EVIDENT™

HST-Lite Scanner

User's Manual

DMTA-20045-01EN — Revision B

September 2022

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

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 HST-Lite Scanner is designed to perform nondestructive inspections on industrial and commercial materials.

WARNING

Do not use the HST-Lite Scanner 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 HST-Lite Scanner 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 HST-Lite Scanner, check your local laws, rules, and regulations, and follow them accordingly.

BC (Battery Charger - California, USA Community)

BC

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 HST-Lite 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 HST-Lite Scanner 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: HST-Lite Scanner
Model: HST-Lite Scanner-MR/HST-Lite 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

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.

1. HST-Lite Scanner

The HST-Lite Scanner is a versatile pipe and plate scanner, which can be used to inspect welds using TOFD and pulse-echo techniques.

The HST-Lite Scanner is composed of the following items (see Figure 1-1 on page 19):

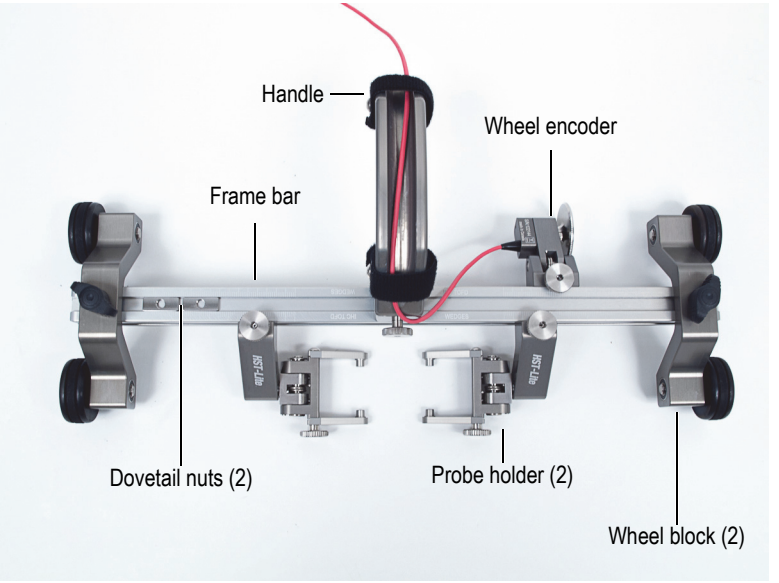

Figure 1-1 The HST-Lite Scanner components

1.1 Positioning the Frame Bar

The frame bar must be positioned differently according to the wedge model used:

- Stainless steel wedges (IHS)
- Rexolite wedges (IHC)

The engraving corresponding to the wedge model used must be facing upward. If it is not the case, perform the following procedure.

To position the frame bar

1. Loosen the wheel block, the probe holder, the handle, and the wheel encoder thumbscrews, and then remove all the components from the frame bar (see Figure 1-2 on page 20).

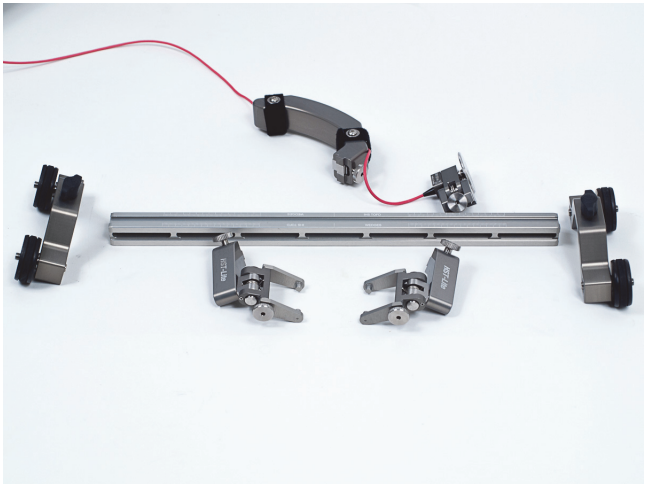

Figure 1-2 Disassembled scanner

2. Position the frame bar so the engraving corresponding to the wedge model used (IHS TOFD WEDGES or IHC TOFD WEDGES) is facing upward (see Figure 1-3 on page 21).

Figure 1-3 Engraving on the frame bar

3. Reassemble the scanner.

1.2 Installing a Probe and a Wedge in a Probe Holder

To install a probe and a wedge in a probe holder

CAUTION

Before installing a new probe into a probe holder, make sure that there is enough couplant between the probe face and the wedge.

1. Apply couplant on the probe face (see Figure 1-4 on page 22).

Figure 1-4 Applying couplant on probe face

2. Install the probe on the wedge.
3. Loosen the yoke thumbscrew (see Figure 1-5 on page 22).

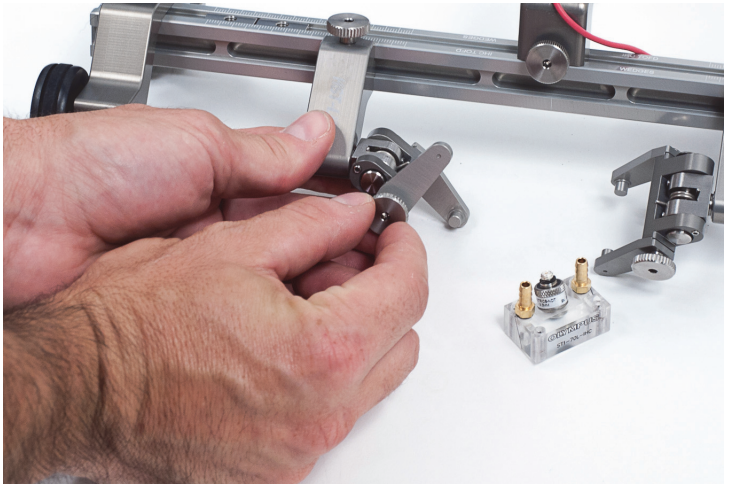

Figure 1-5 Loosening yoke thumbscrew

4. Install the probe and wedge assembly between the two yoke arms (see Figure 1-6 on page 23).

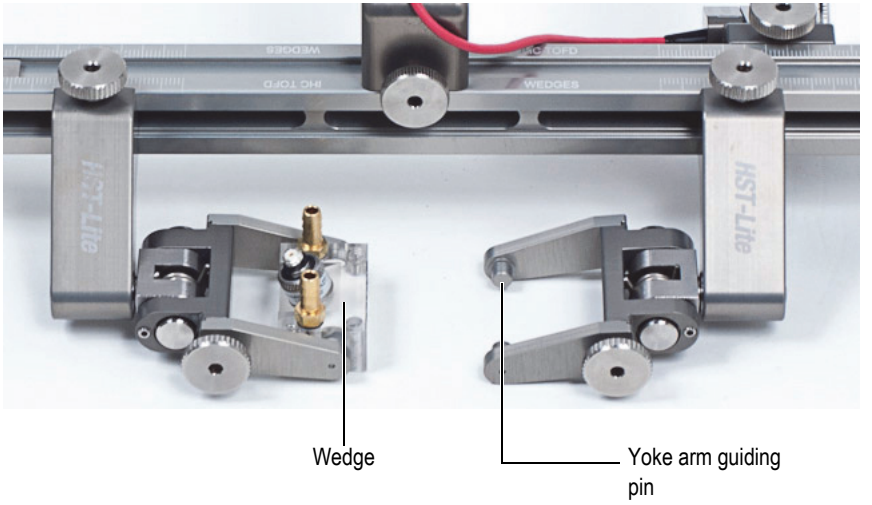

Figure 1-6 Wedge installed

5. Push the yoke arm in order to place the yoke arm guiding pin into the wedge side hole (see Figure 1-6 on page 23).
6. Tighten the thumbscrew until it holds the yoke arm tight against the holder.
7. Repeat the procedure to install the other wedge.

1.3 Setting the Distance Between Beam Exit Points

To set the distance between beam exit points

1. According to the scan plan, determine the distance between the beam exit points (for example, 40 mm).
2. Divide the distance value by two (for example, 20 mm).
3. Position the probe holders so their indicators point to the half value (for example, 20 mm) on the left- and right-hand side frame rulers (see Figure 1-7 on page 24 and Figure 1-8 on page 25).

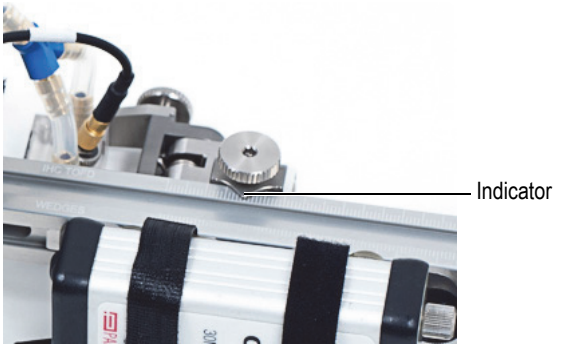

Figure 1-7 Probe holder indicator

NOTE

A millimeter appears as the distance between two short lines. The distance between two long lines is 5 mm.

4. To make sure that the distance between beam exit points is properly set:
   - When using Rexolite wedges, measure the distance between the dots engraved on yoke arms (see Figure 1-8 on page 25).

     OR

     When using stainless steel wedges, measure the distance between the vertical lines engraved on wedges (see Figure 1-9 on page 25).

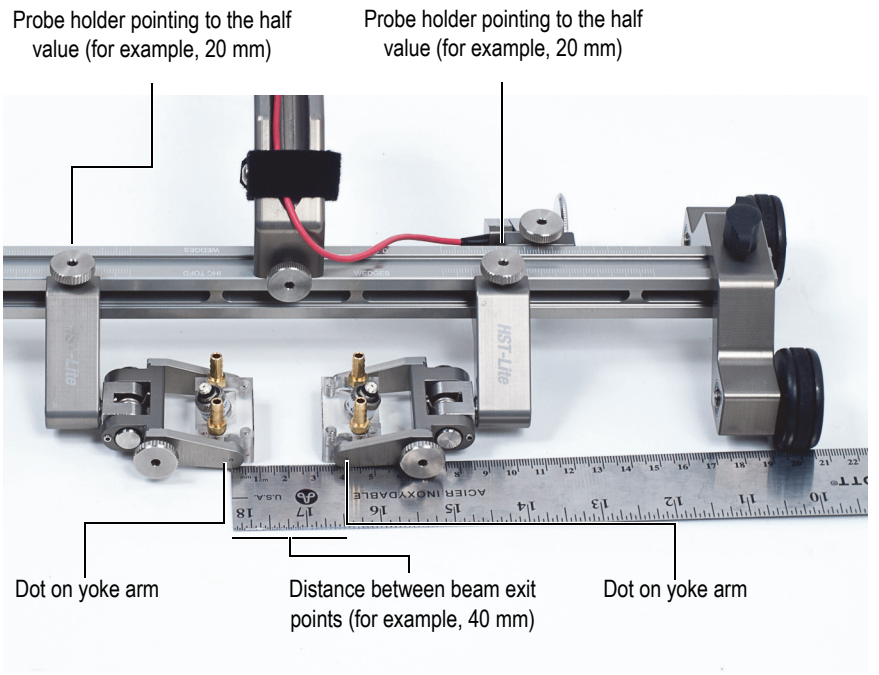

Figure 1-8 Distance between beam exit points (Rexolite wedges shown)

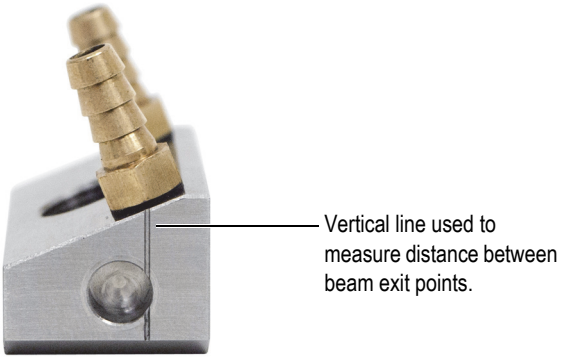

Figure 1-9 Vertical lines engraved on stainless steel wedges

1.4 Positioning the Wheel Encoder

To position the wheel encoder

1. Loosen the wheel encoder thumbscrew (see Figure 1-10 on page 26).
2. Slide the wheel encoder to the desired position (see Figure 1-10 on page 26).
3. Tighten the wheel encoder thumbscrew.

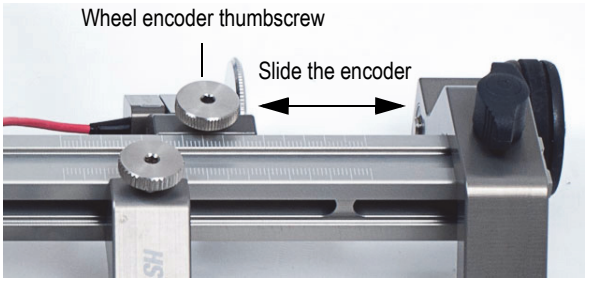

Figure 1-10 Positioning the wheel encoder

1.5 Installing Tubing and Cables

To install tubing and cables

1. If you plan to use the offset probe configuration, assemble the HST-Lite Scanner according to section 1.9 on page 36.
2. If required, install the preamplifier (see section 1.8 on page 34).
3. Connect the probe cables to the probes.
4. Cut four pieces of transparent tube. They should measure about 3.8 cm (1.5 in.) long.
5. Install the four transparent tubes on the wedges (see Figure 1-11 on page 27).
6. Install a Y-fitting on each pair of transparent tubes (see Figure 1-11 on page 27).

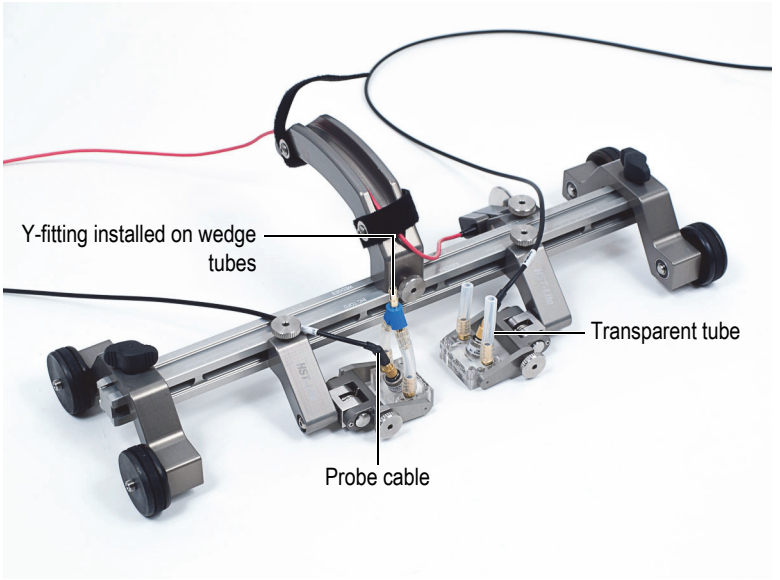

Figure 1-11 Transparent tubes installed on the wedges

7. Insert a Y-fitting in the blue irrigation tube (see Figure 1-12 on page 27).

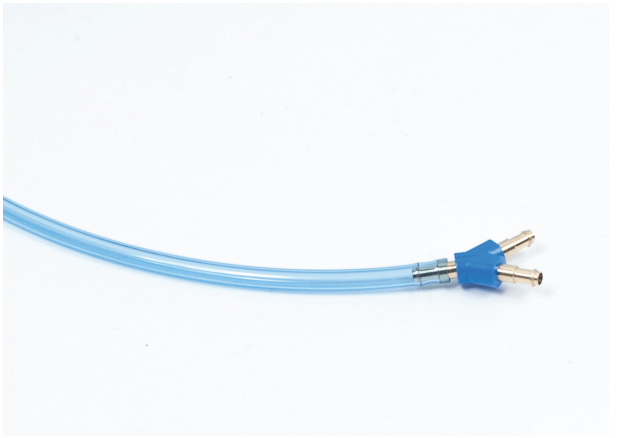

Figure 1-12 Y-fitting inserted in the irrigation tube

8. Install the irrigation tube in the scanner handle, and then temporarily secure the irrigation tube using the hook and loop strips (see Figure 1-13 on page 28).

NOTE

Make sure the Y-fitting of the irrigation tube is outside the handle (see Figure 1-13 on page 28).

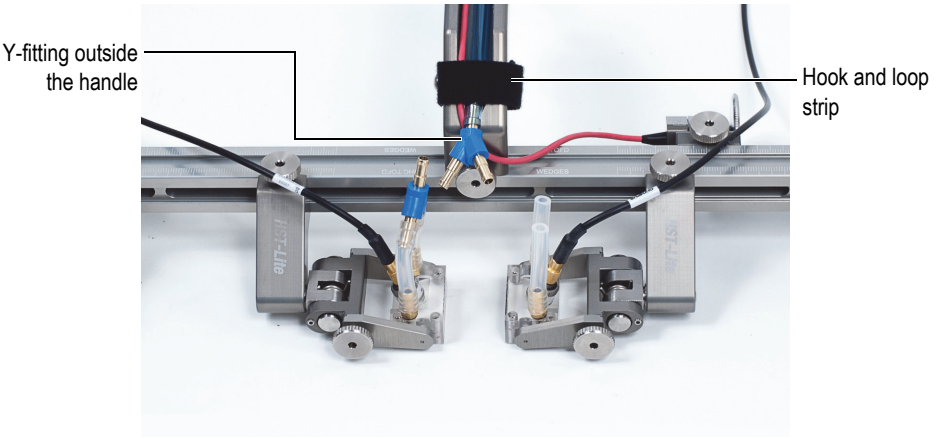

Figure 1-13 Securing the irrigation tube

9. Link the wedges to the irrigation tube using pieces of transparent tubes cut to the required length (see Figure 1-14 on page 29).

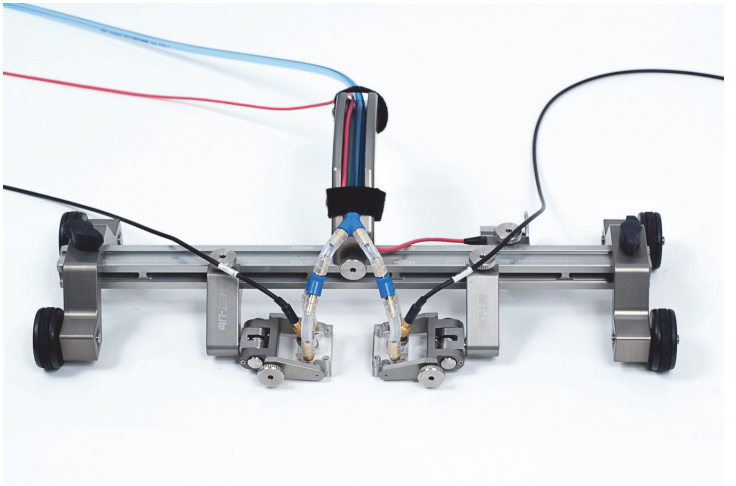

Figure 1-14 Irrigation tube linked to the wedges

1.6 Installing the Cable Sheath

To install the cable sheath

1. Unfasten the handle hook and loop strips.
2. Bundle up the probe cables, wheel encoder cable, irrigation tube, and preamplifier cables (if installed).
3. Install the draw-in tool on the cable and tube bundle. The pointed end of the draw-in tool should point away from the scanner (see Figure 1-15 on page 30).

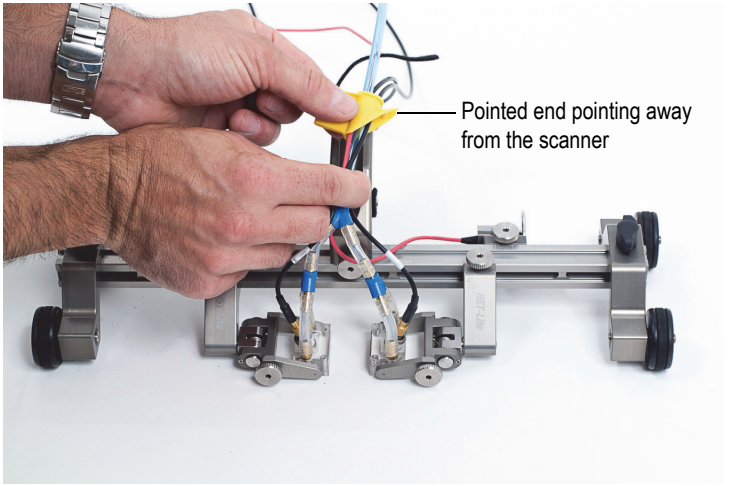

Figure 1-15 Draw-in tool installed on cable and tube bundle

4. Install the cable sheath over the draw-in tool, and then slide the tool to install the cable sheath (see Figure 1-16 on page 30).

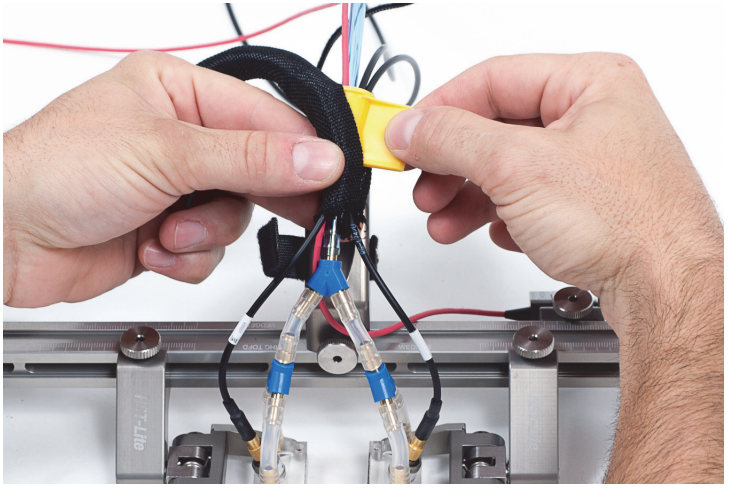

Figure 1-16 Cable sheath installed on the draw-in tool

TIP

To prevent the draw-in tool from slipping out of the cable sheath, place your fingers under the tool and the sheathing (see Figure 1-17 on page 31).

Figure 1-17 Fingers placed under the draw-in tool

5. Position the cable and tube bundle in the scanner handle, and then fasten the hook and loop strips (see Figure 1-18 on page 32).

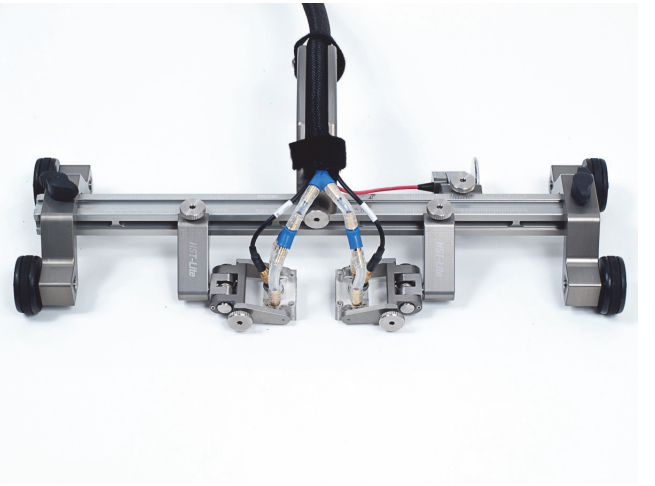

Figure 1-18 Cable and tube bundle in the scanner handle

1.7 Scanner Wheels

The HST-Lite Scanner is equipped with four wheels. Two additional wheels can be installed for offset configuration. For more details about offset configuration, see section 1.9 on page 36.

To replace a scanner wheel

1. Block the wheel shaft using the hexagonal key (see Figure 1-19 on page 33).

Figure 1-19 Blocking the wheel shaft

2. Unscrew the wheel manually, and then remove the wheel (see Figure 1-20 on page 33).

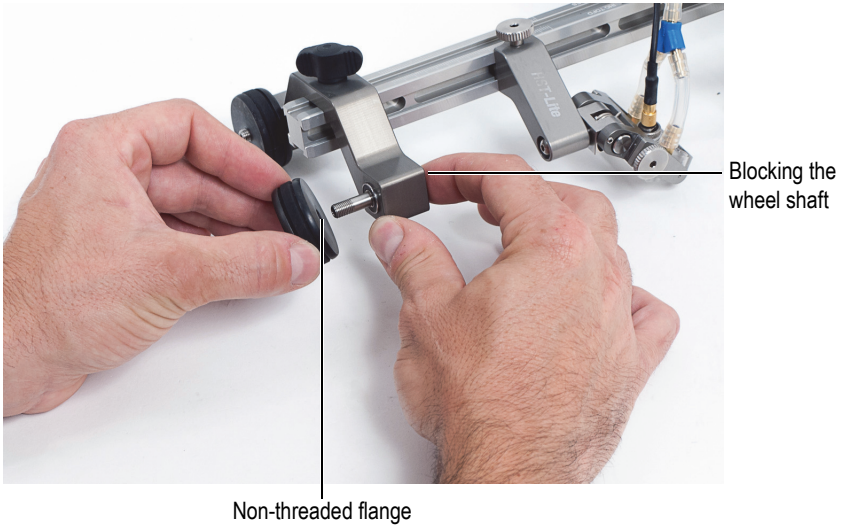

Figure 1-20 Installing a replacement wheel

CAUTION

When installing a replacement wheel, make sure that the non-threaded flange faces the wheel block. If the wheel is not installed properly, the wheel threads will be damaged.

3. Block the wheel shaft with your fingers, and then manually screw on the replacement wheel.
4. Hold the wheel shaft in place using the hexagonal key, and then slightly tighten the wheel.

1.8 Installing a Preamplifier

Perform the following procedure to install the optional preamplifier (P/N: 5682-KIT02 [U8779091]).

To install a preamplifier

1. Remove one of the wheel blocks.
2. Remove both dovetail nuts from the frame bar, and then insert them in the back channel (see Figure 1-21 on page 34).

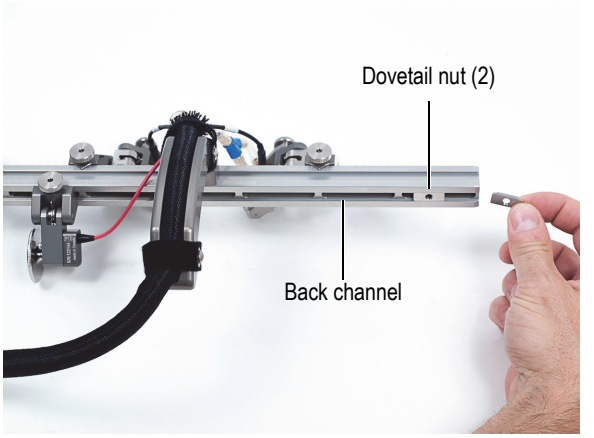

Figure 1-21 Inserting dovetail nuts in the frame bar back channel

3. Reinstall the wheel block.
4. Insert a lock washer on each preamplifier bracket thumbscrew (see Figure 1-22 on page 35).

CAUTION

To prevent thread damage, do not overtighten the preamplifier bracket thumbscrews.

5. Secure the preamplifier bracket to the dovetail nuts using the thumbscrews (see Figure 1-22 on page 35).

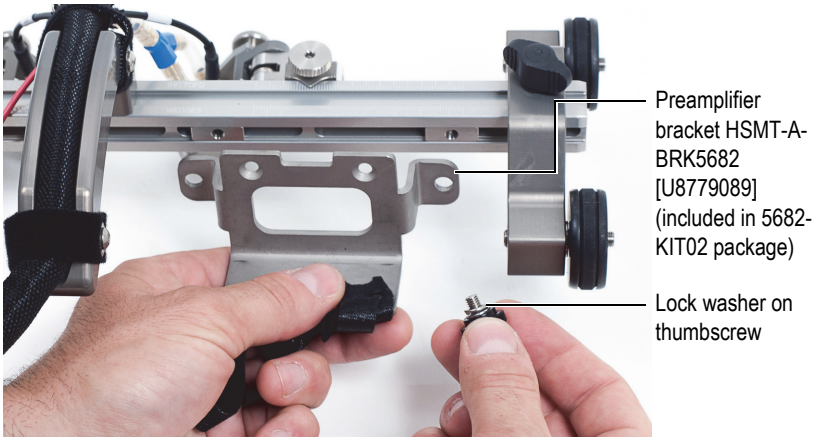

Figure 1-22 Securing the preamplifier bracket

6. Install the preamplifier in the bracket, and then secure the preamplifier using the hook and loop strips (see Figure 1-23 on page 36).

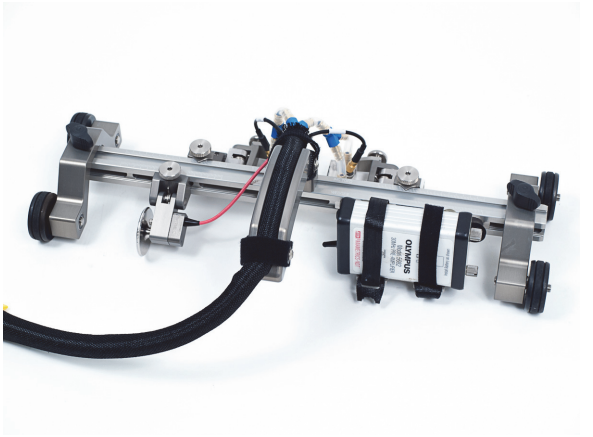

Figure 1-23 Preamplifier installed

1.9 Offset Probe Configuration

When an obstacle prevents you from placing the weld to be inspected between the wheels, we suggest you use the offset configuration.

To configure the scanner for offset inspection

1. Install the scanner components as shown in Figure 1-24 on page 37.

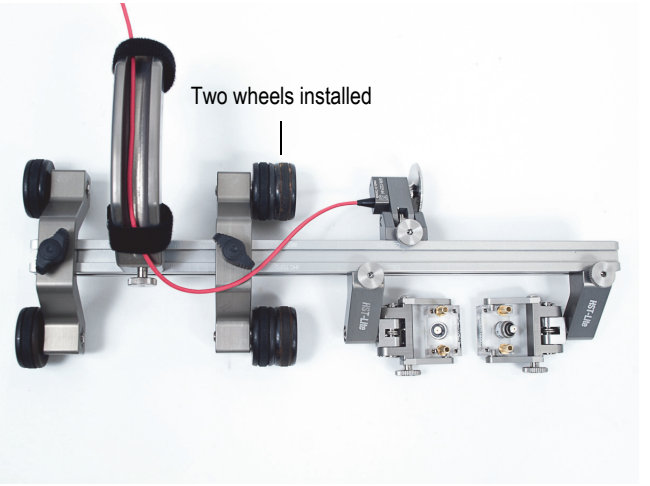

Figure 1-24 Offset configuration

2. Adjust the distance between beam exit points according to step 4 on page 24.

CAUTION

To prevent the scanner from falling off during the inspection, you must add two magnetic wheels to the inner wheel block. Additional magnetic wheels are sold separately.

CAUTION

When installing an additional wheel on a shaft, make sure that the threaded flange of the second wheel faces the wheel block.

3. Install the additional wheels (see Figure 1-25 on page 38):

Figure 1-25 Installing an additional wheel

a) Block the wheel shaft with your fingers, and then manually screw on the wheel. The wheel threaded flange must face the wheel block.

b) Hold the shaft in place using the hexagonal key, and then slightly tighten the wheel.

c) Repeat the step for the other wheel.

2. Parts and Accessories

This chapter describes the accessories delivered with the HST-Lite Scanner and presents a list of spare parts that can be used with the scanner.

2.1 Standard Accessories

The HST-Lite Scanner comes standard with:

- Frame bar with handle.
- Four magnetic wheels.
- OmniScan-compatible, waterproof, spring-loaded wheel encoder with 5 m cable.
- Two spring-loaded arms (SLA) with TOFD–P/E yokes (31.75 mm wide and 5 mm diameter buttons).
- Irrigation tubing and accessories.
- Cable sheath.
- Carrying case.

NOTE

Probes, wedges, and cables are not included with the basic HST-Lite Scanner.

2.2 Optional Accessories

Table 1 HST-Lite Scanner optional accessories

Description	Part number
5682 remote preamplifier kit	5682-KIT02 (U8779091)
Couplant-feed unit	WTR-SPRAYER-8L (U8775001)
TomoScan FOCUS LT encoder cable adaptor	C1-DE15F-BXM-0.30M (U8767107)
Plastic wheel	CHAINSCAN-A-PWHEEL (U8775189)
Magnetic wheel	CHAINSCAN-A-MWHEEL (U8779383)
Replacement encoder	HST-Lite-SP-ENC (U8775277)
Extra handle	HST-Lite-A-Handle (U8775278)
Extra pair of spring loaded probe holders for TOFD inspection compatible with HST-Lite Scanner. Yokes are 31.75 mm wide and 23.5 mm long with 5 mm buttons.	HST-Lite-A-PH-TOFD (U8775279)
Irrigation tubes and fittings for HST-Lite Scanner. Same content as in the basic HST-Lite Scanner package.	HST-Lite-SP-IRRIGATION (U8775281)

3. Specifications

This chapter presents the general specifications for the HST-Lite Scanner.

Table 2 HST-Lite Scanner specifications

Length in scan axis (mm)	Width (mm)	Height (mm)	Weight (kg)	Encoder resolution (steps/mm)
125	385	100[a]	1.3	9

a. 67 mm without handle

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