Doric Fluorescence Detector

User Manual

Version 1.0.3

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System Overview

The Doric Visible Fluorescence Detector is designed specifically for use in fiber photometry experiments. Its high gain and low noise allow it to detect signals in the sub-picowatt to nanowatt range. When used with a modulated light source and a lock-in amplifier it can detect signals in the femtowatt range. The following document describes the detector's components and their usage.

1.1 Fluorescence Detector Head

The *Fluorescence Detector Head* is used to detect fluorescence signal. The detector uses a specialized shielded cable to connect to the amplifier, keeping noise to a minimum. It contains the following elements.

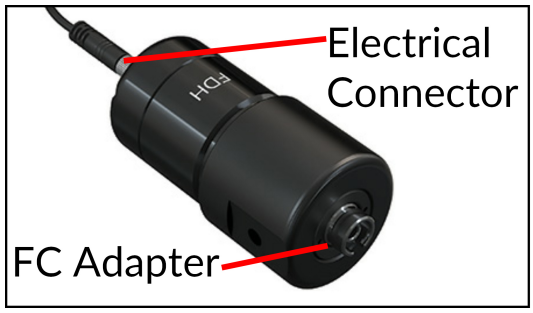


Figure 1.1

Figure 1.2: *Fluorescence Detector Head With Adapter*

- The **Electrical Connector** is an M5 type connector used to link the head and the amplifier using a shielded M5 cable.
- The detector head is provided with an **FC adapter** (Fig. 1.1). This allows the detector to be connected to a fiber-optic patch cord and other connectorized devices.

1.2 Fluorescence Detector Amplifier

The Fluorescence Detector Amplifier amplifies the signal coming from the detector head and transmits it to a recording system using a BNC output. It contains the following elements.

- The **FDH Connector** (Fig. 1.3) is an M5 type connector used to link the amplifier and the head using a shielded M5 cable.
- The **V out Connector** (Fig. 1.3) is a BNC type connector used to connect the fluorescence detector with a DAQ system.

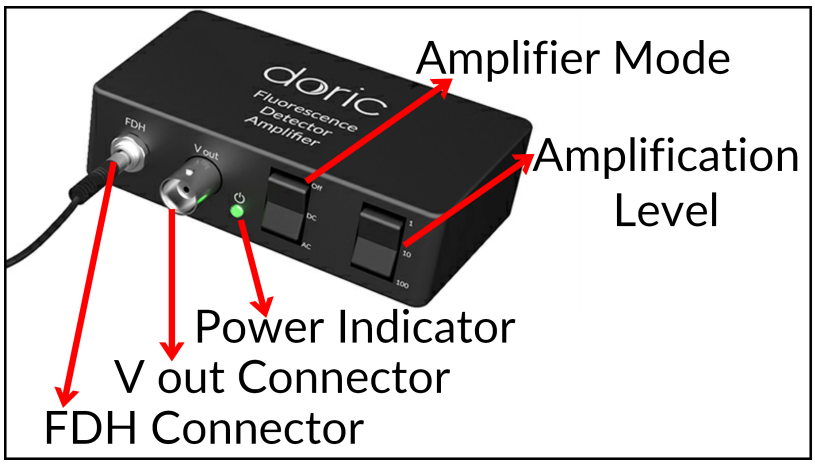


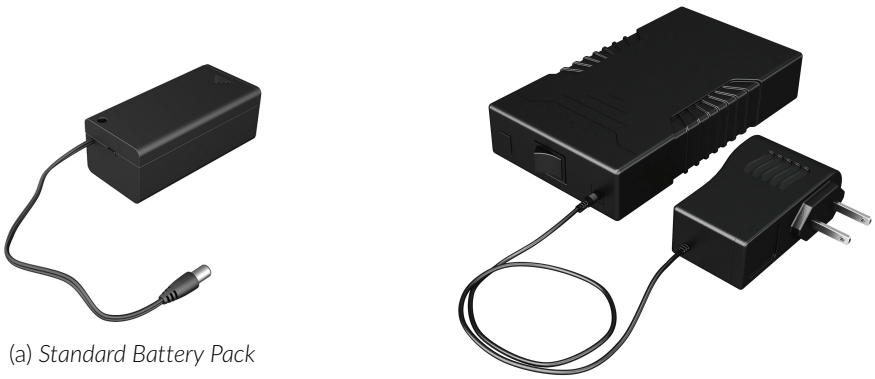
Figure 1.3: *Doric Fluorescence Detector Amplifier Elements*

- The **Power Indicator** light (Fig. 1.3) shines green when the detector is on.
- The **Amplifier Mode** switch (Fig. 1.3) is used to switch the detection mode from **Off** to **AC** or **DC**.
- The **Amplification Level** switch (Fig. 1.3) allows the choice of amplification levels at 1, 10 or 100 times.
- The **Power Supply** connector, located on the back of the unit, is used to connect the 12 V power supply to the amplifier.

1.3 Fluorescence Detector Cable

The *Fluorescence Detector Cable* is used to connect the detector head and amplifier. This is a shielded twisted pair M5 connectorized electrical cable.

1.4 Battery Pack



(a) *Standard Battery Pack*

(b) *Rechargeable Battery Pack*

Figure 1.4: *Doric Fluorescence Detector Battery Packs*

There are two available battery packs.

- A *9V Battery Pack* (Fig. 1.4a) using standard 9V/E type battery, as well as a 9V/E batteries are shipped with each detector. These allow optimal usage of the detector when wall plugs are unavailable or when the current from a wall plug introduces significant noise in the signal. The pack can be connected directly to the **Power Supply** port and a single battery will last an average of 20 hours.

- A *Rechargeable Battery Pack* (Fig. 1.4b) can be provided when requested. These 12V 6000 mAh battery packs can keep a single detector powered for approximately 1 week without interruption. These power supplies are ideal for those who want to use the detectors solely using battery power.

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Operations Guide

2.1 Fluorescence Detector Installation

The following section describes the basic usage of the Fluorescence Detector.

1. Connect the power supply or battery pack to the **Power Supply Connector** of the *Fluorescence Detector Amplifier*.
2. Using the *M5 Cable*, connect the amplifier and the *Fluorescence Detector Head*.
3. Flip the **Amplifier Mode** switch from the off state, and use the **Amplification Level** switch to select the amplification desired.

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Specifications

3.1 Specifications

Table 3.1: *Doric Fluorescence Detector Specifications*

SPECIFICATION	**VALUE**		
Wavelength Range (nm)	320-1100		
Peak Sensitivity Wavelength (nm)	960		
Peak Responsivity (A/W)	0.6		
Output Impedance (Ω)	50		
NEP (fW/√Hz)	<12		
DC Bandwidth (Hz)	0-1000		
AC Bandwidth (Hz)	30-1000		
CW Saturation Power (nW)	4.75		
Output Connector	Male BNC		
Detector Material	Si		
Detector Size (mm x mm)	1.1 x 1.1		
Amplification level	*1x*	*10x*	*100x*
Transimpedance Gain (V/A)	$2x10^{9}$	$2x10^{10}$	$2x10^{11}$
Maximum Conversion Gain (V/W)	$1.2x10^{9}$	$1.2x10^{10}$	$1.2x10^{11}$

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Support

4.1 Maintenance

The product does not require any maintenance. Do not open the enclosure. Contact Doric Lenses for return instructions if the unit does not work properly and needs to be repaired.

4.2 Warranty

This product is under warranty for a period of 12 months. Contact Doric Lenses for return instructions. This warranty will not be applicable if the unit is damaged or needs to be repaired as a result of improper use or operation outside the conditions stated in this manual. For more information, see our Website.

4.3 Contact us

For any questions or comments, do not hesitate to contact us by:

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