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PX-2
Pulsed Xenon Light Source
Installation and Operation Instructions

Description

The PX-2 Pulsed Xenon Light Source is a high flash rate, short-arc xenon lamp for applications involving absorbance, reflection, fluorescence and phosphorescence measurements, and especially for measuring optically or thermally labile samples.

The PX-2 has an SMA 905 Connector that couples to Ocean Optics miniature fiber optic spectrometers and accessories, including optical fibers, cuvette holders, probes and other sampling optics.

The PX-2 operates at speeds up to 220 Hz, offers excellent pulse-to-pulse stability, and has two trigger modes for software control of the flash rate. Any external TTL positive pulse can be used to trigger the PX-2. When it is coupled to a spectrometer, you can easily synchronize operation of both the light and detector.

Because it produces a pulsed signal, the PX-2 is less likely to contribute to solarization in optical fiber assemblies, which can occur when fibers are illuminated with signals less than 260 nm.

Parts Included

The PX-2 ships with the following items:

❑ PX-2 Pulsed Xenon Light Source
❑ 12 VDC power adapter
❑ 15-pin interface cable

Additional Accessories

The following are additional accessories available from Ocean Optics that you may need, depending on your system set-up:

- USB2000/PX-2 adapter (USB-ADP-PX2)
- Replacement bulb (PX-2-B)

WARNING

The PX-2 produces ultraviolet radiation. Direct eye contact can cause permanent eye damage. Always wear safety eyewear, and never look directly into the light source.

Dangerous voltages are present in the PX-2. Do not operate the PX-2 without the housing intact.

The SMA 905 Connector can get hot during operation. Allow the lamp to cool after operation before handling.

Do not drop the instrument, as this may cause permanent damage to the unit. Handle with care.

Using the PX-2

The following sections provide instructions on setting up and using the PX-2.

Connecting the PX-2

The set-up procedure differs, depending on whether you are connecting the PX-2 to an S2000, USB2000/HR2000, or HR2000+/HR4000/QE65000 Spectrometer.

Connecting to an S2000 Spectrometer

► *Procedure*

1. Plug the 12 VDC power supply into a wall outlet, then connect the barrel connector on the power supply to the rear of the PX-2.

2. Connect the 15-pin cable to the rear of the PX-2, and then connect the other end to the 15-pin connector on the S2000 Spectrometer.

You have now connected the PX-2 for operation with the S2000 Spectrometer.

Connecting to a USB2000/HR2000 Spectrometer

► *Procedure*

Follow the steps below to connect the PX-2 to a USB2000/HR2000 Spectrometer:

1. Remove the PX-2 from the product packaging.

2. Connect the spectrometer's 10-pin accessory connector to the USB-ADP-PX2 Adapter

   OR

   Connect the spectrometer to the DB15 cable assembly and connect the other end to the PX-2's 15-pin connector.

You have now connected the PX-2 for operation with the USB2000 or HR2000 Spectrometer.

Connecting to an HR2000+/HR4000/QE65000 Spectrometer

► *Procedure*

Follow the steps below to connect the PX-2 to an HR2000+/HR4000/QE65000 Spectrometer:

1. Remove the PX-2 from the product packaging.

2. Connect the spectrometer's 30-pin accessory connector to the Breakout Box using the Breakout Box Accessory cable.

   OR

   Connect the spectrometer to the DB15 cable assembly and the other end to the PX-2's 15-pin connector.

You have now connected the PX-2 for operation with the HR2000+, or HR4000 or QE65000 Spectrometer.

Configuring the PX-2

After setting up the PX-2, you must configure it to operate with the spectrometer and software.

► *Procedure*

1. Connect an optical fiber to the SMA 905 Connector on the front panel of the PX-2.

2. Turn the PX-2 on via the power switch on the rear of the unit.

3. Select Multiple or Single TTL mode by moving the toggle switch on the rear of the light source. You must also configure this mode in the operating software.

4. Download the latest version of OOIBase32, if necessary.

5. Configure OOIBase32 to operate the PX-2. Access the OOIBase32 setup. In the Configure A/D dialog box, check the S2000 Strobe Enabled box.

    Consult the OOIBase32 documentation for more information on system setup.

If properly configured, the lamp should flash and an audible "ping" sound should be heard.

TTL Mode Information

The PX-2 features a TTL switch that provides two modes of operation: Multiple mode and Single mode.

Multiple Mode

In Multiple mode, the flash timing (pulse rate) is determined by the spectrometer:

- S2000 Spectrometer – Flash timing is determined by the JP3 jumper block setting. See
- All other OOI spectrometers – The Continuous strobe rate is either fixed or software controlled. See

In either case, you must alter the spectrometer's integration time so that a constant number of flashes are observed during each integration period.

When using Multiple mode, you must ensure that a constant number of flashes occurs for each integration cycle. This is accomplished by setting the pulse rate and integration time, which is controlled by OOIBase32 operating software.

S2000 Spectrometer Strobe Rate Adjustments

To achieve a constant number of flashes per integration cycle, the integration time must be a multiple of those shown in the following table.

S2000 JP3 Setting	Integration time must be a multiple of (in milliseconds)			
	ADC500/SAD500	ADC1000	DAQ700	ADC2000-PCI
2^{16} (factory default)	128	64	512	32
2^{14}	32	16	128	8
2^{12}	8	4	32	2
2^{10}	N/A	N/A	8 (with a minimum value of 24 ms)	N/A

The PX-2 repetition rate is determined by the JP3 setting on the S2000 Spectrometer, but it is also dependent on the frequency of the A/D card. The table below shows the repetition rate for the various combinations of hardware and jumper settings. The default factory setting is 2^{16}:

JP3 Post #	Function	Frequency (Hz)			
		ADC500/SAD500	ADC1000	DAQ700	ADC2000-PCI
1	Not enabled – Reserved for future software control				
2	Divide by 2^{10}	Too fast	Too fast	98	Too fast
3	Divide by 2^{12}	122	Too fast	24	Too fast
4	Divide by 2^{14}	30	60	6.1	120
5	Divide by 2^{16}	7.6	15.2	1.5	30

Non-S2000 Spectrometer Strobe Rate Adjustments

The table below shows the Continuous Strobe frequency (multiple strobe operation) for each type of OOI spectrometer.

| Spectrometer	Strobe Rate Adjustment
USB2000	Fixed at 122Hz[1]
USB2000+/USB4000	Software-controlled 220Hz-1Hz[2]
HR2000+/HR4000	Software-controlled 220Hz-1Hz[2]
QE65000	Software-controlled 220Hz-1Hz[2]
[1] Fixed frequency when the USB2000 is programmed with the PX2 firmware [2] The maximum frequency of the PX2; the spectrometer can actually run faster	

Single Mode

In Single mode, a single lamp flash occurs during each integration period. You can modify the flash rate by changing the integration period. Since the PX-2 has a maximum repetition rate of 220 Hz, the minimum integration time allowed in Single mode is 5 milliseconds.

PX-2 Specifications

Specification	Value
Dimensions (mm)	153.4 x 104.9 x 40.9 mm
Weight	370 g
Power consumption	1.5 A @ 12 VDC
Power output	45 microjoules per pulse maximum 9.9 watts average power 220 Hz pulse rate maximum
Spectral range	220-750 nm
Pulse duration	5 microseconds (at 1/3 height of pulse)
Aperture	3 mm
Connector	SMA 905
Bulb life (hours)	800 (deuterium); 2,000 (tungsten)
Time to stabilized output	~30 minutes

PX-2 Pinout Information

The following section contains information on the 15-pin connector on the PX-2.
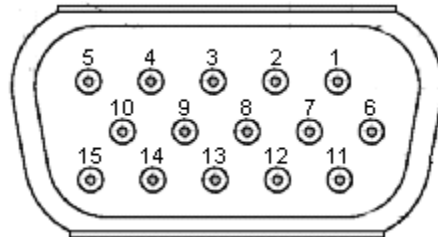
Pin Number	Description
1	Single strobe
2	Continuous strobe
10	Ground