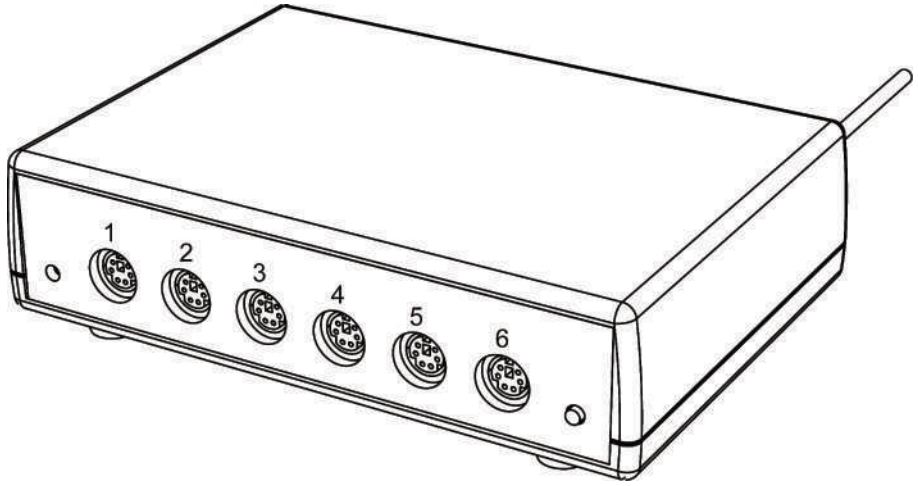
PASPORT Load Cell Amplifier

PS-2198



Included Equipment	Part Number
Load Cell Amplifier	PS-2198
Compatible Sensor	
Load Cell, 100 N	PS-2200
Compatible PASPORT Interfaces	
Xplorer GLX	PS-2002
Xplorer	PS-2000
PowerLink	PS-2001
USB Link	PS-2100

Introduction

The PASPORT Load Cell Amplifier works with up to six Load Cells and a PASPORT interface to collect multiple streams of tension or compression force data.

Individual Load Cells (available separately) can be connected to the input ports, numbered 1 through 6.

The Load Cell Amplifier can be connected to any PASPORT interface. One amplifier can be connected to a single USB Link or Xplorer. Up to three amplifiers can be connected to a PowerLink, and up to four amplifiers can be connected to the Xplorer GLX datalogger.

Have questions?
Ask from PASCO's Global Science Education Partner in Estonia DIFI.NET OÜ
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Usage

The Load Cell Amplifier and the Load Cells that connect to it are designed to measure the tension or compression in beams from the PASCO Structures System. The Structures System consists of the ME-6990 Truss Set, the ME-6991 Bridge Set, the ME-6992 Advanced Structures Set and the ME-6989 Complete Structures Set. (See the PASCO catalog online at www.pasco.com for information.)

Typical usage is to replace an element in a truss or bridge or other structure with two smaller elements joined to a Load Cell that is connected to a Load Cell Amplifier that is connected to a PASPORT interface. The PS-2200 Load Cell's range is from -100 N to +100 N.

About the Load Cell Amplifier

The Load Cell Amplifier has a 16-bit analog-to-digital converter for a theoretical maximum resolution of 0.003 N when a PS-2200 Load Cell, 100 N is connected. The amplifier is lightweight and travels easily when connected to a hand-held datalogger such as the Xplorer or Xplorer GLX.

Load Cells can be connected to the Load Cell Amplifier in any order or combination. The maximum sampling rate is the same whether one Load Cell is connected or some other number of Load Cells up to a total of six is connected.

Setup

Hardware Setup

The following three steps can be performed in any order.

1. Connect up to six separate Load Cells (PS-2200) to the individual input ports of the sensor box.

Probes can be connected to the individual ports in any order (you don't have to start with port 1), and any of the ports can be left unconnected.

The connector on the Load Cell cable fits into the sensor box in only one way.

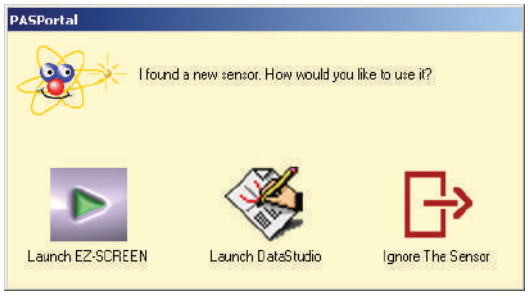
2. Connect the cable of the Load Cell Amplifier to a PASPORT interface.

3. If you will be using a computer, connect the PASPORT interface to the computer's USB port.

DataStudio Setup

If you will be using the Load Cell Amplifier with a computer, install the latest version of DataStudio first. Check the PASCO web site at www.pasco.com for information.

1. When you connect the Load Cell Amplifier to the computer through a PASPORT interface, the PASPortal window will launch automatically (if DataStudio is not already running).



2. Select Launch DataStudio in the PASPortal window.

A Digits display for force will open automatically.

3. Click Start to begin data collection.

To view and change the sample rate and other sensor properties, click Setup.

Xplorer and Xplorer GLX Setup

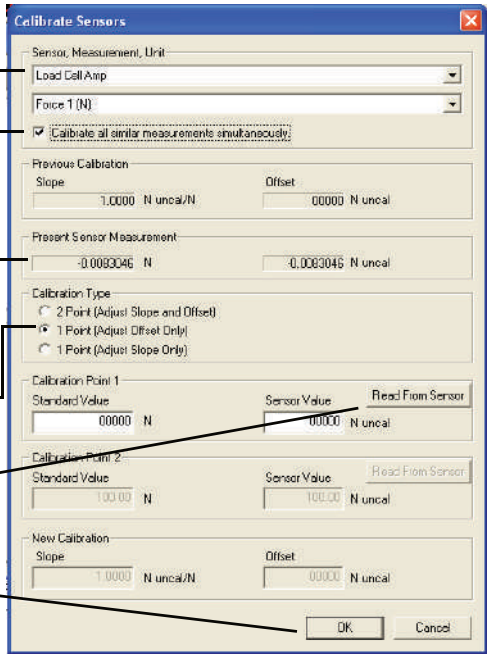
If you will be using an Xplorer or Xplorer GLX in logging mode (not connected to a computer), connect the Load Cell Amplifier to the Xplorer or Xplorer GLX and press ▶ to begin data collection.

Measurement Alignment

When you are using multiple Load Cells, you may find that their readings differ slightly when they are measuring the same thing. Before putting the Load Cells into a bridge, truss, or other structure, press the "TARE" button on the right side of the front panel of the Load Cell Amplifier to "zero" the reading of each of the Load Cells.

No calibration should be necessary for the PASCO Load Cells connected to the Load Cell Amplifier. The following description outlines the procedure for a one point simultaneous calibration.

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 Load Cell Amplifier.
3. Select the "Calibrate all similar measurements simultaneously" option.
4. Arrange all of the Load Cells so that the same amount of mass is hanging from each Load Cell.
5. Observe the Present Sensor Measurement and wait until it has stabilized.
6. From the Calibration Type menu, select 1 Point (Adjust Offset Only).
7. Click the Read From Sensor button for Point 1.
8. Click OK to accept the new calibration; or click Cancel to revert to the previous or default calibration.



Oversampling

Oversampling occurs at low sampling rates when several measurements are recorded and averaged over a short interval of time and the averaged value is displayed. The degree of oversampling that takes place within the Load Cell Amplifier depends on the sample rate. For example, for a sample rate less than or equal to 2 Hz, the number of samples counted and averaged is 255.

Sample Rate	Samples Counted
≤ 2Hz	**255**
≤ 5Hz	**128**
≤ 10Hz	**64**
≤ 20Hz	**32**
≤ 100 Hz	**16**
≤ 200 Hz	**8**
> 200 Hz	**1**

Specifications

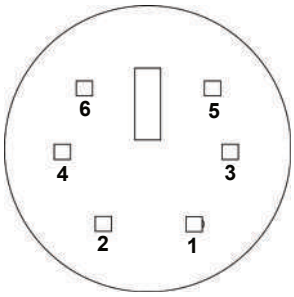
Measurement Ranges	± 100 N*
Accuracy	±1%
Resolution	0.003 N
Maximum Sample Rate	500 Hz
Differential input voltage for any load cell	± 9.96 mV

**Load cells with other ranges such as ± 5N or ± 1,000 N may be available in the future. Check the PASCO web site for further information.*

Pinouts

Following are the pin assignments for the six-pin mini-DIN jacks. The jack has two pins dedicated to sensing the range of the PASCO Load Cell connected to it: Range Select 1 and Range Select 2.

Pin	Signal
1	+ Strain Gauge Output
2	+4.2 V
3	- Strain Gauge Output
4	Ground
5	Range Select 1
6	Range Select 2



Range Select 1	Range Select 2	Range
ground	ground	± 5 N
open	ground	± 100 N
ground	open	± 1,000 N
open	open	no cell connected

The condition of the signal coming from a load cell on pins 5 and 6 determine how the DataStudio program recognizes the range of the load cell that is attached. If you are using a non-PASCO load cell, then either or both Range Select pins of the load cell must be connected to ground in order for the Load Cell Amplifier to report a load cell reading.

Technical Support

For assistance with any PASCO product, contact PASCO at:

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Phone: +372 5551 5542
Web: www.oppelabor.ee
Email: ask@ste.education

Limited Warranty For a description of the product warranty, see the PASCO catalog. **Copyright** The PASCO scientific 012-10400B *Load Cell Amplifier Instruction Manual* is copyrighted with all rights reserved. Permission is granted to non-profit educational institutions for reproduction of any part of this manual, providing the reproductions are used only in their laboratories and classrooms, and are not sold for profit. Reproduction under any other circumstances, without the written consent of PASCO scientific, is prohibited. **Trademarks** PASCO, PASCO scientific, DataStudio, PASPORT, Xplorer, and Xplorer GLX are trademarks or registered trademarks of PASCO scientific, in the United States and/or in other countries. For more information visit www.pasco.com/legal. Windows is a registered trademark of Microsoft Corporation in the United States and/or other countries. Mac is trademark of Apple Computer, Inc., registered in the U.S. and other countries. **Patents Pending** The following PASCO products have patents pendng:

ME-6990 Truss Set
ME-6991 Bridge Set
ME-6992 Advanced Structures Set
ME-6995 Road Bed Spares
PS-2198 Load Cell Amplifier
PS-2199 Load Cell and Amplifier Set
PS-2200 100 N Load Cell