

■ THERMOMETER DATA LOGGER

1821

1822

1823



ENGLISH

User Manual

 **AEMC[®]**
INSTRUMENTS
CHAUVIN ARNOUX GROUP

Statement of Compliance

Chauvin Arnoux[®], Inc. d.b.a. AEMC[®] Instruments certifies that this instrument has been calibrated using standards and instruments traceable to international standards.

We guarantee that at the time of shipping your instrument has met its published specifications.

An N.I.S.T. traceable certificate may be requested at the time of purchase, or obtained by returning the instrument to our repair and calibration facility, for a nominal charge.

The recommended calibration interval for this instrument is 12 months and begins on the date of receipt by the customer. For recalibration, please use our calibration services. Refer to our repair and calibration section at **www.aemc.com**.

Serial #: _____

Catalog #: _____

Model #: _____

Please fill in the appropriate date as indicated:

Date Received: _____

Date Calibration Due: _____













Chauvin Arnoux[®], Inc.
d.b.a AEMC[®] Instruments
www.aemc.com

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Thank you for purchasing the Model 1821 or Model 1822 thermocouple thermometer data logger, or Model 1823 resistance thermometer data logger. For best results from your instrument:

- read these operating instructions carefully
- comply with the precautions for use

| | |
|--|---|
|  | WARNING, risk of DANGER! The operator must refer to these instructions whenever this danger symbol appears. |
|  | Information or useful tip. |
|  | Battery. |
|  | Magnet. |
|  | The product has been declared recyclable after analysis of its life cycle in accordance with the ISO14040 standard. |
|  | AEMC has adopted an Eco-Design approach in order to design this appliance. Analysis of the complete lifecycle has enabled us to control and optimize the effects of the product on the environment. In particular this appliance exceeds regulation requirements with respect to recycling and reuse. |
|  | |
|  | Indicates conformity with European directives and with regulations covering EMC. |
|  | Indicates that, in the European Union, the instrument must undergo selective disposal in compliance with Directive WEEE 2002/96/EC. This instrument must not be treated as household waste. |
|  | |

Precautions

This instrument is compliant with safety standard IEC 61010-2-030, for voltages up to 5V with respect to ground. Failure to observe the following safety instructions may result in electric shock, fire, explosion, and damage to the instrument and/or the installation in which it is located.

- The operator and/or the responsible authority must carefully read and clearly understand the all precautions to be taken in use. Thorough knowledge and awareness of electrical hazards are essential when using this instrument.
- Observe the conditions of use, including temperature, relative humidity, altitude, degree of pollution, and place of use.
- Do not use the instrument if it appears damaged, incomplete, or poorly closed.
- Before each use, check the condition of the housing and accessories. Any item on which the insulation is deteriorated (even partially) must be set aside for repair or scrapping.
- Do not take measurements on bare live conductors. Use a non-contact or properly insulated sensor.
- Always wear personal protective equipment (PPE), in particular insulating gloves, if there is any doubt about the voltage levels to which the temperature sensor is connected.
- All troubleshooting and metrological checks must be done by competent, accredited personnel.

Receiving Your Shipment

Upon receiving your shipment, make sure that the contents are consistent with the packing list. Notify your distributor of any missing items. If the equipment appears to be damaged, file a claim immediately with the carrier and notify your distributor at once, giving a detailed description of any damage. Save the damaged packing container to substantiate your claim.

Ordering Information

Thermocouple Thermometer Data Logger Model 1821 (Discontinued).....Cat. #2121.74

(No longer available for purchase— There is no replacement for this model)

Includes soft carrying pouch, three AA alkaline batteries, 6 ft. (1.8m) USB cable, one thermocouple K Type, quick start guide, USB thumb-drive with DataView® software and user manual.

Thermocouple Thermometer Data Logger Model 1822..... Cat. #2121.75

Includes soft carrying pouch, three AA alkaline batteries, 6 ft. (1.8m) USB cable, two thermocouple K Type, quick start guide, USB thumb-drive with DataView® software and user manual.

RTD Thermometer Data Logger Model 1823 (Discontinued)..... Cat. #2121.76

(No longer available for purchase – There is no replacement for this model)

Includes soft carrying pouch, three AA alkaline batteries, 6 ft. USB cable, one 3-Prong Mini Flat Pin Connector for RTD, quick start guide, USB thumb-drive with DataView® software and user manual.

Note: RTD sensor not included

Replacement Parts:

Thermocouple – Flexible (1M), K Type, -58 to 480 °F (-50 to 249 °C)..... **Cat. #2126.47**

Cable – Replacement 6 ft. (1.8m) USB.....**Cat. #2138.66**

Pouch – Replacement Carrying Pouch.....**Cat. #2139.72**

3-Prong Mini Flat Pin Connector for RTD **Cat. #5000.82**

Accessories:

Multifix Universal Mounting System **Cat. #5000.44**

Adapter – US Wall Plug to USB..... **Cat. #2153.78**

Shock Proof Housing..... **Cat. #2122.31**

Case – General Purpose Carrying Case **Cat. #2118.09**

Thermocouple – Needle, 7.25 x 0.5” K Type, -58° to 1292 °F **Cat. #2126.46**

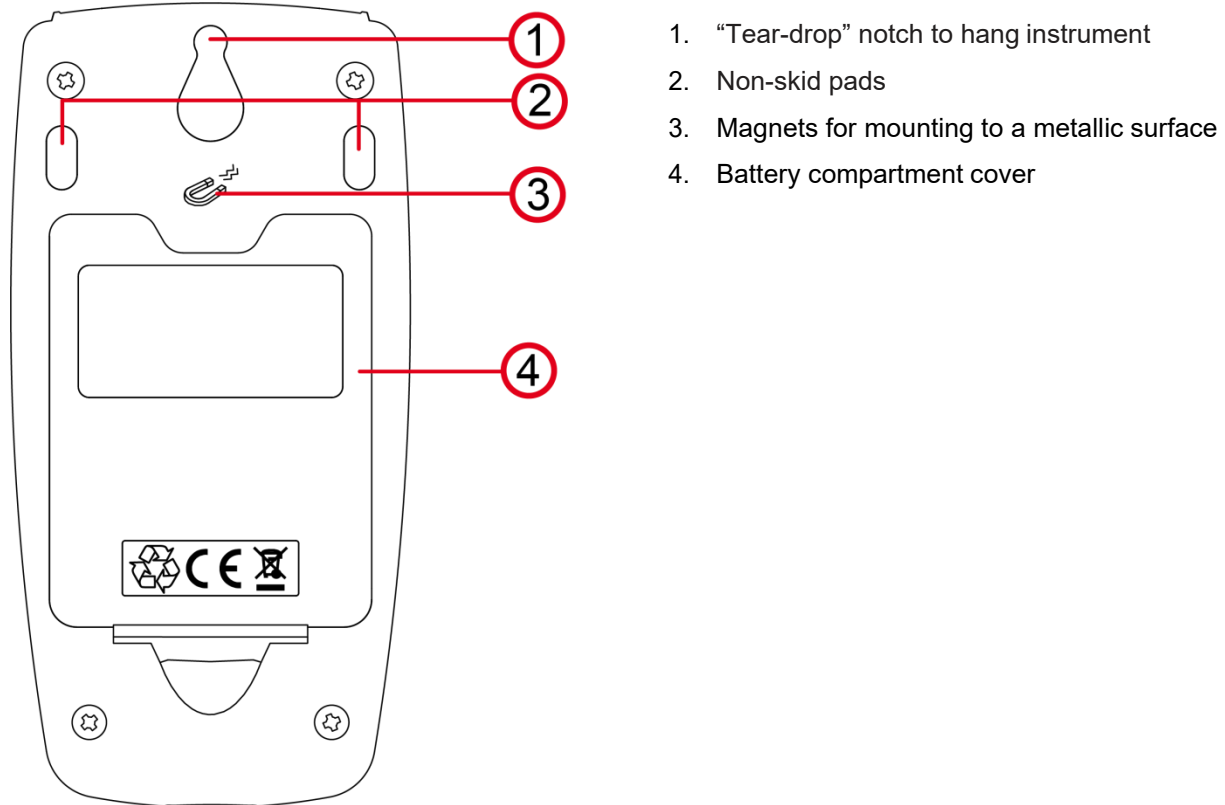
Adapter, Bluetooth USB **Cat. #2126.45**

For the accessories and replacement parts, visit our web site: www.aemc.com

1. GETTING STARTED

1.1. Battery Installation

The instrument accepts three AA or LR6 alkaline batteries.

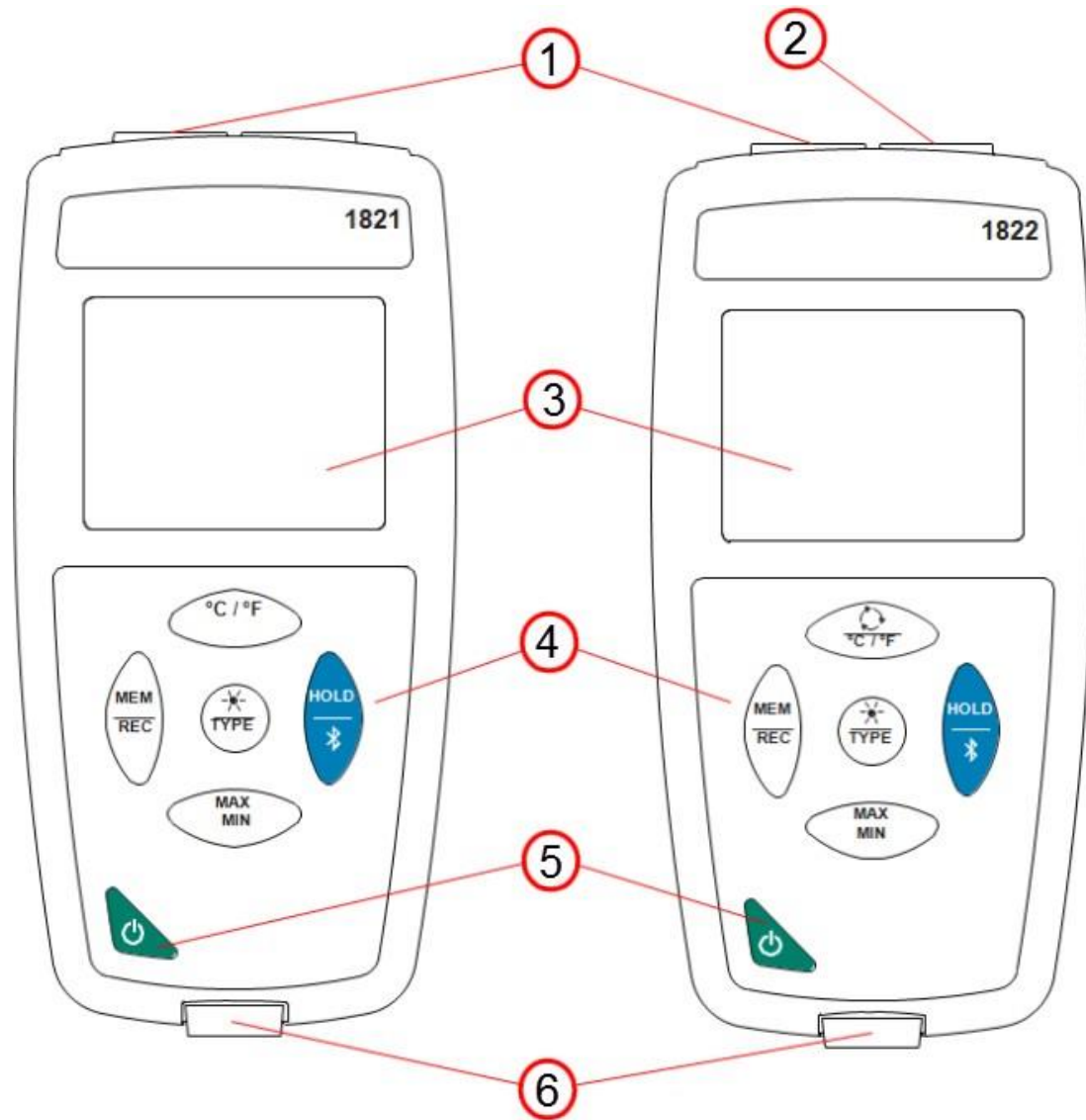


To change the batteries:

1. Press the tab of the battery compartment cover and lift it clear.
2. Remove the battery compartment cover.
3. Insert the new batteries, ensuring correct polarity.
4. Close the battery compartment cover; ensuring it is completely and correctly closed.

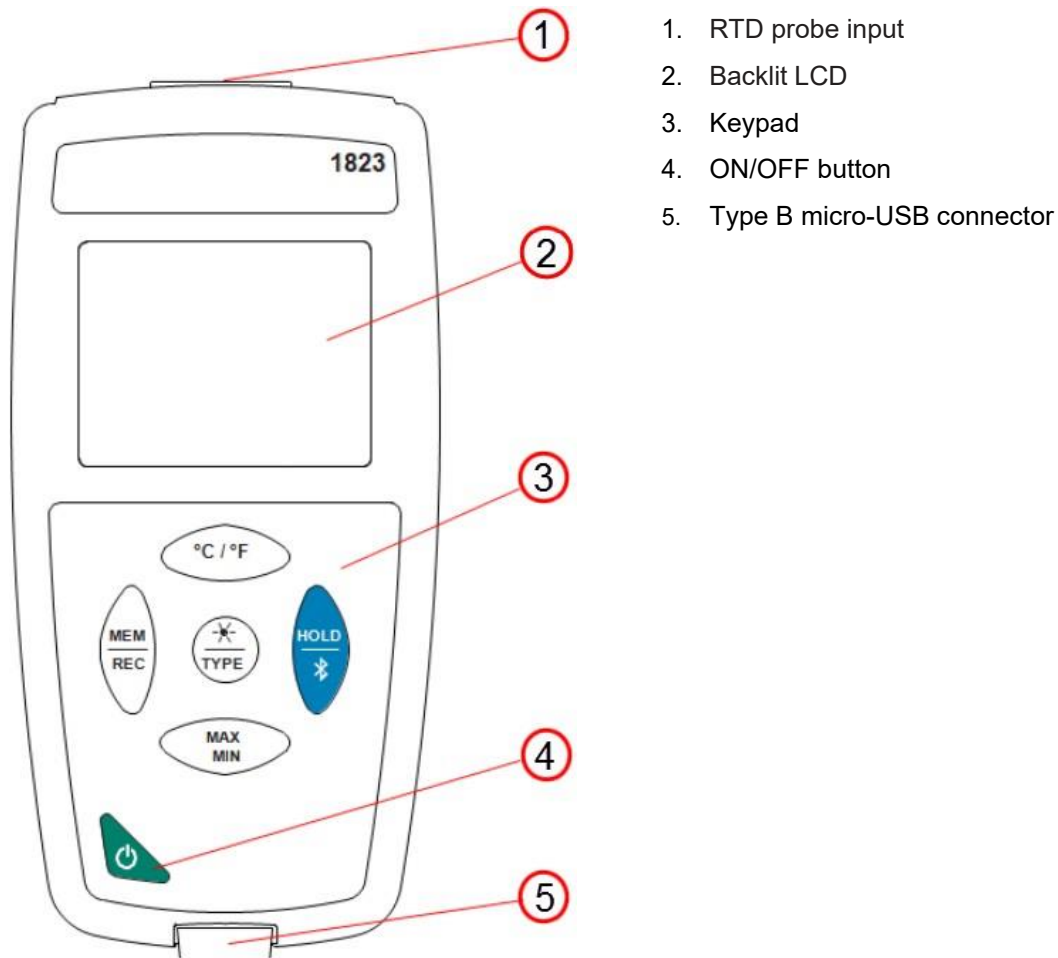
1.2. Instrument Front Panel

1.2.1. Models 1821 and 1822



1. T1 thermocouple input
2. T2 thermocouple input
3. Backlit LCD
4. Keypad
5. ON/OFF button
6. Type B micro-USB connector

1.2.2. Model 1823



1.3. Instrument Functions

The Models 1821 and 1822 are thermocouple-based thermometers with one and two channels, respectively. They operate with sensor types K (Chromel/Alumel), J (iron/Constantan), T (copper/Constantan), E (Chromel/Constantan), N (Nicrosil/Nisil), R (platinum-rhodium/platinum), and S (platinum-rhodium/platinum) and can measure temperatures from -418 to +3213°F (-250 to +1767°C) depending on sensor.

The Model 1823 is a single channel resistive-probe thermometer (RTD100 or RTD1000). It measures temperatures from -148 to +752°F (-100 to +400°C).



These standalone instruments can:

- Display temperature measurements in °C or °F
- Record minimum and maximum temperatures in a specified period
- Record and store measurements
- Communicate with a computer via USB cable
- Communicate with a smartphone or tablet via a Bluetooth link.

DataView® with the Data Logger Control Panel software can be installed on a computer to allow you to configure the instruments, view measurements in real time, download data from the instruments, and create reports.

1.4. Turning the Instrument ON/OFF






- **ON:** Press the  button for >2 seconds.
- **OFF:** Press the  button for >2 seconds when the instrument is ON. Note that you cannot turn OFF the instrument when it is in HOLD or recording mode.

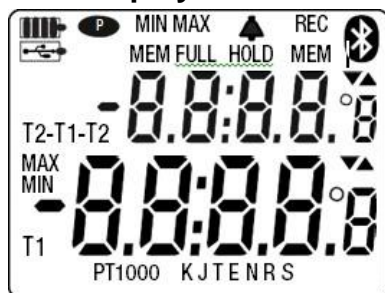
If the screen to the left appears during start-up, a recording session was still in progress the last time the instrument was turned OFF. This screen indicates the instrument is saving the recorded data.

Do not turn OFF the instrument while this screen is displayed; otherwise the recorded data will be lost.

1.5. Function Buttons


| Button | Function |
|---|--|
| °C/°F | (Models 1821 and 1823) Toggles between °C and °F. |
|  °C/°F | (Model 1822) <ul style="list-style-type: none"> ■ Short press toggles between T2 and T1-T2. ■ Long press (>2 seconds) toggles between °C and °F. |
| MEM REC | <ul style="list-style-type: none"> ■ Short press stores the measurement and date/time in the instrument's memory. MAP mode: adds a measurement to the measurements in the MAP (§3.1.3). ■ Long press starts/stops a recording session. |
|  TYPE | <ul style="list-style-type: none"> ■ Short press turns on backlight. ■ Long press: (Models 1821 and 1822) selects the type of thermocouple (K, J, T, E, N, R, S) (Model 1823) toggles between the PT100 and PT1000 probes |
| HOLD  | <ul style="list-style-type: none"> ■ Short press freezes the display. ■ Long press activates/deactivates Bluetooth. |
| MAX MIN | <ul style="list-style-type: none"> ■ Short press enters MAX MIN mode; measurement values continue to be displayed. Second press displays the maximum value. Third press displays the minimum value. Fourth press returns to normal measurement operation. ■ Long press exits MAX MIN mode. |

1.6. Display



---- indicates sensors or probes are not connected.

OL indicates the measurement exceeds the instrument limits (positive or negative).

 indicates Auto OFF is disabled. This occurs when the instrument is:

- recording
- in MAX MIN or HOLD mode
- connected via the USB cable to an external power supply or computer
- communicating via Bluetooth
- set to Auto OFF disabled (see §2.4).

2. SETUP

Before using your instrument, you must set its date and time. If you plan to use alarms, you must define the alarm threshold(s). Date/time and alarm settings must be configured through DataView. Other basic setup tasks include selecting:

- °F or °C for measurement units (can be done on the instrument or via DataView)
- Auto OFF interval (requires DataView)
- (Models 1821 and 1822) Sensor type (can be done on the instrument or via DataView)

2.1. DataView Installation

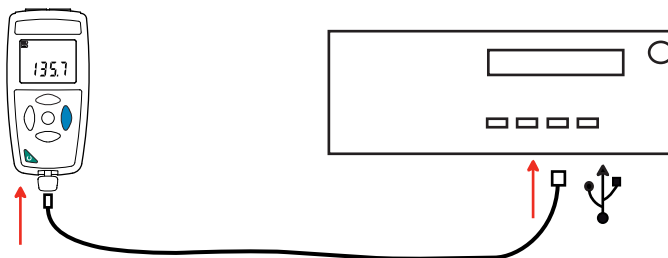
1. Insert the USB drive that comes with the instrument into a USB port on your computer.
2. If Autorun is enabled, an AutoPlay window appears on your screen. Click “Open folder to view files” to display the DataView folder. If Autorun is not enabled or allowed, use Windows Explorer to locate and open the USB drive labeled “DataView.”
3. When the DataView folder is open, double-click the file Setup.exe in the USB drive root directory.
4. The Setup screen appears. This enables you to select the language version of the setup program. You can also select additional install options (each option is explained in the Description field). Make your selections and click Install.
5. Click OK to confirm setup. The InstallShield Wizard screen appears. This program leads you through the DataView install process. As you complete these screens, be sure to check Data Loggers when prompted to select features to install.
6. When the InstallShield Wizard finishes installing DataView, the Setup screen appears. Click Exit to close. The DataView folder appears on your computer desktop.

2.2. Connecting the Instrument to a Computer

You can connect the instrument to a computer through USB cable (provided with the instrument). The first two steps of the connection procedure depend on the connection type:




USB:

1. Connect the instrument to an available USB port using the supplied cable.
2. Turn ON the instrument. If this is the first time this instrument has been connected to this computer, the drivers will be installed. Wait for driver installation to finish before proceeding with step 3 below.






Bluetooth®:

The instrument has a low-energy Bluetooth 4.2 link that requires no pairing. Connect via a low-energy 4.2 wireless link for use with a smartphone or tablet or for use with the CA Environmental Loggers Android™ application at: <https://play.google.com/store/apps/details?id=connection.ble.com>.


- Activate Bluetooth on your smartphone or tablet.
- Turn ON the instrument by pressing the  button, then activate Bluetooth link by a long press on the  button. The Bluetooth symbol  is displayed.
- The instrument is then ready to communicate with smartphone or tablet.



Connecting the instrument via Bluetooth requires your computer to be Bluetooth-enabled. If your computer does not have Bluetooth capability built in, you will need to install a Bluetooth USB adapter (we recommend the Bluegiga BLED112 Smart Dongle, commercially available via several sources). When the dongle is installed, do the following:

1. Turn ON the instrument by pressing the  button.
2. Activate Bluetooth on the instrument by pressing the  button until the  symbol appears in the LCD.

After the USB cable is connected or Bluetooth is activated, proceed as follows:

3. Open the DataView folder on your desktop. This displays a list of icons for the Control Panel(s) installed with DataView.
4. Open the DataView Data Logger Control Panel by clicking the  icon.
5. In the menu bar at the top of the screen, select Help. In the drop-down menu that appears, click the option Help Topics. This opens the Data Logger Control Panel Help system.
6. Use the Contents window in the Help system to locate and open the topic "Connecting to an Instrument." This provides instructions explaining how to connect your instrument to the computer.
7. When the instrument is connected, its name appears in the Data Logger Network folder in the left side of the Control Panel. A green check mark appears next to the name indicating it is currently connected.

2.3. Instrument Date/Time


1. Select the instrument in the Data Logger Network.
2. In the menu bar, select Instrument. In the drop-down menu that appears, click Set Clock.
3. The Date/Time dialog box appears. Complete the fields in this dialog box. If you need assistance, press F1.
4. When you are finished setting the date and time, click OK to save your changes to the instrument.

2.4. Auto OFF

By default, the instrument automatically turns OFF after 3 minutes of inactivity. You can use the Data Logger Control Panel to change the Auto OFF interval, or disable this feature, as instructed by the Help that comes with the software.

When Auto OFF is disabled, the symbol  appears in the instrument LCD screen.

2.5. Measurement Units

The  button on the instrument front panel allows you to toggle between °C and °F for measurement units. You can also set this through the Data Logger Control Panel.

2.6. Alarms

You can program alarm thresholds on each of the measurement channels using the DataView Data Logger Control Panel. For information about using alarms see §3.4.

2.7. Sensor Type

The Models 1821 and 1822 require you to select the sensor type (K, J, T, E, N, R, or S) used with the instrument. You can do this on the instrument, or via DataView. (Note that the Model 1823 automatically detects the sensor type when you install the sensor.)

Instrument

1. Press and hold down the **Type** button. After a few moments the sensor type indicator at the bottom of the LCD begins cycling through the available choices.
2. When the desired sensor type appears, release the **Type** button.

DataView

1. Click the Thermometer tab in the Configure Instrument dialog box. This displays a list of available sensor types.
2. Select the desired type, and click OK to save your changes.

3. STANDALONE OPERATION

The instruments can operate in two modes:

- Stand-alone mode, described in this section
- Remote mode, in which the instrument is controlled by a computer running DataView (see §4)

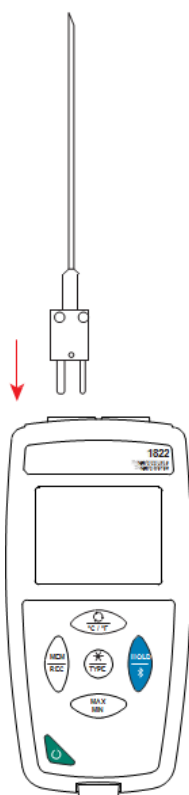
3.1. Sensor Installation

The instrument accepts one or two sensors, depending on model:

- Model 1821: connect one thermocouple.
- Model 1822: connect one or two thermocouples of the same type.
- Model 1823: connect one RTD100 or RTD1000 probe.



Ensure correct polarity when installing sensors.



Model 1822


The Models 1821 and 1822 accept thermocouples of type K, J, T, E, N, R, or S.


The Model 1821 can connect to one thermocouple, and the Model 1822 to two. When using the Model 1822 with two thermocouples, both must be of the same type.

The pins of the male thermocouple connectors are made of compensated materials that (although different from those of the thermocouple) provide the same e.m.f. in the temperature range of use.

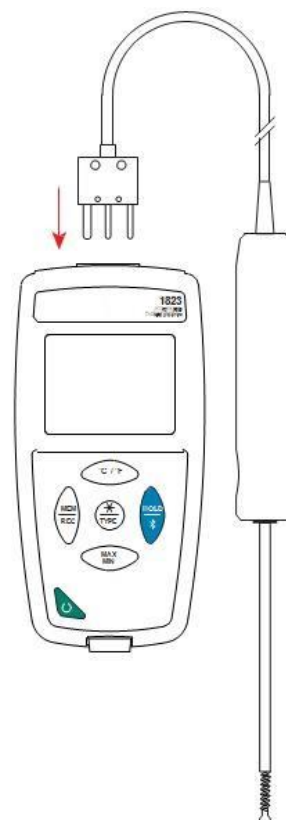
A temperature measurement on the terminals ensures automatic cold junction compensation.

After inserting the sensor(s) into the Model 1821 or 1822,

press and hold down the  **TYPE** button. As you hold the button down, the LCD cycles through a list of available thermocouple types. When the correct type is displayed,

release the  **TYPE** button.

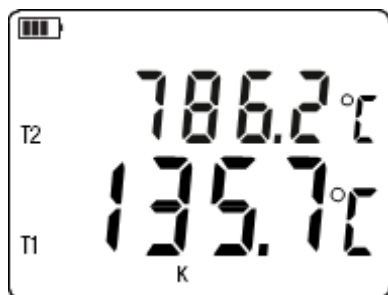
The Model 1823 automatically detects the probe type (PT100 and PT1000).



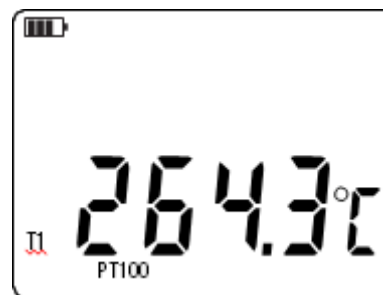
Model 1823

3.2. Making Measurements

If the instrument is OFF, press and hold down the  button until it turns ON. The instrument displays the current time, followed by the measurement(s).



Model 1822





Model 1821



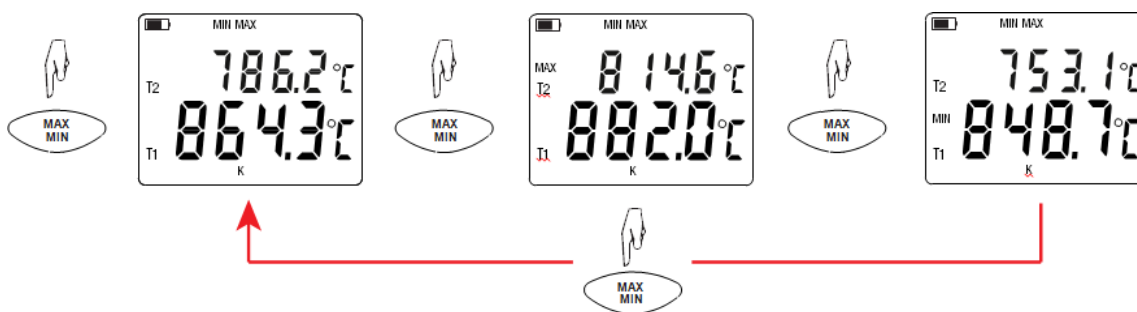
Wait for the display to stabilize before reading the measurement.

3.2.1. Temperature Difference (Model 1822)

When the Model 1822 is connected to two sensors, it displays both measurements, with T1 at the bottom and T2 at the top (see the illustration above). You can display the difference between the sensor measurements by pressing the  button. The T2 measurement is replaced by the temperature difference, labeled T1-T2. A second press of  restores the T2 measurement.

3.2.2. MAX-MIN Mode

You can monitor the maximum and minimum measurements by pressing the MAX MIN button. This displays the words MIN MAX at the top of the display (see below). In this mode, pressing MAX MIN once displays the maximum value measured during the current session. A second press displays the minimum value, and a third restores the normal display. Subsequent presses of MAX MIN repeat this cycle.



To exit MAX MIN mode, press the **MAX MIN** button for >2 seconds.



Note that when using the Model 1822 in MAX MIN mode, the  button is disabled.





3.2.3. HOLD

In normal operation, the display updates measurements in real time. Pressing the **HOLD** button “freezes” the current measurement and prevents the display from updating. Pressing **HOLD** a second time “unfreezes” the display.

3.3. Recording Measurements



You can start and stop a recording session on the instrument. Recorded data is stored in the instrument's memory, and can be downloaded and viewed on a computer running the DataView Data Logger Control Panel.

You can record data by pressing the   button:

- A short press (MEM) records the current measurement(s) and date.
- A long press (REC) starts the recording session. While the recording is in progress, the symbol REC  appears at the top of the display. A second long press of  stops the recording session. Note that while the instrument is recording, a short press of   has no effect.

To schedule recording sessions, and download and view recorded data, consult the DataView Data Logger Control Panel Help (§4).

3.4. Alarms

You can program alarm thresholds on each measurement channel via the DataView Data Logger Control Panel. In standalone mode, if an alarm threshold is programmed, the  symbol is displayed. When a threshold is crossed, the  symbol blinks, and one of the following blinking symbols appears to the right of the measurement:

- ▲ indicates measurement is above the high threshold.
- ▼ indicates measurement is below the low threshold.
- ▼▲ indicates the measurement is between the two thresholds.

3.5. Errors

The instrument detects errors and displays them in the form **Er.XX**:

- Er.01** Hardware malfunction detected. The instrument must be sent in for repair.
- Er.02** Internal memory error. Connect the instrument to a computer via the USB cable and format its memory using Windows.
- Er.03** Hardware malfunction detected. The instrument must be sent in for repair.
- Er.10** The instrument has not been correctly adjusted. The instrument must be sent to customer service.
- Er.11** The firmware is incompatible with the instrument. Install the correct firmware (see §6.4).
- Er.12** The firmware version is incompatible with the instrument. Reload the previous firmware version.
- Er.13** Recording scheduling error. Ensure that the instrument's time and the time of the DataView Data Logger Control Panel are the same (see §2.3).

4. DATAVIEW

As explained in §2, DataView® is required to perform several basic setup tasks including connecting the instrument to a computer, setting the time and date on the instrument, and changing the Auto OFF setting. In addition, DataView allows you to:

- Configure and schedule a recording session on the instrument.
- Download recorded data from the instrument to the computer.
- Generate reports from downloaded data.
- View instrument measurements in real time on the computer.

For information about performing these tasks, consult the DataView Data Logger Control Panel Help.

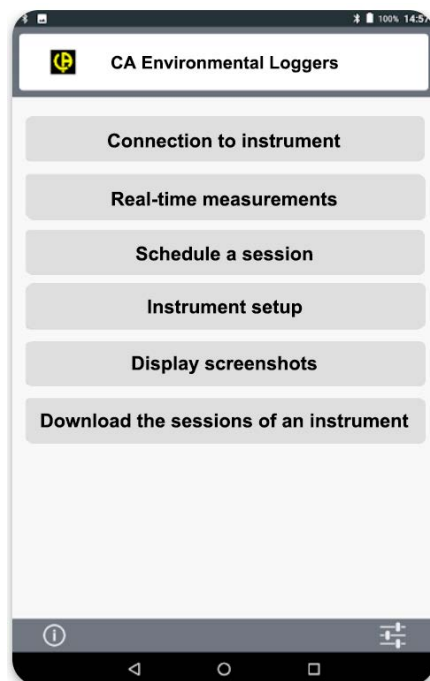


4.1. CA Environmental Loggers Application

This Android™ application provides some of the functions of the Data Logger control panel software. It allows you to connect to your instrument remotely.

This application is located at: <https://play.google.com/store/apps/details?id=connection.ble.com>

Install the application on your smartphone or your tablet.



Activate Bluetooth on your smartphone or tablet and on the 1821, 1822 or 1823 instrument, then connect.

The application lets you:

- See the measurement in real time.
- Program a recording: choose its name, its starting and ending dates, and the sampling period.
- Configure the instrument: synchronize the date and time, select the automatic switch-off time and enter the area for the air flow calculation.
- Download the recordings.

5. TECHNICAL CHARACTERISTICS

5.1. Reference Conditions

| Quantity of influence | Reference values |
|-----------------------|-----------------------|
| Temperature | 73 ± 3.6°F (23 ± 2°C) |
| Relative humidity | 45% to 75% |
| Supply voltage | 3 to 4.5V |
| Electric field | < 1V/m |
| Magnetic field | < 40A/m |

The intrinsic uncertainty is the error specified for the reference conditions.

θ = temperature

R = reading

5.2. Electrical Specifications

5.2.1. Models 1821 and 1822

5.2.1.1 Temperature Measurement

| Type of thermocouple | J, K, T, N, E, R, S |
|---|--|
| Specified measurement range (according to the type of thermocouple used) | J: -346 to +2192°F (-210 to +1200°C) K: -328 to +2501°F (-200 to +1372°C) T: -328 to +752°F (-200 to +400°C) N: -328 to +2372°F (-200 to +1300°C) E: -238 to +1742°F (-150 to +950°C) R: +32 to +3212°F (0 to +1767°C) S: +32 to +3212°F (0 to +1767°C) |
| Resolution | °F: $\theta < 1000^\circ\text{F}$: 0.1°F and $\theta \geq 1000^\circ\text{F}$: 1°F °C: $\theta < 1000^\circ\text{C}$: 0.1°C and $\theta \geq 1000^\circ\text{C}$: 1°C |
| Intrinsic uncertainty (J, K, T, N, E) | °F: $\theta \leq -148^\circ\text{F}$: $\pm(0.2\% R \pm 1.1^\circ\text{F})$ $-148^\circ\text{F} < \theta \leq +212^\circ\text{F}$: $\pm(0.15\% R \pm 1.1^\circ\text{F})$ $\theta > +212^\circ\text{F}$: $\pm(0.1\% R \pm 1.1^\circ\text{F})$ °C: $\theta \leq -100^\circ\text{C}$: $\pm(0.2\% R \pm 0.6^\circ\text{C})$ $-100^\circ\text{C} < \theta \leq +100^\circ\text{C}$: $\pm(0.15\% R \pm 0.6^\circ\text{C})$ $\theta > +100^\circ\text{C}$: $\pm(0.1\% R \pm 0.6^\circ\text{C})$ |
| Intrinsic uncertainty (R, S) | °F: $\theta \leq +212^\circ\text{F}$: $\pm(0.15\% R \pm 1.8^\circ\text{F})$ $\theta > +212^\circ\text{F}$: $\pm(0.1\% R \pm 1.8^\circ\text{F})$ °C: $\theta \leq +100^\circ\text{C}$: $\pm(0.15\% R \pm 1.0^\circ\text{C})$ $\theta > +100^\circ\text{C}$: $\pm(0.1\% R \pm 1.0^\circ\text{C})$ |

The aging of the internal reference voltage causes the intrinsic uncertainty to increase:

- after 4000 hours of use with R and S thermocouples
- after 8000 hours with other thermocouples

For Models 1821 and 1822, connecting the instrument to a computer via a micro USB cable causes an internal temperature rise in the instrument that may result in a temperature measurement error of approximately 2.7°F (1.5°C). This temperature rise does not occur when the instrument is connected to a wall outlet or when it is powered by batteries.

5.2.1.2. Variations within the Range of Use

| Quantity of influence | Range of influence | Quantity influenced | Influence |
|-----------------------|--------------------------------|---------------------|--|
| Temperature | 14 to +140°F (-10 to +60°C) | θ | J: ± (0.02% R ± 0.27°F) / 18°F (± (0.02% R ± 0.15°C) / 10°C) K: ± (0.03% R ± 0.27°F) / 18°F (± (0.03% R ± 0.15°C) / 10°C) T: ± (0.03% R ± 0.27°F) / 18°F (± (0.03% R ± 0.15°C) / 10°C) E: ± (0.02% R ± 0.27°F) / 18°F (± (0.02% R ± 0.15°C) / 10°C) N: ± (0.035% R ± 0.27°F) / 18°F (± (0.035% R ± 0.15°C) / 10°C) R: ± (0.01% R ± 0.45°F) / 18°F (± (0.01% R ± 0.25°C) / 10°C) S: ± (0.01% R ± 0.45°F) / 18°F (± (0.01% R ± 0.25°C) / 10°C) |

The aging of the internal reference voltage causes the intrinsic uncertainty to increase:

- after 4000 hours of use with R and S thermocouples
- after 8000 hours with other thermocouples

For Models 1821 and 1822, connecting the instrument to a computer via a micro USB cable causes an internal temperature rise in the instrument that may result in a temperature measurement error of approximately 2.7°F (1.5°C). This temperature rise does not occur when the instrument is connected to a wall outlet or when it is powered by batteries.

5.2.1.3. Response Time

Response time is the time required for e.m.f. to reach 63% of its total variation when the thermocouple is subjected to a temperature step. The sensor's response time depends on the heat capacity of the medium and the thermal conductivity of the sensor. The response time of a thermocouple with good thermal conductivity, immersed in a medium of high heat capacity, will be short. Conversely, in air or other thermally unfavorable medium, the true response time can be 100 times or more longer than the thermocouple response time.

5.2.2. Model 1823

5.2.2.1. Temperature Measurements

| Temperature sensor | PT100 or PT1000 |
|-----------------------------|---|
| Specified measurement range | -148 to + 752°F (-100 to +400°C) |
| Resolution | 0.1°F (0.1°C) |
| Intrinsic uncertainty | ± (0.4% R ± 0.5°F) (± (0.4% R ± 0.3°C)) |

To determine the total intrinsic uncertainty, add the intrinsic uncertainty of the platinum probe to that of the instrument, shown in the preceding table.

5.2.2.2. Variation within the Range of Use

| Quantity of influence | Range of influence | Quantity influenced | Influence |
|-----------------------|-------------------------------|---------------------|-----------------------------------|
| Temperature | +14 to +140°F (-10 to + 60°C) | θ | ± 0.23°F / 18°F (± 0.13°C / 10°C) |

5.3. Memory

The instrument has 8MB of flash memory, sufficient to record and store a million measurements. Each measurement is recorded with the date, time, and unit. For the two-channel Model 1822, both measurements are recorded.

5.4. USB

Protocol: USB Mass Storage

Maximum transmission speed: 12 Mbit/s Type B micro-USB connector

5.5. Bluetooth

Bluetooth 4.2 BLE

Range 32' (10 m) typical and up to 100' (30 m) in line of sight



Output power: +0 to -11 dBm

Nominal sensitivity: -95 dBm

Maximum transfer rate: 10 kbits/s

Average consumption: 3.3 μ A to 3.3 V

5.6. Power Supply

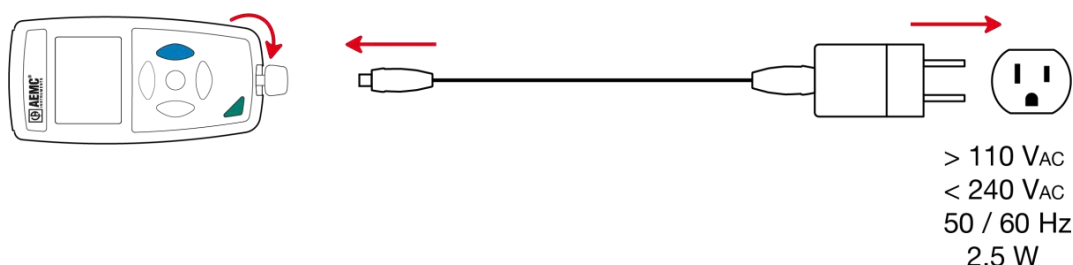
The instrument is powered by three 1.5V LR6 or AA alkaline batteries. You can replace the batteries with rechargeable NiMH batteries of the same size. However, even when the rechargeable batteries are fully charged, they will not reach the voltage of the alkaline batteries, and the Battery indicator will appear as  or .

Voltage for correct operation is 3 to 4.5V for alkaline batteries and 3.6V for rechargeable batteries. Below 3V, the instrument stops taking measurements and displays the message **BAt**.

Battery life (with the Bluetooth connection deactivated) is:

- standby mode: 1821 500 h, 1822 1000 h and 1823 800 h
- recording mode: 3 years at the rate of one measurement every 15 minutes

The instrument can also be powered via a micro USB cable, connected to either a computer or wall outlet adapter.



5.7. Environmental Conditions

For use indoors and outdoors.

- Operating range: +14 to +140°F (-10 to 60°C) and 10 to 90%RH without condensation
- Storage range: -4 to +158°F (-20 to +70°C) and 10 to 95%RH without condensation, without batteries
- Altitude: <6562' (2000m), and 32,808' (10,000m) in storage
- Pollution degree: 2

5.8. Mechanical Specifications

- Dimensions (L x W x H): 5.91 x 2.83 x 1.26" (150 x 72 x 32mm)
- Mass: 9.17oz (260g) approx.
- Ingress protection: IP 50, with the USB connector closed, per IEC 60 529
- Drop impact test: 3.28' (1m) per IEC 61010-1

5.9. Compliance with International Standards

The instrument is compliant with standard IEC 61010-1.

5.10. Electromagnetic Compatibility (CEM)

The instrument is compliant with standard IEC 61326-1 and FCC regulations.

The Bluetooth module is certified in compliance with the FCC regulations under number QOQ-BT122.

The instruments are not influenced by electromagnetic radiation. However, the sensors for the Models 1821 and 1822 can be affected, due to their wire shape. This can cause them to function as antennas capable of receiving electromagnetic radiation and affecting measurements.

6. MAINTENANCE



Except for batteries, the instrument contains no parts that can be replaced by personnel who have not been specially trained and accredited. Any unauthorized repair or replacement of a part by an “equivalent” may significantly impair safety.

6.1. Cleaning



Disconnect the instrument from all sensors, cable, etc. and turn it OFF.

Use a soft cloth, dampened with soapy water. Rinse with a damp cloth and dry rapidly with a dry cloth or forced air. Do not use alcohol, solvents, or hydrocarbons.

6.2. Maintenance

- Place the protecting cap on the sensor when the instrument is not in use.
- Store the instrument in a dry place and at constant temperature.

6.3. Battery Replacement

The  symbol indicates the remaining battery life. When the  symbol is empty, all the batteries must be replaced (see §1.1).



Spent batteries must not be treated as ordinary household waste. Take them to an appropriate recycling facility.

6.4. Firmware Update

AEMC may periodically update the instrument's firmware. Updates are available for free download. To check for updates:

1. Connect the instrument to the Data Logger Control Panel.
2. Click Help.
3. Click Update. If the instrument is running the latest firmware, a message appears informing you of this. If an update is available, the AEMC Download page automatically opens. Follow the instructions listed on this page to download the update.



After firmware updates, it may be necessary to reconfigure the instrument (see §2).

REPAIR AND CALIBRATION

To ensure that your instrument meets factory specifications, we recommend that it be scheduled to be sent back to our factory Service Center at one-year intervals for recalibration, or as required by other standards or internal procedures.

For instrument repair and calibration:

You must contact our Service Center for a Customer Service Authorization Number (CSA#). This will ensure that when your instrument arrives, it will be tracked and processed promptly. Please write the CSA# on the outside of the shipping container. If the instrument is returned for calibration, we need to know if you want a standard calibration or a calibration traceable to N.I.S.T. (includes calibration certificate plus recorded calibration data).

For North / Central / South America, Australia and New Zealand:

Ship To: Chauvin Arnoux®, Inc. d.b.a. AEMC® Instruments
15 Faraday Drive • Dover, NH 03820 USA
Phone: (800) 945-2362 (Ext. 360)
(603) 749-6434 (Ext. 360)
Fax: (603) 742-2346 • (603) 749-6309
E-mail: repair@aemc.com

(Or contact your authorized distributor.)

Costs for repair, standard calibration, and calibration traceable to N.I.S.T. are available.

NOTE: You must obtain a CSA# before returning any instrument.

TECHNICAL AND SALES ASSISTANCE

If you are experiencing any technical problems, or require any assistance with the proper operation or application of your instrument, please call, fax, or e-mail our technical support team:

Contact: Chauvin Arnoux®, Inc. d.b.a. AEMC® Instruments
Phone: (800) 945-2362 (Ext. 351) • (603) 749-6434 (Ext. 351)
Fax: (603) 742-2346
E-mail: techsupport@aemc.com

LIMITED WARRANTY

Your AEMC instrument is warranted to the owner for a period of two years from the date of original purchase against defects in manufacture. This limited warranty is given by AEMC® Instruments, not by the distributor from whom it was purchased. This warranty is void if the unit has been tampered with, abused, or if the defect is related to service not performed by AEMC® Instruments.

Full warranty coverage and product registration is available on our website at:

www.aemc.com/warranty.html.

Please print the online Warranty Coverage Information for your records.

What AEMC® Instruments will do:

If a malfunction occurs within the warranty period, you may return the instrument to us for repair, provided we have your warranty registration information on file or a proof of purchase. AEMC® Instruments will, at its option, repair or replace the faulty material.

Warranty Repairs

What you must do to return an Instrument for Warranty Repair:

First, request a Customer Service Authorization Number (CSA#) by phone or by fax from our Service Department (see address below), then return the instrument along with the signed CSA Form. Please write the CSA# on the outside of the shipping container. Return the instrument, postage or shipment pre-paid to:

Ship To: Chauvin Arnoux®, Inc. d.b.a. AEMC® Instruments

15 Faraday Drive • Dover, NH 03820 USA

Phone: (800) 945-2362 (Ext. 360)

(603) 749-6434 (Ext. 360)

Fax: (603) 742-2346 • (603) 749-6309

E-mail: repair@aemc.com

Caution: To protect yourself against in-transit loss, we recommend you insure your returned material.

NOTE: You must obtain a CSA# before returning any instrument.

NOTES:

NOTES:



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Chauvin Arnoux[®], Inc. d.b.a. AEMC[®] Instruments
15 Faraday Drive • Dover, NH 03820 USA • Phone: (603) 749-6434 • Fax: (603) 742-2346
www.aemc.com