

## **ML866 PowerLab 4/30**

### *Data Acquisition Systems*

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#### **Description**

The PowerLab 4/30 is a data acquisition and analysis system for use in life science research. The system has 16 bit resolution and is capable of recording at speeds of up to 200 000 samples



per second (400 000 samples per second aggregate). Communication is via High Speed USB (2.0). It incorporates four input channels with both differential Pod and single ended BNC connectors. It also features 2 built-in analog outputs for stimulation or pulse generation (software controlled) and a trigger input. The PowerLab 4/30 is compatible with instruments, signal conditioners, and transducers sold by ADInstruments, as well as other third party products. It includes LabChart and Scope software.

#### **Software Compatibility**

The following versions of ADInstruments software are required to operate a PowerLab 4/30:

##### **WINDOWS**

- ◆ LabChart v6 or later
- ◆ Chart v5.2.1 or later
- ◆ Scope v3.7.4 or later

##### **MACINTOSH**

- ◆ LabChart v6 or later
- ◆ Chart v5.2.1 or later
- ◆ Scope v3.7.4 or later

#### **PC and Mac Requirements**

Please visit ADInstruments Software System Requirements page at [www.adinstruments.com/downloads/](http://www.adinstruments.com/downloads/) for Windows and Mac operating system compatibility information. For further assistance please contact your ADInstruments representative.

#### **Applications**

The PowerLab 4/30 data acquisition system is suitable for research in the fields of human and animal physiology, pharmacology, neurophysiology, biology, zoology, biochemistry, and biomedical engineering.

## Specifications

(As tested at the time of printing and are subject to change)

### Analog Inputs

Number of input channels:	4																																							
Input configuration:	4 single ended and differential Pod																																							
Amplification range:	$\pm 2$ mV to $\pm 10$ V full scale in 12 steps:																																							
	<table><thead><tr><th>Range</th><th>Resolution</th><th>Noise (rms)</th></tr></thead><tbody><tr><td><math>\pm 10</math></td><td>313 <math>\mu</math>V</td><td>1 LSB</td></tr><tr><td><math>\pm 5</math> V</td><td>156 <math>\mu</math>V</td><td>1 LSB</td></tr><tr><td><math>\pm 2</math> V</td><td>63 <math>\mu</math>V</td><td>1.5 LSB</td></tr><tr><td><math>\pm 1</math> V</td><td>31 <math>\mu</math>V</td><td>1 LSB</td></tr><tr><td><math>\pm 0.5</math> V</td><td>16 <math>\mu</math>V</td><td>1 LSB</td></tr><tr><td><math>\pm 0.2</math> V</td><td>6 <math>\mu</math>V</td><td>1.5 LSB</td></tr><tr><td><math>\pm 0.1</math> V</td><td>3 <math>\mu</math>V</td><td>1.5 LSB</td></tr><tr><td><math>\pm 50</math> mV</td><td>2 <math>\mu</math>V</td><td>2 LSB</td></tr><tr><td><math>\pm 20</math> mV</td><td>625 nV</td><td>2.4 <math>\mu</math>V</td></tr><tr><td><math>\pm 10</math> mV</td><td>313 nV</td><td>2.4 <math>\mu</math>V</td></tr><tr><td><math>\pm 5</math> mV</td><td>156 nV</td><td>2.2 <math>\mu</math>V</td></tr><tr><td><math>\pm 2</math> mV</td><td>63 nV</td><td>2.2 <math>\mu</math>V</td></tr></tbody></table>	Range	Resolution	Noise (rms)	$\pm 10$	313 $\mu$ V	1 LSB	$\pm 5$ V	156 $\mu$ V	1 LSB	$\pm 2$ V	63 $\mu$ V	1.5 LSB	$\pm 1$ V	31 $\mu$ V	1 LSB	$\pm 0.5$ V	16 $\mu$ V	1 LSB	$\pm 0.2$ V	6 $\mu$ V	1.5 LSB	$\pm 0.1$ V	3 $\mu$ V	1.5 LSB	$\pm 50$ mV	2 $\mu$ V	2 LSB	$\pm 20$ mV	625 nV	2.4 $\mu$ V	$\pm 10$ mV	313 nV	2.4 $\mu$ V	$\pm 5$ mV	156 nV	2.2 $\mu$ V	$\pm 2$ mV	63 nV	2.2 $\mu$ V
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Maximum input voltage:	$\pm 15$ V																																							
Input impedance:	$\sim 1$ M $\Omega$    100 pF																																							
Low-pass filters:	1 Hz – 1 kHz in 2:5:10 steps; 2 kHz, 25 kHz																																							
Input coupling:	DC or 0.15 Hz (software-selectable)																																							
Frequency response ( $-3$ dB):	25 kHz on 10 V range																																							
DC drift:	Software corrected																																							
CMRR:	100 dB @ 100 Hz (differential mode, 100 mV – 2 mV Range)																																							
Input crosstalk:	75 dB minimum																																							

### Pod Connectors

General features:	Combined power, I <sup>2</sup> C and single-ended or differential analog input signals on one connector, supports Pods
Supply voltage:	$\pm 5$ V regulated
Maximum current:	50 mA per pod port
Communications:	2-wire I <sup>2</sup> C
Signal input	positive and negative analog inputs
Connector type:	8-pin DIN

### Sampling

ADC resolution:	16 bit (313 $\mu$ V resolution on 10 V range)
Linearity error:	$\pm 2.5$ LSB
Maximum sampling rates:	200 kHz on one or two inputs 100 kHz on 3 or 4 inputs

## Analog Outputs

Number of outputs:	2														
Output configuration:	Single-ended (outputs can be used as one differential output)														
Output resolution:	16 bits (312.5 $\mu$ V resolution on the 10 V range)														
Maximum output current:	$\pm$ 50 mA														
Output impedance:	0.5 $\Omega$ typical														
Slew rate:	6 V/ $\mu$ s														
Settling time:	10 $\mu$ s (to 1% of FSR)														
Linearity error:	$\pm$ 4 LSB														
Output range:	$\pm$ 200 mV to $\pm$ 10 V full scale in six steps:														
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$\pm$ 500 mV	16 $\mu$ V														
$\pm$ 200 mV	6 $\mu$ V														

## External Trigger

Trigger mode:	TTL level (isolated) or contact closure (non-isolated), software selectable
Trigger threshold:	+1.3 V (rising edge), +1.1 V (falling edge)
Hysteresis:	0.6 V
Input impedance:	50 k $\Omega$
Maximum input voltage:	$\pm$ 12 V
Minimum pulse width:	5 $\mu$ s

## Microprocessor and Data Communication

CPU:	PowerPC 405GPr @ 240 MHz
RAM:	16 MB SDRAM
Data communication:	USB 2.0

## Expansion ports

I <sup>2</sup> C expansion port:	Power and control bus for Front-end units. Supports up to 8 Front-ends but limited to PowerLab's free connectors. Interface communications rate of up to 10 000 bits/s.
Digital output:	8 independent lines, TTL output level (8 mA maximum load per line)
Digital input:	8 independent lines, TTL input level, threshold 1.2 V, 10 k $\Omega$ input impedance, 5V maximum

## Physical Configuration

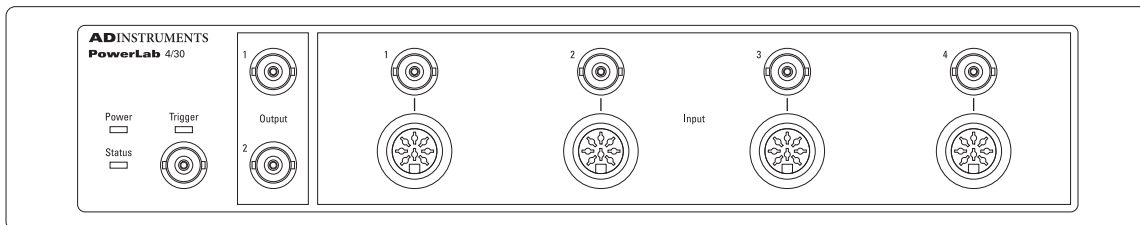
Dimensions (h x w x d):	60 x 300 x 300 mm (2.4" x 11.8" x 11.8")
Weight:	4.8 kg (10 lb 8 oz)
Operating voltage:	90-250 V (automatic)
Maximum power needs:	80 VA (full complement of Front-ends and Pods)
Operating temperature:	5 – 35 $^{\circ}$ C, 0 – 90% humidity (non-condensing)

**WARRANTY:** ADInstruments PowerLab Systems, Front-end and Pod Signal Conditioners are warranted against defects in materials and workmanship for a period of 3 years from the date of purchase. Third party products are covered by the manufacturer's warranty. Warranties are void if the product has been damaged due to negligence. Consumables and electrodes are not covered by a warranty. All questions regarding service and warranty should be directed to your nearest ADInstruments representative or one of the offices listed below.

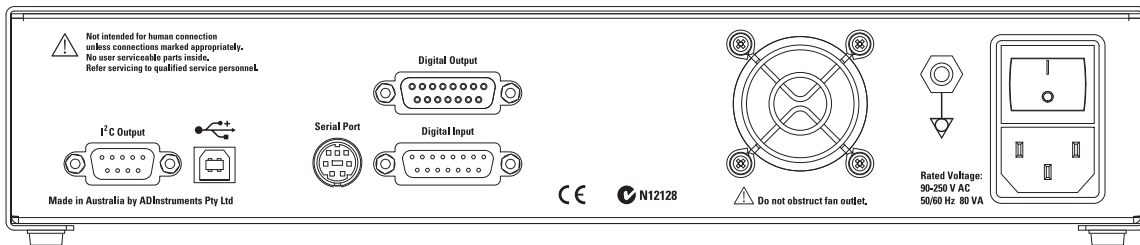
## Caution

Read "Statement of Intended Use" on our website or in "Getting Started with PowerLab" before use.

## PowerLab 4/30 Diagrams



Front panel



Rear panel

## Ordering Information

ML866 PowerLab 4/30

Includes: PowerLab 4/30 4-Channel Data Acquisition System  
 LabChart & Scope Software Installer CD  
 Cable Kit including Power Cord, BNC to BNC test cable, USB Cable  
 Getting Started with PowerLab Manual  
 Finger Pulse Transducer

ML866-DC-09A



## ADINSTRUMENTS.com

### North America

Tel: +1 888 965 6040  
 Fax: +1 866 965 9293  
 info@adinstruments.com

### South America

Tel: +56 2 356 6749  
 Fax: +56 2 356 6786  
 info.cl@adinstruments.com

### United Kingdom

Tel: +44 1865 891 623  
 Fax: +44 1865 890 800  
 info.uk@adinstruments.com

### Brazil

Tel: +55 11 2959 0353  
 Fax: +55 11 2959 0353  
 info.br@adinstruments.com

### Germany

Tel: +49 6226 970105  
 Fax: +49 6226 970106  
 info.de@adinstruments.com

### Indian Subcontinent

Tel: +91 11 2693 3930  
 Fax: +91 11 2693 3929  
 info.in@adinstruments.com

### North Asia

Tel: +86 21 5830 5639  
 Fax: +86 21 5830 5640  
 info.cn@adinstruments.com

### Australia

Tel: +61 2 8818 3400  
 Fax: +61 2 8818 3499  
 info.au@adinstruments.com

### South East Asia

Tel: +60 3 8023 6305  
 Fax: +60 3 8023 6307  
 info.sea@adinstruments.com

### New Zealand

Tel: +64 3 477 4646  
 Fax: +64 3 477 4346  
 info.nz@adinstruments.com

### Japan

Tel: +81 52 932 6462  
 Fax: +81 52 932 6755  
 info.jp@adinstruments.com

### International

Tel: +61 2 8818 3400  
 Fax: +61 2 8818 3499  
 info.au@adinstruments.com

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