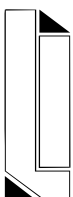


# AC 1000



**High accuracy**  
universal microvolt amplifier.

## User manual



LEIDERDORP INSTRUMENTS  
Splinterlaan 152  
NL-2352 SM Leiderdorp  
The Netherlands  
Phone: --31-71-541 55 14  
Fax: --31-71-541 89 80  
E-mail: [Info@LeiderdorpInstruments.nl](mailto:Info@LeiderdorpInstruments.nl)

## Important user information

Reading this entire manual is recommended for full understanding of the use of this product.



The exclamation mark within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance instructions in the literature accompanying the instrument.

Should you have any comments on this manual we will be pleased to receive them at:

Leiderdorp Instruments

P.O.Box 319

2350 AH Leiderdorp

The Netherlands

Phone: --31-71-5415514

Fax: --31-71-5418980

E-mail: [Info@LeiderdorpInstruments.nl](mailto:Info@LeiderdorpInstruments.nl)

Leiderdorp Instruments reserve the right to make changes in the specifications without prior notice.

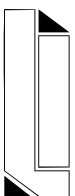
## WARRANTY AND LIABILITY

Leiderdorp Instruments guarantees that the product delivered has been thoroughly tested to ensure that it meets its published specifications. The warranty included in the conditions of delivery is valid only if the product has been installed and used according to the instructions supplied by Leiderdorp Instruments.

Leiderdorp Instruments shall in no event be liable for incidental or consequential damages, including without limitation, lost profits, loss of income, loss of business opportunities, loss of use and other related exposures, however caused, arising from the faulty and incorrect use of the product.

Copyright © 2000 Leiderdorp Instruments

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means, without permission in written form from the company.



LEIDERDORP INSTRUMENTS

Splinterlaan 152

NL-2352 SM Leiderdorp

The Netherlands

Phone: --31-71-541 55 14

Fax: --31-71-541 89 80

E-mail: [Info@LeiderdorpInstruments.nl](mailto:Info@LeiderdorpInstruments.nl)

## Table of contents.

1. GENERAL INFORMATION .....	4
1.1 INTRODUCTION .....	4
1.2 ADDITIONAL EQUIPMENT REQUIREMENTS.....	4
2. TECHNICAL SPECIFICATIONS .....	4
3. INSTALLATION.....	5
3.1 LOCATION.....	5
3.2 CABLING .....	5
4. GAIN SETTING .....	6
APPENDIX A ORDERING INFORMATION.....	11
A.1 DELIVERY .....	11
A.2 ORDERING SPECIFICATIONS.....	11
A.3.OPTIONS .....	11
A.3.1. PULSE OUTPUT .....	11



# 1. GENERAL INFORMATION

## 1.1 INTRODUCTION

The AC-1000 amplifies the output voltage of a wide range of sensors to a level suited for data acquisition equipment and transmission over long cables. The AC-1000 amplifier has technical specifications that match the most accurate radiation sensors, laser power thermopiles and heat flux sensors. The amplifier can be adapted to the sensitivity of the sensor so that a calibrated output voltage or current is obtained. The amplification factor is set with a PC. This manual describes the details of how to do this and how to use the amplifier.

## 1.2 ADDITIONAL EQUIPMENT REQUIREMENTS

The AC-1000 must be powered with a DC voltage of 13..28 VDC. A complete measuring set-up consists of a sensor, the AC-1000 amplifier, a power source and a read-out device (e.g. a DC voltmeter).

## 2. TECHNICAL SPECIFICATIONS

Minimum full scale input voltage:	+/- 3 mV
Maximum full scale input voltage:	+/- 6000 mV
Limits of programmable output signal:	-2.5...+2.5 V 0...24 mA
Factory setting of amplification:	voltage output: 200x current output: 1mA/mV
Accuracy:	<0.1%
Input impedance:	>1 MOhm
Output impedance (voltage output):	<10 Ohm
Maximum output current voltage output:	10 mA
Temperature range storage:	-30...+70°C
Temperature range operating:	-20...+50°C
Offset voltage at the input terminals (@20°C):	<3µV
Temperature drift zero:	<0.05mV/°C <0.15µA/°C
Temperature drift range:	voltage: <40ppm/°C current: <45ppm/°C
Power supply:	13...28 VDC*
Power consumption:	<50 mA
Response time:	<0.2 s
Dimensions:	200 x 120 x 75 mm
Housing material:	polycarbonate or PVC

\*the adapter that is supplied with the AC-1000 has an output voltage of approximately 15 VDC



LEIDERDORP INSTRUMENTS

Splinterlaan 152

NL-2352 SM Leiderdorp

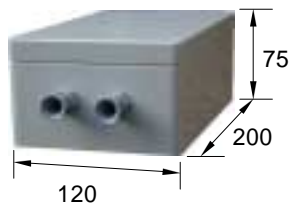
The Netherlands

Phone: --31-71-541 55 14

Fax: --31-71-541 89 80

E-mail: Info@Leiderdorpinstruments.nl

The dimensions of the amplifier are shown in the figure below.



### 3. INSTALLATION

#### 3.1 LOCATION

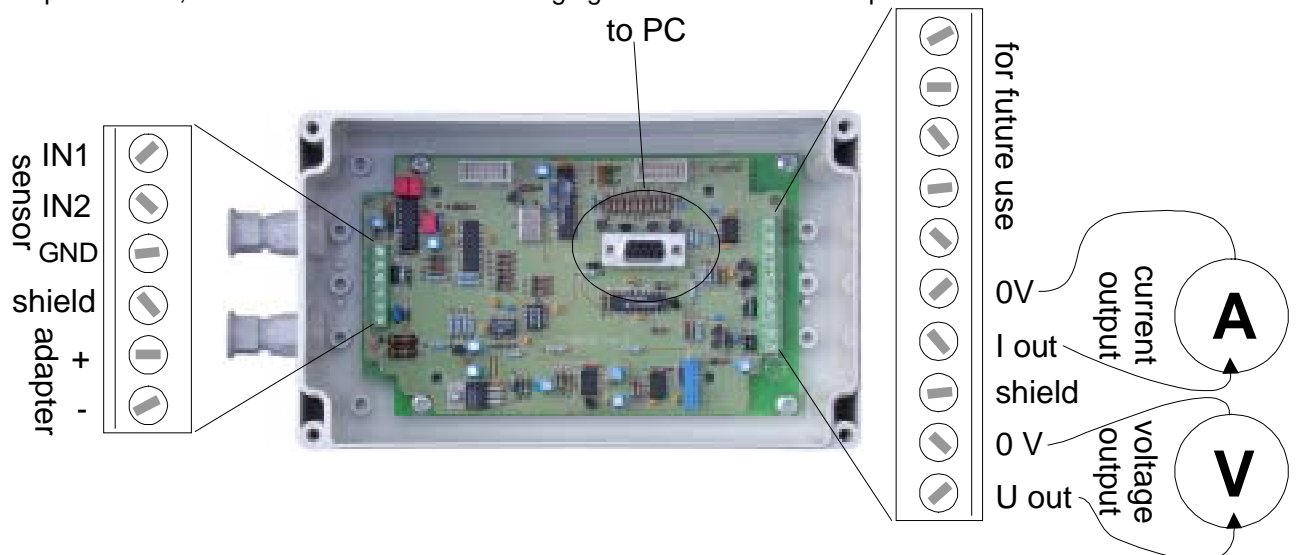
The polycarbonate housing of the AC-1000 is IP65 protected. This means that the amplifier may be placed outside without special protection. However, some precautions are recommended:

- do not mount the AC-1000 on a dark background in direct sunshine (wall/roof)
- if possible shelter the amplifier from rain and snow
- avoid mechanical stress

#### 3.2 CABLING

Make sure that the diameter of the connection cables matches the cable glands (3.5..6 mm). Avoid mechanical stresses on the cables.

Keep the cables as short as possible and keep them away from obvious sources of electrical fields such as power lines, mains outlets etc. The following figure shows how the amplifier is connected:



NOTE: The sensor must be connected to either IN1 and GND or IN2 and GND. It depends on the magnitude of the signal which inputs must be used. The right terminals are indicated during the programming of the amplifier.



## 4. GAIN SETTING

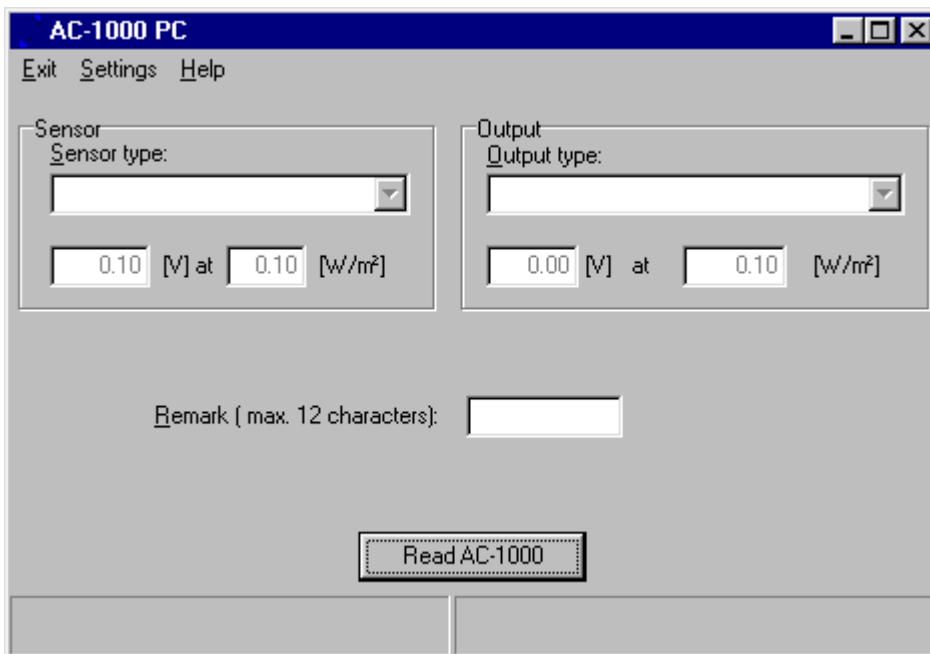
The amplifier has a factory set amplification of 200 times (within 0.1%) on the voltage output and 1mA/mV on the current output. These factors may be changed to get a calibrated output of the converter.

To set the gain, the PC program AC1000PC is required. To install the software on your PC, proceed as follows:

- insert the CD ROM in your PC
- if the autorun feature on the PC is enabled, wait until the opening screen appears
- if nothing happens (autorun is disabled), use the explorer to view the contents of the CD
- double-click 'setup.exe'
- follow the instructions on the screen
- when finished, remove the CD

Start the program.

You will see the following window:

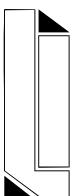


Connect the AC-1000 to the PC by means of the 9-pin PC cable (1:1, do not use a null-modem cable) that is supplied with the amplifier. Verify the number of the COM port the amplifier is connected to. The default software setting is COM1 (click Settings – Serial Port and select the COM port you are using).

Power the amplifier.

Click Read AC-1000 to get the settings from the amplifier.

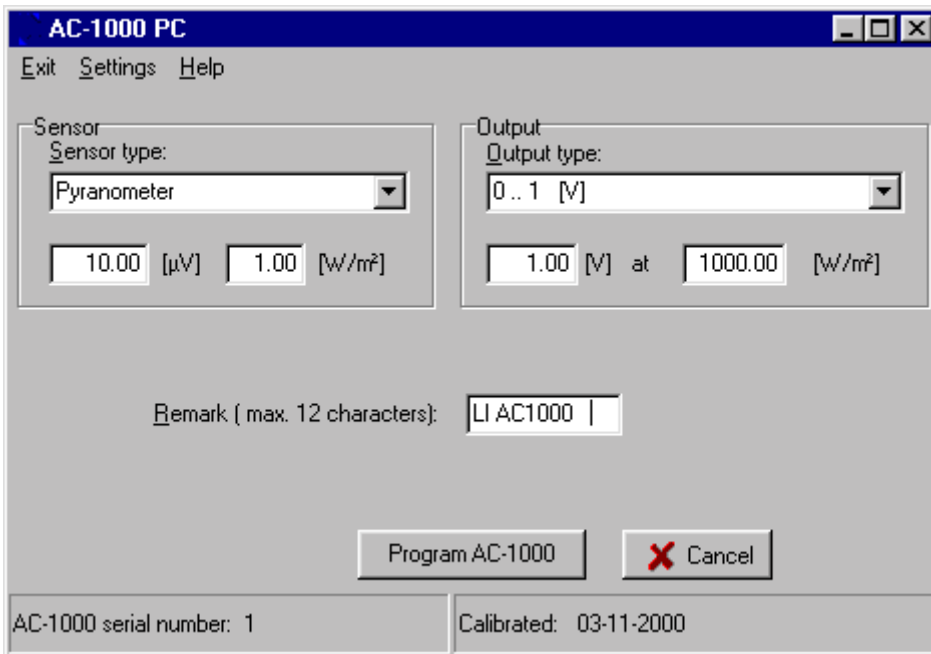
If there is something wrong with the connection between PC and amplifier, or the amplifier is not powered you will see the following message. Check the power and the COM port setting as described above.



LEIDERDORP INSTRUMENTS  
Splinterlaan 152  
NL-2352 SM Leiderdorp  
The Netherlands  
Phone: --31-71-541 55 14  
Fax: --31-71-541 89 80  
E-mail: Info@Leiderdorplnstruments.nl



If the communication is successful, the window will now look as follows (some figures and texts on your screen can be different than shown here):

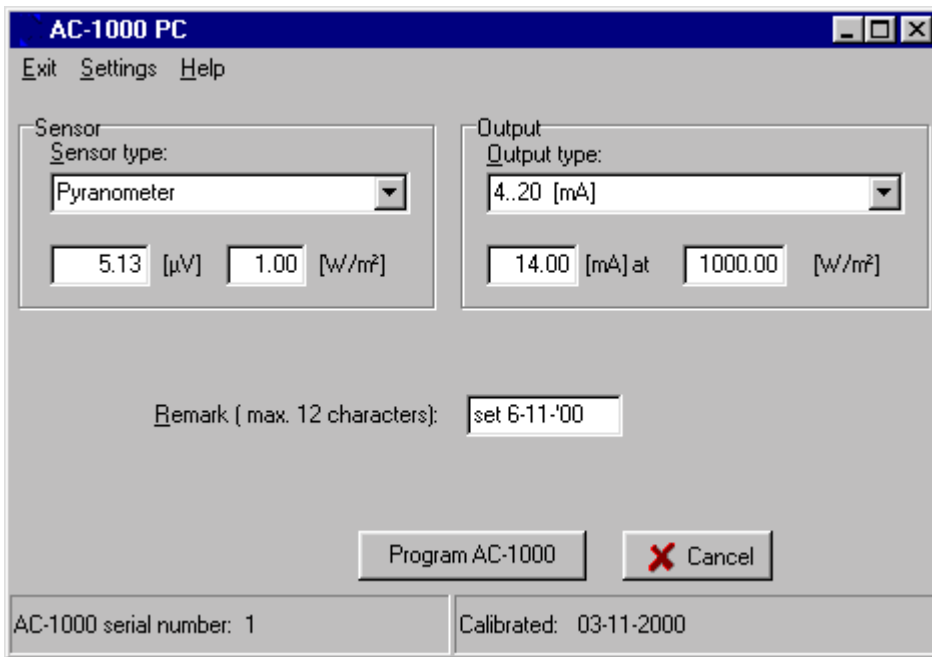


This window shows the current settings of the amplifier.

Enter the settings that are required for your application. For example, if you want to use the amplifier for a pyranometer with a calibration factor of 5.13 mV at 1000 W/m<sup>2</sup> and an output of 4...14 mA is desired for 0...1000 W/ m<sup>2</sup> make the following settings:

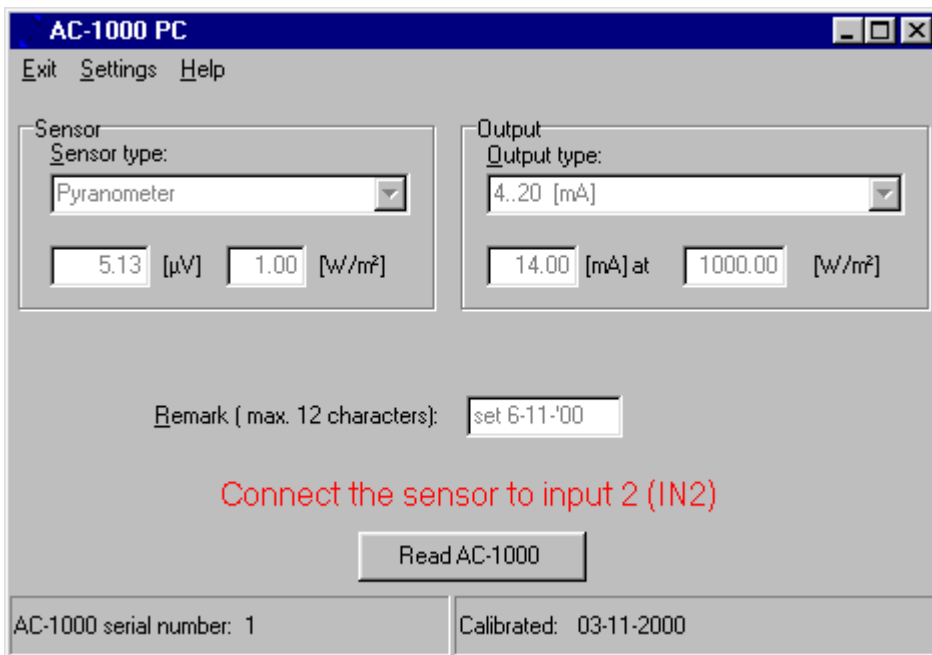


LEIDERDORP INSTRUMENTS  
Splinterlaan 152  
NL-2352 SM Leiderdorp  
The Netherlands  
Phone: --31-1-541 55 14  
Fax: --31-71-541 89 80  
E-mail: Info@LeiderdorpInstruments.nl



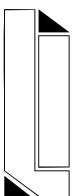
If the settings are OK, transfer the settings to the amplifier by clicking 'Program AC-1000'. You will be prompted to confirm this action.

Depending on the setting that you have entered, the input signal must be connected to input terminal IN1 and GND or IN2 and GND. This is shown in the window as soon as the amplifier is programmed:



Make sure that the signal is connected to the right input. Normally the negative terminal of the sensor is connected to GND, the positive terminal to IN1 or IN2.

Once the settings are stored in the amplifier they are in effect immediately.

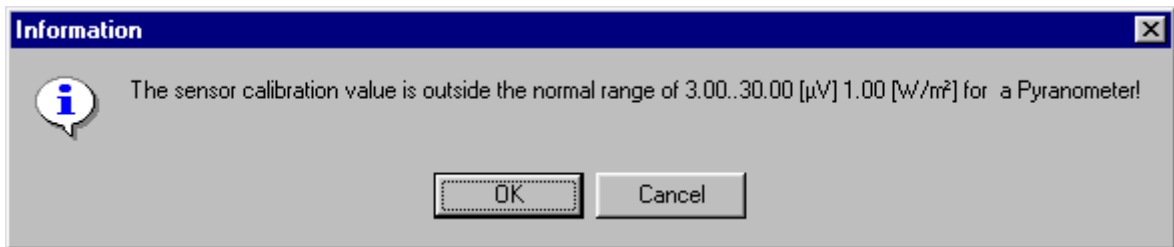


LEIDERDORP INSTRUMENTS  
 Splinterlaan 152  
 NL-2352 SM Leiderdorp  
 The Netherlands  
 Phone: --31-71-541 55 14  
 Fax: --31-71-541 89 80  
 E-mail: Info@Leiderdorpinstruments.nl

You can now disconnect the amplifier from the PC. The settings are stored in the amplifier in non-volatile memory and will stay in effect until changed again.

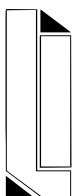
If you want to change the settings directly after programming the AC-1000, you must first click 'Read AC-1000' again.

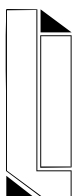
The values that are entered are checked depending on the sensor type. If the value is out of the normal range for the calibration factor of that type of sensor, you will be informed. For example:



This does not prevent programming of the AC-1000, it is merely to inform you that there may have been a mistake in entering the values.

If the settings are such that it is impossible to program the AC-1000 so that the required amplification is obtained, this leads to an error message. Note that the AC-1000 is not programmed in this case. You will have to adjust the entered factors.





LEIDERDORP INSTRUMENTS  
Splinterlaan 152  
NL-2352 SM Leiderdorp  
The Netherlands  
Phone: --31-71-541 55 14  
Fax: --31-71-541 89 80  
E-mail: [Info@Leiderdorpinstruments.nl](mailto:Info@Leiderdorpinstruments.nl)

## APPENDIX A Ordering information

### A.1 DELIVERY

The standard delivery is:

- AC-1000 amplifier
- Manual and software on CD
- AC adapter for 230 VAC
- PC cable

### A.2 ORDERING SPECIFICATIONS

AC-1000 amplifier in PVC housing complete with AC1000PC software and manual on CD, PC cable, adapter	<b>AC-1000 I</b>
AC-1000 amplifier in Polycarbonate housing complete with AC1000PC software and manual on CD, PC cable, adapter	<b>AC-1000 O</b>
AC-1000 amplifier, PCB board only	<b>AC-1000 PCB</b>
AC-1000 PVC housing	<b>AC-1000 BPVC</b>
AC-1000 polycarbonate housing	<b>AC-1000 BPOL</b>
Mains (230VAC) adapter for AC-1000	<b>MA230</b>
PC cable for AC-1000	<b>PC-9-2m</b>
AC-1000 manual (printed version)	<b>AC-1000 MAN</b>
AC1000PC software and manual on CD (software for Windows 9x and 2000)	<b>AC-1000 CD</b>

### A.3.OPTIONS

#### A.3.1. PULSE OUTPUT

The AC-1000 can be equipped with an add-on board that provides a pulse output. A pulse is generated each time the time-integrated value of the output of the amplifier has increased a certain amount. In practice, this output can be used to connect to a pulse counter on a data logger. The number of pulses per unit of time provides information on the average signal magnitude, the accumulated number of pulses is the integrated value of the input signal versus time.



LEIDERDORP INSTRUMENTS  
Splinterlaan 152  
NL-2352 SM Leiderdorp  
The Netherlands  
Phone: --31-1-541 55 14  
Fax: --31-71-541 89 80  
E-mail: [Info@LeiderdorpInstruments.nl](mailto:Info@LeiderdorpInstruments.nl)