LUNA

Setup Guide | ODiSI 7100

Rev003

Class 1 Laser Product
Appareil Laser Classe 1
Laser Produkt Klass 1
IEC60825-1, 2014

Instrument	Wavelength	Max Power Emitted
ODiSI 7100	1515 nm – 1570 nm	< 5 mW

Many regions prohibit the disposal of WEEE (Waste Electrical and Electronic Equipment) in the normal waste stream, to comply with the Restriction of Hazardous Substances (RoHS) released into the environment. Please contact your local waste authority for instructions on proper recycling of the electronic product(s) described in this *User Guide*.

Optical Distributed Sensor Interrogator Model ODiSI 7100:
Setup Guide
© 2025

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1 Safety

The advisory words **Danger**, **Warning** and **Caution** used in this manual identify the level of hazard that may be encountered by the user.

- **DANGER** means if the danger is not avoided, it will cause death or serious injury.
- **WARNING** means if the warning is not heeded, it can cause death or serious injury.
- **CAUTION** means if the precaution is not taken, it may cause minor or moderate injury.

Warning

The protection provided by the equipment may be impaired if the equipment is used in a manner not specified by the manufacturer, resulting in serious injury or death.

The power cord is the main electrical disconnect for this equipment. If it is necessary to ensure no power to the unit, remove the power cord.

The use of controls, adjustments, performance, or procedures other than those specified herein may result in hazardous laser radiation exposure and one or more safety protections may be impaired or rendered ineffective.

Attention

La protection fournie par l'équipement peut être compromise si l'équipement est utilisé d'une manière non spécifiée par le fabricant, entraînant des blessures graves ou la mort.

Le cordon d'alimentation est le principal disjoncteur électrique de cet équipement. S'il est nécessaire de ne pas mettre l'appareil hors tension, retirez le cordon d'alimentation.

L'utilisation de commandes, d'ajustements, de performances ou de procédures autres que celles spécifiées ici peut entraîner une exposition dangereuse au rayonnement laser et une ou plusieurs protections de sécurité peuvent être altérées ou rendues inefficaces.

2 System Overview

Luna Innovations' Optical Distributed Sensor Interrogator (ODiSI 7100) uses optical frequency domain reflectometry (OFDR) to measure strain and temperature using optical fiber as the sensor.

The ODiSI 7100 utilizes fiber optic sensors to make distributed strain and temperature measurements of a test article. Due to the small diameter of the fiber (<0.2 mm), the fiber can access locations not usually acceptable for foil gages and thermocouples. The ODiSI 7100 can differentiate the sensing fiber from other fiber optic devices (patch cables, switches, etc.) enabling the path to test articles to be easily reconfigured without changing the instrument or measurement data.

Optical fiber undergoes well-defined optical and changes as a result of changes in strain and temperature. The ODiSI 7100, using OFDR to interpret these changes, is able to measure the strain or temperature throughout the length of the fiber, at spatial intervals as low as 0.65 mm.

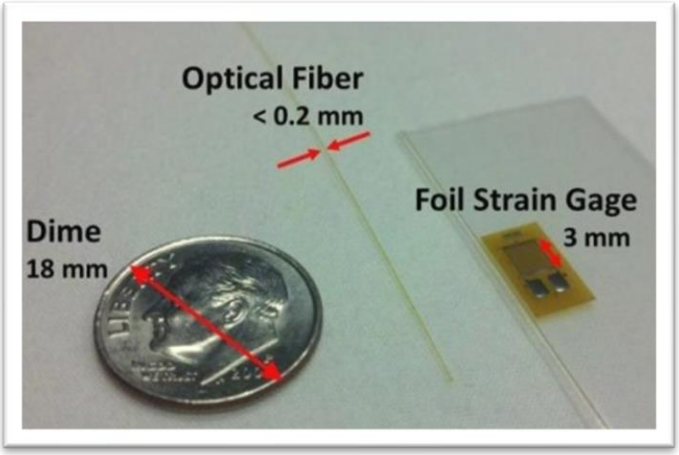


Figure 2-1 ODiSI Sensor Fiber

2.1 ODiSI 7100 Hardware Configuration

The ODiSI 7100 can be used as either a single or multichannel system. In the multichannel configuration, eight separate channels can be used to measure a combination of strain and temperature sensors, with serial switching. The hardware setup and software user interface remains consistent for all channel configurations.

2.2 Ease of Use

The driving philosophy behind the ODiSI 7100 is ease of use and simplicity of data measurement. It is designed to measure strain and temperature quickly, efficiently, and accurately. Once the interrogator and remote module(s) are set up and all the sensors are applied to the test article, measuring data can be as simple as clicking a Start button. The measured data is displayed and can be streamed in real time over a gigabit Ethernet to a separate test software.

3 Components

The ODiSI 7100 measurement instrument is shipped with all supporting hardware, software, documentation, and cables necessary for setup and testing. Read and follow all assembly and startup instructions before attempting to operate the ODiSI 7100.

The following components are shipped with each ODiSI 7100:

Optical Distributed Sensor Interrogator (ODiSI)

10 m, 50 m, or 100 m standoff cable

Remote Module(s)

Number of modules depends on the configuration of the ODiSI 7100, which can accommodate up to eight remote modules.

One power cord for the ODiSI 7100

Optical fiber connector cleaner

Dedicated instrument controller

Power adapter

USB 3.1 Type C to Type C Cable

If any components are missing or damaged, contact Luna toll free at Support at:
support.lunainc.com

3.1 A Closer Look at the ODiSI 7100

3.1.1 Front Panel

The front panel of the ODiSI 7100 contains both optical and electrical connections.

Two LED system status indicators (shown in green box).

Power Lit while the system is powered on (press to turn on)
Reset Indicates instrument status

White	Blinking	Instrument Starting
White	Solid	Instrument Idle
Orange	Blinking	Laser is Starting
Orange	Solid	Laser Started
Blue	Blinking	System Arming
Blue	Solid	System Collecting Measurements
Purple	Blinking	Embedded SW Update in Progress
Red	Solid	System Error

Figure 3-3-1 - ODiSI 7100 Power and Reset Buttons

BNC Input and Output Triggers (shown in orange box). All triggers use 5V TTL signaling.

Figure 3-2 – ODiSI 7100 Trigger Connections

USB and Ethernet Connections (shown in blue box).

Figure 3-3 – ODiSI 7100 USB and Ethernet Connections

Eight optical connectors are located on the front panel of the system (shown in red box). In order to keep the optical connections clean, it is important to keep dust covers attached while a standoff cable is not in use. Refer to the Maintenance and Cleaning section of this guide for instructions.

Figure 3-4 – ODiSI 7100 Optical Connections

3.1.2 **ODiSI 7100 Rear Panel**

The rear panel of the system contains the Power Entry Module

Figure 3-5 - ODiSI 7100 Rear Panel Power Entry

3.1.3 **Air Vents**

Air vents are located on both sides of the ODiSI 7100 (shown in red). These vents should remain unobstructed whenever the system is powered on.

Figure 3-6 - ODiSI 7100 Air Vents

4 Assembly

1. Remove all the ODiSI 7100 components from the packaging and verify that the components are undamaged.
2. Place the unit on a stable surface capable of supporting the entire weight of the unit.
3. Confirm that airflow into and out of the vents at the side and rear of the unit is not obstructed.
4. Clean the optical connectors at the ends of the standoff cable using the provided optical connector cleaner (see Setup Guide for cleaning instructions).
5. Connect one end of the standoff cable to the ODiSI 7100.
6. Connect the other end of the standoff cable to the remote module.

Note: Repeat steps 5 and 6 for each remote module that came with your configuration.

7. Unpack and set up the instrument controller (laptop) according to the manufacturer's instructions.
8. Connect the ODiSI 7100 to the controller using the supplied ***USB 3.1 Gen 1*** cable.
9. Attach the power cords to the controller and ODiSI 7100.

⚠ Attention: Luna requires the use of surge protected and grounded outlets with the ODiSI 7100.

10. Turn on the ODiSI 7100 and the instrument controller (laptop).

    Note: The ODiSI 7100 can be restarted without restarting the laptop.

11. Log into the laptop using the following credentials:

    User Name: odisi

    Password: odisi

Sensor Application

The placement and application of strain sensors is described in the document **Applying Strain Sensors,** which is available from the Help menu in the ODiSI 7100.

5 Software Setup

This section provides instructions for downloading and installing the software, along with a brief introduction to the ODiSI 7100 software. For complete instructions on starting and configuring the application, refer to the *ODiSI 7100 User Guide*, which can be accessed from the **Help** menu within the ODiSI 7100 software.

5.1 Installation

Download the Luna ODiSI software and documentation from the Luna Innovations website at www.lunainc.com. Navigate through the following links:

Products → Sensing And Non Destructive Test Products → ODiSI Interrogator

Under **Software**, the following downloadable links are available:

- **What's New: OD7 v<version#>**: Document describing enhancements and improvements for each release.
- **Setup Guide**: This document.
- **ODiSI 7100 Series Application Software Update**: Installer for the full application, including both the user interface and server.
- **ODiSI Remote Software and Data Viewer for Linu**: Linux user interface installer providing full instrument access and Data Viewer.
- **ODiSI Remote Software for Windows**: Windows user interface installer.
- **ODiSI Data Viewer for Windows:** Windows data viewer providing only view capabilities.

5.1.1 ODiSI 7100 Series Application Software Update Installation

The full application installer installs both the server application and the fully functional user interface. This installer is intended for use on a Linux ODiSI Controller system provided by Luna.

To install the software, follow these steps:

1. Before proceeding, ensure that the Luna instrument is powered on and that the status LEDs indicate the instrument is ready. This is required to install the ODiSI firmware.
2. Make the installer script executable. In a terminal, navigate to the script's location and run: chmod +x *ODiSI_v<version#>.run*. Alternatively, right-click the script, select Properties → Permissions, and check Allow executing file as program.
3. Run the file "*ODiSI_v<version#>.run*".
4. Follow the prompts provided by the installer.

If this is a first-time installation, the system will need to be restarted. Upon completion, an ODiSI UI icon will be placed on the desktop.

5.1.2 ODiSI Remote Software and Data Viewer for Linux Installation

The Linux Remote Software User Interface installer installs both the fully functional user interface and the data viewer on any Linux computer running Ubuntu 18.04 or later.

To install the software:

1. Make the installer script executable. In a terminal, navigate to the script's location and run: chmod +x *ODiSI_v<version#>_LinuxUIonly.run*. Alternatively, right-click the script, select Properties → Permissions, and check Allow executing file as program.
2. Run the file "*ODiSI_v<version#>_LinuxUIonly.run".*
3. Follow the prompts provided by the installer.

Upon completion, an ODiSI UI icon will be placed on the desktop.

5.1.3 ODiSI Remote Software for Windows Installation

The ODiSI Remote Software installer installs the fully functional user interface on any Windows computer running Windows 10 or later.

To install the software:

1. Run the file "*ODiSI_UI_Install.msi".*
2. Follow the prompts provided by the ODiSI Setup.

Upon completion, a Luna icon will be placed on the desktop and on the Start menu.

5.1.4 ODiSI Data Viewer for Windows Installation

The ODiSI Data Viewer User Interface installer installs the Data Viewer on any Microsoft Windows computer running Windows 10 or later.

To install the software:

1. Run the file **"***DataViewerInstall.msi***".**
2. Follow the prompts provided by the ODiSI Setup.

Upon completion, a Luna icon will be placed on the desktop and on the Start menu.

5.2 Software Startup

When the application is first launched, the main user interface is the Sensor Properties screen. Among other things, Sensor Properties displays information about how all the ODiSI 7100 channels are configured.

For complete instructions on how to start and configure the application, refer to the ODiSI 7100 User's Guide, which can be accessed from the Help menu on the ODiSI 7100.

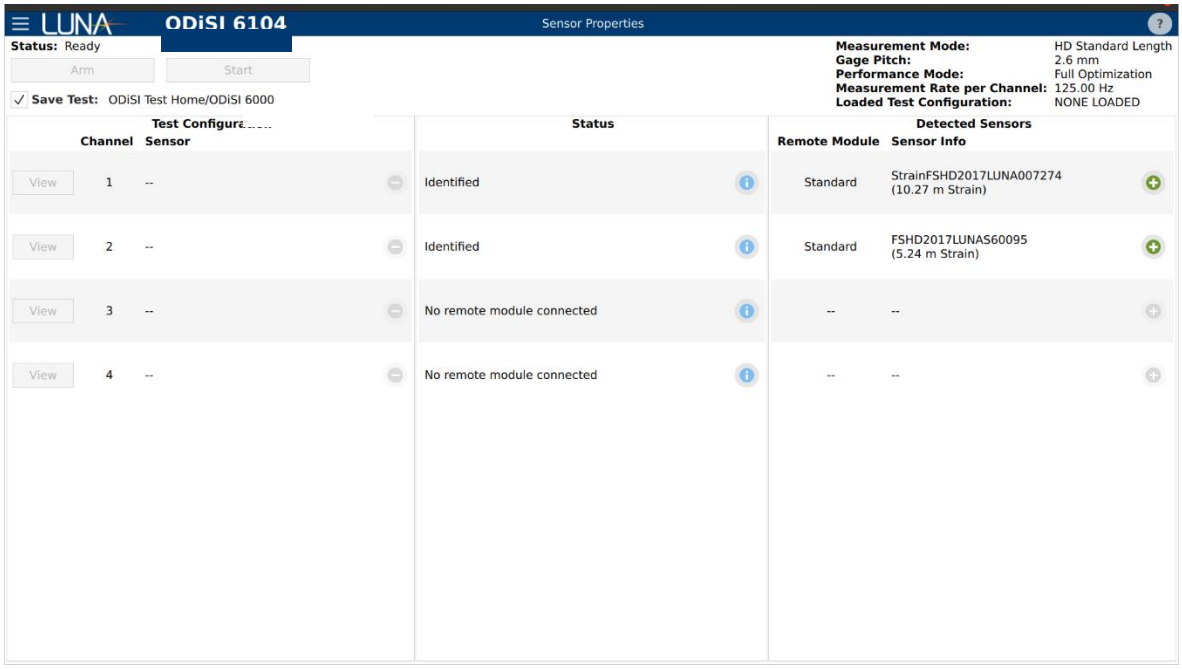


Figure 5-1 Sensor Properties screen with identified sensors.

6 Maintenance and Cleaning

6.1 Optical Connector Cleaning Materials

It is extremely important to clean connectors before attaching optical fibers to the ODiSI 7100 for testing. Failure to do so may result in noisy data or damaged equipment. Optical fiber connectors on cables should be cleaned before every connection to the ODiSI 7100. The bulkhead connectors on the front panel should be cleaned frequently, roughly once every 25 connections.

The cleaning supply included with the ODiSI 7100 is:

- IBC Connector Cleaner for LC & MU Connectors, 1.25mm – P/N 9393

Other alternative cleaning supplies are:

- CLETOP connector cleaner – P/N F1-6270
- CLETOP connector cleaner replacement reel – P/N F1-6271
- CLETOP 1.25mm Stick (5/package) – P/N F10401

These supplies can be ordered from:

FIS Incorporated

161 Clear Road

Oriskany, NY 13424

Web: www.fiberinstrumentsales.com

E-mail: info@fiberinstrumentsales.com

Important: Use only cleaners approved for use with fiber optic bulkheads and fiber connectors. Do not use any type of cleaning fluid, cotton swabs, or cloths. Using unapproved cleaning tools or fluids may result in erroneous or noisy data or may damage the fibers and ODiSI 7100 components.

The IBC Connector Cleaner, included with ODiSI, can be used for cleaning all ODiSI optical connectors:

Figure 6-1 - Connector Cleaner

Cletop sticks can also be used to clean the ODiSI 7100 bulkhead connectors:

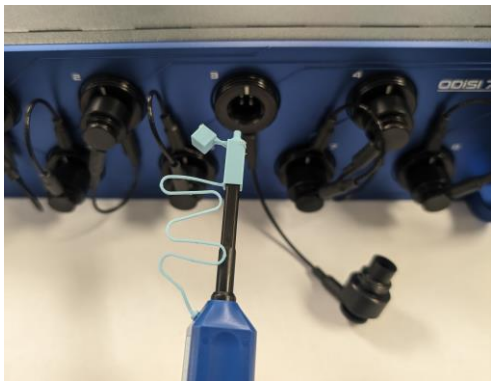
Figure 6-2 – Cletop 1.25mm Sticks

6.2 Cleaning Optical Connectors Using IBC Connector Cleaner

1. Configure the fiber cleaner based on the connector type being cleaned. For a receptacle/bulkhead connection, the entire cap should be removed (see figure 6-3). For a male fiber ferule (only the dust cap should be opened).

Figure 6-3 – Fiber cleaner configurations. Dust capped (left), male fiber ferule (middle), bulkhead/receptacle (right)

2. Center the cleaning probe over the opening or ferule.
3. Press the body of the cleaning tool towards the connector until it clicks. The probe end will compress as the fiber end face is cleaned.



Cleaning Receptacles

Cleaning standoff cable

Figure 6-4 ODiSI 7100 connector cleaning using IBC Connector Cleaner

6.3 Cleaning Optical Connectors Using CLETOP Connector Cleaner

1. Expose the cleaning tape by pushing down the cover release lever.

The cleaner tape has two cleaning strips:

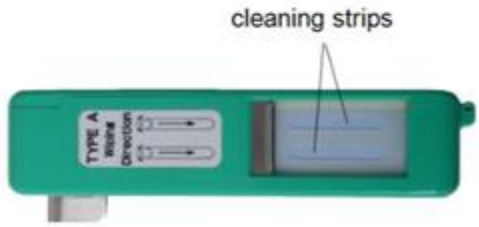


Figure 6-5 Exposing the Cleaning Tape

2. Hold the fiber connector perpendicular to the cleaner tape surface.
3. Swipe the tip of the connector down the first cleaning strip, then swipe on the second strip.

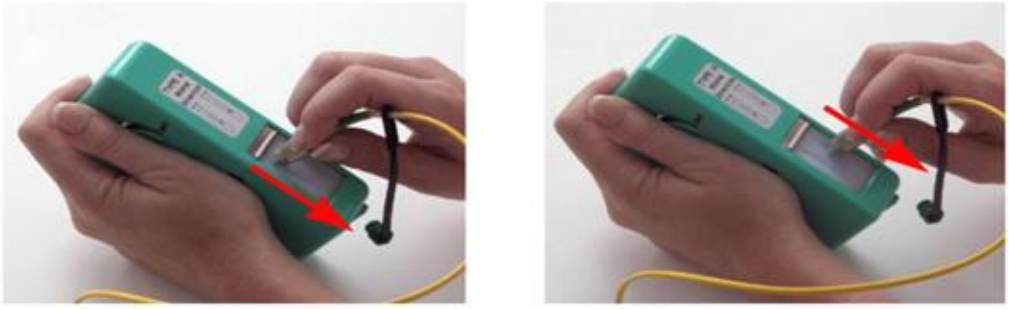


Figure 6-6 Cleaning the Connector on the Tape

4. Close the cleaning tape cover before swiping another connector. This advances the cleaning tape.

6.4 Cleaning Optical Standoff Connections Using a Cletop Stick

Important: The standoff cable connections should be cleaned approximately every 25 connections. Dirty connections can lead to connector damage and poor system performance.

1. Gently insert one of the supplied cleaning sticks, as shown below.
2. Twist the stick through two full revolutions in one direction and then remove.

Do not rotate stick in a back-and-forth motion; one direction only. Sticks should be discarded after a single use.

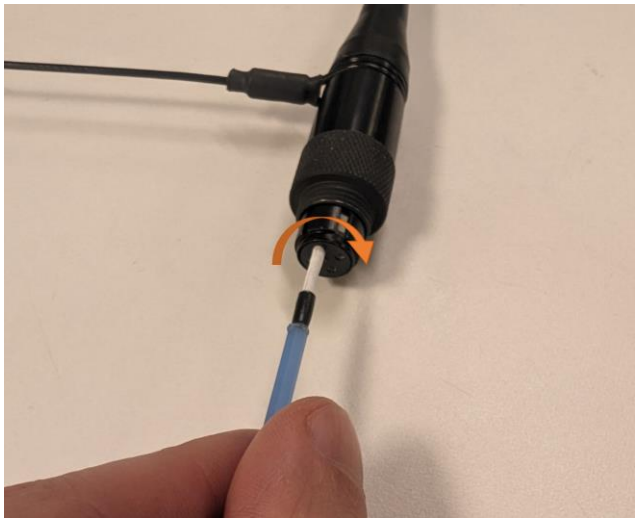


Figure 6-7 - Cleaning Optical Standoff Cable

6.5 Cleaning the Case

1. Clean the case by wiping it with a soft cloth dampened with water or a mild, non-abrasive cleaning fluid such as window cleaner.

Warning ⚠

Do not spray any fluid directly on case surfaces. It may seep into the interior of the case and damage components.

6.6 Replacing Fuses

The fuse drawer is located on the power module of the instrument on the back panel.

Warning ⚠

To avoid the risk of serious injury or death, ensure that the power cord is disconnected from the instrument when checking or replacing fuses.

1. Disconnect the instrument power cord.
2. Place the blade of a screwdriver or similar tool in the slot at the bottom of the fuse drawer, then gently pry the drawer out of the power module.

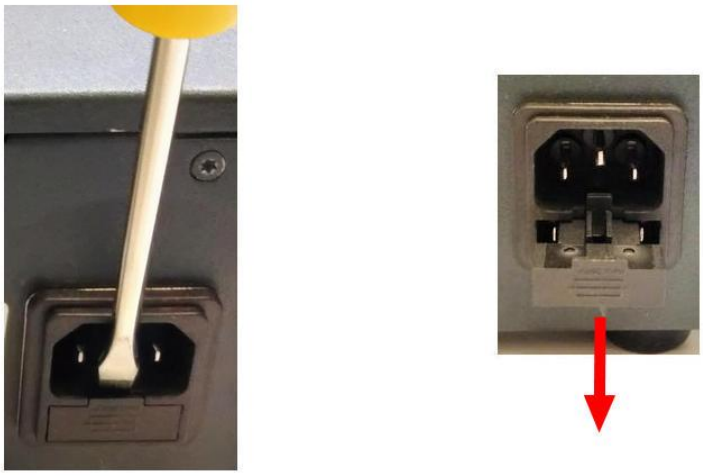


Figure 6-8 - Remove Fuse Drawer

3. Replace fuses with Bussmann AGC-2 type 2A @ 250VAC 1 ¼" x ¼" fast acting (FA) fuses, rated FS01008.

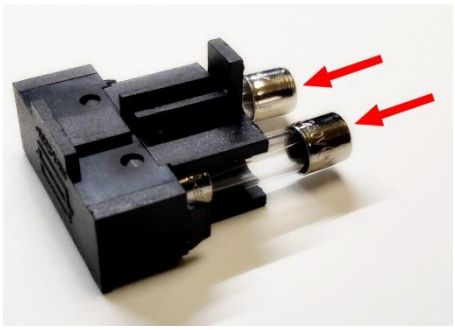


Figure 6-9 - Insert New Fuses

4. Push the drawer back into the power module until it snaps into place.
5. Reconnect the power cord.

7 Product Support Contact Information

Headquarters:	2270 Kraft Dr. Blacksburg, VA 24060
Support:	support.lunainc.com

Specifications of products discussed in this document are subject to change without notice. For the latest product specifications, visit Luna's website at www.lunainc.com.

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