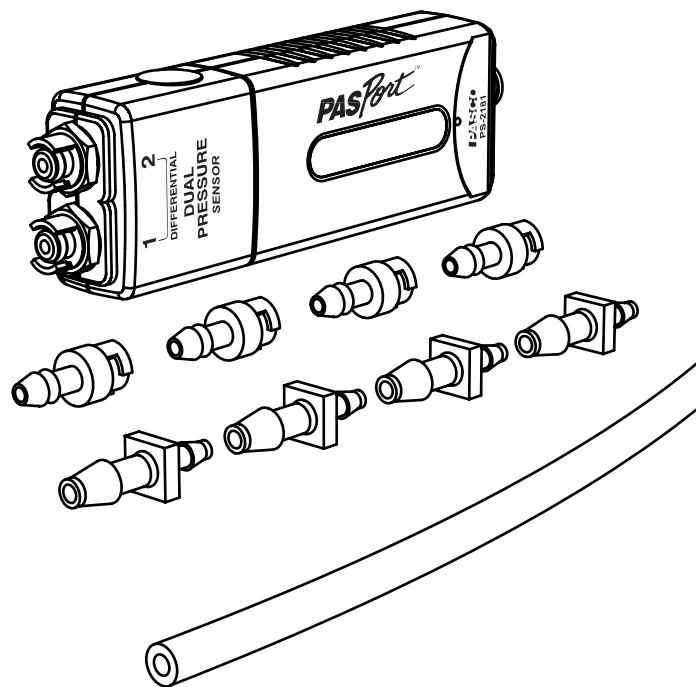


# Dual Pressure Sensor

PS-2181



## Quick Start

1. Connect the Dual Pressure Sensor to your PASPORT interface.
2. If you are using a computer, connect the PASPORT interface to it and start DataStudio.
3. Use the included tubing and quick-release connectors to connect a device to one or both of the sensor's pressure ports.
4. Press or click the start button to begin recording data.

## Introduction

The Dual Pressure Sensor is capable of reading up to two absolute pressures, one differential pressure, or one gauge pressure. Dynamic variable over-sampling automatically reduces measurement noise at low sampling rates. Sample rates up to 1000 Hz make studies of both transient and steady-state pressure possible. The sensor measures pressure in units of kPa, N/m<sup>2</sup>, and pounds per square inch (psi).

## Setup

### Types of Pressure Measurements

To measure pressure in an apparatus, connect one or both of the pressure ports using the included tubing and connectors. The way that you connect the Dual Pressure Sensor depends on whether you will measure absolute pressure, differential pressure, or gauge pressure.

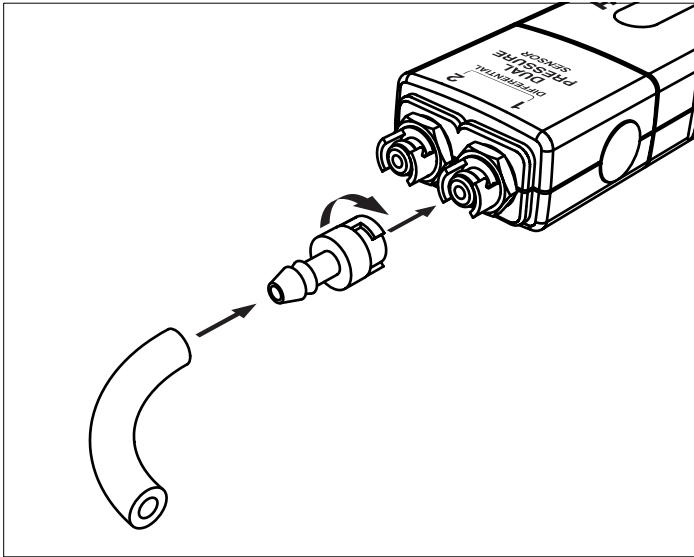
**Absolute Pressure** The sensor can measure up to two absolute pressures simultaneously. One connection is required for each measurement, and either of the pressure ports may be used.

**Differential Pressure** The sensor measures differential pressure by determining the pressure difference between ports 1 and 2. Differential Pressure is positive when the pressure in port 1 is higher than port 2. (See "DataStudio Setup" on page 2 for instructions on making this measurement available.)

Included Equipment	Part Number
Dual Pressure Sensor	PS-2181
Quick-release Connectors (4 pieces)	640-021
Tubing Connectors (4 pieces)	640-030
Polyurethane Tubing (length 2.4 m)	640-023
Required Equipment	
PASPORT Interface	See PASCO catalog or <a href="http://www.pasco.com">www.pasco.com</a>

**Gauge Pressure** Gauge pressure is a special case of differential pressure in which port 2 is left unconnected. The sensor measures the pressure difference between port 1 (connected to the apparatus) and port 2 (left open to the atmosphere).

## Sensor Setup



1. Cut a piece (or pieces) of tubing to the desired length.
2. Insert a quick-release connector into each piece of tubing.
3. Connect each piece of tubing to the sensor by inserting the quick-release connector into one of the pressure ports and twisting clockwise.
4. Connect the free ends of the tubing to the apparatus using connectors supplied with the apparatus or the tubing connectors include with the Dual Pressure Sensor.

You can use the included tubing connectors to connect to a 5 mm ( $3/16$  inch) hole in a rubber stopper.

5. Connect the sensor to your PASPORT interface.


## DataStudio Setup

If you are using a computer, connect the PASPORT interface to the computer and start DataStudio. (Refer to the documentation that came with your PASPORT interface for instructions on connecting it to your computer.) In DataStudio, click **Start** to begin data collection; click **Stop** to stop data collection.

By default, DataStudio displays the absolute pressures (in units of kPa) measured by both ports in a Graph display. To make the differential measurement available for display, click **Setup** to open the Experiment Setup window; in that window, select the **1-2 Differential Pressure** check box. There you can also change the sampling rate (up to 1000 Hz) and select different units of

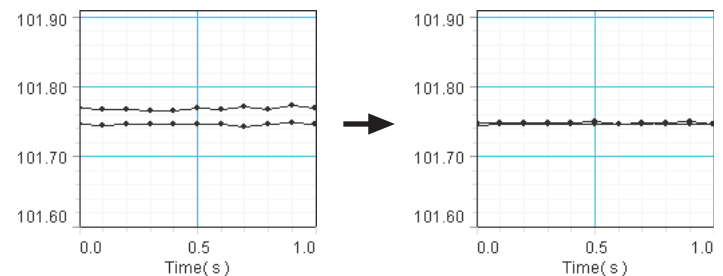
measure. For more instructions on using DataStudio, press F1 to open DataStudio's on-line help.

## Xplorer GLX Setup

If you are using an Xplorer GLX in standalone mode, press  to start data collection. By default, the GLX displays the absolute pressure from port 1 ("Absolute Pressure 1") in units of kPa, but you can select the other absolute measurement or the differential measurement for display. For more instructions on using the Xplorer GLX, refer to the GLX Users' Guide.

## Multiple-measurement Alignment

When you are using both pressure ports, you may find that their readings differ slightly when they are measuring the same thing. In the example illustrated below, measurements from both ports open to the atmosphere differ by about 0.02 kPa. The multiple-measurement alignment procedure adjusts the calibrations of the measurements so they agree more closely.



The procedure described here for DataStudio can also be performed on the Xplorer GLX. See the Xplorer GLX Users' Guide for detailed instructions.

1. Click **Setup** to open the Experiment Setup window. Click **Calibrate Sensors** to open the calibration dialog box.
2. From the Sensor field, select the **Dual Pressure Sensor**. (See screenshot on page 3.)
3. Select the **Calibrate all similar measurements simultaneously** check box.
4. From the Calibration Type menu, select **1 Point (Adjust Offset Only)**.
5. Apply the same pressure to both ports (for instance by opening them to the atmosphere).
6. Click the **Read From Sensor** button for Point 1.
7. Click **OK** to accept the new calibration.

## One-point and Two-point Calibrations

Though it is usually not necessary, a one-point or two-point calibration can be performed on any of the measurements to make them more accurate. To do so, you must have a very accurate, independent means of measuring pressure such as a barometer. For step-by-step instructions refer to the documentation for DataStudio, the Xplorer, or the Xplorer GLX.

## Over-sampling

The Dual Pressure Sensor uses dynamic variable over-sampling to reduce noise, produce smoother data, and improve the measurement resolution. This effect is especially noticeable when very small pressure changes or differences are measured. The degree of dynamic variable over-sampling that takes place within the sensor depends on the sample rate. To maximize the over-sampling, set the sample rate as low as possible for a given application. Maximum over-sampling occurs at sample rates of 1 Hz or slower.

## Specifications

<b>Range</b>	Absolute pressure: 0 to 200 kPa Differential pressure: -100 kPa to +100 kPa
<b>Resolution</b>	0.01 kPa at 10 Hz
<b>Repeatability</b>	1 kPa
<b>Units of Measure</b>	kPa, N/m <sup>2</sup> , psi
<b>Max. Sample Rate</b>	1000 Hz
<b>Included tubing</b>	Material: polyurethane Inside diameter: 3.2 mm ( 1/8 inch) Length: 2.4 m (8 feet)

## Technical Support

For assistance with any PASCO product, contact PASCO at:

Address: PASCO scientific  
10101 Foothills Blvd.  
Roseville, CA 95747-7100

Phone: 916-786-3800 (worldwide)  
800-772-8700 (U.S.)

Fax: (916) 786-7565

Web: [www.pasco.com](http://www.pasco.com)

Email: [support@pasco.com](mailto:support@pasco.com)

**Limited Warranty** For a description of the product warranty, see the PASCO catalog.

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