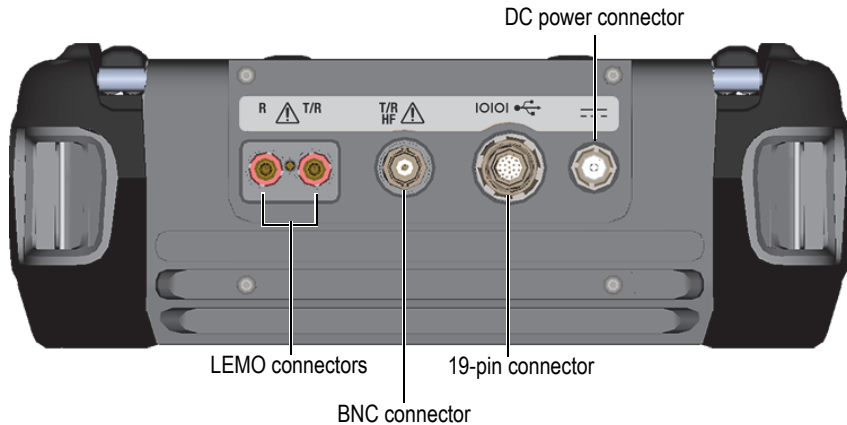


Figure 2-1 External connectors location

2.1.1 LEMO Transducer Connectors

The 72DL PLUS gauge is supplied with sealed LEMO 00 transducer connectors (Figure 2-2 on page 28). A center pin automatically identifies the connected transducer when certain Evident corrosion dual element transducers are used.

When used with dual element transducers in through-transmission modes, the T/R connector acts as the transmit connector and R connector acts as the receive connector.

NOTE

For single element pulse-echo inspections, you must connect the transducer to the T/R connector to send and receive a signal.

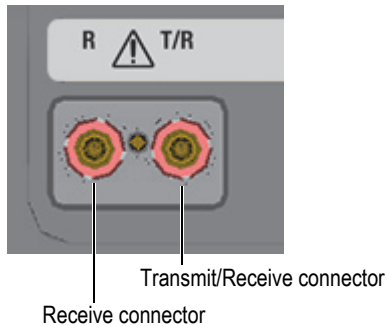


Figure 2-2 LEMO transducer connectors

2.1.2 BNC Connector

The BNC connector is for high-frequency transducers (high-frequency model only, see Figure 2-3 on page 29).



Figure 2-3 BNC connector

2.1.3 19-Pin Connector

The 19-pin connector is for the B-scan encoder and the foot switch (Figure 2-4 on page 29).



Figure 2-4 19-pin connector

2.1.4 DC Power Connector

The AC charger/adaptor connects to the DC power connector of 72DL PLUS gauge to power the instrument and charge the battery (Figure 2-5 on page 29).



Figure 2-5 DC power connector

2.2 Battery Compartment

The battery compartment cover is located on the back of the 72DL PLUS gauge (Figure 2-6 on page 30).

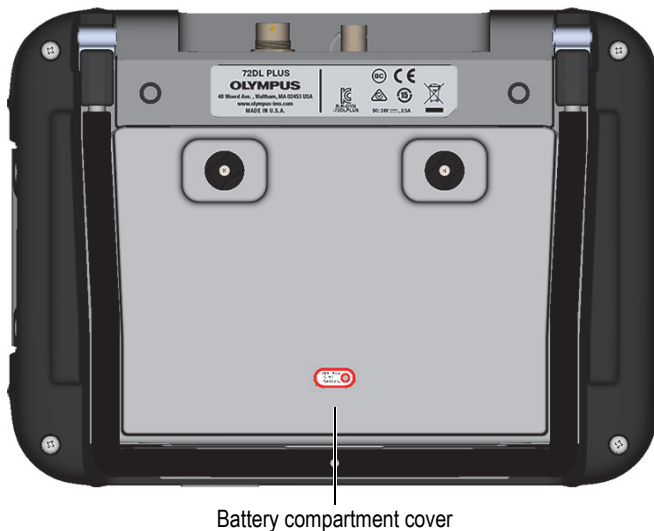


Figure 2-6 Battery compartment cover—closed

Two thumb screws open the battery compartment cover and secure the door when it is closed (Figure 2-7 on page 31).

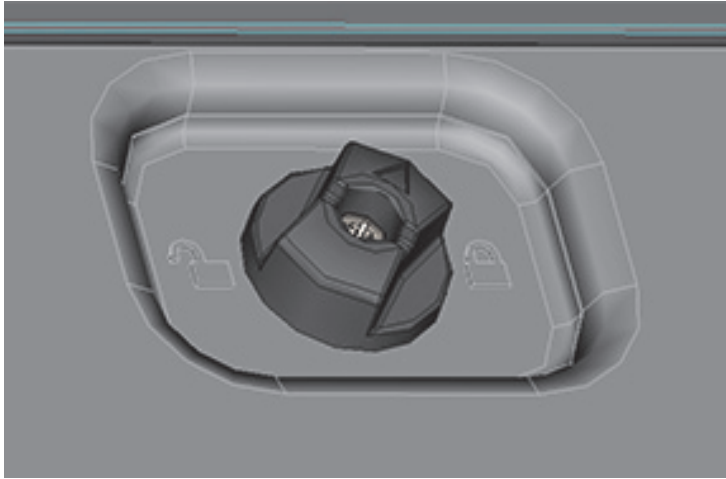


Figure 2-7 Cover thumb screw

2.3 Data Port

The data port contains the 72DL PLUS digital I/O connectors (Figure 2-8 on page 31).

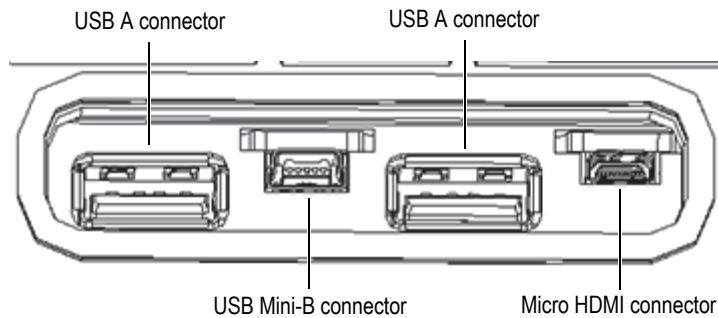


Figure 2-8 Data port connectors

2.3.1 USB A Connectors

Two USB A connectors are used to connect 72DL PLUS gauge to a USB storage device. The USB A connectors must be used with the Evident USB drive or equivalent to be CE compliant.

2.3.2 USB Mini-B Connector

The USB Mini-B connector is used to connect the 72DL PLUS gauge via the supplied USB cable to a PC for data transfer.

2.3.3 Micro HDMI Connector

The Micro HDMI (Type-D) connector is used to connect the 72DL PLUS gauge to an external digital display via a compatible HDMI cable (optional).

2.3.4 Mounting Points

72DL PLUS gauge is equipped with a mounting point at each of its four corners. Two mounting points are on the top of the gauge, and two mounting points are on the bottom of the gauge (Figure 2-9 on page 33).

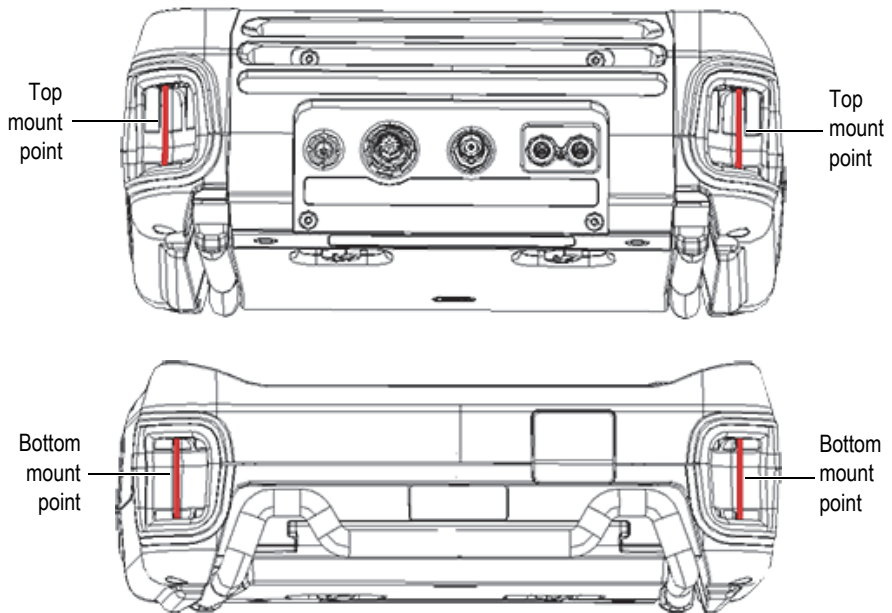


Figure 2-9 72DL PLUS mounting points

2.3.5 Chest Harness

The chest harness connects to the top and bottom mounting points of the 72DL PLUS gauge (Figure 2-10 on page 34).



Figure 2-10 Chest harness

2.3.6 Shoulder Strap

The shoulder strap connects to any two mounting points of the 72DL PLUS gauge (Figure 2-11 on page 35).



Figure 2-11 Shoulder strap

2.4 Keys, Indicator, and Knob

The keys and power indicator are located on the left side of the 72DL PLUS front panel (Figure 2-12 on page 36). The adjustment knob is located above the keys.

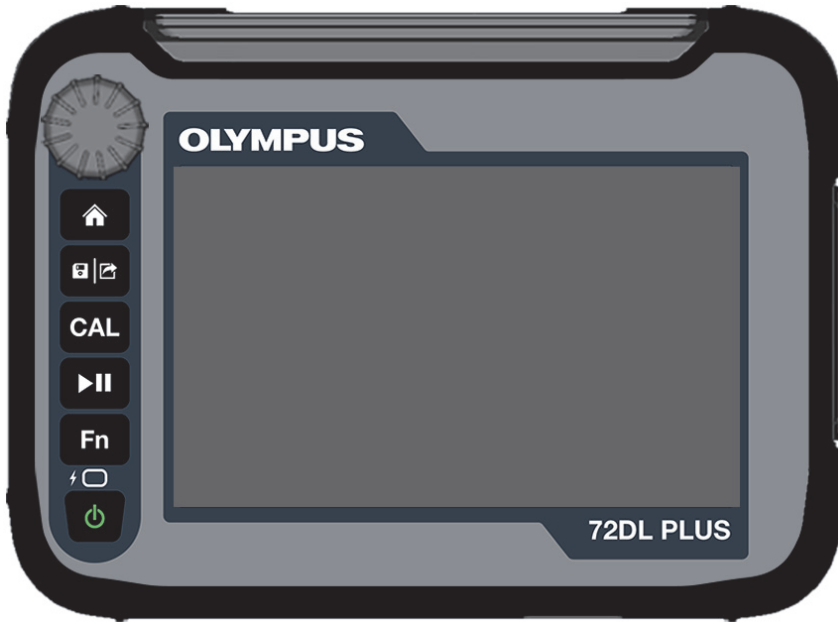




Figure 2-12 72DL PLUS front panel


2.4.1 Power Key

The Power key () is used to turn on or off the 72DL PLUS gauge.


2.4.2 Power Indicator

The power indicator () glows when power is applied to the 72DL PLUS gauge.


2.4.3 Function Key

The Function key () enables you to customize functions.


2.4.4 Play/Pause Key

The Play/Pause key () is used to freeze the displayed waveform and/or scan (B-Scan/Trend) collection until Play/Pause is pressed again.


2.4.5 Calibration Key

The Calibration key () is used to trigger the calibration workflow.

2.4.6 Save/Send Key

The Save/Send key () triggers the Save/Send functionality defined in the user preferences.

2.4.7 Home Key

The Home key () moves the focus back to the live inspection screen.

2.4.8 Adjustment Knob

The adjustment knob increases or decreases the value of the highlighted adjustable parameter (Figure 2-13 on page 38). The adjustment knob also enables you to scroll through available options in the software user interface (UI), such as within a pop-up window or wave adjust parameter.

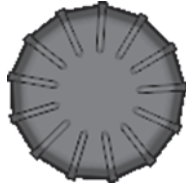


Figure 2-13 Adjustment knob

3. Operation

This chapter provides instructions for basic operational tasks. For information on the 72DL PLUS software, refer to the user interface guide.

3.1 Turning On the Instrument

IMPORTANT

The 72DL PLUS gauge must have a battery installed or be connected to AC power.

To turn on the instrument

- ◆ Press the Power key () to turn on the 72DL PLUS gauge.

The software UI initializes and the touch screen displays the **My Applications** page (Figure 3-1 on page 40).

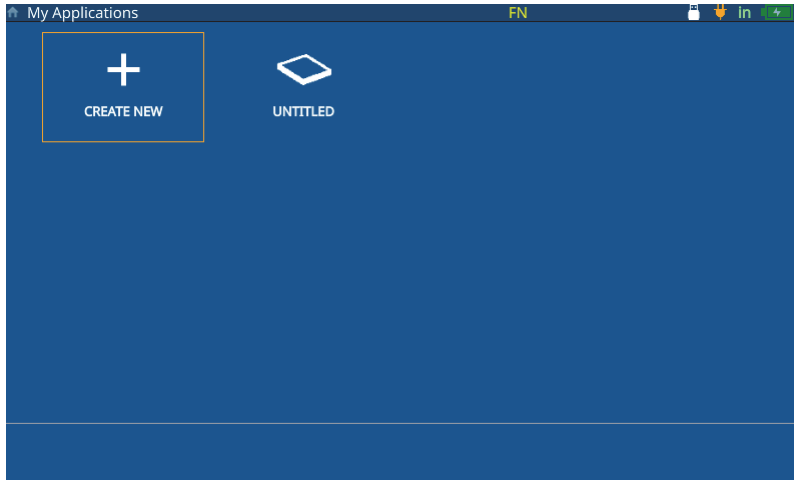


Figure 3-1 My Applications screen

To immediately begin an inspection


1. Press the Home key () to display the inspection screen (Figure 3-2 on page 40).



Figure 3-2 Inspection screen

2. Press the Save/Send key () to save a measurement after it is taken.
3. Tap **Yes** in the **Start New Inspection** dialog box (Figure 3-3 on page 41).

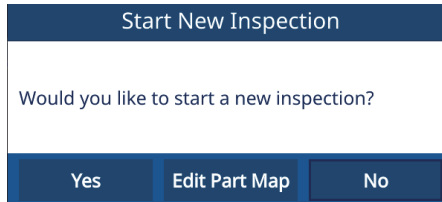



Figure 3-3 Start New Inspection dialog box

The 72DL PLUS gauge automatically generates an inspection data file and the measurement is saved to that file (Figure 3-2 on page 40).

3.2 Turning Off the Instrument

To turn off the instrument

1. Press the Power key () to turn off the 72DL PLUS gauge.
On the touch screen, the **Shut Down** dialog box displays (Figure 3-4 on page 41).

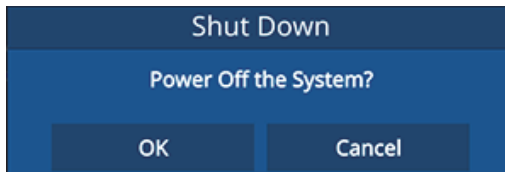


Figure 3-4 Shut Down dialog box

2. Tap **OK**.

3.3 Connecting the AC Charger/Adapter

Connect the AC charger/adapter directly to the 72DL PLUS precision thickness gauge to power it. When a Li-ion battery is installed in the gauge, and the AC charger/adapter is connected, the battery charges until full. Note that the AC charger/adapter is intended for indoor use only.

To connect the AC charger/adapter

1. Plug the DC power plug into the DC power connector on the 72DL PLUS gauge (Figure 3-5 on page 42).

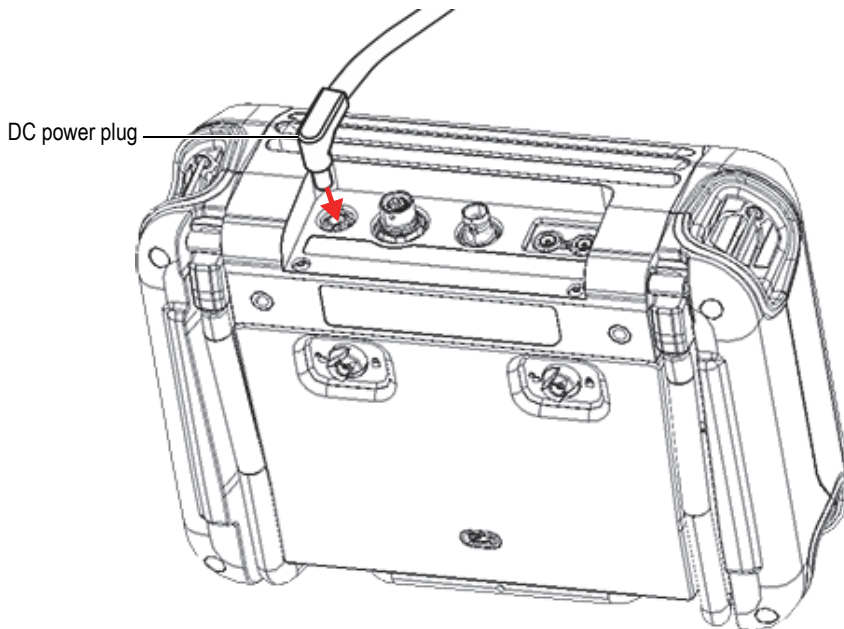


Figure 3-5 Connecting the DC power plug

2. Insert the AC power cord into the AC charger/adapter (Figure 3-6 on page 43).

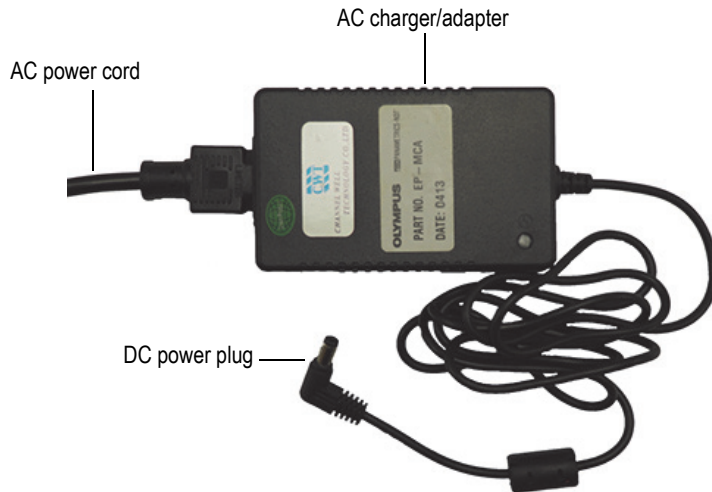


Figure 3-6 AC charger/adaptor

3. Insert the AC power cord plug into a suitable AC mains outlet.

3.4 Opening the Data Port Cover

The data port contains 72DL PLUS data I/O connections.

To open the data port cover

1. With the 72DL PLUS gauge in the orientation shown in Figure 3-7 on page 44, press the cover release latch and slide it towards the left to unlock the data port cover.

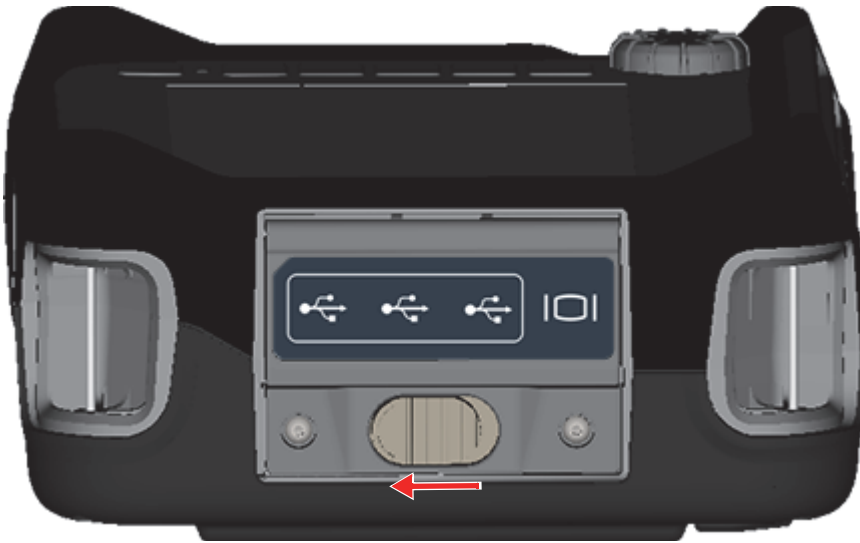


Figure 3-7 Data port cover release latch

2. Swing up the cover to its fully open position (Figure 3-8 on page 44).

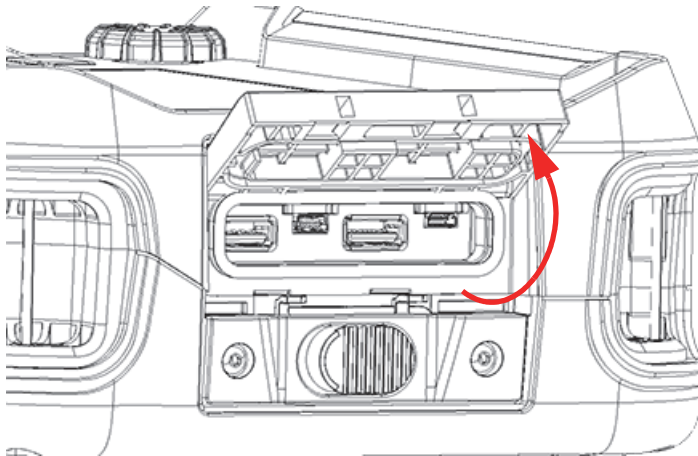


Figure 3-8 Data port—cover open

4. Maintenance and Troubleshooting

This chapter details the maintenance tasks to be performed on the 72DL PLUS precision thickness gauge and provides a troubleshooting guide.

4.1 Replacing the Battery

The lithium-ion (Li-ion) battery is the primary method for powering the 72DL PLUS precision thickness gauge. This battery comes installed in every instrument.

To replace the battery

1. Turn off the 72DL PLUS thickness gauge and disconnect the DC power.
2. Fully unfold the pipe stand at the back of the 72DL PLUS gauge (Figure 4-1 on page 45).

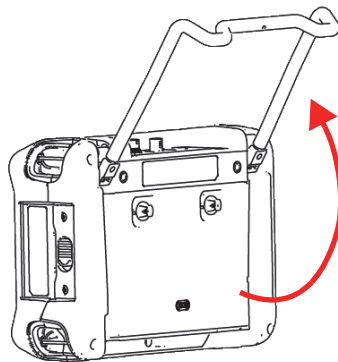


Figure 4-1 Pipe stand unfolded

3. Loosen the two thumb screws securing the battery compartment cover (Figure 4-2 on page 46).

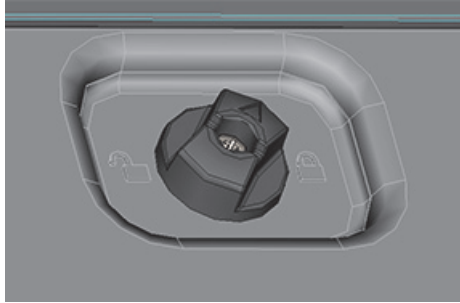


Figure 4-2 Cover thumb screw

4. Remove the battery compartment cover (Figure 4-3 on page 47).
5. Remove the used battery from the battery compartment.
6. Ensure that the gasket around the battery compartment cover is clean and in good condition.
7. Install a new battery in the battery compartment.
8. Make sure that the battery connectors align with the connectors in the battery compartment.
9. Install the battery compartment cover, making sure that the tab on the cover fits the slot on the bottom of the 72DL PLUS gauge.
10. Tighten the two thumb screws on the cover.

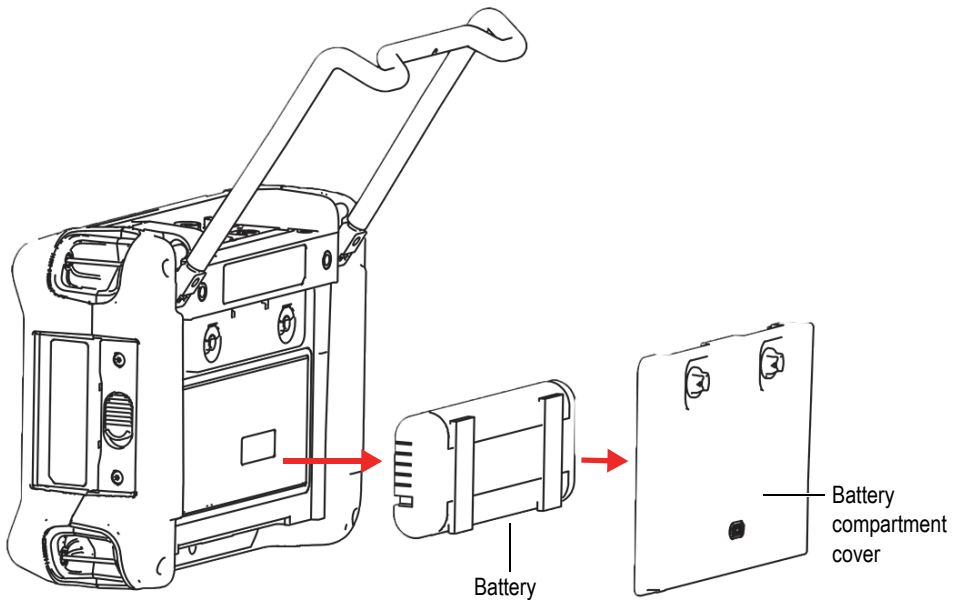


Figure 4-3 Removing the lithium-ion battery

4.2 Instrument Cleaning

When needed, wash the 72DL PLUS gauge with only mild soap and water on a damp cloth.

4.3 Verifying O-Ring Gaskets and Seals

The 72DL PLUS precision thickness gauge contains seals that are used to protect the instrument's internal hardware from the environment. These include:

- Battery compartment cover seal
- Side door seal
- Membrane vent

Regularly clean and verify the state of the above seals and gaskets to ensure the integrity of the hardware protection.

4.4 Annual Calibration

Evident recommends that you send your 72DL PLUS gauge once a year to an Evident service center for annual calibration. Contact Evident for details.

4.5 Troubleshooting

Symptom

The calibration function is unavailable.

Possible cause

The calibration function has been locked.

Solution

Deselect **Calibration** in the **Password Lock** screen.

Symptom

The 72DL PLUS gauge does not start when you press the On/Off power key (following a software update).

Possible cause

Interrupted, incomplete, or corrupted software update.

Solution

1. Remove the battery from the 72DL PLUS gauge as well as the AC line power.
2. Replace the battery in the 72DL PLUS gauge.
3. Start the unit.

Appendix: Specifications

This appendix outlines the specifications for the 72DL PLUS precision thickness gauge and its accessories.

Table 3 Measurements

Parameter	Specifications
Modes	Mode 1: Single layer measurement between excitation pulse and first reflection Mode 2: Delay line or immersion probe time between material interface echo and first back wall reflection Mode 3: Time between multiple back wall reflections. Provides maximum accuracy. Multilayer: 6 max
Application methods	Single layer, Multilayer (6 maximum), Reduction rate, Barrier, Oxide
Units	Standard frequency (SF): mm, in., μ s High frequency (HF): μ , mm, mils, in., μ s
Resolution: SF	Low: 0.1 mm (0.01 in.) Std: 0.01 mm (0.001 in.) Hi: 0.001 mm (0.0001 in.)
Resolution: HF	Low: 25 μ (1 mil or 0.001 in.) Std: 2.5 μ (0.1 mil or 0.0001 in.) Hi: 0.25 μ (0.01 mil or 0.00001 in.)
Velocity range	0.508 mm/ μ s to 18.699 mm/ μ s (0.0200 in./ μ s to 0.7362 in./ μ s)
Thickness range (dependent on probe frequency, probe type, and material)	SF: Steel 0.20–635 mm (0.008–25 in.) HF: Plastic 0.0127–25.4 mm (0.0005–1 in.)

Table 3 Measurements (continued)

Parameter	Specifications
Measurement rates (Maximum rates depend on the value of the Averaging field as configured for the application.)	SF: 1–3 layers, 2 kHz max SF: 4–6 layers, 1 kHz max HF: 1–3 layers, 1 kHz max HF: 4–6 layers, 500 Hz max
Calibration	Single or two point automatic calibration Zero offset and/or velocity manual adjustment Single point calibration from frozen waveform
Signal processing	Up to 64X waveform averaging
Measurement processing options	Averaging, Differential, Visual alarms, First peak, Echo polarity selection
Minimum display range	SF: 1 μ s for 20 MHz probe; 2 μ s for lesser than 20 MHz probe HF: 0.4 μ s for 20 MHz probe; 0.2 μ s for greater than 20 MHz probe
Display layouts	A-scan, B-scan, A/B-scan, Trend, Zoom (Manual and Auto-Zoom)

Table 4 Transmitter

Parameter	Specifications
Standard frequency (SF)	Negative square wave, max 200 V
High frequency (HF)	Bipolar square wave, max 75 V
Pulse width	Adjustable to probe frequency

Table 5 Receiver

Parameter	Specifications
Standard frequency (SF)	0.5–26 MHz (–3 dB)
High frequency (HF)	20–125 MHz (–3 dB); (0–125 MHz for 8x broadband filter)
Gain	Automatic or Manual SF max 100 dB, HF max 80 dB

Table 6 Environmental ratings

Parameter	Specifications
IP rating	Designed and tested for IP65: Protected against dust and water jets from all directions
Explosive atmosphere	MIL-STD-810F, Method 511.4, Procedure 1
Shock tested	MIL-STD-810F, Method 516.5, Procedure I, 6 cycles each axis, 15 g, 11 ms half sine
Vibration tested	MIL-STD-810F, Method 514.5, Procedure I, Annex C, Figure 6, general exposure: 1 hour each axis

Table 7 General

Parameter	Specifications
Overall dimensions (W × H × D)	238.76 mm × 172.72 mm × 86.36 mm (9.4 × 6.8 × 3.4 in.)
Weight	2.08 kg (4.6 lbs)
Data storage	16 GB
Power supply	AC/DC adapter 24 VAC, or Lithium-ion battery 73 Wh
Battery type	Lithium ion
Battery life	8 h
Battery storage temperature	-20 °C to 40 °C (-4 °F to 104 °F)
Operating temperature	-10 °C to 50 °C (14 °F to 122 °F)
Display type	WVGA (800 × 480 pixels) PCAP touch, 60 Hz refresh rate
Display dimensions	177.8 mm (7 in.) diagonal

Table 8 Data storage

Parameter	Specifications
Capacity	2 GB
Supported file formats	Incremental, sequential, 2D grid, custom

Table 9 Connectors

Parameter	Specifications
Transducer connectors	SF: Dual LEMO HF: BNC
USB	Two type A: keypad, mouse, mass storage, wireless dongle One Mini USB client: software updates, remote commands, miscellaneous client communications port
Input/Output	19-pin connector, single alarm, single analog output, digital input
DC input	5.5 mm diameter connector

Table 10 Device options

Parameter	Specifications
Software	Multilayer measurement software
Hardware	High-frequency operation (20–125 MHz)

Table 11 Included accessories

A/C charger/adaptor with power cord (varies by outlet configuration)
Transducer cable, BNC to microdot, 0.6096 m (2 feet), double-shielded (high-frequency models only)
<i>Getting Started Guide</i>
USB drive containing <i>User's Manual</i>
USB cable, Mini A to Mini B
Transport case

Table 12 Additional accessories and options

Interface application
Lithium-ion rechargeable battery
Reference standards
Ultrasound probes

Table 12 Additional accessories and options (continued)

Probe cables
Bubbler fixtures for probes

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