OLYMPUS®

OmniScan *iX*
Conventional Ultrasonic Flaw Detector
User's Manual

This instruction manual contains essential information on how to use this Olympus 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.

Table of Contents

List of Abbreviations

AC   alternating current
DAC   distance-amplitude correction
EFUP   environment-friendly use period
I/O   input/output
LCD   liquid crystal display
PC   personal computer
TCG   time-corrected gain
UT   ultrasonic testing

Labels and Symbols

Safety-related labels and symbols are attached to the instrument at the locations shown in Figure i-1 on page 1. If any or all of the labels or symbols are missing or illegible, please contact Olympus.

Location of rating label
(see Table 1 on page 2)

Warning symbol

Fuse rating

Electrical rating
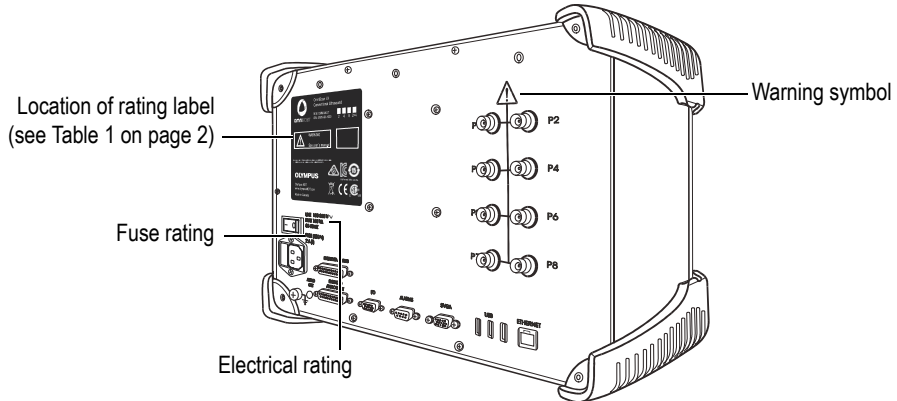
Figure i-1 Label location

Table 1 Content of the rating label
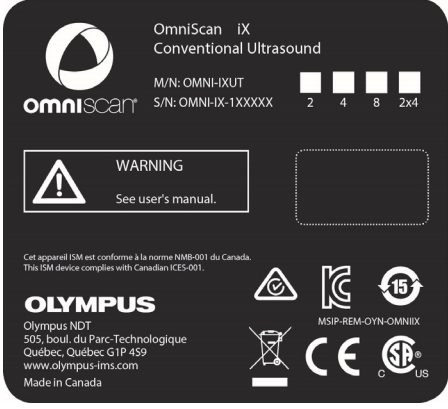
	The **OmniScan iX Conventional Ultrasound** rating label image	
Content		
$C\mathepsilon$	The CE marking is a declaration that this product conforms to all the applicable directives of the European Community. See the *Declaration of Conformity* for details. Contact your Olympus representative for more information.	
WEEE symbol	The WEEE symbol indicates that the product must not be disposed of as unsorted municipal waste, but should be collected separately.	
CSA C/US mark	The CSA C/US mark signifies that the product meets applicable U.S. and Canadian standards, including those from CSA, CSA America, ANSI, ASME, ASSE, ASTM, NSF, and UL.	
warning symbol	The warning symbol indicates that the user must read the user's manual in order to find out the nature of the potential hazards and any actions to avoid them.	

Table 1 Content of the rating label *(continued)*

	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.
	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 home. The MSIP code for the OmniScan *i*X is the following: MSIP-REM-OYN-OMNIIX.
	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 OmniScan *i*X 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.
M/N	The model number
S/N	The serial number

⚠️ **CAUTION**

To avoid the risk of electric shock, do not touch the inner conductor of the BNC connectors. Up to 300 V can be present on the inner conductor. The warning symbol shown in the figure below warns of this electric shock risk.
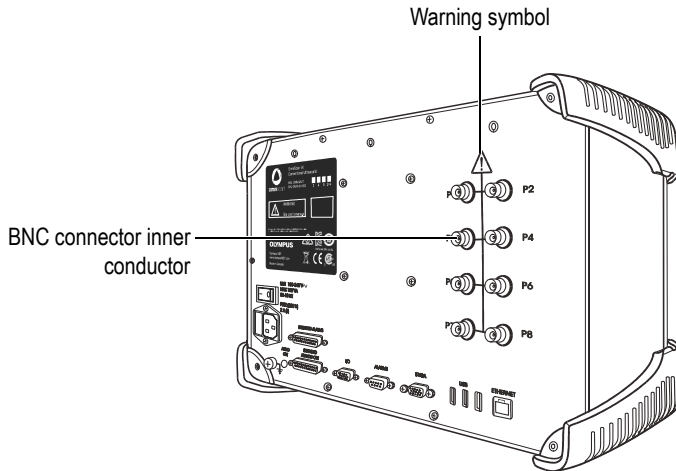
Important Information — Please Read Before Use

Intended Use

The OmniScan *i*X is designed to perform nondestructive inspections on industrial and commercial materials.

> ⚠️ **WARNING**
>
> Do not use the OmniScan *i*X 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 Olympus 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 and/or software images in this manual may differ from your instrument's components or software display. However, the principles remain the same.

Instrument Compatibility

See the details provided in "Connecting the Instrument" on page 37 and in "Connector References" on page 71 to confirm that the OmniScan *i*X is compatible with the ancillary equipment being used.

⚠ **CAUTION**

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

Repair and Modification

The OmniScan *i*X does not contain any user-serviceable parts. Opening the instrument might void the warranty.

⚠ **CAUTION**

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

Safety Symbols

The following safety symbols might appear on the instrument 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.

Shock hazard caution symbol

This symbol is used to alert the user to potential electric shock hazards. 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 instrument:

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 safety symbols could appear in the documentation of the instrument:

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

Warnings

 WARNING

General Warnings

- Carefully read the instructions contained in this instruction manual prior to turning on the instrument.
- 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 instrument 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 instrument.
- Service instructions, when applicable, are for trained service personnel. To avoid the risk of electric shock, do not perform any work on the instrument unless qualified to do so. For any problem or question regarding this instrument, contact Olympus or an authorized Olympus 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 Warnings

- Before operating this instrument using mains electricity, you must connect the protective earth terminal of the instrument to the protective conductor (mains) of the power cord. The mains plug shall only be inserted into a socket outlet provided with a protective earth contact. Never negate the protective action by using an extension cord (power cable) without a protective conductor (grounding).

- Only use fuses with the required rated current, voltage, and specified type (normal-blow, slow-blow, quick-acting, etc.). Do not use repaired fuses or short-circuited fuse holders, doing so could cause electric shock or create a fire hazard.

- If there is any possibility that the ground protection could be impaired, you must make the instrument inoperative and secure it against any unintended operation.

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

⚠️ **CAUTION**

If an unauthorized power supply cord is used to power the instrument or charge the batteries, Olympus cannot guarantee the electrical safety of the equipment.

Equipment Disposal

Before disposing of the OmniScan *iX*, check your local laws, rules, and regulations, and follow them accordingly.

CE (European Community)

$$C\,E$$

This device complies with the requirements of both directive 2004/108/EC concerning electromagnetic compatibility and directive 2006/95/EC concerning low voltage. The CE marking indicates compliance with the above directives.

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 Olympus 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 OmniScan *i*X 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.

Korea Communications Commission (KCC)

A 급 기기 (업무용 방송통신기자재)

이 기기는 업무용 (A 급) 전자파적합기기로서 판 매자 또는 사용자는 이 점을주의하시기 바라 며 , 가정외의 지역에서 사용하는 것을 목적으로 합니다 .

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 OmniScan *i*X 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

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.

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

This equipment 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 equipment is operated in a commercial environment. This equipment 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 equipment 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.

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

Olympus guarantees your Olympus product to be free from defects in materials and workmanship for a specific period, and in accordance with conditions specified in the *Olympus Scientific Solutions Americas Inc. Terms and Conditions* available at http://www.olympus-ims.com/en/terms/.

The Olympus 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 Olympus for assistance with the damage claim and equipment replacement, if necessary.

This instruction manual explains the proper operation of your Olympus 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, Olympus 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.

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

Technical Support

Olympus 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 at: http://www.olympus-ims.com.

Introduction

The OmniScan *i*X is an industrial ultrasonic flaw detector designed for the high-speed immersion or nonimmersion testing of critical industrial components. This powerful and flexible instrument can be configured for 2, 4, or 8 conventional ultrasonic (UT) channels. It features a high-resolution VGA display, data storage, C-scan and strip chart displays, 16 logical alarms, 16 analog outputs, a helicoidal scan mode, and other multiple-scan modes.

Typical applications for the OmniScan *i*X include automotive components, aerospace composite materials, weld or bond testing, and other critical manufactured parts that must conform to strict test code requirements.

1.   OmniScan *i*X Features

This chapter summarizes the OmniScan *i*X features and introduces the interface navigation conventions.

1.1   General Features

- One technology (no modularity)
- Conventional UT
- C-scan production
- Real-time color display of a complete volume (sectorial scanning)
- 16 alarms and 16 analog outputs
- Data storage and imaging
- BNC connectors
- Swivel-arm assembly for benchtop or wall mounting
- Touch screen (resistive)

1.2   Connectors

- 100 V to 240 V direct AC inlet (fuses and main on/off switch)
- Audio output
- Extended alarm (DB-25)
- Extended analog output (DB-25)
- Standard I/O (DE-15), same pinout as the OmniScan MX connector
- Standard alarm (DE-9), same pinout as the OmniScan MX connector
- SVGA output (DE-15)

- 3 USB 1.1 ports
- Fast Ethernet (RJ-45)
- Up to 8 BNC connectors

1.3   Codes

The OmniScan *i*X conforms to the most important industrial standards:

- American Welding Society (AWS)
- American Petroleum Institute (API)
- American Society of Mechanical Engineers (ASME)

The OmniScan *i*X is GE-qualified for:

- P3TF22: Longitudinal immersion ultrasonic inspection of forgings for flat-bottom hole sensitivities
- P3TF30: High-sensitivity ultrasonic inspection of forged fine-grain powder alloy
- P3TF31: Ultrasonic immersion inspection of powder-metallurgy extruded bars and billets
- P3TF35: Ultrasonic inspection of side-drilled holes

1.4   Related Software Features

The OmniScan *i*X offers the following software features:

- Strip charts
- Data storage (internal/external)
- Remote PC control
- Multiple A-scan
- A-scan and C-scan imaging
- TomoView compatible for analysis and/or acquisition (optional)
- Remote control functions for custom programming
- 2-axis mechanical encoders
- Helicoidal scan mode
- TCG and DAC
- Interface gate

- SVGA output
- USB ports for keyboard, mouse, printer, or external storage
- Back wall echo attenuator.

1.5   Interface Navigation Conventions

Navigation through the OmniScan *iX* software interface is described according to a specific syntax. For example, instead of writing: "Press the Menu key, select the **File** menu, the **Format** submenu, the **View** parameter, and then the **Current Layout** value," the following syntax is used:

Main menu > Submenu > Parameter = Value

Example:

File > Format > View = Current Layout

- The first element of a sequence refers to a main menu. See "Menu Button" on page 41, for information about the menus.
- The second element of a sequence refers to a submenu. See "Submenu Buttons" on page 41 for information about the submenus.
- The third element of a sequence refers to a parameter or to a command. See "Parameter Buttons" on page 42 for information about the parameters.
- The fourth element of a sequence refers to a value to be entered or to be chosen from a list (where applicable). See "Parameter Buttons" on page 42 for information about the lists.

For more information about the navigation through the software, see "Interface Operation" on page 47.

2.   Overview of the Instrument

This chapter describes the physical characteristics of the OmniScan *i*X instrument.

2.1   Front Panel of the OmniScan *i*X

The front panel of the OmniScan *i*X (see Figure 2-1 on page 22) incorporates all main controls, and it contains the following elements:

- Display touch screen
- Main control area
- Function keys
- Power button
- Indicator lights
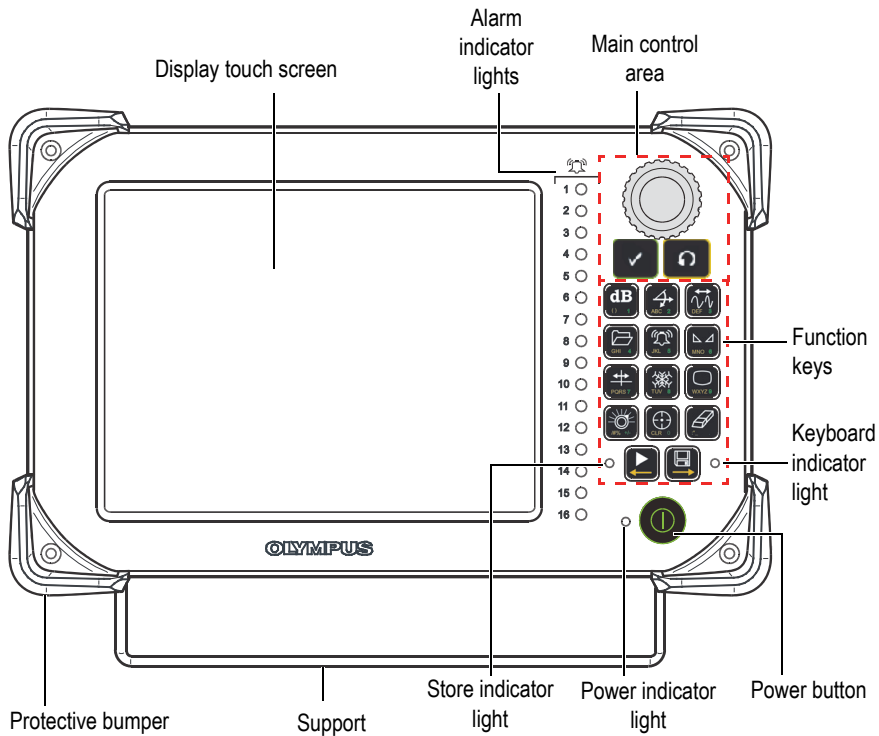- Support
- Protective bumpers

Figure 2-1 Front panel of the OmniScan *i*X

2.1.1   Display Touch Screen

The display touch screen acts as a pointing device. To click an interface element, touch the screen surface lightly with your finger. To drag an interface element, just slide your fingertip across the screen surface.

2.1.2   Main Control Area

The main control area is shown in Figure 2-1 on page 22. You can control the OmniScan *i*X completely from this area if you wish. It contains three elements:
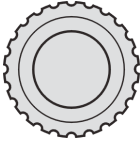
 Scroll knob

Used to navigate through selections without resorting to a keyboard or to a mouse.

 Cancel key

Used to cancel the current selection or to go back one level in the menu hierarchy.

 Accept key

Used to confirm a selection.

The use of these keys is described in more detail in "OmniScan *i*X Interface" on page 39.

2.1.3   Function Keys

There are 14 function keys on the OmniScan *i*X front panel. These function keys have up to three types of information written on them, each of these types of information being color-coded as follows:

• White: primary function
• Yellow: alphabetical characters and symbols
• Green: numerical characters and signs

Table 2 on page 24 lists the function of each key.

Table 2 Function key chart

Function key	UT function	Alphabetical characters and symbols	Numerical characters and signs	Computer-keyboard shortcut
dB ( ) 1	Gain	( )	1	ALT+F1
ABC 2	Display Delay	A B C	2	ALT+F2
DEF 3	Range	D E F	3	ALT+F3
GHI 4	File/ Open	G H I	4	ALT+F4
JKL 5	Alarm/ Gate	J K L	5	ALT+F5
MNO 6	Calibration	M N O	6	ALT+F6
PQRS 7	Cursor	P Q R S	7	ALT+F7
TUV 8	Freeze	T U V	8	ALT+F8
WXYZ 9	Display	W X Y Z	9	ALT+F9

Table 2 Function key chart *(continued)*

Function key	UT function	Alphabetical characters and symbols	Numerical characters and signs	Computer-keyboard shortcut
	Group Selector	/ # %	+ − (positive, negative)	ALT+F10
	Set Reference		0	ALT+F11
	Clear	: * _	. (dot)	ALT+F12
	Start/Stop			
	Store/ Print			

2.1.4   Power Button

Power button

Used to start up or shut down the OmniScan *i*X.

2.1.5   Indicator Lights

There are four types of indicator lights on the OmniScan *i*X front panel: keyboard, power, store, and alarm. Each indicator light is described below.

Keyboard indicator light

The keyboard indicator light is located to the right of the Store/Print key (⬛). Its color identifies the status of the keyboard.

Off

Function mode

Green

Numerical keyboard

Orange

Alphanumerical keyboard

Red

Keyboard locked

Power indicator light

The power indicator light is located to the left of the power button (⬤). Its color identifies the power status of the OmniScan *iX*.

Off

OmniScan *iX* is turned off.

Green

Instrument is ready (has started up).

Orange

Standby mode. When the instrument is connected to the electric network and the main on/off switch on the back panel is set to "l" (the on position), this indicator becomes orange. It changes to green when the power button on the front panel is depressed to start up the instrument.

Blinking red

Critical factor (for example, temperature).

Store indicator light

The store indicator light is located to the left of the Start/Stop key ( ). Its color identifies the operating mode of the OmniScan *i*X.

Off

Oscilloscope mode acquisition

Green

Temporal mode acquisition

Blinking orange

Paused analysis mode

Alarm indicator lights

Sixteen alarm indicator lights—numbered 1 to 16—are located to the right of the OmniScan *i*X screen. They blink only one color—red—to indicate the trigger status of their respective alarms (set in the software).

2.1.6   Support

A fold-out support is provided on the instrument base. When this support is used, the front panel is raised slightly, for easier access and visibility.

2.1.7   Protective Bumpers

The rubber bumpers protect the front panel components.

2.2   Back Panel of the OmniScan *i*X

The back panel of the OmniScan *i*X (see Figure 2-2 on page 28) contains various input and output ports. This panel also contains standard computer interface ports used for expanded connectivity.

⚠   **WARNING**

To avoid the risk of electric shock, do not touch the inner conductor of the BNC connectors. Up to 300 V can be present on the inner conductor. The warning symbol shown in Figure 2-2 on page 28 indicates this electric shock risk.
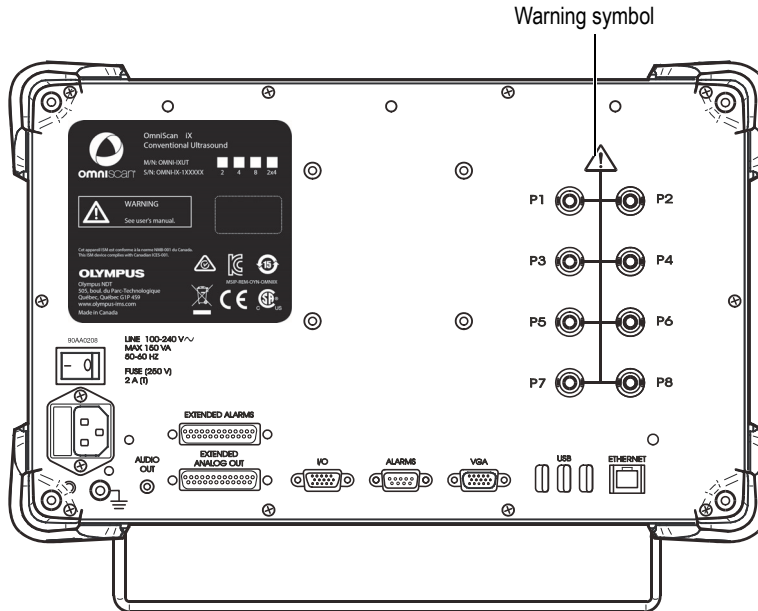

Figure 2-2 Back panel of the OmniScan *i*X

P1 to P8

> These BNC connectors are used to connect conventional ultrasonic probes to the OmniScan *i*X UT instrument.

AUDIO OUT

> Used to connect a set of headphones or external speakers to the OmniScan *i*X for greater audio capacity if the internal speaker is insufficient.

EXTENDED ALARMS

Used as an alarm output for alarms 1 to 16. The alarms are set on this connector to make the connections simpler when more than 3 alarms are used.

Each alarm output corresponds to an indicator light on the front panel. The alarm circuit can also generate an audio alarm, either to the internal speaker or to the AUDIO OUT connector, to which you can connect a set of headphones.

EXTENDED ANALOG OUT

Used for analog outputs. The analog outputs are set on this connector to make the connections simpler when more than 2 analog outputs are used.

I/O

Used to connect a mechanical scanner.

ALARMS

Used as an alarm output for alarms 1 to 3. These alarm outputs correspond to pins 1, 2, and 3 of the EXTENDED ALARMS connector.

SVGA

An external VGA or SVGA monitor may be connected to this DB-15 port, which mirrors the OmniScan *i*X display.

USB

Each one of the three USB 1.1 ports can accommodate a USB peripheral such as an external keyboard, a mouse, a storage device, a printer, a Bluetooth wireless network adaptor, etc.

ETHERNET (RJ-45)

RJ-45 connector for 10/100Base-T that allows OmniScan *i*X communication via an Ethernet or Fast Ethernet network. An indicator light turns on to indicate that the Ethernet link is established.

Power entry module

The power entry module allows connection of a standard three-lead power cord with a central ground. A built-in voltage selector automatically adjusts voltage for the power source of the country where the instrument is used. The instrument accepts voltages between 100 V and 240 V, operating at frequencies between 50 Hz and 60 Hz. However, you must respect the value of the fuse according to the power supply.

The main on/off switch is located on this module.

⚠️ **WARNING**

The AC power supply is not disconnected when the instrument is turned off using the

power button (⏻) on the front panel. It is only disconnected when the main power switch on the power entry module is set to the "O" position or when the power cord is unplugged. Failure to disconnect properly can result in electric shock.

Fuse and fuse holder

> A fuse holder contains the instrument main fuse. This fuse is used to protect the OmniScan *i*X from an external power surge or internal short-circuit.

> The fuse holder also keeps a spare fuse in case a fuse replacement is required.

External ground (⏚)

> This ground terminal can be used to ground the OmniScan *i*X instrument with an external cable. This terminal is very useful for certain inspections where it is recommended to ground the inspection system with the part under inspection.

Protective bumpers

> The rubber bumpers protect the back panel components.

3. System Installation

This chapter contains the procedures for installing the OmniScan *i*X.

3.1 Standard Equipment and Options

The packing list should include the following items:

- OmniScan *i*X instrument with all ordered internal options
- Power cord
- Ethernet cable
- CD-ROM including the OmniScan iXU software installation and OmniScan *i*X user's manual
- Calibration certificate
- Industrial swivel-arm assembly (optional item)

3.2 Installing the Instrument

This section provides installation instructions for the OmniScan *i*X instrument.

3.2.1   Benchtop Instrument
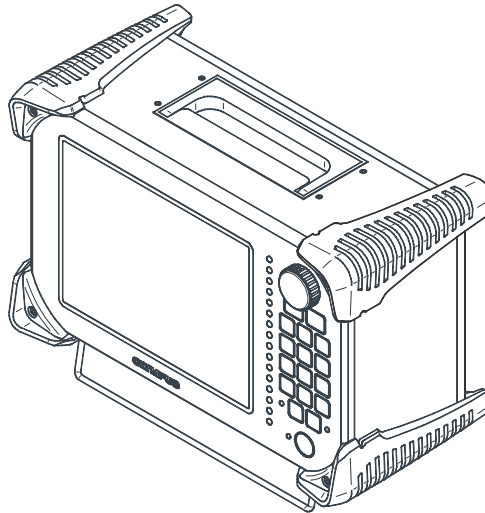
Figure 3-1 The OmniScan *i*X benchtop instrument

To install the OmniScan *i*X benchtop instrument

1. Install the OmniScan *i*X away from heat sources, leaving a minimum clearance of 5 cm (2 in.) to allow for heat dissipation.

⚠️ **CAUTION**

To prevent equipment malfunction and/or damage, make sure to use the instrument in a well-ventilated area. The OmniScan *i*X must be properly ventilated so as to prevent overheating and ensure appropriate operation.

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2. If desired, you can install the OmniScan *i*X using the support provided on the instrument base (see Figure 2-1 on page 22). When this support is used, the front panel is raised slightly, for easier access and visibility.

To install the OmniScan *iX* benchtop instrument on a swivel arm

1. Fix the OmniScan *iX* industrial swivel-arm assembly (Olympus part number OMNI-IX-A-SWIV) to a wall or bench structure.
2. Screw the swivel-arm assembly onto the OmniScan *iX* back panel using the four screw holes provided specifically for this purpose (see Figure 3-2 on page 33).
3. Using the swivel arm, set the OmniScan *iX* to the desired position.
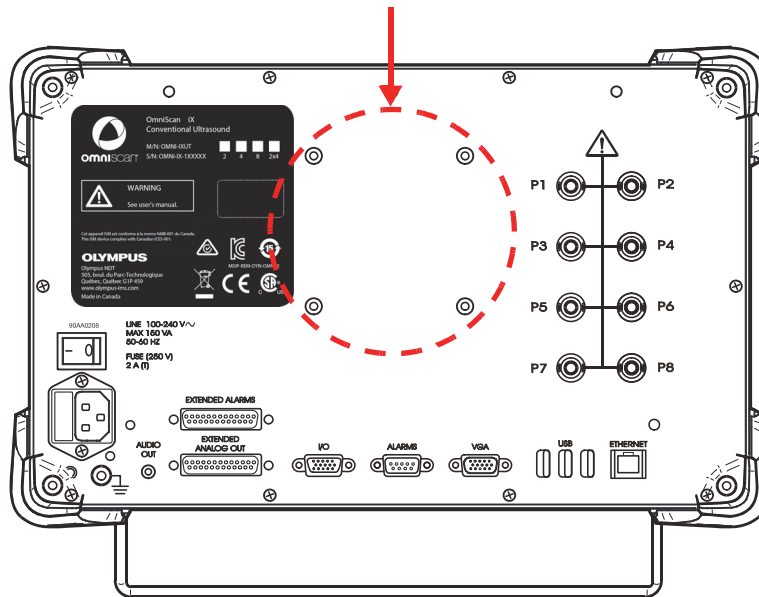
Figure 3-2 The screw holes for the swivel-arm assembly

3.2.2   Rack-Mount Instrument
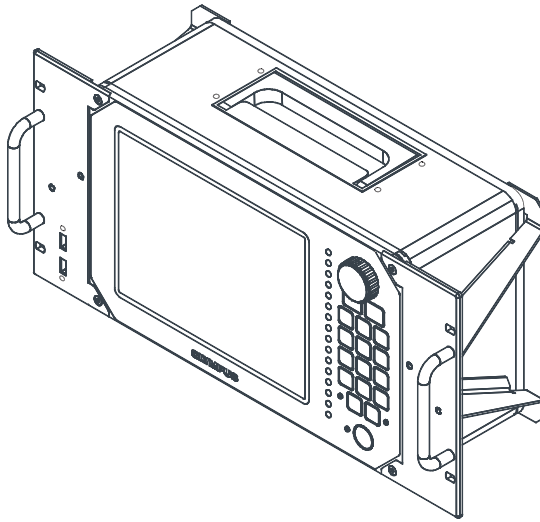
Figure 3-3 The OmniScan *i*X rack-mount instrument

To install the OmniScan *i*X rack-mount instrument in a bay

1. If applicable, turn off the OmniScan *i*X by setting the power switch to the position marked "O", and then disconnect the power cable and all cables connected to the OmniScan *i*X back panel.

2. Ensure that the bay is ready to receive your OmniScan *i*X model.

    The rack-mount model requires a standard 482.6 mm (19 in.) opening, compatible with a 5U-type instrument.

3. Using the two front-panel handles, insert the OmniScan *i*X into the bay.

4. Secure the OmniScan *i*X to the bay.

4. Basic Operation

This chapter contains the OmniScan *iX*'s basic operating principles and procedures for start-up, shutdown, automatic start-up, connections, and software installation.

4.1   OmniScan *iX* Start-Up and Shutdown

To start up the OmniScan *iX*

1. Set the main on/off switch on the back panel to "l" (the on position).

    The power indicator light located on the front panel becomes orange after 3 to 4 seconds.

2. Press the power button ( ) for one second.

    You then hear a beeping sound and the system starts up, performs a memory check, and displays the OmniScan logo and the software version number.

3. Choose the desired inspection application by pressing the F key corresponding to one of the buttons appearing on the OmniScan *iX* splash screen.

NOTE

If the system encounters a problem during its start-up phase, the power indicator light identifies the nature of the problem by using a color code (for details, see "Power indicator light" on page 26).

To shut down the OmniScan *iX*

◆   Press the power button ( ) for one second.

The power indicator light becomes orange as the OmniScan iX shuts down.

| IMPORTANT |

If you press the power button ( ) for more than four seconds, the OmniScan *iX* shuts down without giving you the option of saving the active setup.

4.2   Automatic Start-Up Mode

The OmniScan *iX* provides an automatic start-up mode: auto-boot. Use the auto-boot mode to remotely start up an OmniScan *iX* instrument. When this mode is enabled, you do not need to press the power button ( ) to start up the OmniScan *iX*. The OmniScan *iX* will start up automatically when you connect AC power to the power entry module (back panel). This mode is disabled by default.

To toggle the state of the auto-boot

1.   Turn off the OmniScan *iX* instrument and disconnect the AC power cord.

2.   Press and hold the power button ( ).

3.   Connect the AC power cord to the power entry module (back panel).

4.   Release the power button ( ) when the power indicator light becomes green.

5.   To toggle the state of the mode, repeat steps 1 to 4.

4.3   Connecting the Instrument

This section contains the procedure for connecting the OmniScan *i*X instrument. All of the connectors used for the connection are located on the back panel of the instrument.

Olympus recommends shutting down the OmniScan *i*X before installing a peripheral, unless it is a USB peripheral, in which case a shutdown is not necessary.

IMPORTANT

The OmniScan *i*X has been tested and found to comply with the radio frequency limits for an industrial device in accordance with the specifications of the EMC directive. In order to maintain OmniScan *i*X compliance with the emission specifications of the EMC directive, you must ensure that the following condition is met:

• All cables used for connecting the equipment must have an overall shielding to ensure electromagnetic compatibility and optimal performance.

To connect the OmniScan *iX* instrument

1. Make sure that the instrument is disconnected from the power source.
2. Install the OmniScan *i*X away from heat sources, leaving a minimum clearance of 5 cm (2 in.) to allow for heat dissipation.
3. Using an Ethernet cable, connect the OmniScan *i*X ETHERNET connector to an Ethernet network or to the network board of the control and analysis computer.
4. Using the appropriate cables, connect the probes to the P1 through P8 connectors.
5. Using the appropriate cables, connect each of the components required for your setup and needs to the corresponding OmniScan *i*X connector (for example: encoders, alarms, etc.) For further details on the back panel connectors, see "Back Panel of the OmniScan *i*X" on page 27.
6. Connect the power earth connection to an appropriate cable or to a cable equipped with a lug, and then connect the other end in a cabinet or on a suitable grounded structure.
7. Connect the power cord to the power entry module on the OmniScan *i*X back panel. Connect the other end of the power cord to a three-terminal, grounded power outlet.

8. To start up the instrument, follow the procedure explained in "OmniScan *i*X Start-Up and Shutdown" on page 35.

4.4   OmniScan Software Installation

OmniScan software installation is designed to be as trouble free as possible. The procedure for updating the software involves getting the latest version of the software, backing up the data in the instrument, installing the new software for the instrument, and then restoring the backup data in the instrument.

A detailed software update procedure is described in the document entitled *Updating the OmniScan Software* from Olympus. For more information on software updating, refer to this document, whose PDF file is provided on the Documentation Disk.

5. OmniScan *i*X Interface

The software interface on the OmniScan *i*X is easy to navigate. There are several ways to navigate the interface, but you are not required to learn them all; you may use any combination of methods to suit your preferences.

5.1   Interface Description

The main elements of the software interface are the data display, reading fields, buttons (menu, submenu, parameter, and help), and setup status indicators (see Figure 5-1 on page 40). These are individually detailed in the sections that follow.
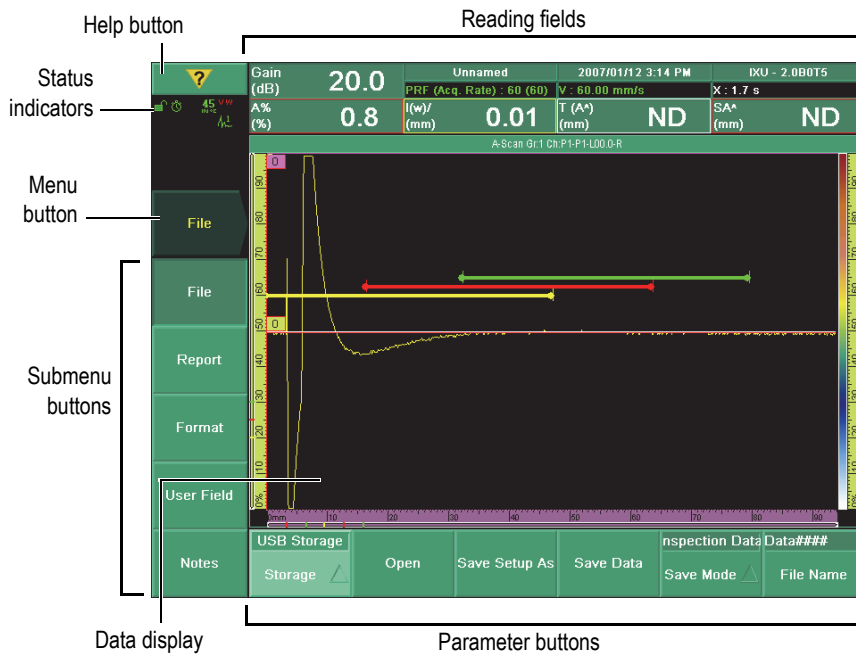
Figure 5-1 OmniScan *i*X software interface

5.1.1   Data Display

The data display area is located in the middle of the interface display. It is where incoming data is graphically displayed for analysis. Its colors may be customized.

5.1.2   Reading Fields

The reading fields are located at the top of the interface display. They are used to display the information coming from devices connected to the OmniScan *i*X. There are eleven reading fields. The four large fields at the bottom display *primary readings*. The large field on the top left and the six small fields at the top display *secondary readings*.

The content of the primary reading fields is user-configurable. The content of the secondary reading fields, however, is not user-configurable and is composed of the following (from left to right at the top, and from left to right at the center):

- Gain value
- Name of the current setup
- Date and time
- Name and version of the current software
- Acquisition rate
- Sound velocity
- Encoder position

To change the content of the primary reading fields

1. Go to **Measurement > Reading**, and then choose the desired **Field *n*** parameter button.
2. Choose the option you wish to display from the list.

5.1.3   Menu Button

The menu button contains all the main menus available in the current software. Some of these menus—like **File**, **Measurements**, **Display**, and **Preferences**—are found in every software package, while others are package-specific.

When you select a menu from the main menu list, its submenus and parameters appear automatically in their respective areas.

The menu button is displayed above the submenu buttons (see "Submenu Buttons" on page 41). The name on the menu button displays the menu that is currently selected. Each menu contains between two and five submenus, which are displayed directly beneath it.

5.1.4   Submenu Buttons

The submenu buttons are located on the left side of the interface display, just below the menu button. Between two and five submenus are displayed whenever a menu is selected. The content of the submenus depend on the menu that is selected.

When you select a submenu, the parameters associated with that submenu appear at the bottom of the screen.

To select a submenu

1. Select a menu by using one of the navigation methods described in "Using the Scroll Knob" on page 47 through "Going Back One Level or Canceling a Choice" on page 52.

2. Select the desired submenu button to the left of the data display area.

    If applicable, this will transfer you to the parameter area.

5.1.5   Parameter Buttons

The parameter buttons, located at the bottom of the interface display, contain parameters or commands. There can be up to six parameter buttons per submenu.

There are six types of buttons in the parameter area:

Command

   This button causes a specific action to be carried out (see Figure 5-2 on page 42).

Figure 5-2 Example of a command button

Toggle

   This button enables you to alternate between two settings (see Figure 5-3 on page 42).

Figure 5-3 Example of a toggle button

List

   This button displays a list of values from which you must choose (see Figure 5-4 on page 43).
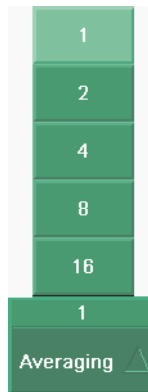
Figure 5-4 Example of a list button

Edit

    This button enables you to enter an alphanumerical value or to modify an existing value (see Figure 5-5 on page 43).
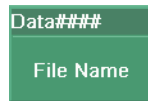
Figure 5-5 Example of an edit button

Edit list

    This button is similar to a list button, but it has an editable field for the last value in the list. This means that you can either choose one of the present values or create your own (see Figure 5-6 on page 44).
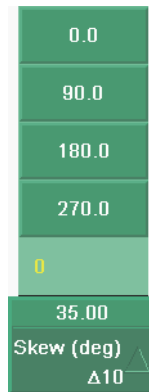
Figure 5-6 Example of an edit list button

Edit/cyclic

This button contains two different values that can be edited separately (see Figure 5-7 on page 44).

a) The top section contains a numerical value that can be modified in the same way as an edit button value.

b) The bottom section enables you to cycle between a set of fixed values by using one of the following methods:

○ Touch the section repeatedly with your fingertip.

○ Click the section repeatedly with a mouse.

○ Using an external keyboard, press the corresponding F key repeatedly.

NOTE

The principle behind the delta variable (Δ) is explained in detail in "Delta variable" on page 45.

Figure 5-7 Example of an edit/cyclic button

Parameters can define a variety of settings. In the case of the edit, edit list, and edit/cyclic buttons, the contents can be modified using an external USB keyboard, the OmniScan *iX*'s function keys, or the scroll knob. Some parameters occasionally lead to deeper levels.

Delta variable

Edit/cyclic buttons contain a delta variable (Δ) on the lower part of the button (see Figure 5-7 on page 44). This variable specifies the increment that is used when you increase or decrease the value in the upper box with the scroll knob.

For example, if the delta value of a parameter box is 6, then the value in the upper box will increase or decrease by 6-unit increments when you use the scroll knob. If you change the delta value, the increment will change to correspond appropriately.

To change the delta variable, touch it with your fingertip or click it with the mouse pointer. The variable will then continuously cycle among a set of available values.

5.1.6   Help Button

The yellow Help button is in the shape of an inverted triangle. It is located in the upper-left corner of the OmniScan *iX* interface.

Help button

Pressing this button displays online help regarding the current function you are using.

5.1.7   Setup Status Indicators

The setup status indicators display indications about the current status of the OmniScan *iX*. They are located in the upper-left corner of the display screen (see Figure 5-1 on page 40).

Table 3 on page 46 contains a list of the setup status indicators and their meanings.

Table 3 The setup status indicators and their meanings

Indicator	Meaning
A_1	The normal A-scan mode is enabled.
A_Σ	The all A-scan mode is enabled.
A_n	The smart A-scan mode is enabled.
↻	The data in gate A is in the skip number found in the symbol.
Out	The C-scan data is located farther than the fourth skip.
DAC	The distance-amplitude correction (DAC) curve is enabled.
TCG	The time-corrected gain (TCG) is enabled.
Ref	The reference mode is enabled.
🔒	The setup is locked.
🔓	The setup is unlocked.
⏱	The acquisition synchronization is set to clock mode.
XT	The acquisition synchronization is set to external mode.
⚙	The acquisition synchronization is set to encoder mode.
◢◢ (red)	A probe is present but it is not calibrated (phased array software only).
◢◢ (green)	A probe is present and it is calibrated (phased array software only).

Table 3 The setup status indicators and their meanings *(continued)*

Indicator	Meaning
45 IN °C	The indicator that displays the OmniScan *i*X internal temperature in Celsius degrees.
S (red)	The sensitivity is not calibrated.
S (green)	The sensitivity is calibrated.
W (red)	The wedge delay is not calibrated.
W (green)	The wedge delay is calibrated.
V (red)	The sound velocity is not calibrated.
V (green)	The sound velocity is calibrated.

5.2   Interface Operation

The software interface is organized into menus, submenus, and parameters that you must navigate through to use the equipment. You can navigate using the OmniScan *i*X's keys, the touch screen, a mouse, an external USB keyboard, or any combination of the above. You can go from a menu to submenu to option, and back and forth, by using the various navigation methods.

This section describes the different ways of performing a specific action within the software interface of the OmniScan *i*X.

5.2.1   Using the Scroll Knob

Turning the scroll knob in a clockwise direction shifts a selection to the right (horizontal list) or upward (vertical list). In an edit field, the scroll knob cycles through the character list shown in Figure 5-8 on page 48.

```
0123456789._ABCDEFGHIJKLMNOPQRSTUVWXYZ!@#$%&(){}[]~<>
```

Figure 5-8 Alphanumerical character list

Turning the scroll knob in a counterclockwise direction shifts the selection to the left (horizontal list) or downward (vertical list). In an edit field, the scroll knob cycles through the character list presented in Figure 5-8, but from the opposite direction.

To write something using the scroll knob, turn the knob until you reach the desired character, wait one second to allow the character to be selected, and then turn the knob again to choose the next character. Pressing the Cancel key erases the last character in the edit field, and pressing the Accept key validates the contents of the edit field.

5.2.2   Choosing a Menu from the Main Menu List

To choose a menu from the main menu list

Using	Perform this action
Main control area	Press the Cancel key repeatedly until the main menu list is displayed. Use the scroll knob to select the desired menu, and then press the Accept key.
Touch screen	Touch the main menu button to display the main menu list. Touch the desired menu in the list.
External keyboard	Press ESC repeatedly until the main menu list is displayed. Use the arrow keys to select the desired menu, and then press either the SPACEBAR or ENTER.
Mouse	Click the main menu button to display the main menu list. Click the desired menu in the list.
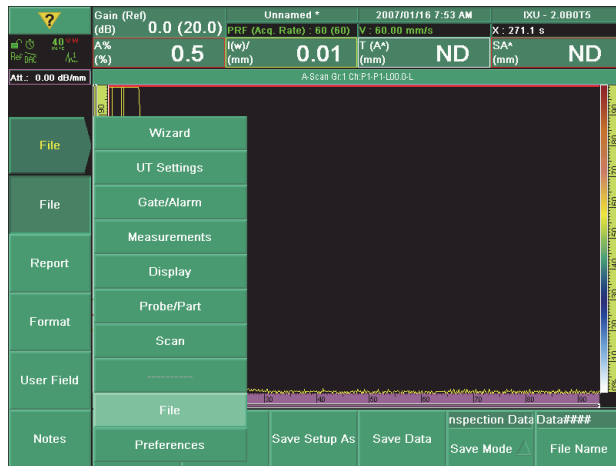
Figure 5-9 Choosing a menu

5.2.3   Choosing a Submenu from a Menu

To choose a submenu from a menu

Using	Perform this action
Main control area	Use the scroll knob to select the desired submenu, and then press the Accept key.
Touch screen	Touch the desired submenu button.
External keyboard	Use the arrow keys to select the desired submenu, and then press either the SPACEBAR or ENTER. You may also press the corresponding function key (F).
Mouse	Click the desired submenu button.
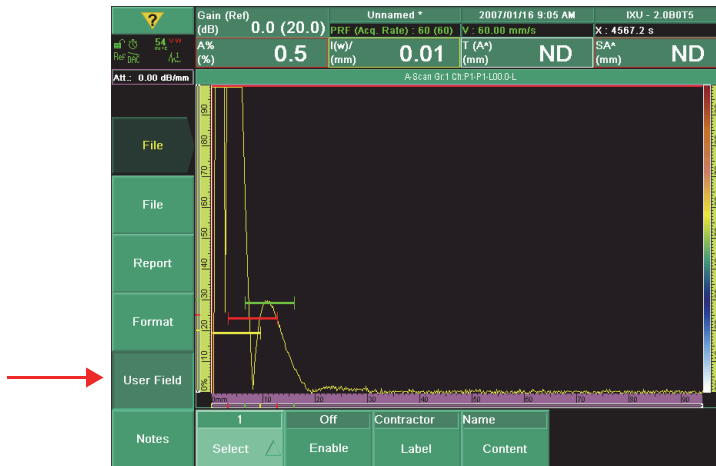
Figure 5-10 Choosing a submenu

5.2.4   Choosing a Parameter from a Submenu

To choose a parameter from a submenu

Using	Perform this action
Main control area	Use the scroll knob to select the desired option, and then press the Accept key.
Touch screen	Touch the desired parameter button.
External keyboard	Use the arrow keys to select a parameter, and then press either the SPACEBAR or ENTER. You may also press the corresponding F key.
Mouse	Click the desired parameter button.
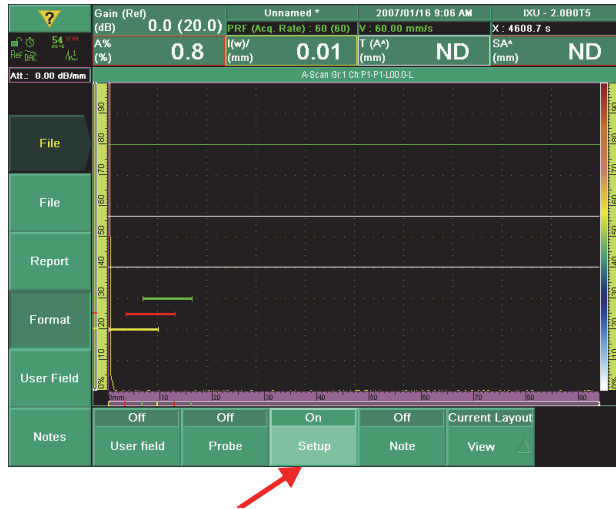
Figure 5-11 Choosing a parameter

5.2.5   Choosing a Value from a List

To choose a value from a list

Using	Perform this action
Main control area	Use the scroll knob to choose the desired value, and then press the Accept key.
Touch screen	Touch the desired value.
External keyboard	Use the arrow keys to choose the desired value, and then press either the SPACEBAR or ENTER.
Mouse	Click the desired value.

Figure 5-12 Choosing a value

5.2.6   Going Back One Level or Canceling a Choice

To go back one level or to cancel a choice

Using	Perform this action
Main control area	Press the Cancel key.
Touch screen	Touch the button pertaining to the level to which you wish to return.
External keyboard	Press ESC.
Mouse	Click the button pertaining to the level to which you wish to return.

5.2.7 Entering a Value in an Edit Field

To enter a value in an edit field

Using	Perform this action
Main control area	See "Using the Scroll Knob" on page 47.
Touch screen	Touching the edit field only selects it. You must choose another way to enter data.
Function keys	The input method for the function keys is explained later in this section, under "Function keys" on page 53.
External keyboard	Use the alphanumerical keys to type what you want (see Figure 5-8 on page 48 for the list of valid characters), and then press ENTER to exit the edit field. To exit the edit field without making any changes, press ESC.
Mouse	Touching the edit field only selects it. You must choose another way to enter data.

Figure 5-13 Entering a value

Function keys

It is possible to use the function keys to enter alphanumerical values in an edit field.

First, the edit field must be selected. This will cause the function keys to switch to alphanumerical mode, and the keyboard indicator light will blink yellow (see "Keyboard indicator light" in "Indicator Lights" on page 25). You can then use the Start/Stop and Store/Print keys to move the cursor forward and backward inside the edit field.

The function keys all have yellow and green characters printed on them (see Figure 5-14 on page 54). The yellow characters represent alphabetical characters and symbols; the green characters represent numerical characters and signs. Pressing a function key will cycle through the yellow characters first, through the green characters next, and then back to yellow. To proceed to the next character, press another function key to have a different character or simply wait for one second.
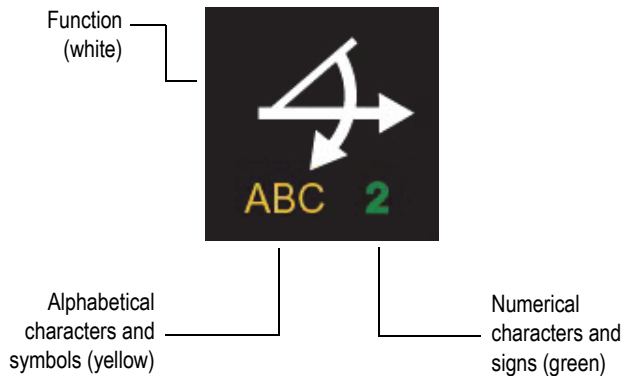
Figure 5-14 Information provided on each key

For example, note the following sequences ("1 s" stands for 1 second wait):

 = A

 = B

 = C

 = 2

 1 s = AB

 1 s = AMTU

To exit the edit field, press the Accept key. To exit the edit field without making any changes, press the Cancel key.

6. Maintenance

This chapter outlines basic OmniScan *i*X instrument maintenance. The maintenance operations explained below enable you to keep your instrument in good physical and working condition. Because of its design, the OmniScan *i*X requires only minimal preventive maintenance and instrument cleaning.

6.1   Preventive Maintenance

Because the OmniScan *i*X does not have many moving parts, it does not require much preventive maintenance. Only regular inspection of the instrument is recommended to ensure that the OmniScan *i*X is functioning correctly.

6.2   Instrument Cleaning

The OmniScan *i*X's external surfaces (the casing and the LCD screen protector) may be cleaned when needed. This section provides the appropriate cleaning procedure for the instrument.

6.2.1   Casing

To clean the OmniScan *i*X casing

1. Make sure that the instrument is turned off, and that the power cord is disconnected.
2. Disconnect all cables.
3. To bring the instrument back to its original finish, clean the casing with a soft cloth.

4. To get rid of persistent stains, use a damp cloth and a soft soapy solution. Do not use abrasive products or powerful solvents that might damage the finish.

5. Make sure that the connectors are dry before connecting anything. If they are not dry, either dry them off using a dry cloth, or wait until they dry on their own.

6.2.2 Touch-Screen Cleaning

Never use abrasive products or powerful solvents to clean the touch screen of the OmniScan *i*X. To clean the touch screen, use a damp cloth with a common glass cleaner that completely evaporates. If necessary, clear off paper towel residue using a soft-bristle brush.

⚠️ **CAUTION**

Never spray liquid directly onto the instrument. Liquid could fall into cracks or flow into the housing and damage circuits.

6.3 Changing the Fuse

The fuse protects the instrument from power overload. If the instrument does not turn on, check the fuse.

NOTE

The internal power supply units of the instrument have protective fuses that are not replaceable by an operator. If these fuses are defective, refer to a qualified technician for the replacement.

To change the fuse

1. Verify that the OmniScan *i*X is turned off, and that the power cord is disconnected.

2. Using a flat-head screwdriver, remove the fuse holder (see Figure 6-1 on page 59).

3. Remove the fuse.
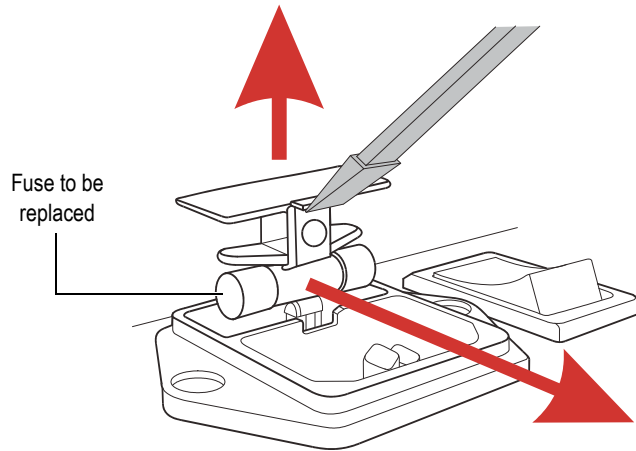
Fuse to be
replaced

Figure 6-1 Changing the fuse in the OmniScan *i*X

4. Replace the fuse with a fuse of the correct rating.

    See Table 4 on page 59 to match the correct fuse with the power supply being used with the OmniScan *i*X.

Table 4 Type of fuse to use according to power supply voltage

Power supply	Type of fuse	
100 VAC to 240 VAC	250 V	2 A time lag (T)

![!] **WARNING**

To avoid the risk of electric shock and to avoid a potential fire hazard, use only 250-volt time-lag fuses that meet IEC 60127-2 standards.

5. Reinstall the fuse holder.

The fuse is now replaced and the OmniScan *i*X is ready for operation.

7. Troubleshooting

This chapter will help you resolve minor problematic issues that could occur during the operation of your OmniScan *i*X instrument. Issues could be related to the video output, networking, USB peripherals, data storage, the touch screen, or memory card space. This troubleshooting guide has been written assuming that the instrument has not been modified and that the cables and connectors are those provided and documented by Olympus.

7.1   Video-Output Problems

The video output does not function.

Possible solutions:

•   Ensure that the video cable is correctly connected.

•   Make sure that the external video monitor can sustain a resolution of 800 × 600 in VGA mode.

•   Ensure that your monitor respects the VGA standard. The VGA standard requires the removal of pin 9 on the video connector. While the OmniScan *i*X respects this specification, some monitors do not. If pin 9 has not been removed on your monitor connector, you will have to remove it yourself. Olympus is not responsible for any potential damage caused by this pin-removal procedure.

7.2   Networking Problems

Ethernet communication is unavailable.

Possible solutions:

- Ensure that you have the Ethernet option (it can be bought separately).
- Ensure that the Ethernet cable is connected correctly.
- Ensure that you have installed the software that is necessary for the PC to communicate with the OmniScan *iX*.

7.3 USB-Peripheral Problems

Some USB peripherals do not function when connected to the OmniScan *iX*.

Possible cause

The peripheral does not support USB 1.1.

Possible solutions:
- Use only a standard USB mouse.
- Use only a standard USB keyboard.
- Use only external storage devices that adhere to the USB Mass Storage specification.
- If the problem is a malfunctioning printer, ensure that the printer is compatible with the OmniScan *iX*.

7.4 Data-Storage Problems

Data storage is not possible.

Possible cause

The internal hard disk is full.

Solution

Manage the content of the internal storage disk by performing the procedure below.

To manage the content of the internal storage disk

1. On the OmniScan *iX*, select **Preferences > Service > File Manager**.
2. In the **File Type** list, select the file type on which the operation (**Copy**, **Move**, **Delete**, or **Rename**) is to be done.

3. For each operation to be done:

   a) In the source pane at the left, select the file(s) or folder(s) by using the **Select** or **Select All** buttons. Note that the rename operation only allows a single file or folder selection.

   b) Choose the command corresponding to the operation to be performed:

   Copy: To copy the selected item from the source pane to the destination pane. The destination folder must be selected in the destination pane at the right. If the OmniScan *i*X is connected to a remote computer, the destination can be \Network\OmniScan to copy the file(s) or folder(s) to the remote computer.

   Move: To move the selected item from the source pane to the destination pane. The destination folder must be selected in the destination pane at the right. If the OmniScan *i*X is connected to a remote computer, the destination can be \Network\OmniScan to move the file(s) or folder(s) to the remote computer.

NOTE

Using the mouse or touch screen to drag files across the two panes to copy or move them does not work, as the drag-and-drop feature is not currently supported.

   Delete: To delete the selected item.

   Rename: To rename the selected item.

   For more information on the File Manager, refer to the online help.

7.5 Touch-Screen Problems

The touch screen does not function properly.

Possible cause

   The touch screen is not calibrated.

Solution

   Calibrate the touch screen by performing the procedure below.

To calibrate the touch screen

1. On the OmniScan *i*X, select **Preferences > Options > Calib. T.Screen**.

2. Follow the calibration instructions that appear on the screen.

7.6   Insufficient Space on the Memory Card

It is possible that the space used on the memory card is larger than all its files added together. It could appear that there is insufficient space when in fact there should be enough.

Possible cause

The memory card is corrupted or contains fragments of lost files. This problem could be caused by the shutdown of the OmniScan *i*X while writing on the memory card, such as when saving a setup or data file.

Solution

Check the memory card by performing the procedure below.

To check the memory card

1. On the OmniScan *i*X, select **Preferences > Service > File Manager**.
2. Select **Scan S. Card**.

This command launches a scan of the memory card, which will fix any problems found. The operation could take several minutes, according to the memory card capacity and the problems to rectify.

8.   Specifications

This chapter covers the OmniScan *i*X instrument specifications. It includes the general specifications for the instrument, as well as the specifications related to the alarms and to safety.

8.1   General Specifications

Table 5 General specifications

Description	Value
Housing size	
Benchtop instrument	W × H × D: 375 mm × 238 mm × 185 mm (14.75 in. × 9.4 in. × 7.3 in.)
Rack-mount instrument	W × H × D: 485 mm × 222 mm × 190 mm (19 in. × 8.7 in. × 7.5 in.)
	Bay: 482.6 mm (19 in.) standard
	Height: 5U
Weight	6.5 kg (14.3 lb)
Environmental conditions	
Operating temperature	0 °C to 45 °C
Storage temperature	−20 °C to 60 °C
Relative humidity	95 % noncondensing. No air intake, splashproof design.
Pollution degree	2
Installation category	II
Operating environment	Rated for indoor use only

Table 5 General specifications *(continued)*

Description	Value
Altitude	< 2000 m (< 6000 ft)
Power supply	
Voltage	100 VAC to 240 VAC
Frequency	50 Hz to 60 Hz
Maximum power	150 VA
Fuse	250 V, time-lag (T), 2 A
Main supply voltage fluctuations	Not greater than ±10 % of nominal
Display	
Display size (diagonal)	264 mm (10.4 in.)
Resolution	800 pixels × 600 pixels
Number of colors	16 million
Type	TFT LCD, visible everywhere
Data storage	
Storage devices	Internal hard drive of 8 GB, most standard USB, or through optional Fast Ethernet. Internal flash memory.
Data file size	Up to 160 MB
I/O ports	
USB ports	3 USB 1.1 ports, rated 500 mA output current
Audio output	0.5 W, 8 Ω (used to connect an external buzzer)
Video output	Video output (SVGA)
Ethernet	10/100 Mbps (megabits per second)
I/O lines	
Encoder	2-axis encoder line (quadrature or clock/direction)
Digital inputs	4 digital inputs, TTL 5 V
Digital outputs	4 digital outputs, TTL 5 V, 10 mA maximum per output
Acquisition on/off switch	Remote acquisition enable or disable, TTL 5 V
Power output line	5 V nominal, 500 mA nominal power output line (short-circuit protected)
Alarms	16 TTL 5 V, 10 mA maximum

Table 5 General specifications *(continued)*

Description	Value
Analog outputs	16 analog outputs (12-bit resolution) ±0 V to 5 V nominal in 10 kΩ
Pace input	5 V TTL pace input

8.2   Alarms

Table 6 Alarms

Description	Value
Number of alarms	16
Conditions	Any logical combination of gates
Analog outputs	16

8.3   Acoustic Specifications

Table 7 on page 67 contains the number of channels available and the acoustic specifications for the pulser and the receiver.

Table 7 Acoustic specifications

Description	Value
Number of channels	
Pulse-echo mode	2 channels, OMNI-iXUT2
	4 channels, OMNI-iXUT4
	8 channels, OMNI-iXUT8
Pitch-catch mode	1 pulser and 1 receiver, OMNI-iXUT2
	2 pulsers and 2 receivers, OMNI-iXUT4
	4 pulsers and 4 receivers, OMNI-iXUT8
Pulser	
Supported voltage	50 V, 100 V, 200 V, 300 V; ±10 %

Table 7 Acoustic specifications *(continued)*

Description	Value
Pulse width	Adjustable from 30 ns to 1000 ns, in steps of 2.5 ns, resolution of 5 ns or ±10 % of the greatest value
Fall time	Less than 7 ns
Pulse shape	Negative square pulse
Output impedance	<7 Ω
Receiver	
Receiver gain range	0 dB to 100 dB, maximum input signal 20 V_{p-p}
Input impedance	50 Ω
Bandwidth	0.25 MHz to 32 MHz (−3 dB)

8.4   Acquisition Specifications

Table 8 on page 68 contains the acquisition specifications for frequency, data display, and synchronization.

Table 8 Acquisition specifications

Description	Value
Digitizing frequency	100 MHz (10 bits)
A-scan (acquisition)	Up to 6000 A-scans per second (512-point, 8-bit A-scan)
Maximum pulsing rate	Up to 12 kHz (C-scan)
Depth in material	59.8 m in steel (L-wave), 10 ms with compression
	0.49 m in steel (L-wave), 81.9 μs without compression
Display	
Refresh rate	A-scan: 60 Hz
Envelope (echo-dynamic mode)	Yes
Synchronization	
On internal clock	1 Hz to 12 kHz

Table 8 Acquisition specifications *(continued)*

Description	Value
On external pace	Yes
On encoder	On 2 axes; from 1 step to 65 536 steps

8.5   Data Specifications

Table 9 on page 69 contains the data specifications for processing, TCG, and storage.

Table 9 Data specifications

Description	Value
Processing	
Number of data points	Up to 8000
Real-time averaging	2, 4, 8, or 16
Rectification	RF signal, full wave, halfwave+, halfwave−
Video filtering	Smoothing (adjusted to probe frequency range)
Filtering centered at:	1 MHz
	2 MHz
	5 MHz
	10 MHz
	15 MHz
	20 MHz
Filtering bandpass	0.25 MHz to 2.25 MHz ±10 %
	2 MHz to 25 MHz ±10 %
Programmable TCG	
Number of points	16; one TCG (time-corrected gain) curve per channel
Maximum gain	40 dB
Maximum slope	20 dB/µs
Step	0.1 dB

Table 9 Data specifications *(continued)*

Description	Value
Synchronization	Pulser or gate I
Storage	
A-scan recording	6000 A-scans per second
C-scan recording	I, A, and B, up to 12 kHz
Maximum file size	Limited by memory size

8.6   Declaration of conformity

European directives and standards

The "CE" marking indicates conformity with all applicable directives and standards of the European community, that is, IEC 61326, Electrical Equipment for Measurement, Control and Laboratory Use - EMC requirements, and IEC 61010-1 (second edition), Safety Requirements for Electrical Equipment for Measurement, Control and Laboratory Use - Part 1: General Requirements.

Canadian and U.S. directives and standards

The "CSA C/US" marking indicates conformity with Canadian standard CAN/CSA-C22.2 No. 61010.1-04, Safety Requirements for Electrical Equipment for Measurement, Control and Laboratory Use, Part 1: General Requirements; and with the U.S. standard UL 61010-1 (second edition), Safety Requirements for Electrical Equipment for Measurement, Control and Laboratory Use, Part 1: General Requirements. This Class A digital apparatus complies with Canadian ICES-003.

9.   Connector References

This chapter contains the technical description of the following connectors on the OmniScan *i*X instrument:

*   P connectors
*   I/O connector
*   ALARMS connector
*   EXTENDED ALARMS connector
*   EXTENDED ANALOG OUT connector

For each of these connectors, you will find the following information: a brief description, the manufacturer number, the number of the corresponding cable connector, an illustration, and a table giving the signal pinout for the connector.

The other connectors on the OmniScan *i*X comply with their respective standards:

*   AUDIO OUPUT (headphone jack)
*   USB (3)
*   ETHERNET (RJ-45)
*   SVGA

9.1   P Connectors

The P connectors are used in conventional ultrasonic mode to connect the pulsers and receivers to the OmniScan *i*X.

![Warning symbol] **WARNING**

To avoid the risk of electric shock, do not touch the inner conductor of the BNC connectors. Up to 300 V can be present on the inner conductor. The warning symbol shown in Figure 2-2 on page 28 indicates this electric shock risk.

Description

BNC, female, insulated connectors

Manufacturer and number

Amphenol, 31318
Olympus, 21AJ0001

Suggested cable connectors

Amphenol, 31-320
Olympus, 21AJ0005
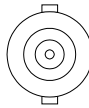
Figure 9-1 The P connector

Table 10 Pinout for the P connectors

Connector	I/O	Signal	Description
P1 to P8	Input/Output	Probe_1 to Probe_8	The P connectors are used to transmit and receive the signals of eight conventional probes.

9.2   I/O Connector

Description

DE-15, female connector

Manufacturer and number

Kycon, K61-E15S-NS
Olympus, 21AE0135

Suggested cable connector

Conec, 301A10129X
Olympus, 21AE0052
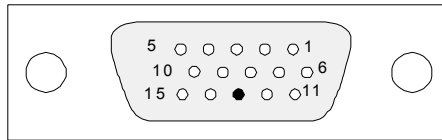
Figure 9-2 The I/O connector

Table 11 Pinout for the I/O connector

Pin	I/O	Signal	Description	Current	Level
1	In	Din1/ Preset1	Digital input 1/Preset axis 1 Programmable input. Can be configured as generic input 1 or as preset of encoder 1. Refer to the OmniScan software *User's Manual* ("Configuring the Digital Input" section) to learn how to program this input. To preset, you must use a high-level signal, with a minimum signal length of 50 ms.		TTL

Table 11 Pinout for the I/O connector *(continued)*

Pin	I/O	Signal	Description	Current	Level
2	In	Din2/ Preset2	Digital input 2/Top-turn/Preset axis 2 Programmable input. Can be configured as generic input 2 or as preset of encoder 2. Refer to the OmniScan software *User's Manual* ("Configuring the Digital Input" section) to learn how to program this input. To preset, you must use a high-level signal, with a minimum signal length of 50 ms.		TTL
3	Out	+5 V	External power supply	500 mA	
4	–	NC	Not connected		
5	In	Din3/ AcqEn	Digital input 3 / Acquisition enable Programmable input. Can be configured as generic input 3 or as acquisition enable signal (enable at high level, with a minimum signal length of 50 ms). By default configured as generic input 3. Refer to the OmniScan software *User's Manual* ("Configuring the Digital Input" section) to learn how to program this input.		TTL

Table 11 Pinout for the I/O connector *(continued)*

Pin	I/O	Signal	Description	Current	Level
6	Out	Dout1/ PaceOut	Digital out 1 / Pace output. Pulse width = 25 μs. The PaceOut signal is continuously active, even if the ExtPace signal is not used. It does not need to be activated.	±25 mA	TTL
7	In	RRx	Rx		RS232/485
8	Out	RTx	Tx		RS232/485
9	In	PhA axis 1	Encoder 1: phase A/clock/up/down		TTL
10	In	PhB axis 1	Encoder 1: phase B/direction/N.U./ N.U.[a]		TTL
11	In	PhA axis 2	Encoder 2: phase A/clock/up/down		TTL
12	In	PhB axis 2	Encoder 2: phase B/direction/N.U./ N.U.		TTL
13	–		Key (blocked hole— security feature to prevent inserting wrong connector)		
14	Out	Dout2	Digital output 2 *Ready line* signal of the handshake protocol (see "The Handshake Protocol" on page 82 for details)	±25 mA	TTL
15	–	Gnd	Ground		

a.   N.U. = not used

Output: maximum load of 25 mA

9.3   ALARMS Connector

Description

DE-9, female connector

Manufacturer and number

Amphenol, 788797-1
Olympus, 21AE0134

Suggested cable connector

ITT Cannon, DE-9P
Olympus, 21AE0015
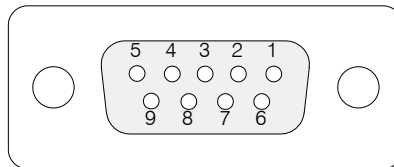
Figure 9-3 The ALARMS connector

Table 12 Pinout for the ALARMS connector

Pin	I/O	Signal	Description	Current	Level
1	Out	Al1	Alarm output 1.[a] This alarm output corresponds to pin 1 of the EXTENDED ALARMS connector.	±25 mA	TTL
2	Out	Al2	Alarm output 2.[a] This alarm output corresponds to pin 2 of the EXTENDED ALARMS connector.	±25 mA	TTL

Table 12 Pinout for the ALARMS connector *(continued)*

Pin	I/O	Signal	Description	Current	Level
3	Out	Al3	Alarm output 3.[a] This alarm output corresponds to pin 3 of the EXTENDED ALARMS connector.	±25 mA	TTL
4	Out	Aout1	Analog output 1	±25 mA	±0–5 V
5	Out	Aout2	Analog output 2	±25 mA	±0–5 V
6	–	Gnd	Ground		
7	Out	Dout4	Digital output 4	±25 mA	TTL
8	Out	Dout3	Digital output 3 *Inspection ready* signal of the handshake protocol (see "The Handshake Protocol" on page 82 for details)	±25 mA	TTL
9	In	Din4/ ExtPace	Digital input 4/External pace input Programmable input. Can be configured as generic input 4 or as external pace input (high level, with a minimum signal length of 50 ms when used as Din4, or 21 μs as ExtPace). Refer to the OmniScan software *User's Manual* ("Configuring the Digital Input" section) to learn how to program this input.		TTL

a.   The output, disabled on reset, is at 0 V. When active, it is at 5 V.

9.4　EXTENDED ALARMS Connector

Description

　　DB-25, female connector

Suggested cable connector

　　ITT Cannon, DB-25P
　　Olympus, 21AE0034
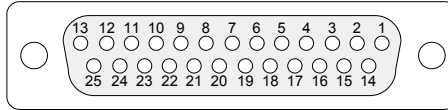
Figure 9-4　The EXTENDED ALARMS connector

Table 13　Pinout for the EXTENDED ALARMS **connector**

Pin	I/O	Signal	Description	Type
1	Out	Alarm1	Alarm 1[a]	TTL
2	Out	Alarm2	Alarm 2[a]	TTL
3	Out	Alarm3	Alarm 3[a]	TTL
4	Out	Alarm4	Alarm 4[a]	TTL
5	Out	Alarm5	Alarm 5[a]	TTL
6	Out	Alarm6	Alarm 6[a]	TTL
7	Out	Alarm7	Alarm 7[a]	TTL
8	Out	Alarm8	Alarm 8[a]	TTL
9	Out	Alarm9	Alarm 9[a]	TTL
10	Out	Alarm10	Alarm 10[a]	TTL
11	Out	Alarm11	Alarm 11[a]	TTL

Table 13 Pinout for the EXTENDED ALARMS **connector** *(continued)*

Pin	I/O	Signal	Description	Type
12	Out	Alarm12	Alarm 12[a]	TTL
13	Out	Alarm13	Alarm 13[a]	TTL
14	Out	Alarm14	Alarm 14[a]	TTL
15	Out	Alarm15	Alarm 15[a]	TTL
16	Out	Alarm16	Alarm 16[a]	TTL
17	Out	TRIG_OUT	A high-level 1 µs pulse is generated at the beginning of each channel fired.	TTL
18	Out	HEART_BEAT	This signal indicates if the instrument is working properly. When the instrument is working properly, a 1 Hz, 50 % duty cycle signal (pulse) is generated. If the instrument is not working properly, no pulse is generated. Also, no pulse is generated until the start-up of the instrument has been completed.	TTL
19	–	GND	Ground	
20	–	GND	Ground	
21	–	GND	Ground	
22	–	GND	Ground	
23	–	GND	Ground	
24	–	GND	Ground	
25	–	GND	Ground	

a.   The output, disabled on reset, is at 0 V. When active, it is at 5 V.

Output: maximum load of 25 mA

Heartbeat function

The OmniScan *i*X instrument features a hardware heartbeat function to continuously validate that all its hardware and software components are operational.

If any of the components cease to operate, the instrument falls in a fatal error state within 5 seconds. When this case occurs, all sixteen front panel alarm indicators flash simultaneously, the built-in buzzer emits a sound at a frequency of 2 Hz and a 50 % duty cycle, and the HEART_BEAT signal (see Table 13 on page 78) stops. You need to turn the instrument off and restart it to return to the normal operation.

9.5   EXTENDED ANALOG OUT Connector

Description

DB-25, female connector

Suggested cable connector

ITT Cannon, DB-25P
Olympus, 21AE0034
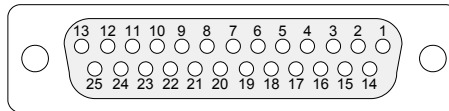
Figure 9-5 The EXTENDED ANALOG OUT connector

Table 14 Pinout for the EXTENDED ANALOG OUT **connector**

Pin	I/O	Signal	Description	Type
1	Out	Aout1	Analog output 1	±0–5 V
2	Out	Aout2	Analog output 2	±0–5 V
3	Out	Aout3	Analog output 3	±0–5 V
4	Out	Aout4	Analog output 4	±0–5 V

Table 14 Pinout for the EXTENDED ANALOG OUT **connector** *(continued)*

Pin	I/O	Signal	Description	Type
5	Out	Aout5	Analog output 5	±0–5 V
6	Out	Aout6	Analog output 6	±0–5 V
7	Out	Aout7	Analog output 7	±0–5 V
8	Out	Aout8	Analog output 8	±0–5 V
9	Out	Aout9	Analog output 9	±0–5 V
10	Out	Aout10	Analog output 10	±0–5 V
11	Out	Aout11	Analog output 11	±0–5 V
12	Out	Aout12	Analog output 12	±0–5 V
13	Out	Aout13	Analog output 13	±0–5 V
14	Out	Aout14	Analog output 14	±0–5 V
15	Out	Aout15	Analog output 15	±0–5 V
16	Out	Aout16	Analog output 16	±0–5 V
17	Out		Output validation: 1 = analog signal valid 0 = analog signal invalid	TTL
18	Out	HEART_BEAT	This signal indicates if the instrument is working properly. When the instrument is working properly, a high-level 200-μs pulse is generated every millisecond. If the instrument is not working properly, no pulse is generated. Also, no pulse is generated until the start-up of the instrument has been completed.	TTL
19	–	GND	Ground	
20	–	GND	Ground	

Table 14 Pinout for the EXTENDED ANALOG OUT **connector** *(continued)*

Pin	I/O	Signal	Description	Type
21	–	GND	Ground	
22	–	GND	Ground	
23	–	GND	Ground	
24	–	GND	Ground	
25	–	GND	Ground	

Level: ±5 V, maximum load of 1 kΩ, maximum current of 100 mA

Frequency: up to 20 kHz (follows trigger frequency)

9.6   The Handshake Protocol

The OmniScan *i*X uses Din*x* (digital inputs), Dout2 (digital output 2), and Dout3 (digital output 3) signals to implement a handshake protocol between your external system and the OmniScan *i*X instrument. The sequence of handshake protocol signals is shown in Figure 9-6 on page 82.

Command line (Din*x*)

Ready line (Dout2)

Inspection ready (Dout3)
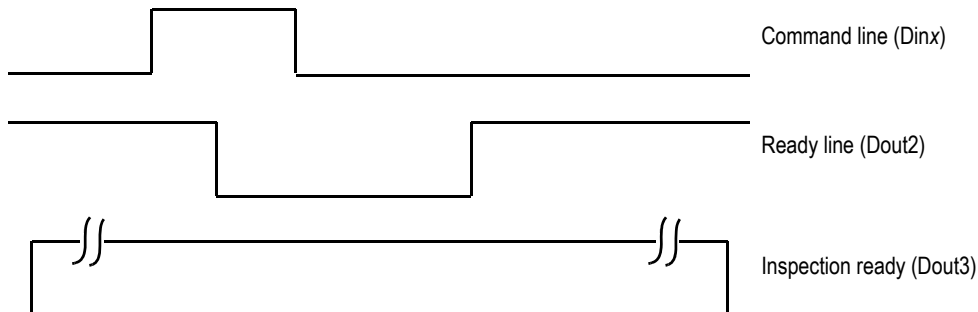
Figure 9-6 Handshake protocol signals

The Din*x* signals allow your external system to activate a command. The Dout2 signal is the *Ready line* function of the handshake protocol, which lets your external system know that the action or actions requested through the digital inputs are completed.

Your external system also needs to monitor the Dout3 signal, which is an *Inspection ready* signal. When starting up the instrument, the Dout3 signal is low and turns high only after the instrument has completed its start-up process and is in a state ready to receive an external command. The Dout3 signal is temporarily deactivated whenever the instrument is no longer in a state where it can produce alarms. This is the case, for example, when the acquisition is paused, when a wizard is active, or when a calibration is ongoing.

> **NOTE**
>
> Only one command can be processed at a given time.
> The native hardware Din*x* commands (preset encoder 1, preset encoder 2 and acquisition enable) do not use the handshake protocol. They are executed immediately.

Command activation using the handshake protocol

The following steps outline how commands are activated using the handshake protocol:

1. Your external system ensures that the *Inspection ready* signal (Dout3) and the *Ready line* signal (Dout2) are high.

2. Your external system generates a *Command line* signal to activate one of the Din*x* signals and maintains it high for at least 50 ms.

   Shortly after, the Dout2 signal goes down (for at least 1 mS), indicating that the command is received and ongoing.

   The Dout2 signal goes back to high whenever the requested command is completed.

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