WatchDog®

A160 Temp/RH/CO$_2$ Data Logger

PRODUCT MANUAL

Item # 3611A

Spectrum®
Technologies, Inc.

Contents

Specifications

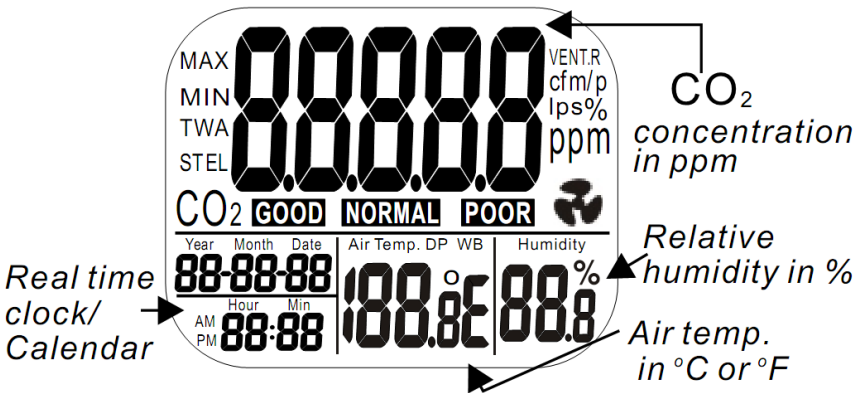|	
Logger Capacity	15,999 data points (5,333 per sensor)
CO_2 Range	0 to 9999 ppm
CO_2 Accuracy	±50ppm ±5% of reading from 0 to 2000 ppm, else unspecified
Pressure Dependence	+0.16% of reading per 1 hPa deviation from normal pressure of 1000 hPa
Temperature Range	14 to 140°F (-10 to 60°C)
Temperature Accuracy	±1.0°F (±0.6°C)
Humidity Range	5.0 to 95.0% RH (avoid condensation)
Humidity Accuracy	±3% RH at 77°F (25°C) (10 to 90% RH, else ±5% RH)
Warm up	30 seconds
Power Supply	100-240VAC adapter to 5VDC 500mA
Dimensions (w/o A/C adapter)	4.75x4x4in (12x10.5x10.5cm)

For customer support, or to place an order, call Spectrum Technologies at (800)248-8873 or (815)436-4440 between 7:30 am and 5:30 p.m. CST, FAX at (815)436-4460, or E-mail at info@specmeters.com.

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Thank you for purchasing a WatchDog Model A160 A-Series Data Logger. This manual describes how to use your WatchDog Logger and keep it working accurately for many years. Read this manual thoroughly in order to get effective performance from your data logger.

The A160 logger also has a comprehensive LCD display with controls. Pages 3-6 describe the operation of the display LCD and controls. Pages 7-9 describe the logger function.

LCD Display

Symbols

ppm	The scale of the CO_2 value
GOOD	CO_2 is in good level
NORMAL	CO_2 is in normal level
POOR	CO_2 is in poor level
Air Temp.	Air temperature
Humidity %	Unit of air relative humidity
^oE (C/F)	Celsius/Fahrenheit of temp.
MAX/MIN	Maximum/Minimum readings
☘	Icon of CO_2 alarm

Control Buttons

SET	-Enter setup mode. -Save and finish settings.
ESC	-Exit setup page / mode. -Terminate calibration / datalogging
RESET	-Press to clear the MAX/MIN records.
LOG/▲	-Select mode or increase value in setup -Start data logging
MIN/MAX▼	-Activate MAX, MIN function. -Select mode or decrease value in setup.
▲ + SET + MIN/MAX▼	-Enter CO_2 calibration.

Installation and Operation

Power On/Off
Plug in the adaptor and the meter turns on automatically with a short beep, then displays current CO_2, temperature, and humidity readings on the LCD. The LED will flash a bAt symbol if the battery level is low.

Taking a Measurement
The meter measures continuously and updates the LCD every second. With a significant environmental change, the CO_2 sensor requires 2 minutes, and the RH sensor 10 minutes to respond. Note: Do not hold the meter close to the face because exhalation affects the CO_2 reading.

MIN, MAX
Press "MIN/MAX▼" to switch between displaying the current, minimum, and maximum reading. Press and hold "RESET" for at least 1 second to reset the minimum and maximum values.

Alarm

An audible alarm can sound when CO_2 concentration exceeds user-set limits. The logger beeps and displays fan icon on the LCD when the CO_2 level goes over the upper limit. The sound can be stopped by pressing any button.

Setup

In normal mode, hold down the SET button for at least 3 seconds to enter setup mode. To exit setup, press the ESC button.

P1.0 Set CO_2 Alarm

When entering setup mode, "CO_2" and "P1.0" are displayed on the LCD. Press SET again to enter "P1.1" to set upper limit for the GOOD indicator on the LCD. Press "LOG▲" to increase or "MIN/MAX▼" to decrease the value.

Press SET again to enter "P1.2" to set the CO_2 alarm upper limit for the NORMAL indicator. The current value will be blinking on the LCD. Press "LOG▲" to increase or "MIN/MAX▼" to decrease the value. Press SET to save the values, or ESC to exit without saving.

Press SET again to enter "P1.3" to set the CO_2 alarm lower limit (exceeding this triggers the alarm). Typically, the upper level for NORMAL and the lower level for the alarm are the same value. The current value will be blinking on the LCD. Press "LOG▲" to increase or "MIN/MAX▼" to decrease the value (in a plant growth environment, this should probably be set as high as possible (5000) to effectively disable the alarm). Press SET to save the values, or ESC to exit without saving.

Pressing SET will take you to "P1.4". Use "LOG▲" or "MIN/MAX ▼" to toggle between enabling and disabling the alarm. Press ESC to return to normal mode.

P2.0 Set Temperature Units

From the P1.0 display, press "LOG▲" to change to the P2.0 screen. Press SET to enter "P2.1" to set the temperature units. The current units, "°C" or "°F", will be displayed on the lower middle area of the LCD. Press "LOG▲" or "MIN/MAX▼" to switch between "°C" and "°F". Press the SET button to save the setting, or ESC to exit without saving.

P3.0 Real Time Clock

From the P1.0 display, press "LOG▲" twice to change to the P3.0 screen. Press SET to enter "P3.1" to set the real time clock. The year will be blinking. Press "LOG▲" or "MIN/MAX▼" to set the year. Press the SET button to save the setting, or ESC to exit without saving. Repeat for (P3.2) month, (P3.3) day, (P3.4) 12/24 hour, (P3.5) hour, and (P3.6) minute.

P4.0 Reset

From the P1.0 display, press "LOG▲" three times to reset the A160 to default settings. Press SET to enter "P4.1" to reset the settings. Press "LOG▲" or "MIN/MAX▼" to change to "Yes". Press the SET button to save the setting, or ESC to exit without saving.

P5.0 Rate

The sampling rate is set by SpecWare software (see p. 9). Whatever value is shown on the LCD will be over-ridden when the logger is launched.

CO_2 Manual Calibration

Manual calibration should be done outdoors on a sunny day with fresh air and plenty of ventilation, resulting in a CO_2 value of about 400 ppm. Do not calibrate on a rainy day because high humidity will affect the CO_2 level. Do not calibrate in places with crowds of people or in the vicinity of high concentration CO_2 sources such as ventilation outlets or fireplaces.

Place the A160 in the calibration site and turn it on. Simultaneously press and hold "SET", "LOG▲", and "MIN/MAX▼" for at least 1 second to enter CO_2 calibration mode. "400ppm" and "CO_2" will be blinking on the LCD. Wait about 30 minutes. The blinking will stop after the calibration completes. Press and hold "RESET" for more than 1 second to exit the calibration process.

Connecting to the Computer

NOTE: The A160 logger requires SpecWare version 9.03 or above. If you are already running a version of SpecWare 9, an update to the latest version is available as a free download on the SpecWare 9 update page at www.specmeters.com.

The A160 and other A-Series loggers do not use the standard gray PC interface cable that accompanies SpecWare Software. Instead, you need the A-Series PC Connection Cable (Item 3661A). The cable is a serial USB cable and requires that you install the driver prior to its use. The driver is included on the SpecWare Software installation CD for SpecWare 9 Pro or Basic, Version 9.01 Build 206 or greater, as well as on the SpecWare 9 update page at www.specmeters.com.

After installing the drivers, if you plug in the cable before you start SpecWare (or leave it plugged in), SpecWare will automatically find the COM port used by the cable.

The 2.5mm stereo pin connects to the jack on the back of the data logger.

The **only time** *you must have the WatchDog connected to the computer is during the launching and downloading of the data logger.* After the logger has been launched, and/or downloaded, disconnect the logger and place it in the environment you wish to monitor.
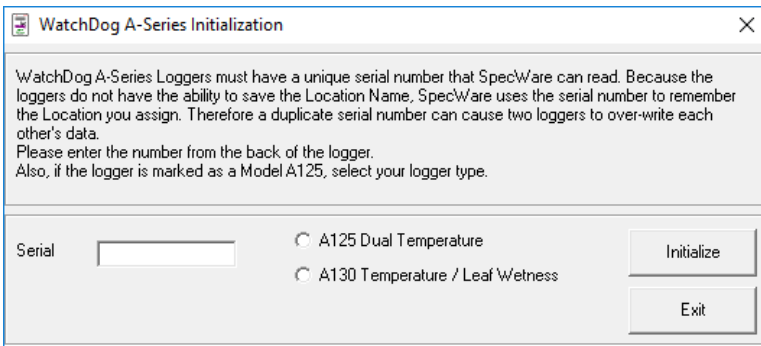
SpecWare Software

SpecWare software version 9.03, and above support the Watch-Dog A160 logger. Previous builds of SpecWare 9 can be updated via the free downloads available at www.specmeters.com. The software version can be checked by selecting "About SpecWare" from the Help menu.

Complete details on the software are included in the SpecWare Software manual which is available as a pdf document on the installation CD (and accessible via the Help menu). The following sections summarize the most commonly used functions.

Initializing the Serial Number and Logger Type
The first time that an A-Series logger is read by SpecWare, an initialization screen will open. Enter the serial number printed on the bottom of the logger. Because you have an A160, the A125/A130 options are ignored.

Logger Location Names
SpecWare maintains a list of A-Series logger serial numbers and their corresponding location names. As a result, the first time an A-Series logger is connected on a PC, SpecWare will ask for a location name. If you are planning to launch loggers with one PC and read them with another, you may wish to use the default name of *model-number-serial-number* to make tracking easier.

Launching Loggers
The launch screen is used to configure the logger so it can collect data. The launch screen can be accessed by selecting the "Launch WatchDog A-Series" option from the Logger menu,

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clicking the icon on the SpecWare toolbar, or from the WatchDog Manager screen.

Select the logging interval (ranging from 1 to 120 minutes), and ensure all channels are enabled before clicking "Ok" to launch the logger.

IMPORTANT! The A160 does not begin logging until you press and hold the "LOG" button for two seconds. The LCD will alternate between "rEC" and the CO_2 value to indicate it is logging.

Downloading The Loggers
The download sequence is initiated by selecting the "Get Watch-Dog A-Series data" option from the Logger menu, clicking the icon on the SpecWare toolbar, or from the WatchDog Manager screen.. When the download is complete, the data will be saved in the location defined for that logger. "End" will flash on the LCD to show the download was complete. Press and hold the "ESC" button to return to the normal display.

Charts/Reports
Whenever a file is opened, SpecWare will automatically generate a chart. You will be given the choice of which parameters are to be plotted. The Tools menu gives you access to a variety of standard and user-defined (SpecWare Pro only) reports.

Troubleshooting

The A160 logger will not power on.
- Check that the AC adapter is plugged in to an outlet and the A160.
- Use a paper clip or toothpick to press "reset" on the base of the logger.

The readings on the LCD don't change.
Check to see if the display is in maximum or minimum mode.

"Bat" and the green LED keep flashing.
The adaptor output voltage is not 5VDC (±10%), 500mA. Please ensure you are using the correct adapter.

Why won't the logger connect with the computer?
The COM Port settings may need to be changed in SpecWare software.

I accidentally sprayed water on my A160.
If you haven't done so already, unplug the AC adapter. Shake any water out of the A160. Set the A160 in a ventilated area for at least a day, preferably more. Do not plug it in until you are confident that any water has evaporated. Water damage is not covered under warranty.

LCD Diagnostic Codes

Code	Problem	Solution
CO_2 Reading		
E01	The CO_2 sensor is damaged.	Contact your distributor regarding repair.
E02	The CO_2 reading is under the lower limit.	Recalibrate the A160. If this reappears, then contact your distributor regarding repair.
E03	The CO_2 reading is above the upper limit.	Put the A160 in fresh air for 5 minutes. If it still appears, recalibrate the unit. If this fails, contact your distributor for repair.
E17	ABC mode (auto-calibrate) of CO_2 sensor has failed and might cause incorrect CO_2 readings.	Perform a manual calibration as per manual page 6.

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Code	Problem	Solution
End	The download of logged data has successfully completed.	Press and hold the "ESC" button for two seconds to return to the normal display.
rEC	(alternating with the CO_2 value) The A160 is logging data.	If you want to stop logging, press and hold the "ESC" button for two seconds.

Air Temperature Reading

Code	Problem	Solution
E02	Air temperature measurement is below the lower limit.	Put the meter in regular room temperature for 30 minutes. If this still appears, then contact your distributor regarding repair.
E03	Air temperature is above the upper limit.	Put the meter in regular room temperature for 30 minutes. If this still appears, then contact your distributor regarding repair.
E31	Temperature sensor or measuring circuit has failed.	Contact your distributor regarding repair.

Relative Humidity Reading

Code	Problem	Solution
E04	Air Temperature measurement has an error code.	Refer to the above temperature error codes for problem resolution.
E11	The RH calibration has failed.	Contact your distributor regarding recalibration and repair.
E34	RH sensor or measuring circuit has failed.	Contact your distributor regarding repair.

WARRANTY

This product is warranted to be free from defects in material or workmanship for one year from the date of purchase. During the warranty period Spectrum will, at its option, either repair or replace products that prove to be defective. This warranty does not cover damage due to improper installation or use, lightning, negligence, accident, or unauthorized modifications, or to incidental or consequential damages beyond the Spectrum product. Before returning a failed unit, you must obtain a Returned Materials Authorization (RMA) from Spectrum. Spectrum is not responsible for any package that is returned without a valid RMA number or for the loss of the package by any shipping company.

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