

ENERCORN

AIR QUALITY MONITOR Installation and Operation Manual



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1. AIR QUALITY COMPONENTS

a) Order number AQT-S-2000. A cream coloured instrument resembling a thermostat called the air quality monitor or AQT. This instrument can be ordered factory programmed or programmed in the field with a hand-held module.

b) Order number HHM-AQ. A black instrument with keypad and alpha-numeric display, called a hand-held module or HHM. If you wish to log data or modify the program of AQT-2000's you will need one of these. Only one of these will be required per site or per service representative.

c) Order number AQT-DEMO-KIT. A black sample case containing a pre-wired power module and analogue meter connected to a hand held module and air quality monitor. This is a convenient way to test drive the AQT-2000 to verify to yourself that it is effective in your installation. Since it is complete with a highly visible readout indicator it is a very effective way to provide client demonstrations.

d) Order number AQT-SERIAL-KIT. Cables and software to permit data from the air quality system to be downloaded to a PC and graphed.

2. COMPONENT FUNCTION

a) The AQT-2000 monitors and controls air quality. It senses volatile organic compounds, VOC's. People breath out VOC's, including ketones. Building materials out-gas VOC's such as formaldehyde from carpets and chip board. The AQT-2000 is therefore a good sensor of air quality deterioration due to both occupancy and chemicals in the work place.

If you choose CONTROLLER while setting up the AQT-2000 it will respond quickly to any worsening of air quality but react slowly to improvements in air quality. This is to insure that any contaminants are flushed from the monitored space. CONTROLLER should be selected for applications such as portable classrooms where one AQT-2000 will be directly connected to a fresh air damper actuator to control air quality.

If you choose TRANSMITTER it will produce an analogue voltage or current signal proportional to the selected range of air quality you wish to monitor. TRANSMITTER should be selected if several AQT-2000 monitors will transmit signals to a central control system which will decide on the appropriate action to take to control air quality.

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b) The HHM interacts with you to SETUP operating parameters to match your installation. It stores these parameters in non-volatile memory. You can then SEND these parameters to the AQT-2000. The HHM can also LOG data from the AQT-2000 and later DUMP it to a personal computer. The HHM is only used for SETUP and LOGGING of air quality. It has no monitoring or control function and can be disconnected from the installation once the AQT-2000 is programmed. It is powered by the AQT-2000.

c) The demo kit contains a 4 to 20mA analogue panel meter connected to the current output of the AQT-2000. In a typical installation this 4 to 20 mA signal would be fed directly to a damper actuator to control its position. The power supply powers the AQT-2000. It can be plugged into any 110V outlet to operate the demonstration kit. In permanent installations the AQT-2000 requires a 12 to 30VDC power supply.

d) The hand held module has a serial output that can be attached to the serial port of an IBM compatible PC or Macintosh computer. We offer a package containing a data download cable which powers a hand-held module and connects it to a PC to download stored data to the graphing package we supply. You can also use your own communications, graphing and spreadsheet software for complex analysis. If you have a real-time graphical package you can use the supplied "Y" cable to connect the AQT-2000 and the HHM-AQ to your PC to monitor and save air quality data in real-time. If you will be using a Macintosh computer you will need to extend the supplied cable with a null modem connector and a MAC serial modem cable. We suggest you use Claris Works for communication and graphing or use the charting software we supply under Soft Windows.

3. PROGRAMMING

The AQT-S-420 and AQT-D-420 are factory calibrated and programmed before delivery to the customer. The analogue output changes proportionally to pollution level. If a 4-20mA output has been chosen 4mA represents the best possible air and 20mA represents the worst.

We use medical air to calibrate the 4mA setting. Readings this good will not normally be achieved in operating conditions. Readings of 8mA or less indicate excellent indoor air quality while 16mA or more is poor.

In general practice anything less than 1/3 scale

(9.3mA) is usually considered very good and not in need of any action. Between 1/3 and 2/3 scale (14.6mA) progressive stages of filtering or cleaning are employed to improve air quality. Sufficient fresh air is normally introduced to prevent air quality readings exceeding 2/3 scale (14.6mA).

Although the air quality monitor is ready for operation as received from the factory the available hand held module serial kit are valuable tools to log and graph air quality data to determine if and where air quality monitors should be used. the hand held module can also be used to reconfigure or recalibrate an air quality monitor.

The following section describes the use of the hand-held module and graphical software. If you are simply installing an air quality monitor you can skip to section 6, which describes wiring hook up.

When powered on the HHM will display:

SELECT FUNCTION

SEND flashing

As you press the up/down arrow key SEND will toggle to SETUP, DUMP, LOG and back to SETUP

The first time the HHM is used press the up/down arrow key until SETUP is displayed. Then press the green enter key.

The unit will display:

HOW WILL AQT BE USED

TRANSMITTER flashing

As the up/down arrow key is pressed TRANSMITTER toggles to CONTROLLER and back again. Press the green ENTER key to select your choice.

CONTROLLER should be chosen for use in a portable classroom or similar application where the AQT will monitor the conditions in a single room and directly control a fresh air damper to maintain air quality. In this mode the AQT reacts very quickly to changes in air quality so it can provide additional fresh air as more occupants enter a room or the activity level increases in the room.

TRANSMITTER should be chosen if several AQT's will send an analogue signal representing air quality back to a central control system which will perform the control function. In this mode the air quality monitor produces an analogue output signal proportional to a user defined section of the air quality spectrum.

If you choose CONTROLLER go to A

If you choose TRANSMITTER skip section A and go to B

A

The unit will display:

TYPE OF OUTPUT

4...20MA flashing

The up/down arrow key toggles 0...10V to 4...20ma and back. Press enter to accept your choice.

The display will now read:

TYPE OF OUTPUT

CONTINUOUS flashing

The up/down arrow toggles from CONTINUOUS to STEPPED. Press enter when the desired value is selected. Continuous gives an output signal that varies continuously from zero to full scale. Stepped gives an output signal in steps equal to the values specified in the GOOD, FAIR, POOR and BAD parameters. Choose continuous normally.

The display now reads:

SENSITIVITY 100 MOST

XX % flashing

Press up/down to display desired value, then press ENTER to accept the value. This parameter fine tunes an AQT-2000 for a particular location. Start with 25. If the instrument responds too quickly to changes in air quality lower the value, if too slowly increase the value. After changing the value you must SEND the new program to the AQT.

The unit now displays:

SET GOOD AIR OUTPUT

XX % flashing

Enter the desired value on the keypad. Press ENTER to accept the value. Selecting 10% would open the damper on a school portable 10% to provide fresh air at all times even if the air quality was good.

The HHM will display:

SET FAIR AIR OUTPUT

XX % flashing

Press up/down to display desired value, then press ENTER to accept the value. If you select 33, the AQT-2000 output will be 33% of full scale or open a damper 33% when the air quality is fair.

The display then reads:

SET POOR AIR OUTPUT

XX % flashing

Press up/down arrow to display desired value and press ENTER to accept the value. Try 66 to start.

The unit now displays:

SET BAD AIR OUTPUT

XX % flashing

Press the arrow key until the display shows the desired value and then press ENTER to accept the value. If you select 100, the AQT output will be 100% of full scale when the air quality is bad. Skip section B and go directly to section C.

B

The unit will display:

TYPE OF OUTPUT

4...20MA flashing

The up/down arrow key toggles from 0...10V to 0...5V to 4...20mA and back again. Press enter to accept your choice.

The display will now read:

CHOOSE SCALE START

99999

This is the larger of the two numbers you enter to set the analogue output scale range. It can have a maximum value of 39999. As a starting point try 20,000 to 30,000. Press the enter key when the desired value is selected.

The display will now read:

CHOOSE SCALE END

99999

This is the smaller of the two numbers you enter to set the analogue output scale range. It can have a value from zero up to near the value specified above. As a starting point try 5,000 to 10,000 for clean living spaces or zero for spaces that may have very high concentrations of VOC's Press the enter key when the desired value is selected.

Proceed to section C.

C

The display will read :

SETUP COMPLETE

then

SELECT FUNCTION

SEND flashing

The program has now been entered in the HHM, hand held module. It has not been entered into the AQT-2000, air quality monitor.

If you are happy with the entered program and wish to send it to the AQT-2000. Press the green ENTER key while SEND is flashing.

The program in the HHM will be sent to the monitor and the display will read

DEVICE PROGRAMMED

PRESS ANY KEY

It is possible to get an ERROR message at this point if the data has not been properly transmitted to the AQT-2000. If this occurs check the Telco connection and press the ENTER key again until you get the DEVICE PROGRAMMED message.

You can disconnect the HHM now. It will retain its program and can be used to program other AQT-2000 modules later.

4. DATA LOGGING

The HHM can be used as a data logger to record air quality and later dump it into your PC.

To enter data logging mode use the up/down arrow key while in the SELECT FUNCTION screen until you get the following display
SELECT FUNCTION
LOG flashing
Press ENTER.

The display now reads
YYMMDDHHMM SET TIME
9 9 9 9 9 9 9 9 9 9
where 9999999999 is the current date and time
Use the up arrow key to move the cursor and the numeric keypad to change the values. Press enter to accept the displayed value.

The display now reads
5 s flashing
Toggle through the available choices with the up/down arrow key. Press enter when your choice is displayed. THE HHM can log for 12 hours at 1 minute intervals or 4 weeks at 60 minute intervals.

The display will read:
SET LOG OPTION
0 flashing
Press ENTER, this option is only used for factory setup.

BEGIN LOGGING NOW?
PRESS ENTER TO BEGIN flashing
When you press ENTER
The display will read :
LOGGING: . TO STOP
99999

The HHM is logging data. To stop data logging press the period key. 99999 is a number between 0 and 32000. This number is a measure of air quality. The larger the number the better the air quality. You may find it useful to look at this number to see instantaneous changes in air quality.

5. TRANSFERRING DATA to a PC or MAC

If you want to do this you will need the required connector and communications software.

1. We offer a relatively user friendly software package that runs under Windows 3.1 on a PC or Soft Windows on a MAC. It can read data from the handheld module while connected to the computer's serial port. Once the data is read the program automatically scales the data, displays a graph on the screen and allows you to save and/or print it. This is a very simple and effective way to quickly view trends in air quality over a time period. For more

complex analysis of the data you can save the data and use your spread sheet program for analysis.

SERIAL COMMUNICATIONS

If you have purchased the AQT-SERIAL-KIT you will have a cable with power supply to connect the HHM-AQ to a COM port of your your PC. You will also have a floppy diskette with software to read and graph the data you have logged with the HHM-AQ.

Before using the communications program ensure that the COM port you want to use is working properly under Windows. Use a communications program such as the Windows TERMINAL (or XTALK, PROCOMM etc.) to verify that you can properly 'DUMP' the data to the PC.

Set the communications port to ...

8 data bits
1 stop bit
n no parity
9600 baud

Use COM 1,2,3 or 4 (usually 1 and 2 have interrupt capability and often COM 1 is used by the Mouse, it is recommended to use COM 2 if available)

The sample DUMP data should look like this...

```
DUMP 96/03/28 20:06 @ 5s
AIRQ, TEMP, HUM, OUT.
25023 09246 22985 00043
25047 09246 22985 00043
25067 09247 22986 00043
25094 09248 22987 00043
25105 09247 22989 00043
25119 09247 22990 00043
25129 09247 22992 00042
25141 09246 22993 00042
25153 09246 22994 00042
```

To enter down loading mode use the up/down arrow key while in the SELECT FUNCTION screen until you get the following display

DUMP flashing

Connect the HHM to the serial port of your computer with the appropriate cable.

Run the supplied graph program under windows and press the CAPTURE button when it is displayed. A field at the bottom of the screen will display CAPTURE ON.

At this time press the green enter key on the HHM.

The HHM-AQ display will read :

DUMP

OUTPUT flashing

When all the data has been transferred to your computer

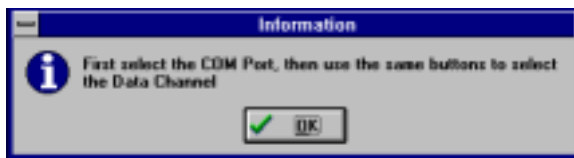
The display will read
SELECT FUNCTION

SEND flashing

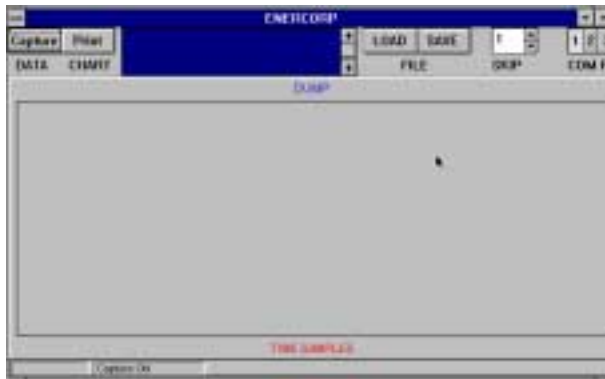
The data is retained in the HHM and can be dumped again if desired. Stored data is only erased when the you begin logging again.

The computer screen will display a graph of the data. You can then print the data by pressing the PRINT button on the screen.

The supplied graphing program is intended to provide a very straight forward method of graphing data. If more complex analysis of the data is



required you can press the SAVE button and copy the data into your spread sheet application.



After checking for proper connections and communication

1. Run the GRAPH.EXE program
2. Select the correct COM port



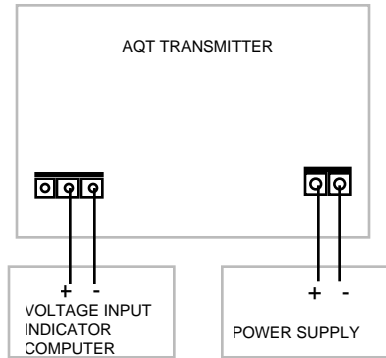
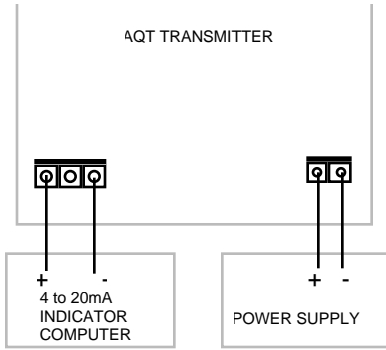
3. Set CAPTURE to ON
4. 'DUMP' the data from the HHM.
5. When all data is received a graph will display on your screen
6. The screen has buttons to PRINT the graph and to SAVE the data to a file.
7. You can later load the saved file into your spreadsheet for more complex analysis.

The instrument has logged four fields of data. 1 is air quality, 2 is temperature, 3 is humidity and 4 is the analogue output. All values should be used to establish trends. The absolute values on the scales are arbitrary. Once a graph is displayed use the COM Port buttons to select the data field you wish to view.

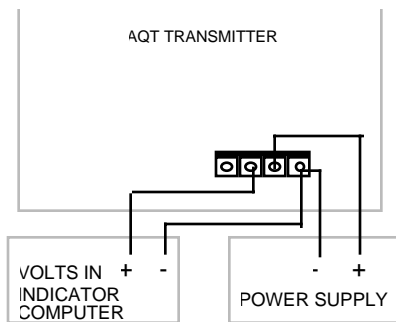
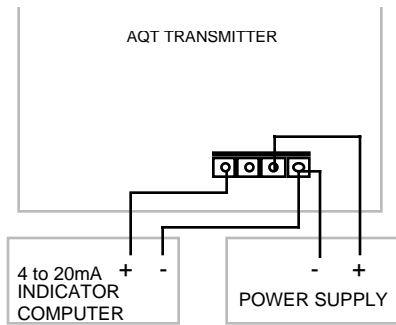
6. WIRING & TECHNICAL DATA

Supply Voltage	12 to 30 VDC
Supply Current	100 mA
Operating temperature	-10 to 60 C
Operating Humidity	10 to 95% rH
Outputs	4 to 20mA / 0...10 VDC
Output Impedance	> 1k ohms for voltage 1000*Vs/24 for current

Note about outputs: Both the current and voltage outputs are always available. They are independent but their scales are related. If you select 4-20mA you will also get a 2 to 10V output. If you select 0 to 10V out you will also get 0 to 20mA out. If you select 0 to 5V you will also get 0 to 10 mA out.



Versions manufactured after September 1996



Versions manufactured before September 1996