



# HSMT-Compact Manual Weld Scanner

User's Manual

DMTA017-01EN — Rev. G  
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 CANADA, INC., 3415, Rue Pierre-Ardouin, Québec (QC) G1P 0B3 Canada

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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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Rev. G

September 2022

Printed in Canada

All brands are trademarks or registered trademarks of their respective owners and third party entities.

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## List of Abbreviations

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EFUP	environment-friendly use period
hex	hexagonal
ID	inside diameter
PA	phased array
SLA	spring-loaded arm
TOFD	time-of-flight diffraction



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## Important Information — Please Read Before Use

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### Intended Use

The HSMT-Compact scanner is designed to perform nondestructive inspections on industrial and commercial materials.



#### **WARNING**

Do not use the HSMT-Compact scanner for any purpose other than its intended use. It must never be used to inspect or examine human or animal body parts.

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### 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.

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#### **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.

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## 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.

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### CAUTION

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

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## Repair and Modification

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

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### CAUTION

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

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## 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.

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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 HSMT-Compact scanner unit during device storage.

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## Regulations for Shipping Products with Lithium-Ion Batteries

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**IMPORTANT**

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

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**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.

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## Equipment Disposal

Before disposing of the HSMT-Compact scanner, 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 HSMT-Compact scanner 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.

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 HSMT-Compact scanner has been tested and found to comply with the limits for an industrial device in accordance with the specifications of the EMC directive.



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## FCC (USA) Compliance

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<b>NOTE</b>
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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.

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

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### FCC Supplier's Declaration of Conformity

Hereby declares that the product,

Product name: HSMT-Compact scanner

Model: HSMT-Compact scanner-MR/HSMT-Compact scanner-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 CANADA, INC.

Address:

3415, Rue Pierre-Ardouin Québec (QC) G1P 0B3 Canada

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.



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# Introduction

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This manual provides instructions for assembling, installing, and operating the HSMT-Compact scanner. The HSMT-Compact scanner is a versatile pipe and plate scanner that can be used to inspect pipes of 4 in. schedule or greater (with minimum outside diameters of 114 mm [or 4.5 in.]), as well as flat surfaces.

To help users understand the HSMT-Compact scanner's operation and configuration, this manual provides the following subject matter:

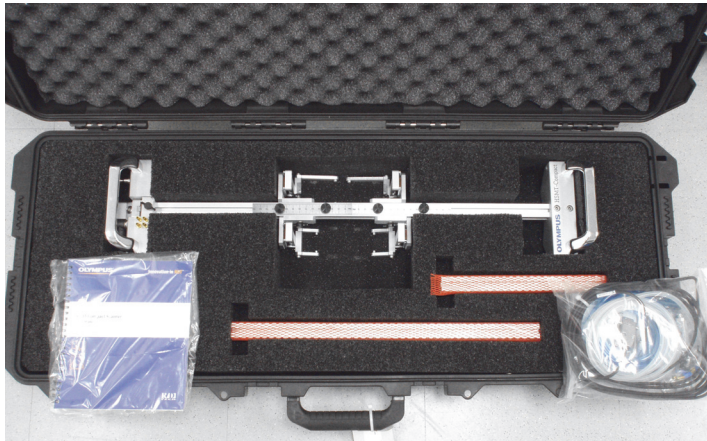
- The scanner's main components
- Assembly and setup
- Scanner operation
- Maintenance
- Technical specifications, including system connectors
- Accessories and spare parts, with exploded view diagram and descriptions



# 1. Overview

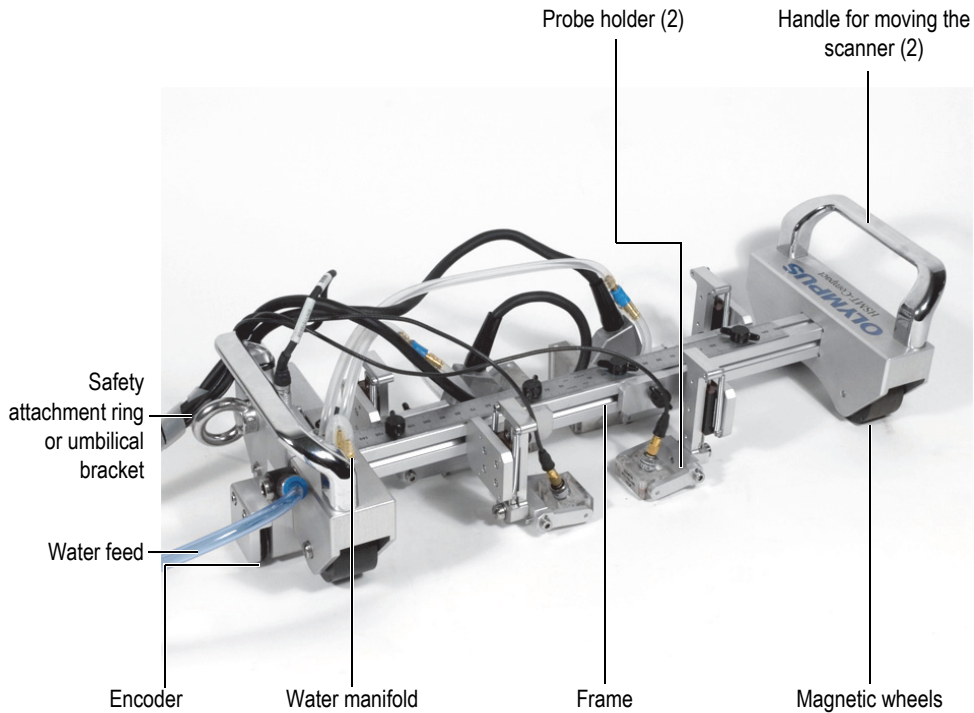
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This chapter provides an overview of the main HSMT-Compact scanner components. The contents of a standard case are shown in Figure 1-1 on page 23.



**Figure 1-1 Case contents**

The main HSMT-Compact scanner components are the frame (with four wheels and two handles), the probe holders, the water-couplant distribution system, and the encoder (see Figure 1-2 on page 24).



**Figure 1-2 The HSMT-Compact scanner**

### Frame

The frame provides a base for up to four conventional ultrasonic probes or phased array ultrasonic probes. It is supported at both ends by subassemblies that hold the wheels and handles used to move the unit across the surface being inspected. If necessary, the handles can be removed to reduce the height of the scanner.

### Magnetic wheels

The magnetic wheels help hold the unit against a ferromagnetic inspection surface. The wheels are covered with a plastic layer for smooth motion during inspection (see Figure 1-2 on page 24).



**WARNING**

To avoid injury, use caution when handling the magnetic wheels; the magnetic pull of the wheels is strong and could cause bodily harm—for example, a finger pinched between two wheels, or between a wheel and a steel surface.

---

#### Probe holders

The probe holders are used to secure the probes. The probe-holder position is adjustable. The probe holders are also spring-loaded to ensure a proper contact between the probes and the surface to be inspected.

#### Water manifold

Four tubes branch out from one main water-entry point to supply the wedges with water couplant.

#### Encoder

A wheel encoder measures the scanner displacement to determine the position on the scan axis.

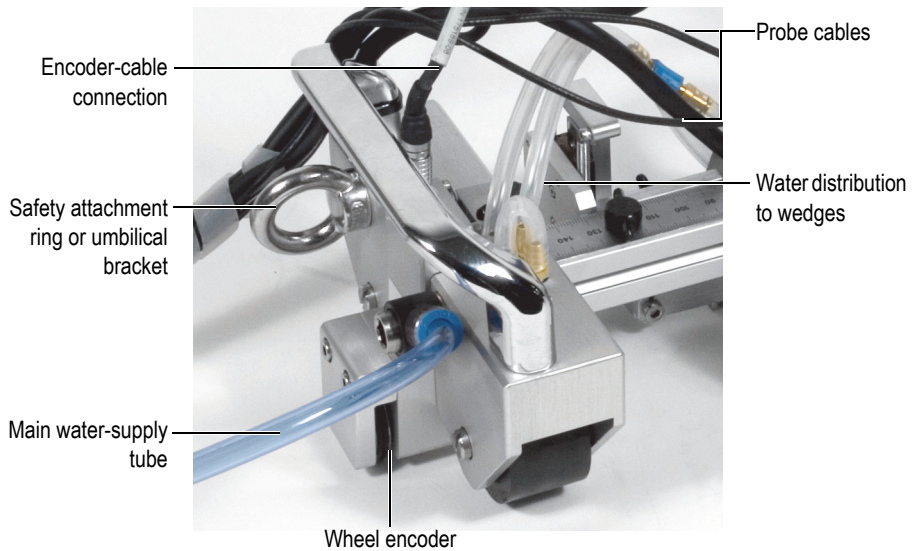
The encoder is waterproof and compatible with the OmniScan unit. The encoder is also spring-loaded to ensure that it remains in contact with the inspection surface, with adequate pressure for different pipe diameters.

#### Safety attachment ring

This ring can be used to secure the scanner with a safety hook (see Figure 1-3 on page 26). If the scanner is equipped with an umbilical cable, this cable can be attached to the ring to prevent overtensioning of the probe cables.

#### Umbilical bracket

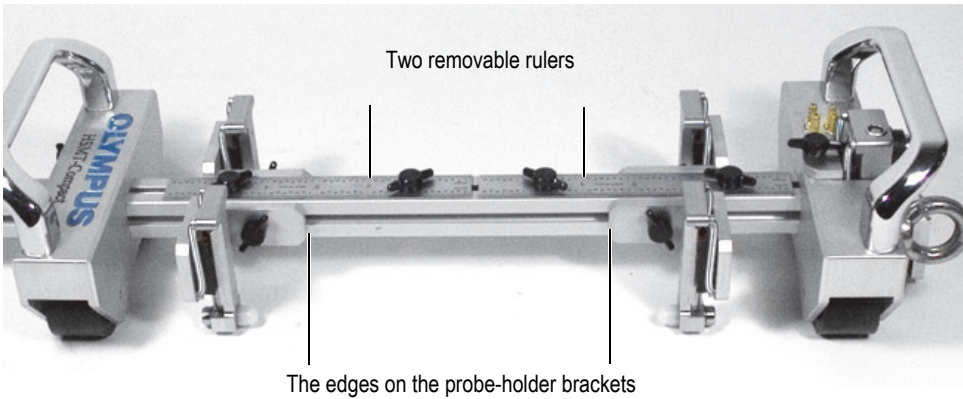
An umbilical bracket is supplied with the scanner for quick attachment of a cable bundle wrapped with a divisible shell (see “Attaching the Umbilical Cable” on page 33).



**Figure 1-3 Detail of connections**

### Positioning a probe holder

Two removable rulers are provided on the top of the scanner frame to help accurately position a probe holder. The edges of the probe-holder brackets can be used to position the exit points of the ST1 and ST2 TOFD wedges, which are designed to align with each other (see Figure 1-4 on page 27).

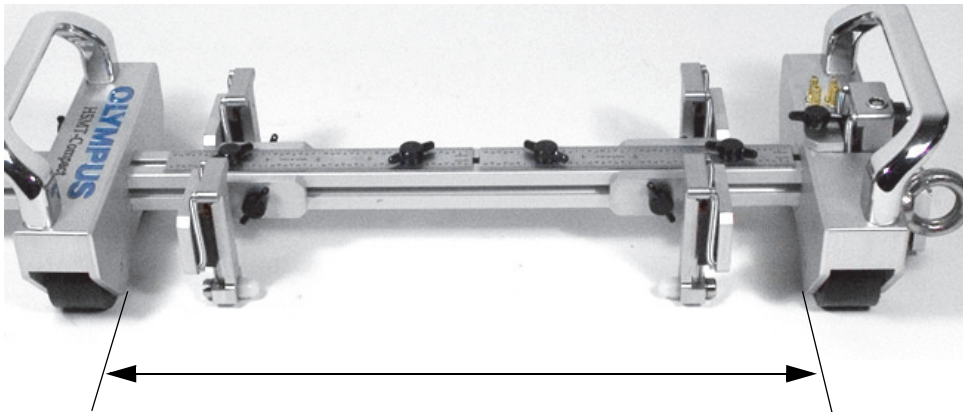


**Figure 1-4 Removable rulers**

**Alternative frame configuration**

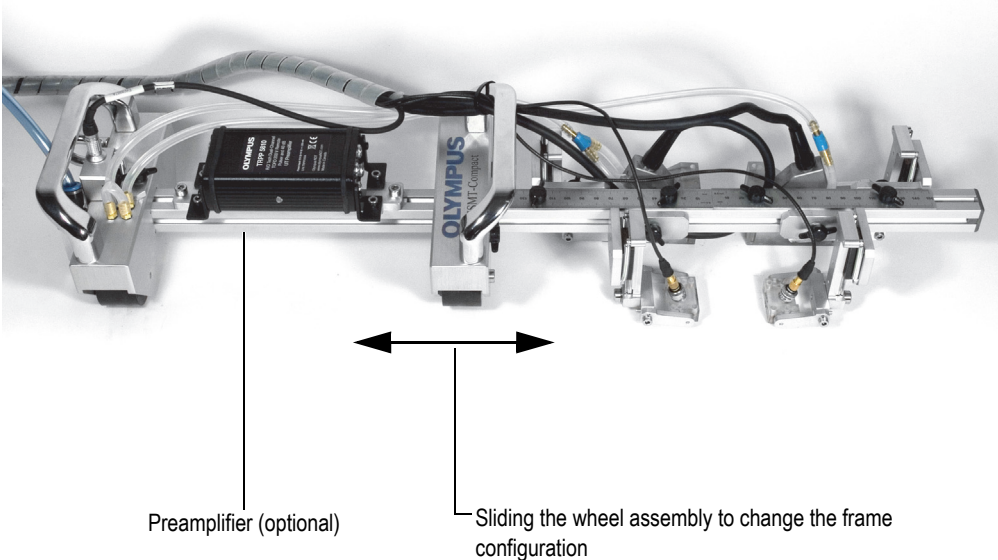
The frame can hold both conventional ultrasonic probes and phased array ultrasonic probes.

The frame section between the wheels can be changed to vary the scanner length (see Figure 1-5 on page 27).



**Figure 1-5 Changing the scanner length**

When loosened, the wheel assembly slides freely on the frame, and can be temporarily removed and reinstalled in a different configuration. For example, the frame can be positioned to extend outside the limits of the wheels, which is well-suited to hard-to-reach areas, such as pipe-to-component welds (see Figure 1-6 on page 28).



**Figure 1-6 Alternative scanner configuration**

### Preamplifier

If necessary, a preamplifier (often required for TOFD inspections) can be mounted on the frame. In the example shown in Figure 1-6 on page 28, an Evident TRPP 5810 pulser/preamplifier is used. A bracket is required to mount the TRPP 5810 on HSMT scanners. This bracket is included with some TRPP 5810 packages, and can also be ordered separately (part number: HSMT-A-BRK5810 [U8779088]).

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## 2. Scanner Assembly and Setup

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This chapter explains how to adjust parts on the HSMT-Compact scanner (for example, the wheel-assembly position on the frame), and how to set up the scanner for inspection.

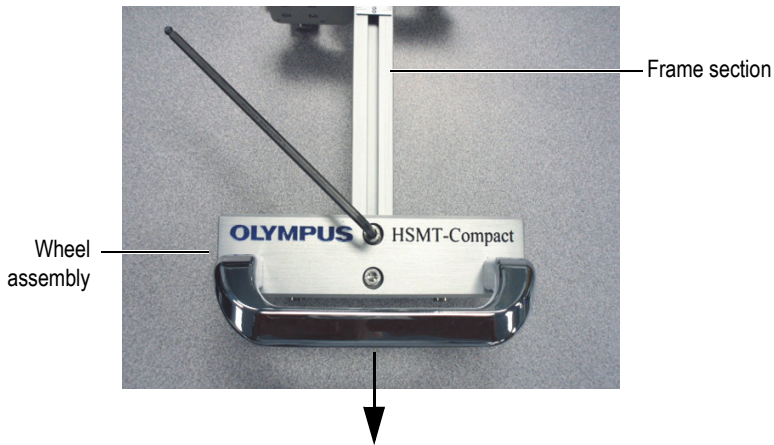
### 2.1 Changing the Frame Configuration

The frame configuration can be changed as follows:

- The frame section between the wheels can be changed to increase or decrease the distance between the wheels. This is accomplished using frame sections of different lengths.  
OR
- The wheel-assembly position can be adjusted on the frame; it can be loosened and moved along the frame section. As such, the wheel assembly can be temporarily removed, and then reinstalled so that the frame and the probe extend outside the limits of the wheels, which is ideal for hard-to-reach areas, such as pipe-to-component welds (see Figure 1-6 on page 28).

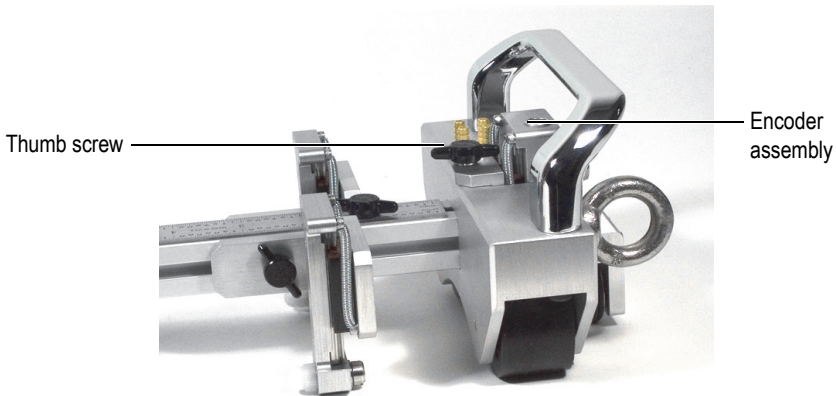
#### To change the frame section between the wheels

1. On the end of the scanner displaying the company name, perform the following steps:
  - a) Using a hexagonal key, remove the two screws that attach the frame section to the wheel assembly (see Figure 2-1 on page 30).
  - b) Remove the wheel assembly from the frame.
  - c) To facilitate reassembly, remove the T-nut, and then install it onto the new frame section.



**Figure 2-1 Sliding the wheel assembly off**

2. On the water-manifold end of the scanner:
  - a) Remove the cable from the encoder assembly.
  - b) Remove the thumb screw that holds the encoder assembly, and then pull this assembly away from the scanner (see Figure 2-2 on page 30).The remaining frame screws are now easy to access.



**Figure 2-2 Thumb screw for the encoder assembly**

- Using a hexagonal key, remove all five of the frame screws, and then pull out the frame section (see Figure 2-3 on page 31).



**Figure 2-3 Removal of the frame screws behind the encoder assembly**

- Reinstall the new frame section and scanner parts in the reverse order from the preceding steps.

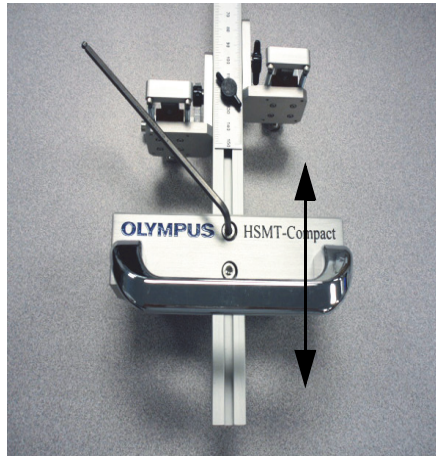
#### **To adjust the wheel-assembly position on the frame**

- Using a hexagonal key, loosen the two screws that hold the wheel assembly onto the frame section (see Figure 2-4 on page 31).



**Figure 2-4 Loosening the wheel assembly**

2. Slide the wheel assembly to the desired new location (see Figure 2-5 on page 32).



**Figure 2-5 Sliding the wheel assembly onto the frame**

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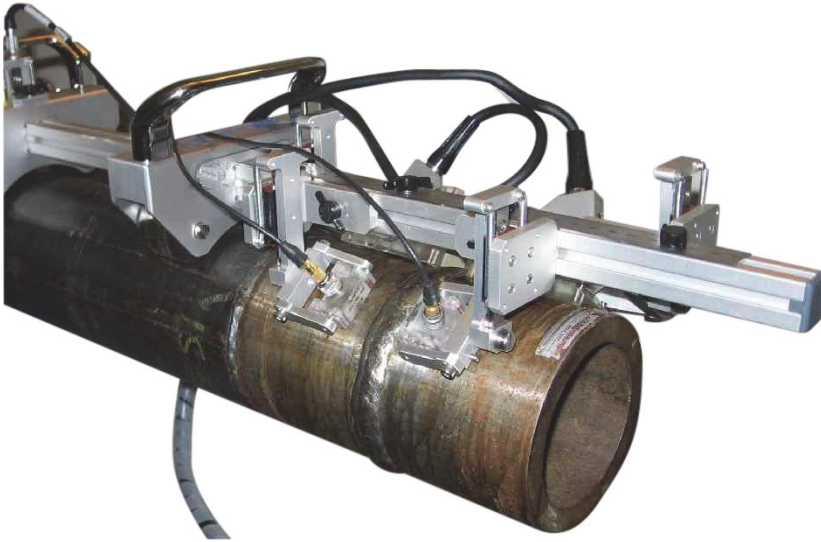
**NOTE**

If necessary, you can temporarily remove the entire wheel assembly, and probe holders from the frame section in order to reassemble them in the desired new configuration.

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3. Attach the remaining scanner components in the desired configuration. An example inspection setup with the frame extended beyond the wheel limits is shown in Figure 2-6 on page 33.

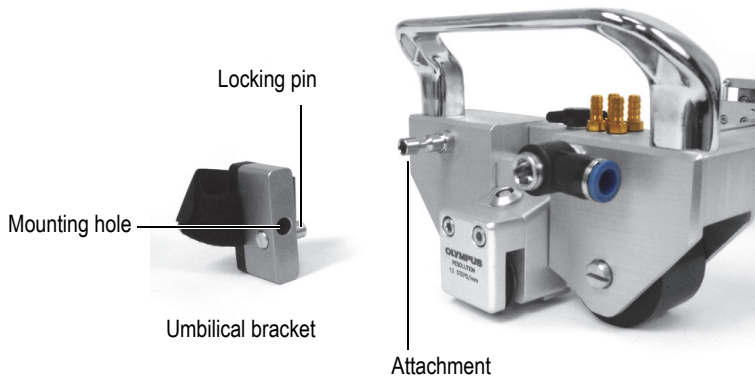




**Figure 2-6 Scanner with frame extended beyond wheel limits**

## **2.2 Attaching the Umbilical Cable**

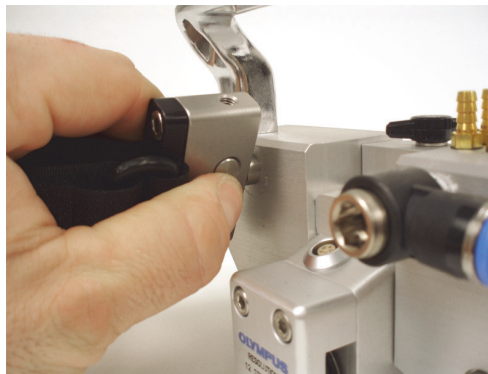
The umbilical cable can be attached to the HSMT-Compact scanner using the umbilical bracket (see Figure 2-7 on page 34).



**Figure 2-7 Umbilical-cable attachment and bracket**

### To attach the umbilical cable

1. Press the locking pin on the umbilical bracket, slide the mounting hole over the attachment on the HSMT-Compact scanner, and then release the pin (see Figure 2-8 on page 34).



**Figure 2-8 AEIX378 umbilical-cable attachment**

2. Loosen the strap, wrap it around the umbilical cable, then reinsert the strap into the buckle and tighten it (see Figure 2-9 on page 35).

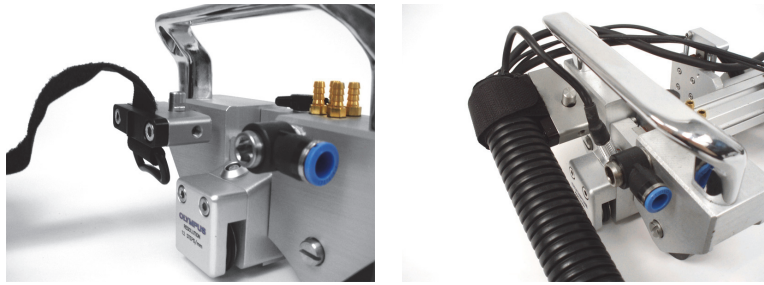


Figure 2-9 Loosened strap (*left*) and tightened strap (*right*)

## 2.3 Setting Up the Scanner

This section describes the procedure for preparing the HSMT-Compact scanner for inspection.

### To set up the scanner

1. Connect the probes and any other equipment (a preamplifier, for example) to the acquisition unit.
2. Connect the encoder cable to the side of the scanner (carefully align the marks on the connector), and then connect the other end of the encoder cable to the instrument (see Figure 2-10 on page 35).

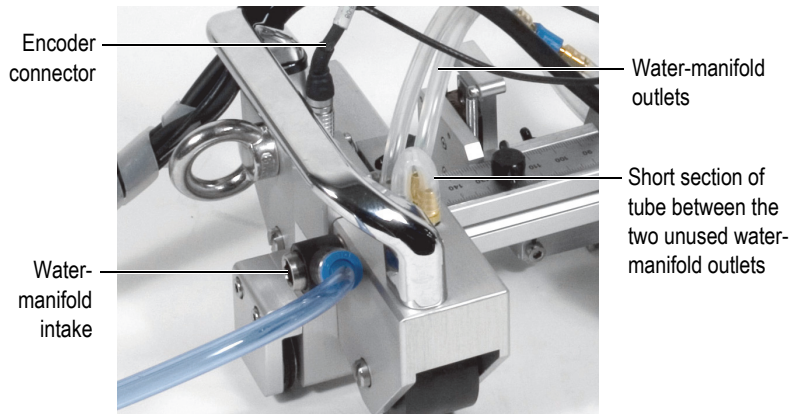
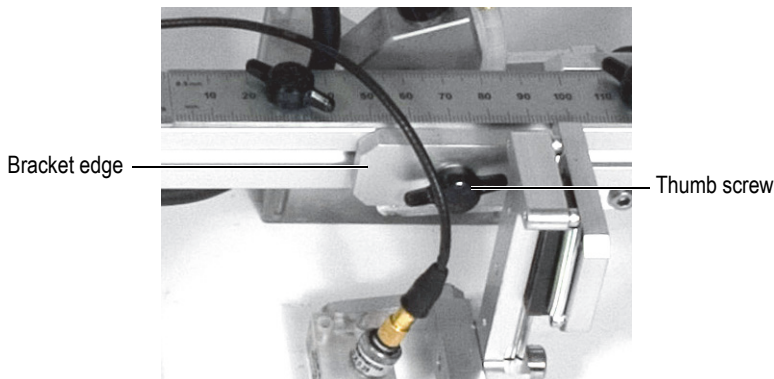


Figure 2-10 Scanner connections

3. Connect the water-manifold intake to the feed system (see Figure 2-10 on page 35).
4. Connect the water-manifold outlet to the wedge-couplant intake.  
If only two out of the four water-manifold outlets are used, connect a tube between the two unused outlets (see Figure 2-10 on page 35).
5. Adjust the probe position as follows:
  - a) Loosen the thumb screw that secures the probe-holder bracket to the scanner frame (see Figure 2-11 on page 36).



**Figure 2-11 Adjusting the probe position**

- b) Slide the probe holder to the desired position, and then tighten the thumb screw.

---

**TIP**

For the TOFD ST1 and ST2 models exclusively, the edges of the probe-holder brackets are in line with the beam exit point of the wedge to facilitate probe positioning.

---

---

**NOTE**

Equipment connections and probe positions vary according to the application. To mount the components, you might have to add or correctly position T-nuts in the frame slots.

---

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## 3. Operating the Scanner

---

The HSMT-Compact scanner is designed for manual use, and is straightforward to operate.

### To operate the scanner

1. Hold the scanner above the inspection surface, and then align the scanner so that the inspection area is centered between the probes.
2. With the inspection area centered between the probes, bring the scanner's magnetic wheels into contact with the inspection surface.
3. Next, push or pull the scanner in the desired inspection direction.  
If the inspection surface is made of a ferromagnetic material, the scanner does not need to be pushed down to prevent liftoff.



---

## 4. Maintenance

---

This chapter contains procedures for replacing wheels, probes, and wedges for both conventional ultrasonic and phased array ultrasonic technologies. The probes may need to be replaced if they malfunction, or if the inspection application has changed. Depending on operating conditions, the HSMT-Compact scanner parts might need periodic cleaning.

### 4.1 Replacing Wheels

This section contains the procedure for changing the wheels once they are too worn.

**WARNING**

To avoid injury, use caution when handling the magnetic wheels; the magnetic pull of the wheels is strong and could cause bodily harm—for example, a finger pinched between two wheels, or between a wheel and a steel surface.

---

#### To replace wheels

1. Using a flathead screwdriver, remove the screw that secures the wheel to the frame (see Figure 4-1 on page 40).



**Figure 4-1 Removing the wheel screw**

2. Lift the scanner and pull the wheel down and outward.
3. Insert the new wheel in the frame and secure it with the screw.  
Make sure the bearings are placed in the correct position.
4. Repeat the procedure for the other wheels.



**WARNING**



To avoid the risk of injury from magnetic attraction forces between wheels, only remove and replace one wheel at a time (always reinstall the magnetic wheel on the scanner before removing the next one).

---

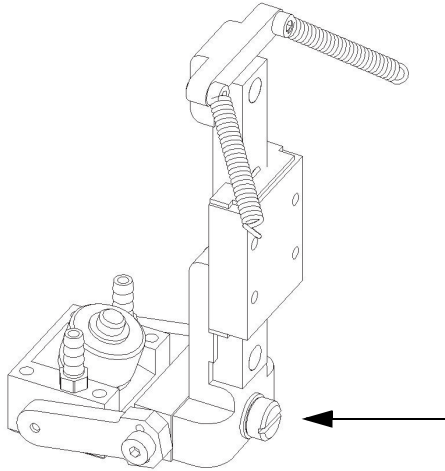
## 4.2 Replacing a Conventional Ultrasonic Probe

This section describes the procedure for removing a conventional ultrasonic probe and wedge from the holder on the scanner.



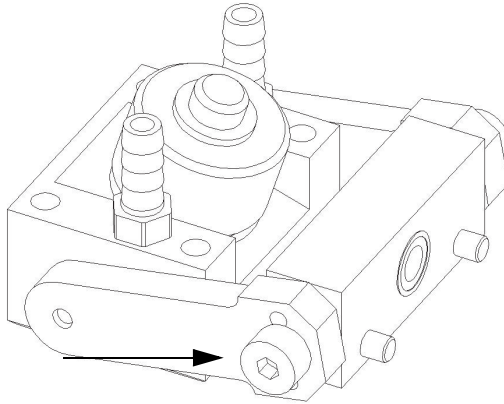
## To replace a conventional ultrasonic probe

1. Turn off the couplant flow.
2. Disconnect the couplant tubes from the couplant source, or from the wedge.
3. Disconnect the probe cable.
4. Remove the scanner from the inspection surface.
5. Using a flathead screwdriver, loosen the screw at the back of the spring-loaded arm (SLA), just enough to free the yoke from the arm (see Figure 4-2 on page 41).



**Figure 4-2** The screw that secures the yoke to the SLA

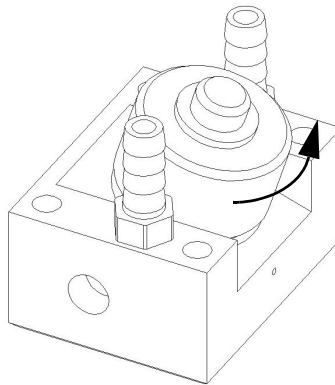
6. Remove the yoke.
7. Using a hex socket-head screwdriver, remove the screw (on the side of the yoke) that holds the parts together (see Figure 4-3 on page 42).



**Figure 4-3 The screw that secures the yoke assembly**

8. Ensure that the probe cable is disconnected, and then unscrew the probe from the wedge (see Figure 4-4 on page 42).

In certain equipment configurations, it may be possible to unscrew the probe without removing the wedge from the yoke (and the yoke from the SLA).



**Figure 4-4 Unscrewing the probe**

9. Install the new probe.

---

**NOTE**

Before installing the new probe into the probe holder, ensure that there is enough couplant between the probe and the wedge.

---

10. Tighten the probe inside the holder.
- 

**CAUTION**

Do not overtighten the screws; doing so could crack the wedge.

---

11. Reinstall the yoke onto the holder.
12. Reinstall the yoke, probe holder, and probe assembly onto the spring-loaded arm.

This concludes the procedure for replacing a conventional ultrasonic probe.

### 4.3 Replacing a Phased Array Probe

This section describes the procedures for removing a phased array ultrasonic probe from the scanner, and for removing the probe and wedge from the holder.

#### To replace a phased array probe

1. Turn off the couplant flow.
  2. Disconnect the couplant tubes from the couplant source.
  3. Disconnect the probe cable from the instrument.
- 

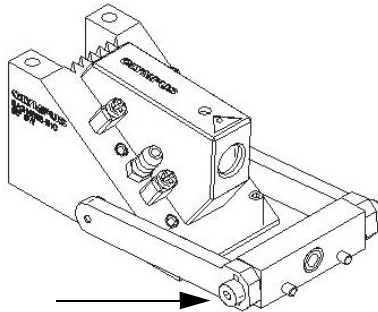
**CAUTION**

To prevent any damage to the pins, always place the protective cover over the phased array probe's Hypertronics connector when it is disconnected.

---

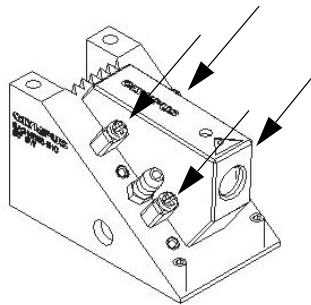
4. Remove the scanner from the inspection surface.
-

5. Using a flathead screwdriver, remove the screw (at the back of the SLA) that secures the yoke to the spring-loaded arm.
6. Remove the yoke, probe holder, and probe assembly from the scanner.
7. Using a hexagonal key, remove the screw (on the side of the yoke) that holds the parts together (see Figure 4-5 on page 44).



**Figure 4-5 The screw that secures the yoke assembly**

8. Using a cross-head screwdriver, loosen the four screws (see Figure 4-6 on page 44), and then remove the probe from the wedge.



**Figure 4-6 The probe holder**

9. Install the new probe.

---

**NOTE**

Before installing the new probe into the probe holder, ensure that there is enough couplant between the probe and the wedge.

---

10. Install and tighten the screws to secure the probe within the holder.

---

**CAUTION**

Do not overtighten the screws; doing so could crack the wedge.

---

11. Reinstall the yoke onto the holder.

12. Reinstall the yoke, probe holder, and probe assembly onto the spring-loaded arm.

This concludes the procedure for replacing a phased array probe.

## 4.4 Unit Cleaning

The HSMT-Compact scanner's external surfaces can be cleaned when needed.

---

**WARNING**

The magnetic wheels can be strongly attracted to any ferromagnetic materials or surfaces, which potentially can cause injuries (for example, pinched fingers) or equipment damage.

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### To clean the unit

1. Ensure the unit is turned off by removing the source of power.
2. Disconnect all cables.
3. To bring the unit back to its original finish, clean the housing with a soft cloth.
4. To remove persistent stains, use a damp cloth with a soft, soapy solution. Do not use abrasive products or powerful solvents that could damage the finish.

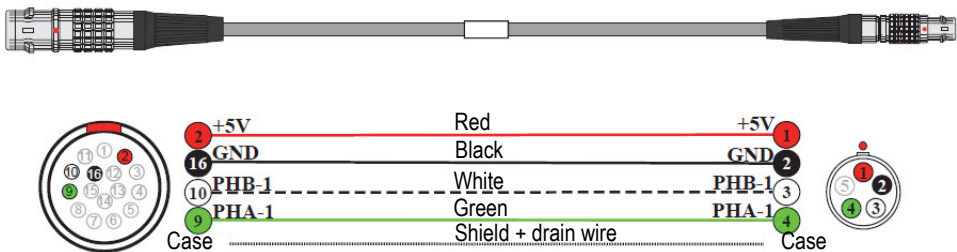
5. Wait until the unit dries completely before reconnecting the cables.

## 5. Specifications

This chapter contains the general specifications for the HSMT-Compact scanner (see Table 1 on page 47 to Table 3 on page 48).

**Table 1 General specifications**

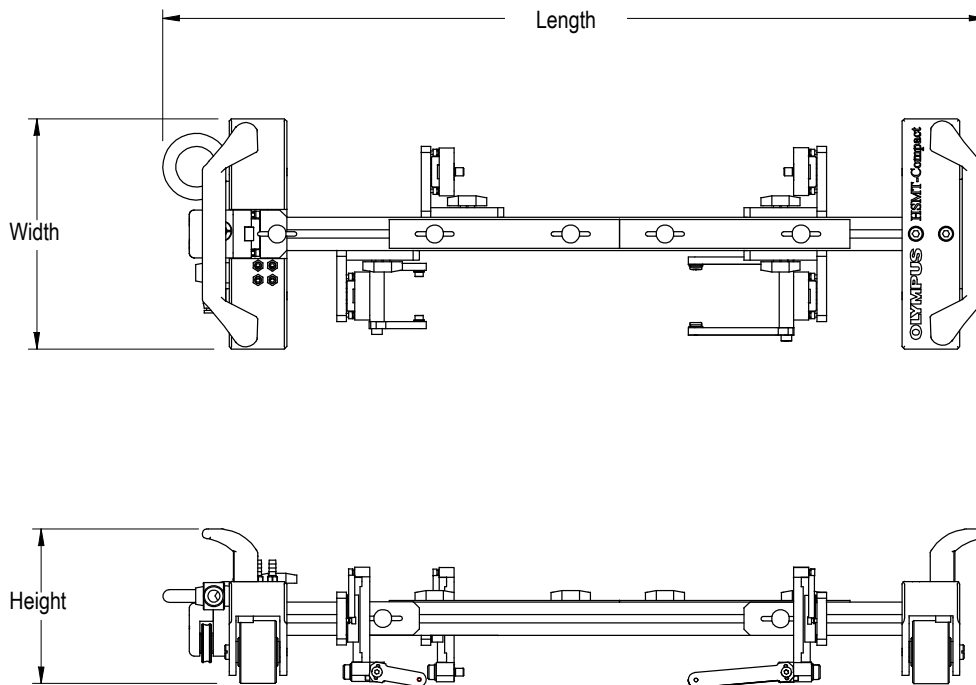
Parameter	Value
Dimensions	See Table 2 on page 48 and Figure 5-2 on page 48.
Encoder	Type: Quadrature
	Resolution: 12 steps/mm $\pm$ 0.15 steps/mm (encoder calibration is recommended for every setup)
	Waterproof
	Pinout: See Figure 5-1 on page 47.
Power rating	5 VDC, 25 mA max.
	Frequency: 0 kHz to 1.5 kHz (for a maximum displacement velocity per second of 10 cm or 4 in.)



**Figure 5-1 Encoder pinout for EWIX1418 cable**

**Table 2 Dimensions (overall)**

Bar length (mm)	Width		Length		Height	
	(mm)	(in.)	(mm)	(in.)	(mm)	(in.)
250	152	5.98	344	13.54	102	4.02
450	152	5.98	544	21.42	102	4.02
650	152	5.98	744	29.29	102	4.02

**Figure 5-2 Scanner dimensions****Table 3 Environmental conditions**

Parameter	Value
Operating temperature	-10 °C to 55 °C
Storage temperature	-30 °C to 60 °C



**Table 3 Environmental conditions (continued)**

<b>Parameter</b>	<b>Value</b>
Relative humidity (RH)	Max. 85 % RH noncondensing
Altitude	Up to 2000 m
Outdoor use	Yes
Wet locations	Yes
IP rating	Waterproof (designed for IP67)
Pollution level	1



---

## 6. Accessories and Spare Parts

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This chapter contains lists of accessories (such as cables, yokes, and pumps) and spare parts for the HSMT-Compact scanner.

### 6.1 Umbilical Cables

Umbilical cables are available as either a closed type or a divisible type. The closed type incorporates a protective conduit that is waterproof and dust proof, and comes with safety hooks on both ends (for order details, contact Evident). The divisible type makes it possible to change cables, without the need of connection boxes (for order details, see Table 4 on page 51).

**Table 4 Umbilical cables (divisible-conduit type)**

Part Number	Description
U8779093	One 0.3 m divisible cable conduit with a 16 mm ID. Well-suited to 2 × PA, irrigation tube, and the encoder cable.
U8779094	One 0.3 m divisible cable conduit with a 19.2 mm ID. Well-suited to 2 × PA, 2 × conventional UT, irrigation tube, and the encoder cable.
U8775093	One 0.3 m divisible cable conduit with a 24.2 mm ID. Well-suited to 2 × PA, 4 × conventional UT, irrigation tube, encoder, and preamplifier power supply cables.
U8779095	One 5 m divisible cable conduit with 24.2 mm ID. Well-suited to 2 × PA, 4 × conventional UT, irrigation tube, encoder, and preamplifier power supply cables.

## 6.2 Yokes

Figure 6-1 on page 52 and Table 5 on page 52 provide ordering information for yokes. Yoke dimensions depend on the wedge model used.

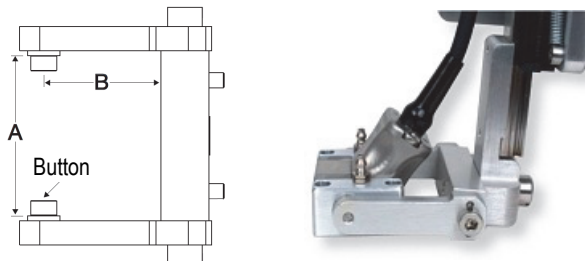


Figure 6-1 Yoke geometry

Table 5 Replacement yokes

Part number	Wedge compliance	Button OD (mm)	A (mm)	B (mm)
Standard yokes				
U8775048 <sup>a</sup>	ST1, ST2, SPE1, SPE2, SPE3, SA0	5	31.75	23.5
U8775047 <sup>b</sup>	SA1, SA2, SA10, SA11, SA12, SA31, SA32, SI1, SPWZ3, SNW1-AQ25 (WR), and SNW3-AQ25	8	40	55
U8775046	SA10, SA11, SA31, and SA32	8	40	38
Other yokes				
U8775187	SPWZ1 and SA14 (in reverse position)	8	40	46
U8780194	SPWZ1, SA14, RexoFORM, and SNW3-AQ25-WR	8	40	65
U8775055	SA1-L (lateral)	8	45	60
U8779096	SA3	8	50	55
U8775084	SA4, SA5, and HydroFORM-A-LiteHolder	8	55	55
U8779097	Water wedge	8	50	65
U8775132	SNW1	8	31.75	55

**Table 5 Replacement yokes (continued)**

Part number	Wedge compliance	Button OD (mm)	A (mm)	B (mm)
U8775165	SNW2	8	31.75	23.5
U8775164	SNW3	8	31.75	65
Q7750014	SA17-DN	5	50	38
Q7750015	SA17-N	5	31.75	38
U8775056	SA27-DN and Creeping wave probe holder (U8775080)	5	40	23

- a. Standard yoke for TOFD-P/E probe mounting
- b. Standard yoke for phased array probe mounting

### 6.3 Couplant-Feed Units

Couplant can be supplied to wedges by either an electric or a manual pump (see Table 6 on page 53).

**Table 6 Couplant-feed units**

Part number	Description
U8780008	Electric couplant-feed unit 3.78 l/min at 414 kPa (1 GPM at 60 psi) 100 VAC/240 VAC
U8780009	Electric couplant-feed unit with suction capability Same operating specification as CFU03
U8775153	4 L manual water pump with irrigation tubes and fittings
U8775001	8 L manual water pump with irrigation tubes and fittings

## 6.4 Connector Reference

HSMT-Compact scanner models sold after July 2013 come standard with the LEMO connector, which is compatible with the OmniScan MX2 and SX instruments. For use with a different instrument, an optional adaptor is required (see Table 7 on page 54).

**Table 7 Required encoder cable adaptor**

Scanner Connector	Instrument		
	OmniScan MX	OmniScan MX2, SX and FOCUS PX	TomoScan FOCUS LT
LEMO (from July 2013 onward)	P/N: U8780329	—	P/N: U8769010
DE15 (Prior to July 2013)	—	P/N: U8775201	P/N: U8767107

## 6.5 Spare Parts

An exploded view of the scanner is shown in Figure 6-2 on page 55. A list of standard spare parts is provided in Table 8 on page 55.

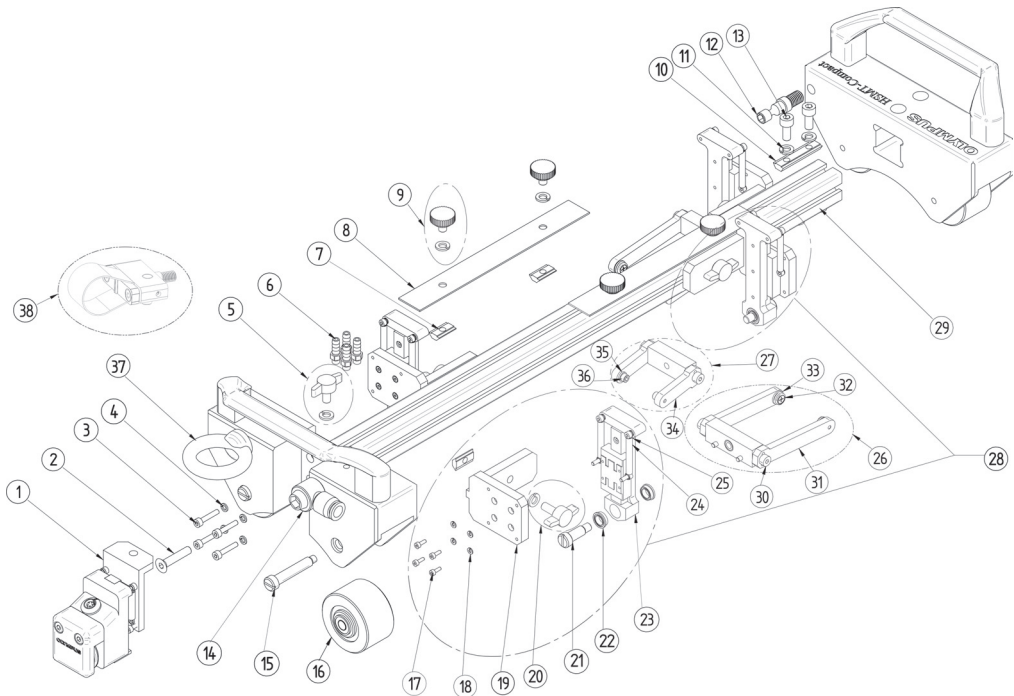


Figure 6-2 Exploded view

Table 8 Spare parts

Drawing item	Qty <sup>a</sup>	Part number	Description
1 <sup>b</sup>	1	U8775097	Spring-loaded encoder and bracket
2	1	U8775235	M5 × 25 mm hex flat
3	4	U8908261	M3 × 16 mm hex socket
4	4	U8905961	Spring washer M3
5	1	Q8300237	Thumb screw assembly 10 mm
6	4	U8902678	10-32 to T-1/8 in. ID short-barb brass fitting
7	8	U8900310	Dovetail M5 nut
8	2	Q8300422	Ruler

Table 8 Spare parts (*continued*)

Drawing item	Qty <sup>a</sup>	Part number	Description
9	4	U8909791	Thumb screw assembly 6 mm
10	1	U8830333	Double dovetail M5 nut
11	11	U8900327	Spring washer M5
12	1	Q8300899	Locking umbilical pin
13	2	U8900317	M5 × 12 mm hex socket
14	1	Q1500599	Push-in fitting
15	4	U8902414	Wheel shaft
16	4	U8750050	Kit of one magnetic wheel and two bearings
17	16	Q8300893	M3 × 5 mm hex screw
18	16	U8905961	Lock washer M3
19	4	U8767270	90° probe-holder bracket for serial numbers below 872542- <i>nn</i>
		U8775204	90° probe-holder bracket for serial numbers 872542- <i>nn</i> and above
20	4	U8775070	Thumb screw assembly 12 mm
21	4	U8775041	Shoulder screw for yoke
22	8	U8775110	Yoke bearing
23	4	U8830739	Spring-loaded arm (SLA)
24	8	U8900337	Spring for SLA
25	16	Q8300929	M2.5 × 6 mm hex socket
26	2	U8775047	PA yoke 5°, 40 mm wide × 55 mm long
		U8775046	PA yoke 5°, 40 mm wide × 38 mm long
27	4	U8775048	TOFD yoke 10°, 31.75 mm × 23.5 mm
28	2	U8779086	Pair of SLA mounted on brackets (left and right)
29	1	U8775229	Profile 250 mm
	1	U8775104	Profile 450 mm
	1	U8775103	Profile 650 mm



**Table 8 Spare parts (continued)**

<b>Drawing item</b>	<b>Qty<sup>a</sup></b>	<b>Part number</b>	<b>Description</b>
30	4	U8770529	M4 × 10 mm hexagonal head stainless steel screw
31	4	U8831534	PA probe yoke arm 55 mm
		Q8300930	PA probe yoke arm 38 mm
32	4	U8906398	M3 × 8 mm Phillips flathead stainless steel screw
33	4	U8721914	PA 8 mm yoke button
34	8	Q8300931	UT probe yoke arm
35	8	U8770531	0.040 in. yoke button spacer
36	8	U8770530	UT 5 mm yoke button
37	1	U8831178	M8 × 13 mm bolt with stainless steel ring
38	1	Q8300895	Umbilical bracket
Not Shown	1	U8775313	5 m encoder cable with LEMO connector (for direct connection to OmniScan MX2 and SX models)
Not Shown	1	U8775040	Metric hexagonal key kit
Not Shown	5	U8902320	4 mm ID irrigation tube (unit: ft)
Not Shown	4	U8900341	0.125 in. ID irrigation tube (unit: ft)
Not Shown	1	U8902317	Irrigation valve
Not Shown	4	U8902321	“Y” irrigation splitter
Not Shown	1	Q8300932	Velcro tape (unit: ft)

- a. This number represents the typical quantity initially included with your scanner package.  
b. For serial number 872542-*nn* and below, the encoder part number is ADIX1584 [U8780200] (former part number ADIX847).



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