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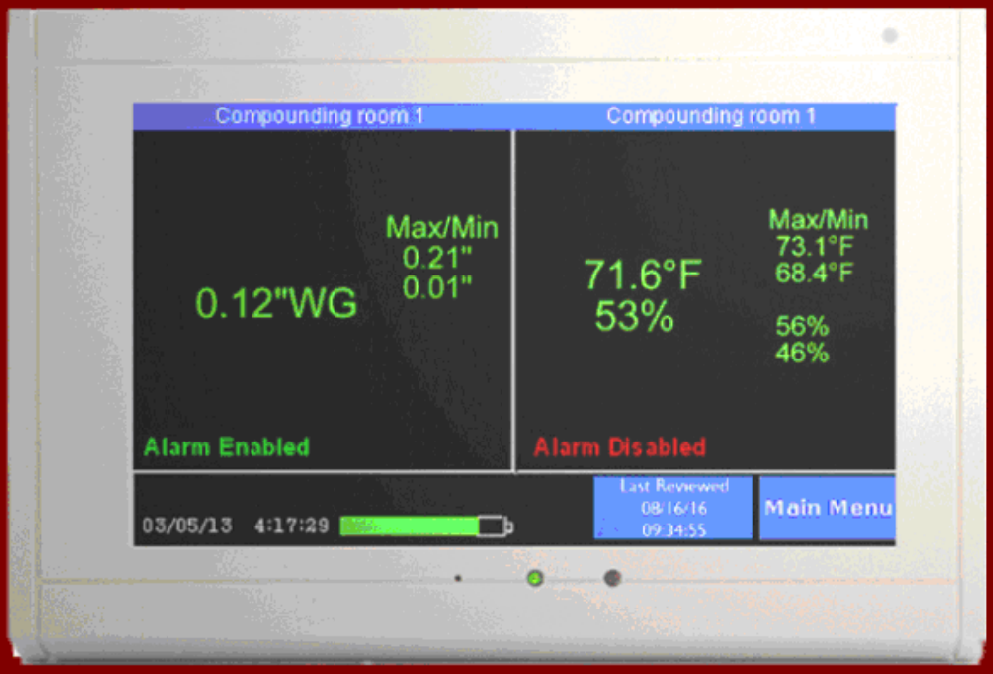

TV2 Clean Room Monitor

Users Guide
&
Installation Manual

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Congratulations!

Your TV2 Cleanroom monitor with easy touch display will provide years of reliable service, collecting, storing and displaying data while monitoring temperature, humidity and even pressure. Although it is a highly sophisticated instrument it is easy to install and use.

The Display:
The LCD display is a full color Easy-Touch display. With a simple touch you can navigate to the menu screens, a logged data chart for each sensor, zoom in or out of a chart to see more data, set the alarms, silence an alarm, set the data storage rate, etc...

Sensor Accuracy:
The TV2 Cleanroom monitor logs and displays information it receives from its sensors. The accuracy of that data is superb. Temperature sensor is ±0.3°C. The humidity sensor is ±3.0% or ±1.5% and the pressure sensor is accurate to .002"WC.

Powering the Cleanroom Display:
The TV2 Cleanroom display is powered via a USB cable, which can be plugged into a computer or the wall plug. A rechargeable non-user-serviceable lithium batter is installed in the Cleanroom monitor to provide for at least 100 hours if a power failure occurs.

Operating on batteries:
If normal power fails and the 'Missing AC alarm' is active, the internal buzzer will beep once a second for 60 seconds, sleep for 10 minutes, then beep every second for another 60 seconds, etc.. At the same time the Cleanroom Monitor will enter a light sleep mode after 20 seconds, to conserve battery power. Once power is restored the display will wake up.

Internal Alarm & Relay:
The Cleanroom monitor is equipped with a dry contact normally open (N/O) relay and piezo buzzer, which are activated when an alarm occurs. (See appendix for alarm types)

Factory Service and Returns:

Please call for a return authorization (RA) prior to sending any instrument for repairs. (see page 39 for warranty information).

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Cleanroom monitor Components

Your TV2 Cleanroom Monitor should have come with

1. At least two sensors (1 temp/RH and 1 pressure)
2. A six-foot USB cable
3. A wall transformer
4. A printed quick start guide

If any of these items are missing please contact the factory or the distributor/reseller from whom you ordered the TV2 for help.

Sensor types used by the TV2			
ID	Type of sensor	Range	Accuracy
Differential Pressure	**Digital**	**±0.5"wc**	**±0.002"wc**
Temperature only	**Digital**	**-20° to 80°C**	**±0.3°C**
Temperature & Humidity	**Digital**	**-20° to 80°C & 1% to 99%**	**0.3°C and 1.5%**
Extreme Temperature	**Thermocouple**	**-200° to 300°C**	**±1.0°C**

Additional Help

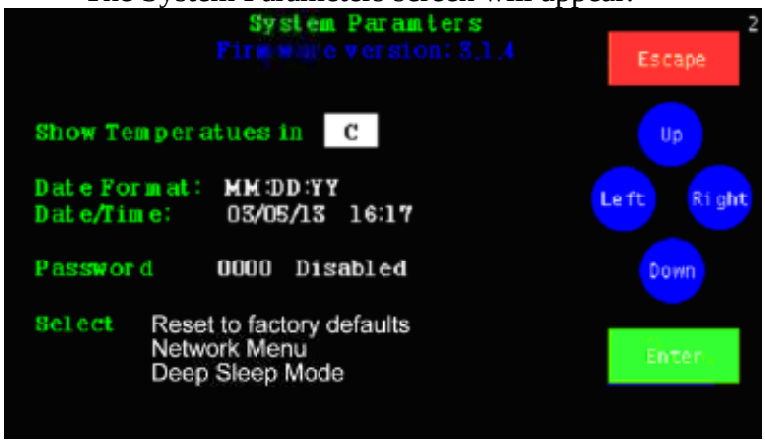
Installation Videos: **https://www.e2di.com/videos.html**
Installation Guide: **https://www.prodataloggers.com/clean-room-installation-guide/**

Quick Start

Your Cleanroom monitor can be installed and operating in just a few minutes.

1. Connect the Cleanroom monitor to a power supply (computer or wall plug). The display should immediately come on. If the display remains blank press the 'reset' button by inserting a paper clip into the small hole to the left of the green LED on the face of the Cleanroom monitor. (see page 10).

The System Parameters screen will appear.



2. Touch 'Up' or 'Down' to select C° or F° and touch 'Enter'. The highlight will move to the next field.

3. Touch 'Up' to select the date format (MM/DD/YY, DD/MM/YY or YY/MM/DD) and then 'Enter'. The date format defaults to the US style (MM/DD/YY).

4. Set the day, month, year, hour and minute in the appropriate field by scrolling through the possible values with 'Up' or 'Down' after moving to the appropriate field with 'Enter'.

   *(Note: If you move to another field by touching 'Right' your changes will **not** be recorded).*

5. Touch 'Escape'. You will be asked to verify that you want to erase all data. Touch 'Right' to highlight YES and touch 'Enter'.

6. Touch 'Escape' to return to the previous menu.

The Cleanroom monitor is now set and operating.
Next it will help you setup the sensors and alarms.

Setting up sensors

1. Plug the differential pressure sensor into the socket next to the green relay and the temperature/RH sensor right next to it.

Panel Mount

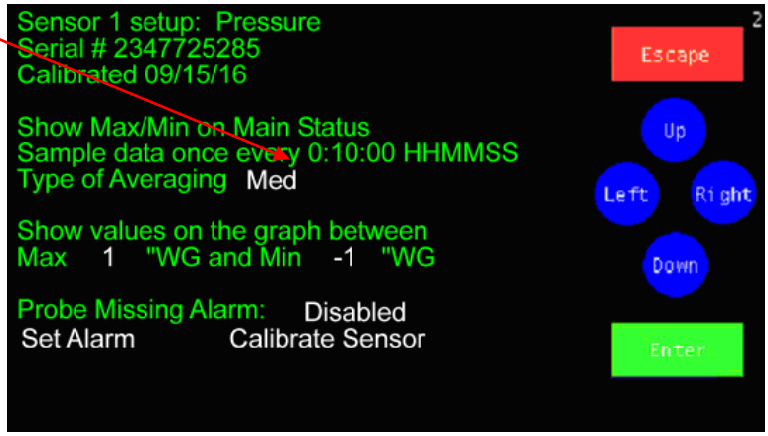
Pressure Sensor

Temperature/RH Sensor

(Note: The Differential Pressure Sensor has two clear plastic tubes only one of which must be positioned in the area you are monitoring. The 2nd one must be in an area where a different pressure is present. The sensor itself is extremely sensitive and can be affected by its position, so once it is in a permanent position it should be zeroed out-auto calibrated)

2. After a few seconds, the Cleanroom monitor will recognize one of the sensors and the sensor setup screen will be displayed (see below).

3. Show Max/Min on screen will be highlighted. Touch enter and the highlight will move to the hour field in the log data setting.



4. This determines how often the sensor will log a value. You may scroll to any value between 1 min and 24 hrs with 'Up' or 'Down', touching 'Enter' to move to the next field, or accept the default by touching 'Enter'. The default value is ten minutes (00:10:00).

5. Select the type of averaging with 'UP', or 'Down' and touch 'Enter'. There are three possible selections.
   a. Fast – no averaging occurs. The exact measurement at the time of sampling will be stored and displayed. (Not normally used except during calibration)
   b. Medium- some averaging will take place so that minor temperature fluctuations will be filtered out. *(This is the default value).*
   c. Slow – additional averaging will occur. (Not normally used).

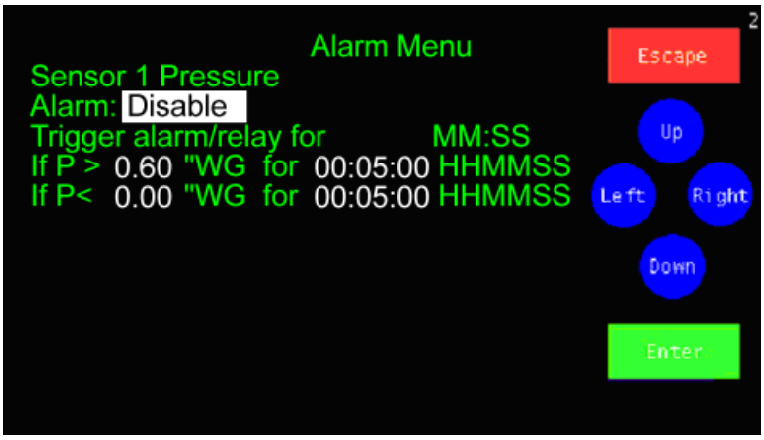
5. Set the graph max & min values (Y axis) with ‘Up’ and ‘Down’. **<u>This does not set the alarm</u>**. Setting these values has no effect on the alarm, what data is collected, or what is stored. <u>It simply sets the upper and lower point of the Y-axis of the data chart shown on the display.</u> Any logged value that falls outside these limits will show as a point at the top or the bottom of the display.

Note: These limits can be adjusted at any time without affecting your data.

Setting the sensor alarms

6. Highlight ‘Set Alarm’ and touch ‘Enter’.

7.



8. The alarm for this sensor is disabled by default. To enable the alarm touch 'Up' and then 'Enter'.

A. Set the trigger-alarm/relay to any time between 0:00 and 99:00. This controls how long the local alarm will beep and the N/O relay remain closed.

B. Scroll in the alarm upper limit and delay time and then the alarm lower limit and its delay time with 'Up’ and ‘Down’ touching 'Enter' to move to each field in turn.

Note: The delay time is how long the measured value, in this example pressure, must remain above the limit before the alarm occurs. <u>This helps prevent false alarms</u>.

9. You do not need to enter the Calibration Menu at this time, although once the pressure sensor is positioned it should be auto calibrated.

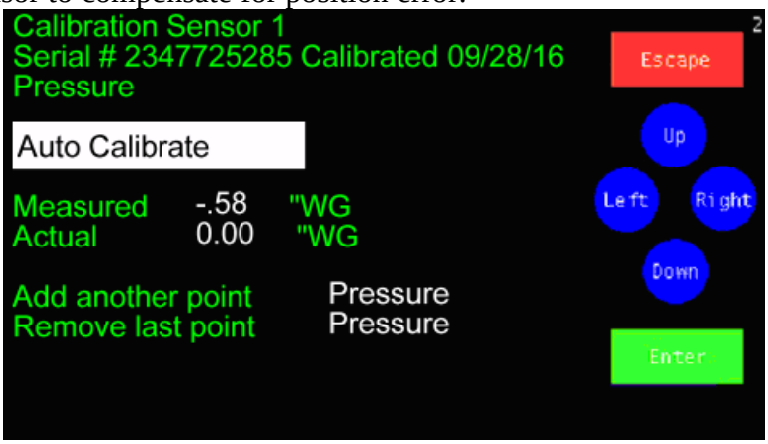
10. Once you have set the alarm for this sensor touch 'ESC'. The 2nd sensor setup screen will then appear so you can be set also.

External Alarm

The TV2 has an external normally open (N/O) dry contact relay that can be used to trigger an external alarm, auto dialer, or strobe. It supplies no power, only closing a circuit. It can be wired to any external device with its own power supply to be triggered when any alarm occurs.

Installation tips

1. **Planning -** Position the Cleanroom Easy Touch display close to an AC power source or your computer. It receives its power via a USB cable.
2. **Sensors:**
   Pressure and Temperature/RH Sensors. Decide where you are going to place each sensor. Each one has a 25-foot wire which needs to be run back to the display. Extender wires are available.
   a. The + (positive) opening at the end of the clear plastic tube of the pressure sensor should be placed so that it senses the room pressure and the tube from the - (negative) side should be placed so that it sensors the environment right outside the room. *(If your cleanroom has negative pressure the tubes should be reversed).*
   b. Once the clear plastic tubes coming from the pressure sensor are positioned and the Cleanroom Monitor is 'seeing' the pressure **it should be auto calibrated**. Move to the 'Sensor Setup' menu and touch 'Enter'. Highlight the Calibration Menu and touch 'Enter'. The calibration menu will be displayed. Make sure that the pressure in the two areas or rooms equal and touch 'Enter' while the Auto Calibration is highlighted. This will 'zero' out the pressure sensor to compensate for position error.



3. **Power for TV2.** Power is supplied through the USB cable. This cable can be plugged into the wall transformer which came with the Cleanroom Monitor or into a PC. If the USB cable is plugged into a computer, the display will be powered by the PC.
4. Backup Battery - A rechargeable lithium battery is installed in the display to provide temporary power during a power outage. If a power outage occurs, the display will go to sleep after 20 seconds to decrease the load on the battery. A fully charged battery will operate the TV2 in sleep mode for at least 100 hours when new, depending on how often you are sampling data.

Operational Tip: The battery will be discharged during a power outage, but will recharge itself once power is restored. The icon in the bottom center of the display shows the battery charge level. A text message 'AC Charge" appears on top of the green battery icon any time it is being charged. This is normal. The AC-Charge message disappears when the battery is fully charged. The lithium battery slowly loses its charge over time, so that after five years it will only run the TV2 for 72 hours and after 10 years it will run the TV2 for 40 hours.

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The Cleanroom Monitor

The QuickCheck display

(see pg 14 for alternate displays)

Current Differential Pressure. Updated several times a minute.

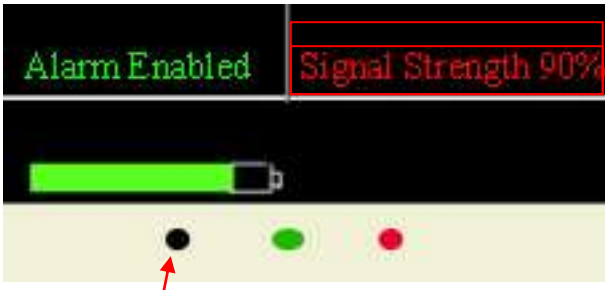
Max/Min temperature recorded since the last reset. *Appears in red if the reading is too high or low.*

Additional information can be seen by touching various 'hot spots' on the Easy Touch display.

For example:

1. Touch a value to see the history chart for that sensor.
2. Touch a Max/Min area to reset it to zeros.
3. Touch 'Main Menu' to set or change various settings, such as the scale, the temperature sample rate, high-low alarms for each sensor, etc...
4. Touch Last Review to log an instance of an operator review.
   a. Cleanroom log - to record a review touch the Last Review button. The monitor records that review on its on-screen chart. If the data is downloaded to a computer each review shows on the chart as a vertical line. If the chart is exported to Excel a 1 will appear in the Last Review column at the time it was recorded.

The LEDs and reset button at the bottom of the display.



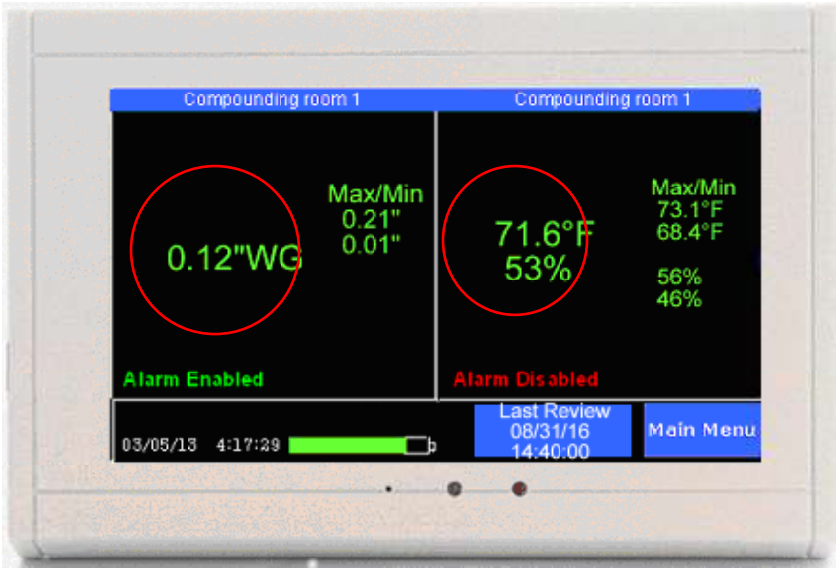
The green LED blinks once a second, indicating the display is collecting data and working normally. This LED will continue to blink during a power outage, indicating that it is collecting and logging temperatures from the sensors

The Red LED blinks when the display is operating on batteries, or if an alarm occurs.

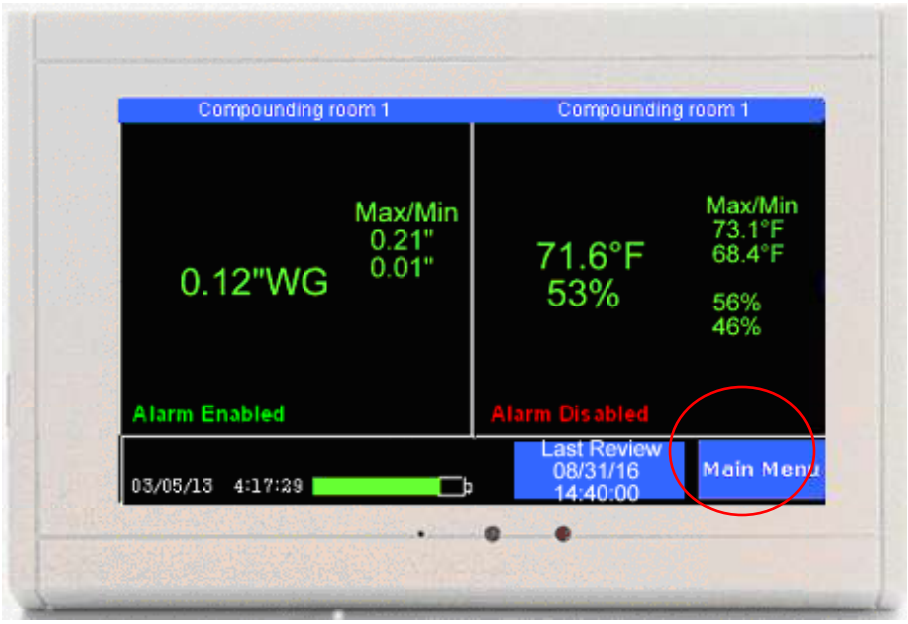
The small hole on the left of the green and red LEDs is the reset button. Insert the paper clip until you feel the button press down. It will pop back up as soon as you release the paper clip and a system reset will occur. (Your settings and data will be preserved).

Navigating with Easy Touch

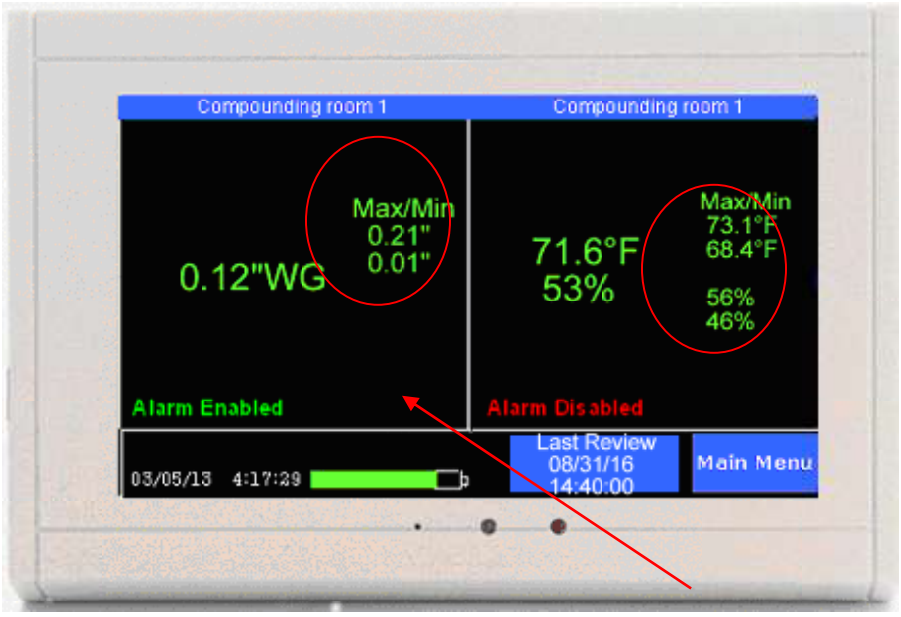
Where to touch



Touch any value to see a logged data chart for that sensor.



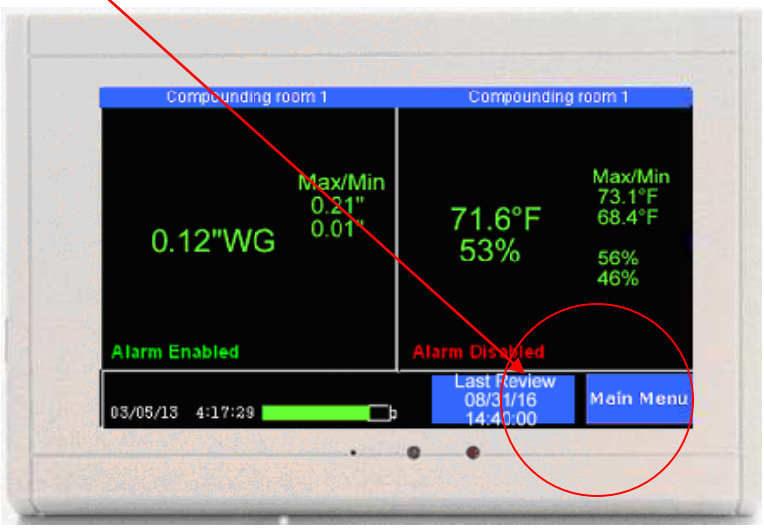
Touch 'Main Menu' to change settings.



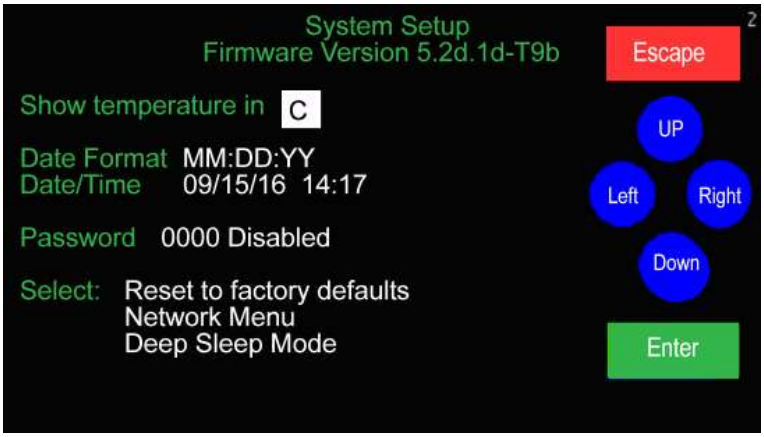
Touch a Max/Min temperature to reset it

The Main Menu

Touch 'Main Menu' at the bottom of the Status Screen to enter the menu system.



To change the system operating parameters highlight the 'System Setup' and touch 'Enter'



In the ‘System Setup’ menu, the date and time can be set or changed, a password to restrict access to the menu system can be set, a system reset to factory default can be activated, and the Cleanroom monitor can be put into a deep sleep mode.

To make a change:

1. Make sure the proper field is highlighted by touching ‘Left' or 'Right' until the desired field is reached. If the last field on the page is highlighted touching 'Right' will move the highlight to the first field on the page.

2. Once the field is highlighted, touch 'Up' or 'Down' to select the desired choice.

   Note: The longer you hold your finger on 'Up' or 'Down', the faster it will scroll through the possible choices. Once it reaches the last possible choice it will wrap around to the first choice.

3. Touch 'Enter' after selecting the proper value.

   Note: It is possible to move to the next field by touching 'Right' but your change will not be saved. The change is only finalized by touching 'Enter'.

Displaying Sensor Data

The Cleanroom monitor main display (Quick-check) will change depending on how many sensors you are receiving data from. If you have one sensor plugged into or linked to the TV2, the display will look like the one below.

Once you plug a second sensor into the TV2 the QuickCheck screen will change to show both sensors as depicted below.

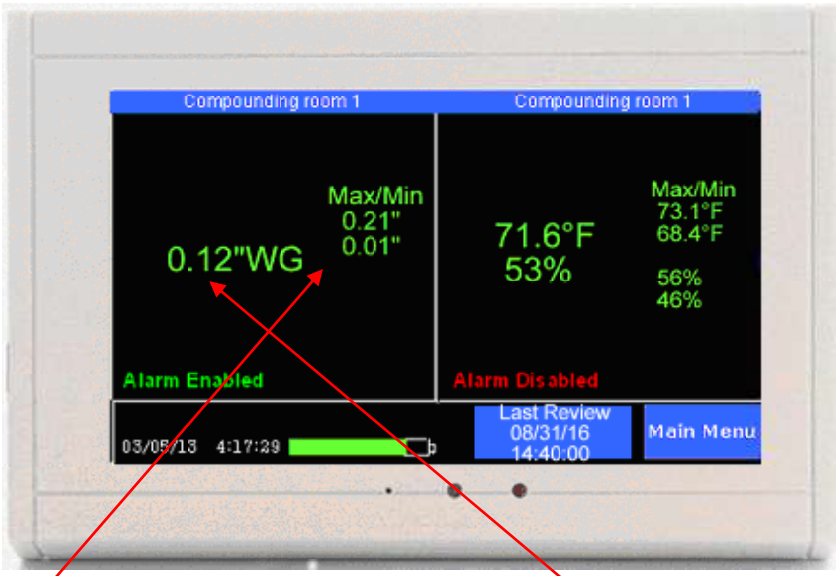
Although the display is dynamic and will change depending on the number and type of sensors, It will always show:

1. The current measurement for each sensor
2. Whether the alarm is enabled or disabled for each sensor
3. The current date and time
4. The backup battery charge state
5. The date of the last data review.

Operational Modes

The Cleanroom monitor has four operational modes: ***Main; Chart; Trace; and Sleep.***

Main Mode



The screen is divided into sections showing each sensor's current reading along with the maximum and minimum value recorded for that sensor.

Elements of the display:

1. The differential pressure or temperature/relative humidity, is displayed in large green letters. The max/min readings are also shown in green, unless one of the values violated an alarm limit, in which case the font will change to red.

   Note: It is possible that a max or min temperature was too high or low but an alarm was not triggered. This would happen if the violation was shorter than the delay time.

2. The battery icon at the bottom of the display is for the Cleanroom backup-battery.

Chart Mode

To see the logged data for a sensor, touch that sensor's current value.

Chart for sensor #2

Hot Spots to switch sensors

1. The scale, in this example temperature, which appears as the Y-axis of the chart, is set in the sensor setup menu. (There could be logged values above or below the Y-axis limits)

2. The number in the upper right hand corner of the display indicates which sensor's chart is being shown (sensor 2 in this example).

3. The timeline along the top of the chart, the X-axis, indicates when the temperatures were logged. The dates on this line will change if you scroll left or right or zoom out or in to view additional data. (See FAQ page 35 for more explanation of the zoom feature).

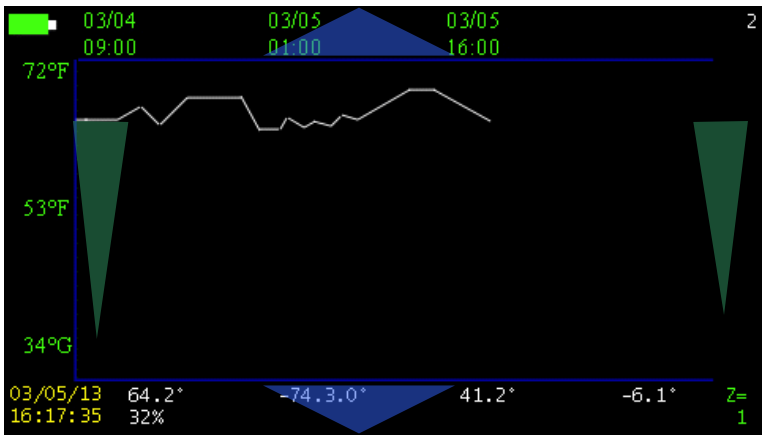
4. The bottom two rows of the display show the current day and time along with the most recent reading from each sensor. Also shown, at the bottom right of the screen, is the zoom level. (See FAQ on page 35 for an explanation of this feature)

Use the hot-spots to switch charts. Lightly touching any of the four temperatures on the bottom of the display will immediately change the screen to show that sensor's temperature history chart.

Note: *The Cleanroom monitor stores a lot of data but eventually it fills up. Once it does, the newer data rolls over the oldest data. If you are sampling data every 10 minutes the last 2 years of data are stored and can be viewed.*

Touching anywhere in body of this chart adds four navigation buttons (blue and green triangles) as shown below so you can view additional information.

Touching the bottom blue triangle doubles the amount of data displayed on the chart (see zoom in FAQ, pg 35). The top blue triangle zooms in, so less data is displayed. The green triangle on the left scrolls backward, showing older data, while the green triangle on the right shows more recent data. To return to the status screen touch 'Escape'.



Sleep Mode

There are actually two different sleep modes. The display is blank in each sleep mode.

1. A light sleep mode is entered anytime the TV2 is operating on battery. This limits the drain on the battery. The TV2 automatically enters the light sleep mode 20 seconds after power to the TV2 is cut. The TV2 continues to perform all normal functions while running on batteries performing all normal functions, including: taking and logging temperatures; sounding alarms; and downloading data, if auto downloads are setup. The only difference in operation is that the display is blank.

2. A deep sleep mode can be selected by the user to suspend all functions of the CLEANROOM MONITOR. This deep sleep mode turns all Cleanroom monitor functions off except the internal clock. Once the Monitor is put into deep sleep mode it will remain asleep until power is supplied.

Calibrating sensors

The TV2 monitor does not require calibration. There is no error introduced by the monitor. It is only necessary to calibrate the sensors.

To calibrate a sensor, access the sensor setup menu by touching 'Main Menu' and 'Right' until the sensor setup area is highlighted.

Touch 'Left' to highlight Calibrate Sensor and touch 'Enter''. The calibration table for that sensor will be shown.

Calibration Table

Auto Calibrate zeroes out the sensor and in only done for pressure sensors.

Calibration data entered in the calibration table will be stored on the sensor in non-volatile RAM. Sensors can easily be moved between Monitors.

Each sensor may have up to three different calibration points. When the calibration screen first opens, only one point is listed, but you can add one or two additional points by highlighting 'Add another point' and touching 'Enter'.

The 'measured value' is the temperature shown on the status screen, and the 'actual value' is what it should be reading. This 'actual value' is most often obtained from a second comparison instrument.

How the Cleanroom monitor uses this data:

1.One point – Any measured value will be offset by this amount.

2.Two Points – Any value will be adjusted by the offset equal to the point on a line drawn between the two points.

3.Three Points – Any value will be adjusted by the offset equal to the point on a line drawn between the three points. The line could be straight or the slope between point 1 and 2 could be different than the slope between point 2 and 3.

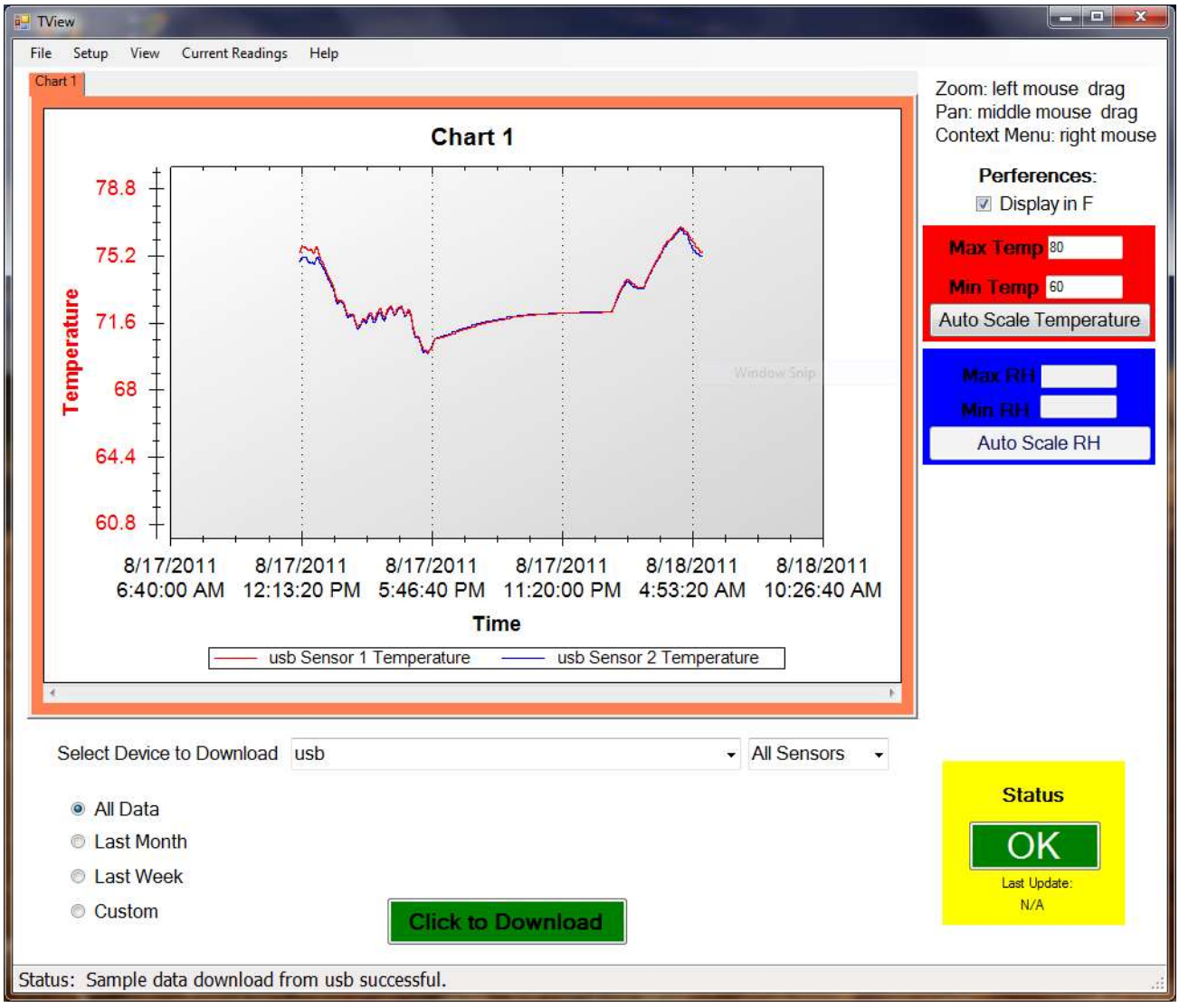
Note: Once either an actual value has been entered into one of these fields the values displayed in these fields will not change. Even if the sensor is showing some very different value on the QuickCheck screen the measured and actual value will be fixed at the values you keyed in during the calibration procedure.

(Suggested calibration procedures can be downloaded from the support page under Resources on the 2di web site)

TView Software

Copying data from the display

Downloading, or copying data from a Cleanroom monitor to a computer is done over your LAN. When the TV2 is plugged into a LAN the TV2 will obtain an IP address from your local DHCP server. This address can be seen on the Network menu.



TView Software Users Guide

To obtain the free version of TView software:

1. Click on the 'Support' link under Resources on any page on http://www.e2di.com.

2. Click the link for the PC Download software and select the version you need.

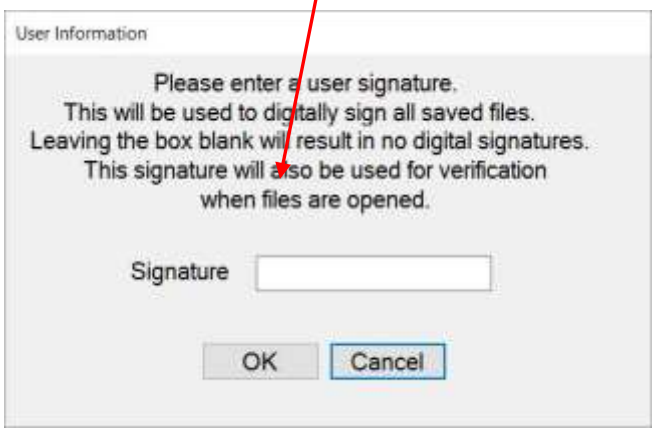
3. Save it to your computer.

4. **Unzip the file** and click on Setup. *(If you have an older version of the software already installed on your computer you must uninstall it first).*

5. During the installation process, a directory may be created and files will be written to your computer. Make sure you have rights to do so. You will be given an opportunity to install the software in a directory other than the default directory. We recommend that you accept the default directory. This installation process is just like any other Windows installation process.

6. Once the software is installed, click on the TView icon to open the program. The icon will be in the Two Dimensional Instruments folder. You can, of course, copy the TView icon to your desktop for convenience.

When you open the TView software you may see a small popup window asking for a user signature. You may skip this step unless you must comply with 21 CFR 11 requirements. Once you save a file with a Users Signature you will not be able to open that file without supplying the Signature. If you do not see the popup you can open it from the 'File Menu' later

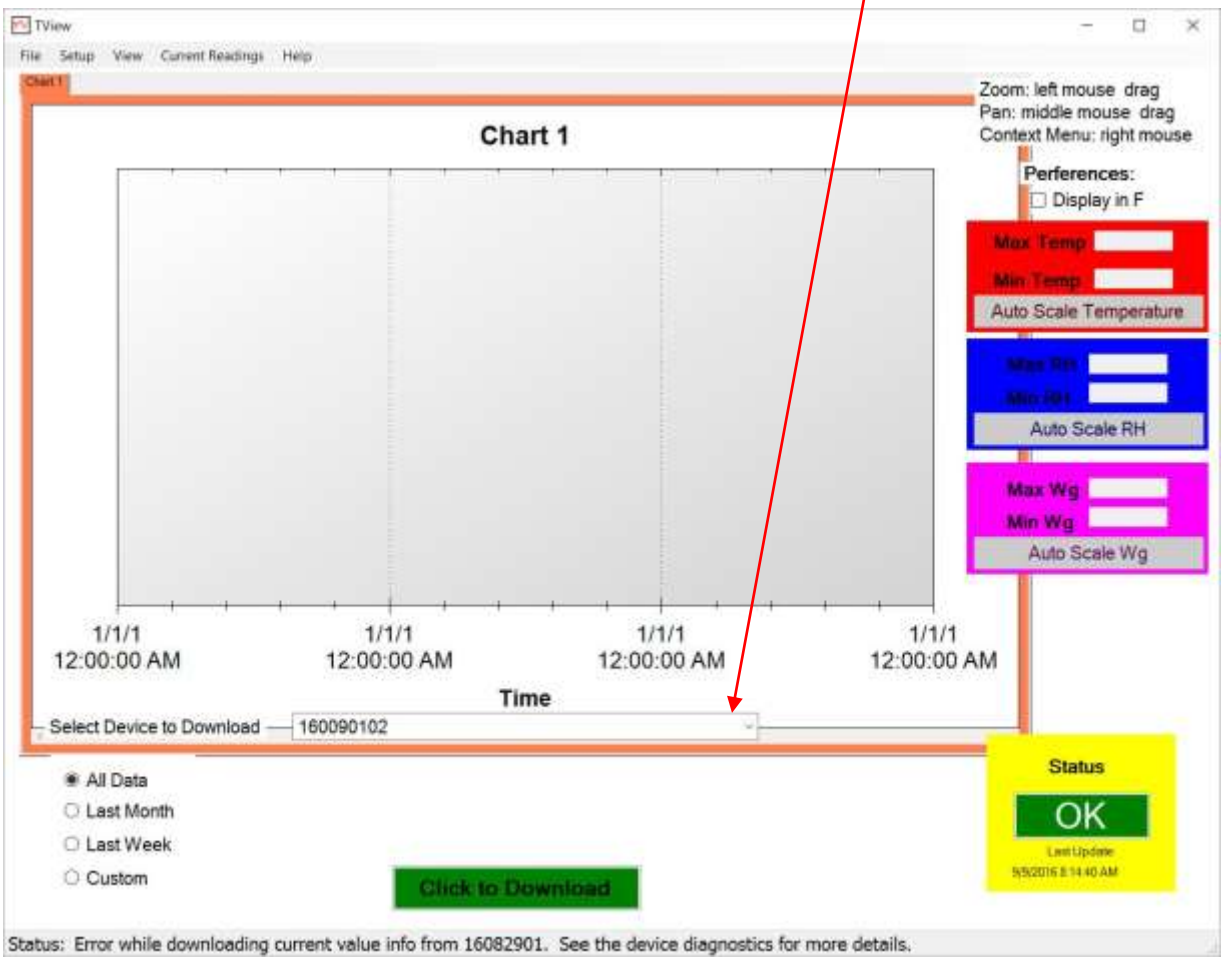


To Copy Data from the Cleanroom monitor

To copy (download) data from a TV2 you must link the TView software to the TV2 by entering the IP address in the 'Manage TV2 devices' fields under Setup, (See page 37).

Once you have identified your Cleanroom monitors, you are ready to copy data.

1. To copy data from a Cleanroom monitor first select it by clicking the small arrow on the right side of the box entitled 'Select Device to Download'. All TV2 monitors will be listed by the location name. Select the one you want to download data from.



   a. Select the date range you want to download by clicking one of the buttons to the left of the green download button. The 'All Data' button is selected by default, so that all stored data for the selected Cleanroom Monitor will be downloaded and displayed. Clicking on last month, last week, or custom and setting a date range will cause only that data to be copied to the PC and displayed. *This can be tricky and may not work the way you expect if the date on the monitor is different than the one on the PC.*

b. Click the 'Click to Download' button.
   i. If there is already data from the same Cleanroom monitor on the PC chart you will be asked if you want to replace the existing data. If you answer yes, the displayed chart will be erased, and data will be charted on the display. If you need to keep the displayed data, click 'no' and save the existing data before downloading additional data. You could also move the chart with existing data to another tab, by right-clicking on the chart or download the new data to different chart.

2. By default, the TView will set the scale of the display so that the downloaded data will be positioned near the center of the chart. If you type a value in the Max - Min boxes to the right of the display, the scale will be adjusted accordingly.

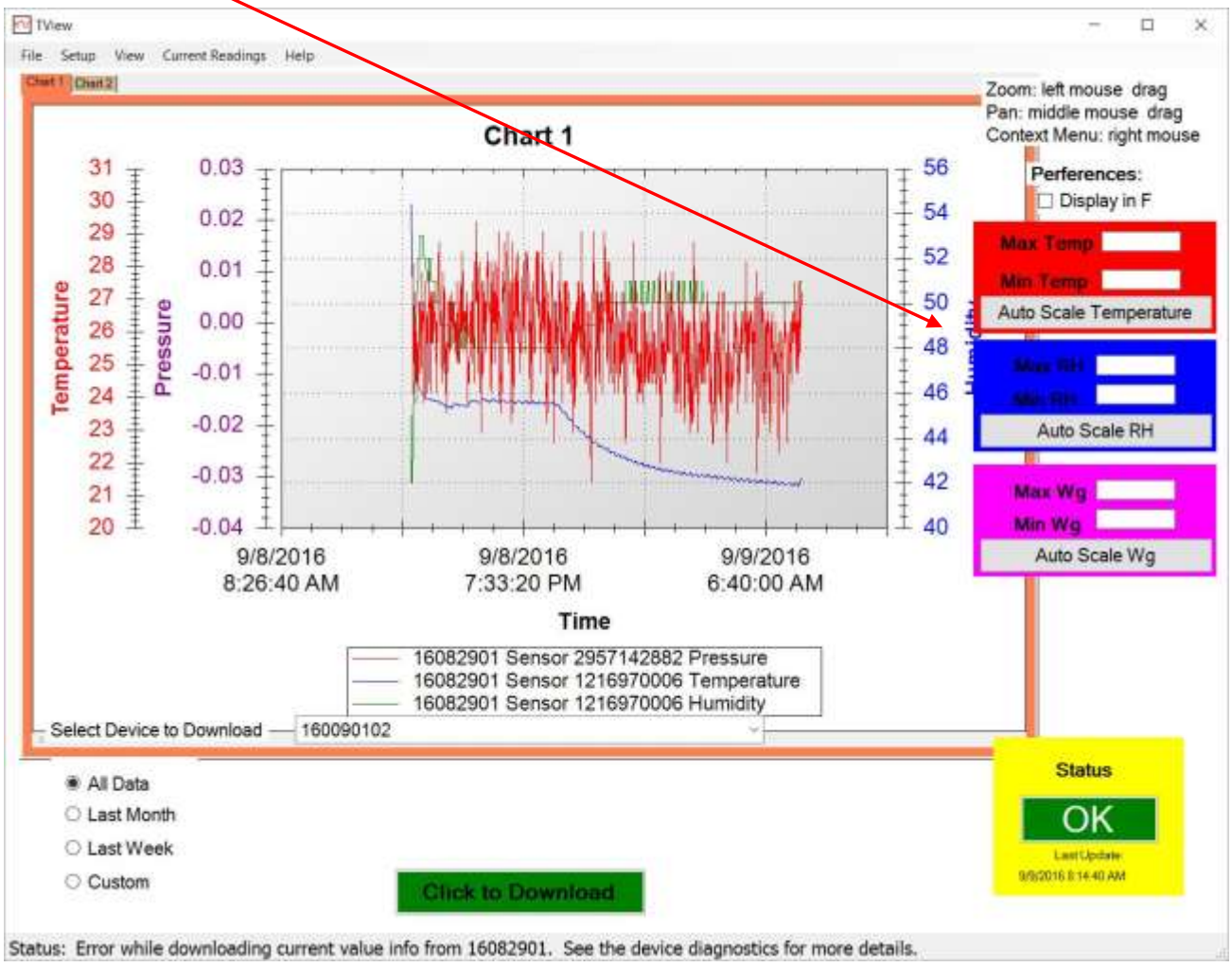
3. Once the chart has been copied to your computer, the actual data can be moved around or zoomed into, to highlight a particular area.
   a. To zoom into an area of the chart, draw a box around it with the mouse by positioning the cursor at the top left-hand corner of the area and while holding down the left mouse button move the cursor toward a lower right position. When the mouse button is released the chart will be re-scaled to show only the data within the box. To display the entire chart click the right mouse button and select 'Undo all Zoom/Pan'.
   b. To move a chart to a different tab right click the mouse on the chart and select 'Move a Plot to another graph'.

Working with Charts

1. When TView is opened, a blank chart is displayed. It is listed as Chart 1 on the tab at the top of the chart and as the title of the chart. You can rename this by double-clicking on the tab and typing a description in the text box. This will rename the chart and the tab.

2. You can place the cursor over any point of the chart to see the logged value, the date and the time it was saved.

3. Scales will be displayed on the left and right side of the chart. You can change the temperature scale to Fahrenheit by clicking the box to the right of the chart under preferences. You can also set the Y-axis for temperature and humidity by typing a value into the boxes on the right.



Drop-Down Tabs

1. The ‘File’, ‘Setup’, 'View, 'Current Readings', and ‘Help’ tabs:

a. File

i. New Chart. This creates an empty screen with a new tab to the right of any already displayed tabs. The tab and chart description can be changed by double clicking on the tab itself and typing the new name in the text box. Multiple charts, each with its own tab can be created.

ii. Open Chart. This command opens a TView file previously saved and stored on a computer. You will be prompted for a file name. Only files with a file extension of TXV can be opened. You must enter a Signature if the chart was originally saved with a Signature (see iii below).

Note: It is not possible to load the same file into more than one chart or to change any part of a file displayed in TView.

iii. Save Chart. This saves the active chart to your computer. The saved chart will be encrypted and have a TXV suffix. It is encrypted with the Signature you entered when the program was opened.

iv. Export Chart to .XLS. This command exports the chart shown on the active tab to an XLS file that can be opened with Microsoft's Excel. Each sensor's data will be transferred to a separate worksheet in the Excel Workbook. This breaks the 21 CFR 11 requirement as it **is** possible to change this data once exported to Excel.

v. Print Chart. Sends the displayed chart to a printer. If there is more than one plot on the chart, you should use a color printer so you can tell the plots apart. The chart looks better in landscape mode that portrait mode.

vi. Close chart. This immediately erases the selected chart and deletes it from your computer.

vii. Run in System Tray. This minimized the TView program and moves it to the background. This is useful if you are auto-downloading to your computer and want to leave the program running without seeing it on your desktop.

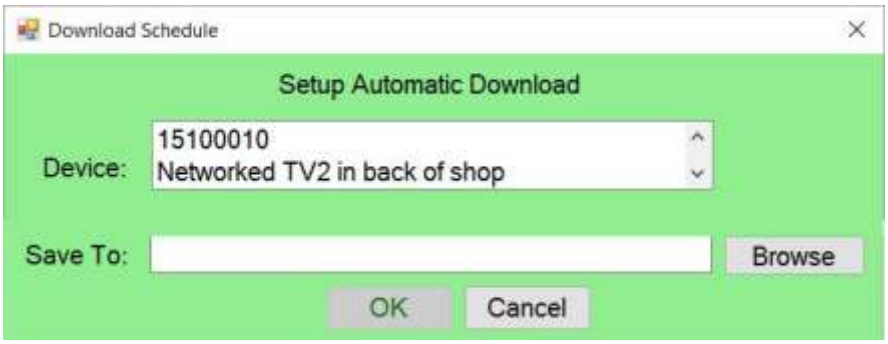
viii. Exit. This closes the program and stops any further activity.

b. Setup tab:

i. Manage TV2s. Used to add, remove or modify a TV2. Adding a TV2 requires the user to name it and allows each sensor to be named and an email address to be entered. *Note: This email address overwrites email addresses entered in the 'Email Setup' menu; so that specific persons are alerted if this particular TV2 goes into alarm mode.*

ii. Schedule Download. Once scheduled, data will automatically be written to your computer ever few minutes.

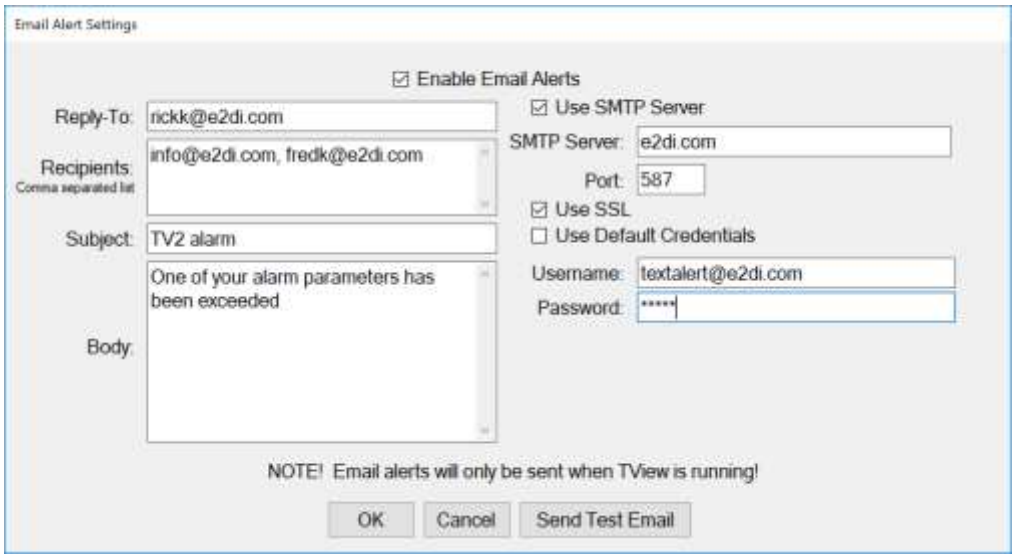
1. Select the Cleanroom monitor with its sensors to be downloaded by clicking 'Add New Device' and selecting the one you want.
2. Type in a file name and specify the location on your computer where you want the data stored. The file name will be proceeded by a year, month. A new file will automatically be created every month.
3. For alerts to be emailed or texted, Automatic Downloads must be setup and working.



Note: You must have rights to create and to write files on your computer when you schedule an auto download.

iii. Change user information. This is used to enter or change a username and password for a Cleanroom monitor for 21 CFR 11 purposes.

iv. Email Alerts.



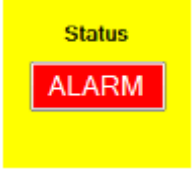
Step by step instructions for setting email alerts can be found under the 'Help' tab or by downloading the "Setting up Email Alerts" under support.

c. View tab:

To view alarm settings or logs, the TView software must be auto-downloading mode the TV2 you want to view.

ı. Alarm setting. Shows alarm setting for a particular TV2.

ıı. Alarm log. Shows a record of all alarms for all Cleanroom monitors being auto-downloaded. This display can also be accessed when the user clicks on the status button at the lower right of the TView program. If a known Cleanroom monitor goes into alarm mode, the status button will indicate that an alarm has occurred by displaying the word 'Alarm' in red letters to alert the user. By double clicking this button the alarm log will be shown. After reviewing the alarm, click 'Mark as Reviewed' to hide it or right click an alarm and delete to remove the alarm from this list.



iii. Email alerts. This displays a history of all email alerts sent.

iv. Legend. This moves the legend on the TView download screen from underneath the display to the side. If also allows you to turn off the legend which is helpful if you are download data from a TV2 with a lot of sensors.

d. Current Readings tab: This screen displays real time data from Cleanroom monitor sensors. Data does not have to be auto-downloading but the Cleanroom monitor must be detectable by the TView software.

1) When this window opens it will be blank. To add a sensor to this screen click the 'Add' button and select the Cleanroom monitor to which the sensor is attached. A popup will list the sensors attached to monitor. Select one or more sensors by clicking on them. The last 100 readings will be displayed in the chart along with the current temperature. You can add additional sensors to this page. Clicking the 'Hide chart' button will hide the chart and display only the numeric reading. The charts are updated every few seconds.

(*Note: These values displayed are the actual values seen by the sensor, which may or may not be the same as the logged values, depending on how you are averaging data.)*

2) A plot can be removed by clicking on the X in the upper right area of the chart.

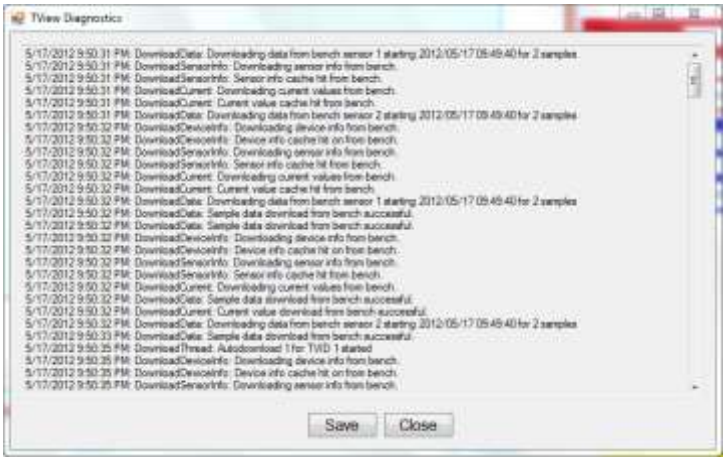
3) If a plot is displayed and an alarm occurs for that sensor, the small chart will turn red and the alarm status button on the main page will be updated.

e. Help:

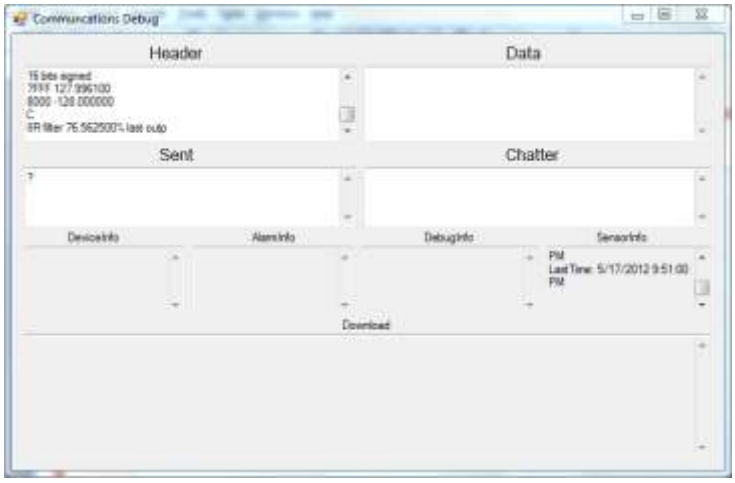
1. 'User guide'.

2. Email Alert Setup. This word document contains a step-by-step guide to implementing the Email Alert Setup.

3. 'TView Diagnostics Menu' will be used when requested by a 2di technician. All activity of the TView software is archived. This information can be saved to a file and emailed to 2di.



4. 'TView Communications Diagnostics' Menu archives all communications between TView and TV2s for support and troubleshooting.



5. 'Save Diagnostics file send to 2di'. This will save the diagnostic file your computer so that can be emailed to 2di help in troubleshooting.

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FAQ

1. Can I tell if a high or low alarm occurred by looking at the Cleanroom Monitor chart display?
   Yes – If an alarm was triggered an upper-case "A" is placed on the chart at the time the alarm began and a lower-case "a" at the time the alarm was silenced or expired. (To see logged data touch the value on the Quick-Check display.

2. What is the purpose of the Zoom-out and Zoom-in buttons on the monitor logged data chart?
   a. The amount of data displayed by the chart on the Cleanroom monitor changes according to the Zoom setting. One data point is plotted in each column if the chart is zoomed in completely (Zoom =1X).

   b. Touching the '**ZOOM-OUT'** button *(green triangle at the bottom of the chart display)* causes more than one data points to appear in each column. The data on the Cleanroom monitor can be zoomed out 10 times (Zoom =10X). This means that the user can see between 4 months and 256 years of data on one screen, depending on how often the sensor logging data. In any zoomed-out mode more than one collected measurement appears in each column. The logged data is displayed as a high-low vertical bar.

      1. So, for example, if the Cleanroom monitor is set to Zoom=2X then each column will show two temperatures connected by a vertical line whose top is the higher temperature and whose bottom is the lower temperature.

      2. If the chart is zoomed out further than 2X to say Zoom = 6X, the measurements (in this case all 32 of them) will appear as a single vertical line with the highest of the 32 temperatures being the top of the line and the lowest of the 32 temperatures as the bottom of the line. The TV2 can display between 1 and 512 measurements in each column. The **ZOOM-OUT** green triangle can be touched ten times (Zoom=10X), which will show the maximum amount of data. This method of displaying multiple measurements in the same column allows the TV2 to display large amounts of data in the same way that stock prices are displayed with high-low bars covering a period of time.

3. Can I change the date and time without loosing data?
   If you are set the date or time **back**, all logged data will be erased *(You will be warned before any data is actually erased)*. You can move the time forward **1 hour or less** without losing data. A data gap will appear in the logged data. If you move the time forward more than one hour, all logged data will be erased.

4. How much data can be exported to Excel with the TView program?
   When you open a file with Excel that has been exported from TView, only the first 65,000 data points will be saved. *(This is a limitation of the Excel program not the Cleanroom monitor or TView*). The TView program has no such limitation and will save and display all data.

14. Can I move Cleanroom monitor to a new location without losing data? Yes. If the move is a short one you can just unplug the monitor and move it. The internal battery will continue to operate the monitor. If the Cleanroom monitor is to be unplugged for several days it should be put in a deep sleep mode.

    1. Go to the Main menu by touching 'Enter' twice and touch 'Left' to highlight 'Deep Sleep Mode'. Touch 'Enter'. The monitor will go into a deep sleep mode during which the clock will continue to run but no other functions will occur. Once Cleanroom monitor is repositioned and power supplied it will re-start. If the display does not immediately wake up press the 'Reset' button with a paper clip. Your previously logged data will still be there and will display properly.

15. How do I change the Cleanroom monitor batteries?
    The Cleanroom monitor has an internal rechargeable Lithium battery which is not user serviceable. It should last for at least 10 years. If it does fail it must be returned to the factory for replacement.

Disclaimers

:::Disclaimers:::----------

1. Although Two Dimensional Instruments, LLC has made operational tests on our software "TView", we cannot guarantee that all operations will work properly under all conditions.

2. Two Dimensional Instruments, LLC shall not accept any responsibility for any damage whether direct or indirect that results from the usage of the TView software or the Cleanroom monitor.

3. Specifications of “TView software” may be subject to change and service may be terminated without advance notice to the user. In such a case Two Dimensional Instruments, LLC shall not be responsible for any damages whether direct or indirect from the inability to use “TView software”.

4. Two Dimensional Instruments, LLC has no obligation to correct any defects found in “TView software”.

5. If the TV2 firmware is modified in any way it will be rendered inoperable and non-responsive. It is not possible for firmware to be upgraded in the field. To upgrade firmware the TV2 display must be returned to Two Dimensional Instruments, LLC for reprogramming for which service additional charges may be incurred.

:::Copyright:::----------

1. All copyrights “TView software”, including all programs and all related documents, are the sole property of Two Dimensional Instruments, LLC.

2. “TView software” without Email notification is for use free of charge. Redistribution is permitted as long as it is to others for non-profit. In this case, all terms and conditions as written in the above disclaimers automatically transfer and hold true and valid for the party to which the program was redistributed. Please note that if you wish to commercially redistribute the program please contact Two Dimensional Instruments, LLC directly.

3. The reprinting or redistribution for commercial purposes whether in part or in whole, in magazines or as a part of any product is strictly forbidden without the expressed consent of Two Dimensional Instruments, LLC. Any inquiries concerning commercial redistribution should be directed to the Sales Department of Two Dimensional Instruments, LLC.

4. Please do not attempt to make any changes or modifications to “TView software”.

Warranty

The TV2 line of Instruments including the Cleanroom monitor is warranted by the manufacturer to be free from defects in material and workmanship for a period of twelve months after delivery. In the event of a claim under this warranty, the product or part must be returned to the factory for repair or replacement (shipping prepaid) with a Return Authorization Number. It will be repaired or replaced at the factory's option without charge to the user. Any freight charges incurred may, at the factory's option, be passed on to the user.

This warranty does not cover routine calibration or battery replacement. The forgoing warranty and remedy are exclusive and in lieu of all other warranties either expressed or implied.

The manufacturer shall under no circumstances, be liable for consequential or incidental damages resulting from failure or malfunction of its products. The manufacturer makes no warranty for products not manufactured by itself or for any products modified by the buyer or subjected to misuse or neglect.

Under no circumstances shall the manufacturer be liable for consequential or incidental damages to any other products or inventory as the result of the use or misuse of its products.

FCC Verifications

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules.

This equipment conforms with the Australian and New Zealand EMC requirement for generic products to be used in residential, commercial and light industrial environments. AS/NZS 4251.1.1:1999 (AUS/NZ Class B verified)

Declarations of Conformity and Certificates of compliance can be Downloaded from our web site at: http://www.e2di.com/doc.htm

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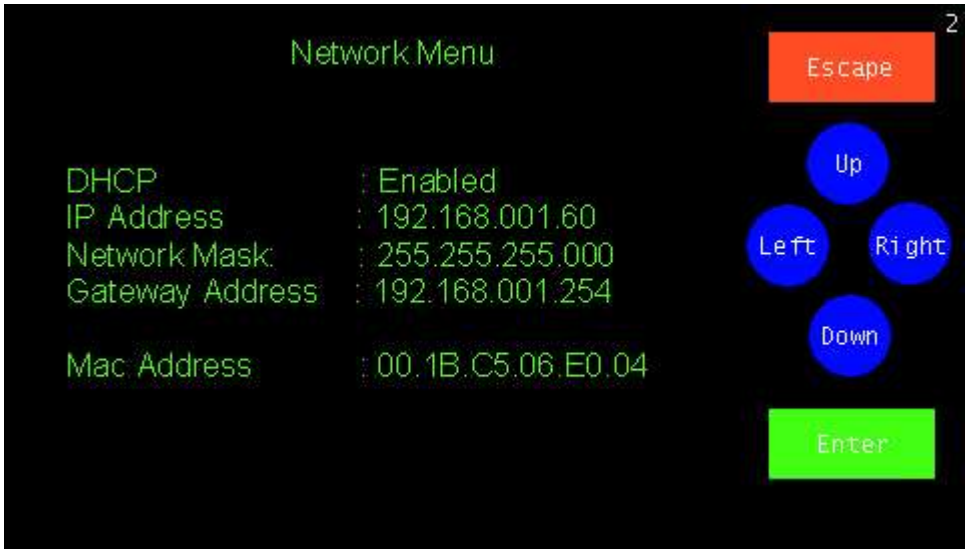
Appendix

Configuring the Cleanroom monitor for a Local Area Network

Enter the Network menu by touching ‘Enter’ twice, highlighting the ‘Network Menu’ selection and touching ‘Enter’

Each Cleanroom monitor has a unique MAC address which has been programmed by the factory. TView PC software communicates with the monitor via this MAC address. The Cleanroom monitor can obtain an IP address from your local DHCP server when it is plugged into your LAN.



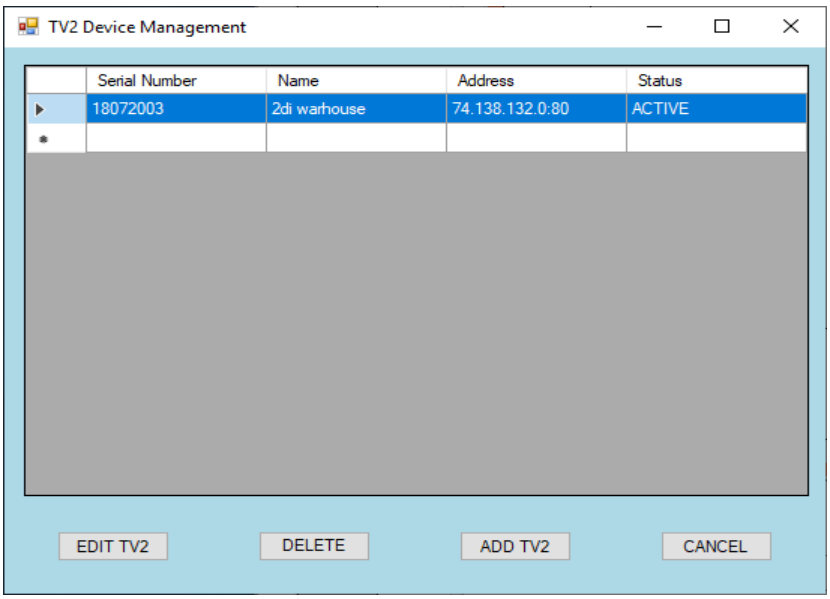
If DHCP is Enabled a DHCP server on your network will automatically assign an IP address to it. If you prefer to assign a static IP address to the monitor disable the DHCP and enter the IP address into the IP Address field on this menu.

Whether you enable DHCP or assign a static IP address, make a note of it so you can enter it into the communication setup area of TView.

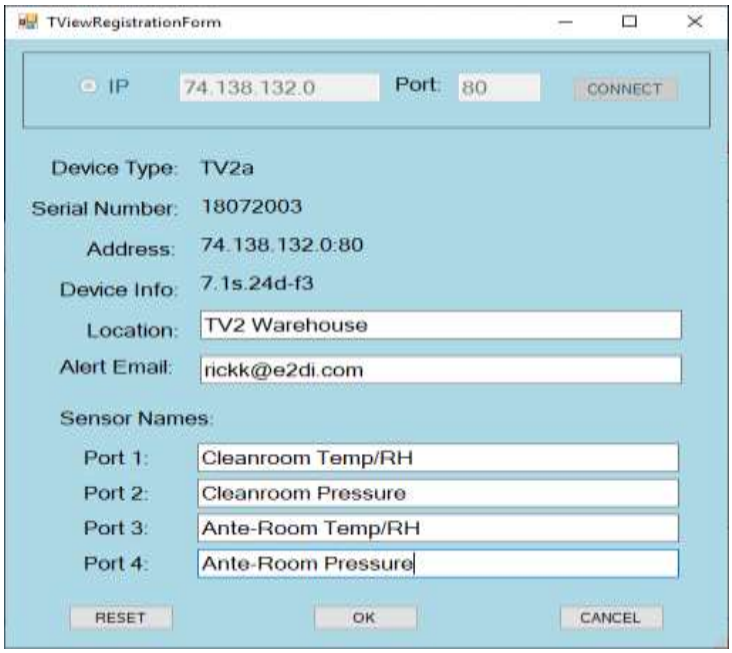
Exit this menu by touching 'Escape'. This menu can be accessed at any time through the 'System Setup' menu.

Configure TView

To configure TView to communicate with a Cleanroom monitor on your LAN open TView click 'Setup' and 'Manage TV2 devices.



Click Add TV2, type in the IP address of the Cleanroom monitor and click 'Connect'. After a moment a popup menu will be displayed. You must type something in the Location field, but the rest of the fields are optional.



TWO DIMENSIONAL INSTRUMENTS, LLC

Viewing the Cleanroom Monitor over the Internet

To access the Cleanroom monitor from outside the LAN a static IP address will need to be used and port forwarding setup by your IT department. With port forwarding you can see current conditions by typing the correct IP address into a browser.

You can use Current View to see current data or download data with the Tview download function to see logged data.

You will be able to view the information below but you cannot make changes to the Cleanroom monitor or go to the chart display remotely.

Notes:

1. If you are using the port forwarding technique you can assign a unique port to each TV2 monitor if you wish to view multiple monitors remotely. Your IT department can help you choose port numbers.

2. If you intend to access your Cleanroom monitor from outside your local network, you will need to enable external access to your local network: not always a good idea. Check with your IT department for advice.
   Note: Creating a 'hole' in your firewall will leave you vulnerable to possible attack.

1. If your local network has a router that assigns local IP addresses (i.e. 192.168.1 50 or 10,199.1.52), you must enable port forwarding to your Cleanroom monitor. Tview assigns port 80 to the TV2 although you can assign a different port to different TV2s if desired.