PENTAIR

SPECTRACOOL
REMOTE ACCESS CONTROL

INSTRUCTION MANUAL

DESIGN WITH CONFIDENCE™

Rev. I
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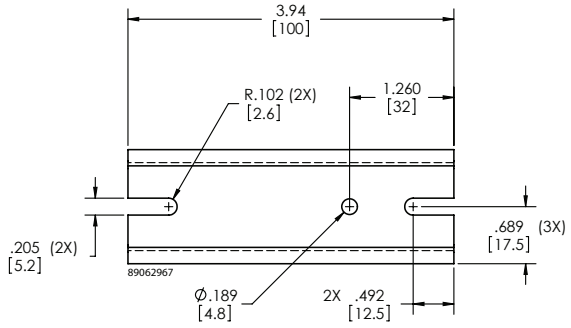
INTRODUCTION

The Remote Access Control is a parametric controller for the complete management of air conditioners. All settings are pre-programmed at the factory. Cooling/heating set-points, cooling/heating differential and high /low temperature alarm set-points can be adjusted by the user. Alarms are outputted through a relay contact and also can be accessed through an Ethernet connection utilizing SNMP, EtherNet/IP, Modbus TCP, and PROFINET. A USB connection is also provided and can be used to interface with the controller utilizing Modbus RTU.

MOUNTING THE CONTROLLER

The Remote Access Control must be mounted and enclosed inside a tool access enclosure. This Remote Access Control comes with a DIN rail and a DIN rail mounting bracket; see below for DIN rail mounting dimensions. The communication ports and alarm input/output terminals are located underneath the Remote Access Control. When installing, allow sufficient space under the Remote Access Control for access to communication ports and alarm input/output terminals.



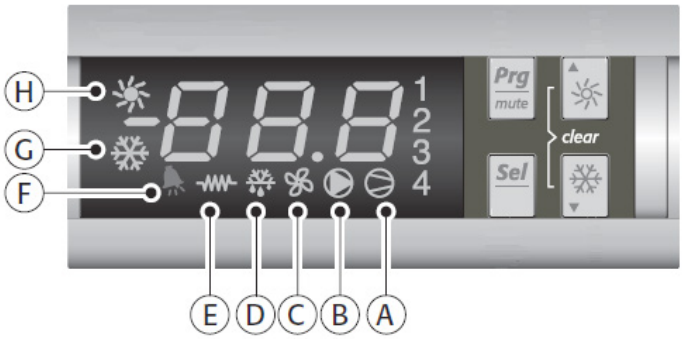
ENERGIZING THE CONTROLLER

The controller is wired and programmed at the factory to be energized when power is supplied to the air conditioner. The controller will default to the standalone operating mode when powered the first time. Master-Slave operating mode is optional and will require additional setup.

CONTROL STATUS INDICATION

The display has numerous symbols that indicate if the controller is heating, cooling, alarming, if the compressor is enabled, and if the ambient fan is enabled. The 3 alpha-numeric characters further describe alarms and show the cabinet temperature by default.

NOTE: The Slim Fit air conditioners DO NOT come standard with a heating option.



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SYMBOL	COLOR	ICON ON	ICON FLASHING
1,2,3,4	AMBER	1. Compressor On 2. TLAN Device ID	3. Flashing at start up request is standalone mode 4. Master-Slave Mode: 1: TLAN Master. 2,3,4: TLAN Slave. Device ID 2,3,4 are not active in standalone mode
A	AMBER	Compressor On	Active when compressor is ON
B	AMBER	Evaporator Fan On	Start-up Request
C	AMBER	Not Used	Not Used
D	AMBER	Master Unit	Active when this is the TLAN Master
E	AMBER	Heater Active	Not Used (always OFF)
F	RED	Alarm Active	Active if there is an alarm condition
G	AMBER	Controller Active	ON indicates power and activates all functions. OFF indicates controller is in standby mode and all functions are OFF
H	AMBER	Not Used	Not Used (always OFF)

NOTE: On the smart controller, the display symbols for "H" and "E" are always OFF. If they turn ON, simply hold the "sun" button for greater than 5 sec to turn OFF. The electric heater "E" symbol is required to minimize the heating setpoint (parameter A04) and/or defrost setpoint (parameter A01). Then, hold the "Cooling" button for great than 5 sec to turn ON the snowflake symbol ("G").

DISPLAYING AND CHANGING PROGRAM VARIABLES

Access: To view and/or change parameters, press and hold the Prg and Sel buttons for greater than 5 seconds. Press the up or down arrow buttons until "22" is displayed, then press Sel button. When "S-P" is displayed, press Sel.

Navigation: Press up or down arrows to display sub-menus then press Sel to select the desired sub-menu. In the sub-menu, use up or down arrows to display parameters for viewing or changing and press Sel. Use Prg button to back out of menu levels as desired.

Adjust: Use the up or down arrows to change the parameter value then push Sel to save that setting. If Sel is not pressed, the change to the value will not be saved. Navigate to and change other parameters as desired. When finished, push Prg to back out of the sub-menus to the main menu.

NOTE: The display will revert to normal temperature display mode if no buttons are pressed for 60 seconds.

MODELS WITH °C CONTROLLER

Cooling turns ON at r01 (setpoint) and OFF at r01 (setpoint) – r02 (differential).

For example, using default values form the table below, cooling will turn ON at 35°C (setpoint) and turn OFF at 30°C (setpoint – differential).

OPERATING PARAMETERS

Parameter	Description	Default Value	Range
r01	Cooling set-point	35 C	20 C to 55 C
r02	Cooling differential	5 C	-
P08	Door Open and/or smoke detected	28	4 or 28

ALARM PARAMETERS

Parameter	Description	Default Value	Range
P16	High Temperature Alarm	55 C	-
P19	Low Temperature Alarm	14 C	-

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MODELS WITH °F CONTROLLER

Cooling turns ON at r01 (setpoint) + r02 (differential), and OFF at r01 (setpoint).

For example, using default values form the table below, cooling will turn ON at 87°F (setpoint + differential), and turn OFF at 80°C (setpoint).

OPERATING PARAMETERS

Parameter	Description	Default Value	Range
r01	Cooling set-point	80 F	72 F to 120 F
r02	Cooling differential	7 F	-
P08	Door Open and/or smoke detected	28	4 or 28

ALARM PARAMETERS

Parameter	Description	Default Value	Range
P16	High Temperature Alarm	125 F	-
P19	Low Temperature Alarm	40 F	-

OPERATING REAL-TIME CLOCK (RTC) PARAMETERS

Parameter	Description	Default Value	Range
t01	Hour	0	0 to 23
t02	Minute	0	0 to 59
t03	Day	1	1 to 31
t04	Month	1	1 to 12
t05	Year	3	3 to 99

DISPLAYING TEMPERATURE SENSOR #2

Both the air inlet sensor (b01) and outlet or evaporator coil sensor (b02) can be reviewed at any time by pressing the up and down arrow button on the front panel of the controller display. The display will revert to the temperature sensor number b01 (air inlet temperature) or b02 (air outlet temperature) after 60 seconds. Both sensors can also be read through the Ethernet and USB connections with optional remote access communication board.

COMPRESSOR RESTART TIME DELAY

A factory set 5 minute (360 second) restart delay exists to reduce residual back pressure before allowing the compressor to restart. The compressor will stay off for the entire restart duration after the compressor is disabled. A flashing "1" on the controller display will indicate the unit is in a compressor restart delay while calling for cooling. If the delay time is reduced to less than 5 minutes, this may cause reduced compressor life.

ALARM OUTPUT CONTACT

The smart controller has a normally open dry contact alarm output with a resistive load rating of 250 VAC to 3 Amp. The 6-POS connector terminals 3 and 4 (marked YEL/ALARM) located on the enclosure side of the unit provides a connection to this output. The optional Remote Access Communication board can accept this normally open dry contact alarm from the smart controller..

ALARM INPUT CONNECTION

The smart controller can accept a dry contact/switch input via the 6-POS connector terminals 1 and 2 (marked WHT/DS1 and WHT/DS2), located on the enclosure side of the unit. This input is associated with the controller display alarm mnemonic "tP" (door open and/or smoke detected). Note that the door open and/or smoke detected is pre-programmed at the factory as "Normally Open". The optional Remote Access Communication board can accept this door open and/or smoke detected alarm from the smart controller. To use this feature, simply connect the customer supplied wires from the cabinet door switch to DS1 and DS2 terminals.

ALARM CONDITION DISPLAY

There are eleven possible non-latching alarm conditions detectable by the controller and are indicated on the controller display. All alarms can also be accessed through the Ethernet and USB connections with the optional remote access communication board.

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Alarm Mnemonic	Description	Cause	Result	Alarm Relay
tP	General Alarm	Door open and/or smoke detected	Unit turns OFF for duration of alarm	Relay Contact closed
LA	High Pressure Warning	MALF high pressure switch opens (see note 3 below)	No effect on function	N/A
LP	Low Pressure Alarm	Low pressure switch open (see note 4 below)	No effect on function	Relay Contact closed
E1	Air Inlet Temperature Sensor Alarm	Sensor failure	See note 1 below	Relay Contact closed
E2	Air Outlet Temperature Sensor Alarm	Sensor failure	See note 2 below	Relay Contact closed
Ht	High Temperature Alarm, default = 55°C	Air inlet temperature greater than 55°C	No effect on function	Relay Contact closed
Lt	Low Temperature Alarm, default = 14°C	Air inlet temperature less than 14°C	No effect on function	Relay Contact closed
A1	Frost Alarm	Air outlet temperature less than or equal to -1.0°C	Compressor and Condenser fan OFF for duration of alarm	Relay Contact closed
HP/HP1	High Pressure Serious Alarm	High pressure switch open (see note 5 below)	Unit turns OFF for duration of alarm	Relay Contact closed
LC	Lost Communication Alarm	The Master cannot communicate with any Slave, or the Slave cannot communicate with the Master	No effect on function. Unit will enter standalone mode	N/A
LC1	Lost Communication Alarm	The Master cannot communicate with one of the Slaves	No effect on function. Unit will enter standalone mode	N/A

NOTE 1: Air inlet temperature sensor will default to air outlet temperature sensor. Cooling setpoint default to 10°C.
NOTE 2: Unit continues to operate without evaporator freeze protection.
NOTE 3: The MALF high pressure switch is optional.
NOTE 4: The Low Pressure switch is optional.
NOTE 5: The High Pressure (HP) or High Pressure Serious (HP1) switch is optional.

MASTER-SLAVE CAPABILTY (OPTIONAL)

The Master-Slave capability is included as standard and can accommodate up to four (4) air conditioners in a single cabinet. In the Master-Slave operating mode, there is a delay period of 20 seconds between startup of each unit during the startup. For example, the master unit number 1 starts first, unit number 2 will start after 20 seconds, followed by unit 3 and another 20 seconds, and so on.

Note the controller default operating mode is single or standalone. To initiate the Master-Slave operating mode, parameters H24 and H25 require reconfiguration as described below. TLAN communication and Door Open cables are also required to interconnect the air conditioners.

- Connect the door open and/or smoke detected harness to the DS1 and DS2 terminals on the enclosure side of the air conditioner unit in parallel. The maximum length of the door switch harness between two air conditioners is 3.33 meter (10 feet). This harness is NOT included with the Master-Slave option. It is offered separately as an accessory.
- Connect the TLAN harness to the MS1 and MS2 terminals on the enclosure side of the air conditioner unit in parallel. The maximum length of the TLAN communication cable is 10 meters (30 feet) and 3.33 meters (10 feet) between the two air conditioners. This harness is NOT included with Master-Slave option. It is offered separately as an accessory.
- Select one of the units in the group to be the master unit. This is indicated unit number 1
- Select the slave units, numbers 2, 3 and 4 in sequence.

ALARM PARAMETERS

Parameter	Description	Default Value	Range
h24	Device unit ID	0	0 to 4
h25	Number of units	4	2 to 4

NOTE 6: To initiate Master-Slave operating mode, set parameter h24 (device unit ID) of master unit to 1. Set parameter h24 of slave units as applicable. Set parameter h24 (unit number 2) to 2, set parameter h24 (unit number 3) to 3, and set parameter h24 (unit number 4) to 4.
NOTE 7: Set parameter h25 (number of units) of each unit to the same value, for example, h25 = 2 if only two units are connected in a group, h25 = 3 if three units are in a group and h25 = 4 if four units are in a group.

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MASTER-SLAVE ALARM INPUT CONNECTION

The smart controller can accept a TLAN communication via the 6-POS connector terminals 5 and 6 marked MS1 and MS2 located on the enclosure side of the unit. This TLAN communication is associated with the controller display alarm "LC" and "LC1", lost communication.

To use the TLAN communication feature, simple connect the TLAN harness to MS1 and MS2 terminals and to MS1 and MS2 of each unit in parallel.

REMOTE ACCESS CONTROL

AIR CONDITIONER UNIT COMMUNICATION FEATURES

An optional communication board offers capabilities that include Profinet, EtherNet/IP, Modbus TCP, and SNMP protocols through Ethernet and Modbus RTU protocol via USB. Hoffman® Cooling has a PC Interface Tool available for download that can utilize either mode to communicate with the air conditioner unit.

USB COMMUNICATION

This communication mode allows direct connection of a PC to the air conditioner unit. The protocol supported is Modbus RTU. Use the PC Interface Tool to communicate with the air conditioner unit. A MINI-b USB connection is provided.

ETHERNET COMMUNICATION

This communication mode allows remote connection to the air conditioner unit using SNMP, Modbus TCP, EtherNet/IP, and Profinet protocols. Customers using their own software can download a MIB file for SNMP, Coil_Register file for Modbus TCP, EDS file or EtherNet_IP Object file for EtherNet/IP, and GSDML file for Profinet.

NOTE: ACU has a default IP Address of 192.168.1.2

Both Ethernet and USB communication modes allow the ability to:

- Read ACU inlet and outlet air temperatures
- Read and change Cooling Set-point and Cooling Differential
- Read and change Heating Set-point, Heating Differential
- Read and change High and Low Temperature Alarm Settings
- Read and change Gateway IP Address, Device IP Address, Subnet Mask, Trap IP Address and Community
- Read and change Unit Identification
- Read and change the state of IP addressing (static or dynamic)
- Read current Alarm Status
- Read MAC Address
- Read and change the door open and/or smoke detected switch polarity

SOFTWARE AND CONFIGURATION FILE DOWNLOADS

The PC Interface Tool, MIB file, EDS file, EtherNet_IP Object file and Coil_Register file can be downloaded from www.pentairprotect.com.

MASTE-SLAVE CAPABILITY (OPTIONAL)

In the master-slave application, only one Remote Access Communication board is required. All alarms are communicated through the TLAN serial connection, except the door open and/or smoke detected alarm. Door open and/or smoke detected switch polarity can be remotely changed from Normally Open to Normally Close if needed.

Note that if the door open and/or smoke detected harness is not used, and the door switch is wired to only one of the units, for instance, the master unit. If the power of the master unit is OFF, the slave units will NOT detect the door open alarm and they will continue operating in standalone mode even if the door is open.

SOFTWARE AND CONFIGURATION FILE DOWNLOADS

The PC Interface Tool, MIB file, Coil_Register file, EDS file or EtherNet_IP Object file, and GSDML file can be downloaded from http://www.pentairprotect.com/en/na/Product-Enclosure-Cooling-Heating

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USING THE PC INTERFACE TOOL

The PC Interface Tool gives the user the ability to communicate with the air conditioner unit to read/write parameters using either Ethernet or USB connections.

USB COMMUNICATION MODE

NOTE: Before connecting unit to the PC, make note of the comm ports present. After the unit is connected to the PC, a new comm port will be added to the list. Use this new comm port.

- From **Tools** menu select **Use Ethernet**
- When **Use Ethernet** is unchecked, then **Comm Port** menu is enabled, **Device IP** and **Community** boxes are not shown, and USB communication can be used
- To set the comm port, choose **Comm Port** from the **Tools** menu and then select the comm port from the combo box

VIEWING AIR CONDITIONER UNIT VALUES

To view Air Conditioner Unit values

- Select the **ACU Values** tab
- Select the **Enable Comm** button (the PC Interface will now be communicating with unit)
- To stop communication select the **Disable Comm** button

CHANGING AIR CONDITIONER UNIT VALUES

To change **ACU Values**

- Select the **Settings** tab
- Select the value to change
- Make the change to the value
- Select the **Change Setting** button
- Change can be verified in **ACU Values** tab

VIEWING AND CHANGING ETHERNET INFORMATION

To view and change Ethernet Information

- Select **Ethernet Info** tab

To view Ethernet Information

- Click **Read Ethernet Info** button

To change to dynamically assigning IP Address Mode

- Check **Use DHCP Server** checkbox
- Enter Trap IP Address and Community
- Click **Load Ethernet Info** button

To change to statically assigning IP Address Mode

- Uncheck **Use DHCP Server** checkbox
- Enter Device IP Address, Subnet Mask, Gateway IP Address, Trap IP Address and Community
- Click **Load Ethernet Info** button

ETHERNET COMMUNICATION MODE

Each unit has two community strings. One is a Read/Write community string (defaulted to 'private') that can be changed by the customer (must be 4 to 8 characters long). The other is a Read-Only community string ('public') and cannot be changed.

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1. The Hoffman A.C. Monitor

The Hoffman A.C. Monitor is a Windows® application for the complete management of Hoffman air conditioners. The initial air conditioner settings; cooling/heating set-points, cooling/heating differential and high/low temperature alarm set-points are pre-programmed at the factory, but can be locally or remotely adjusted by the user. Alarms are output from the air conditioner relay contacts and also can be accessed through an Ethernet network connection. A USB serial connection is provided on the air conditioner to configure the network interface and air conditioner settings before it is connected to a network.

Windows is a registered trademark of Microsoft Corporation in the United States and/or other countries.

When a Commboard is installed in a Hoffman air conditioner, it can communicate with an external computer or PLC using the SNMP, EtherNet/IP, Modbus TCP, and PROFINET protocols.

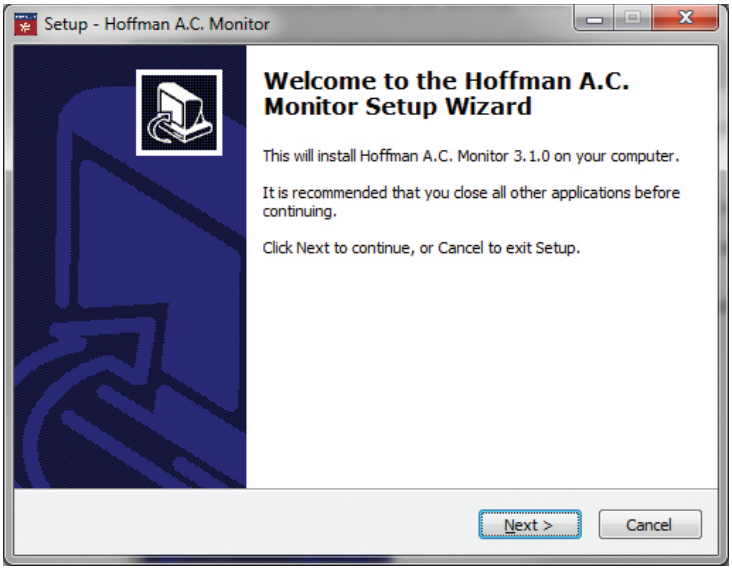
1.1 New Features in V3.1.0

- Support for Master-Slave ACU configurations, with one Master ACU and up to three slave ACUs.
- Support for configuring the polarity of the door open/smoke detected switch with Control firmware version 11 or newer.
- Added support for the Mexican Spanish language

2. Installing the Hoffman A.C. Monitor

Note: If you are upgrading from V3.0.3 or V3.0.4 to V3.0.5, the location where configuration files are stored has changed. You should follow the procedure in 4.6 Exporting a Configuration File on page 22 to export the configuration file to a local directory, upgrade the application, and then follow the procedure in 4.5 Importing a Configuration File on page 21 to import the original configuration file.

- Unzip the **Hoffman A.C. Monitor 3.1.0 Setup.zip** file into a temporary directory.
- Double click on the **Hoffman A.C. Monitor 3.1.0 Setup.exe** file to start the installation process.



- Click on the "Next" button when the installation window opens.

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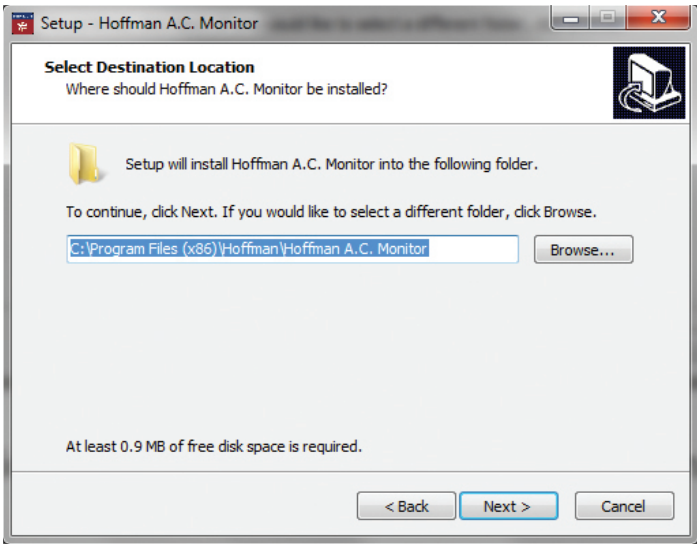
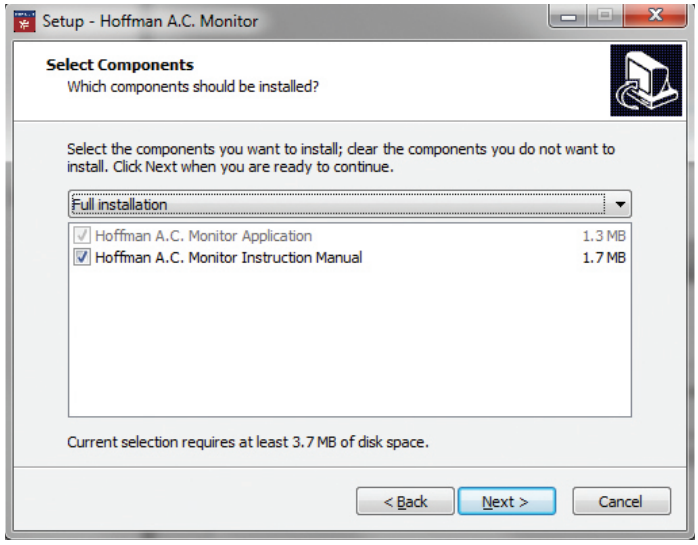
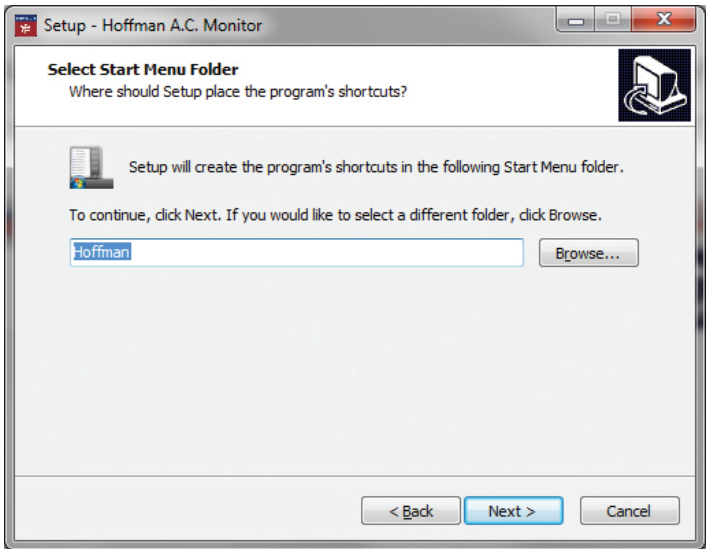


- If the default installation directory is OK click the "Next" button.



- By default, the installation will put the User's Manual and the Serial USB driver in the C:\Users\<your userid>\Documents\Hoffman directory. If you don't want the User's Manual, uncheck the box. If it is OK, click the "Next" button.



- If the default Start Menu folder "Hoffman" is OK, click the "Next" button.

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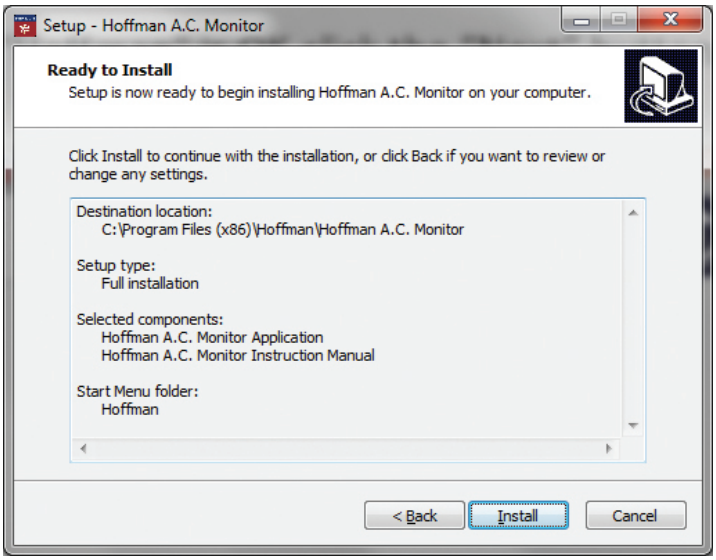
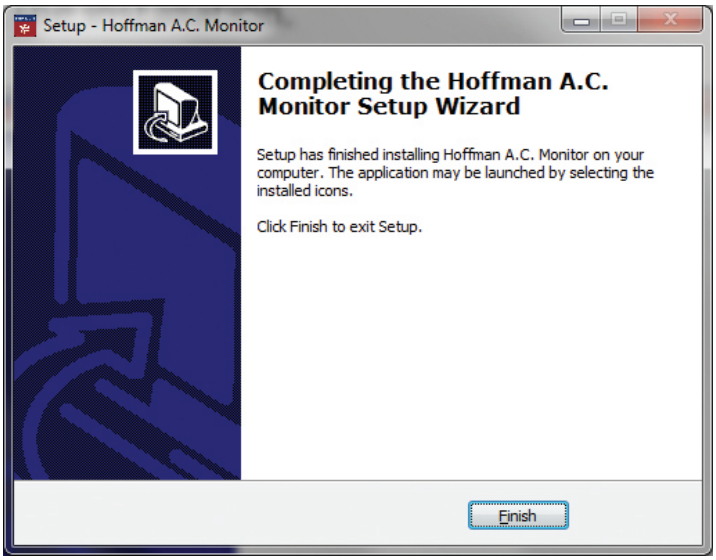


- Click the "Install" button to start the installation.



- Click on the "Finish" button when the installation completes.
- The Hoffman A.C. Monitor application is now ready to use. You can start the program by clicking "Start->All Programs->Hoffman->Hoffman A.C. Monitor" menu, or on the Desktop icon.

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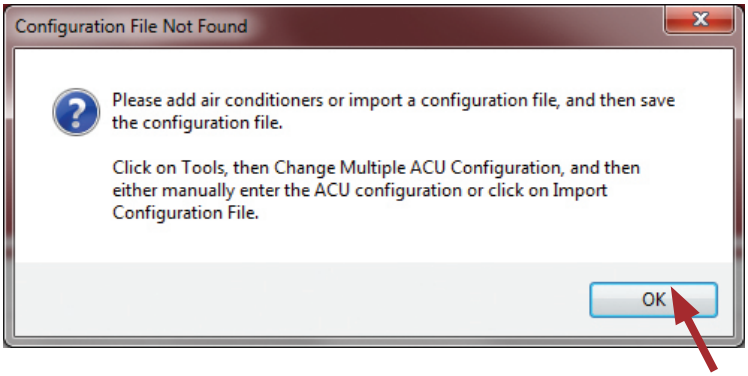
3. Running the Hoffman A.C. Monitor

The installation program added an entry to the list of programs in the Windows "Start->All Programs->Hoffman" menu, and added an icon on the Desktop.

Hoffman A.C. Monitor

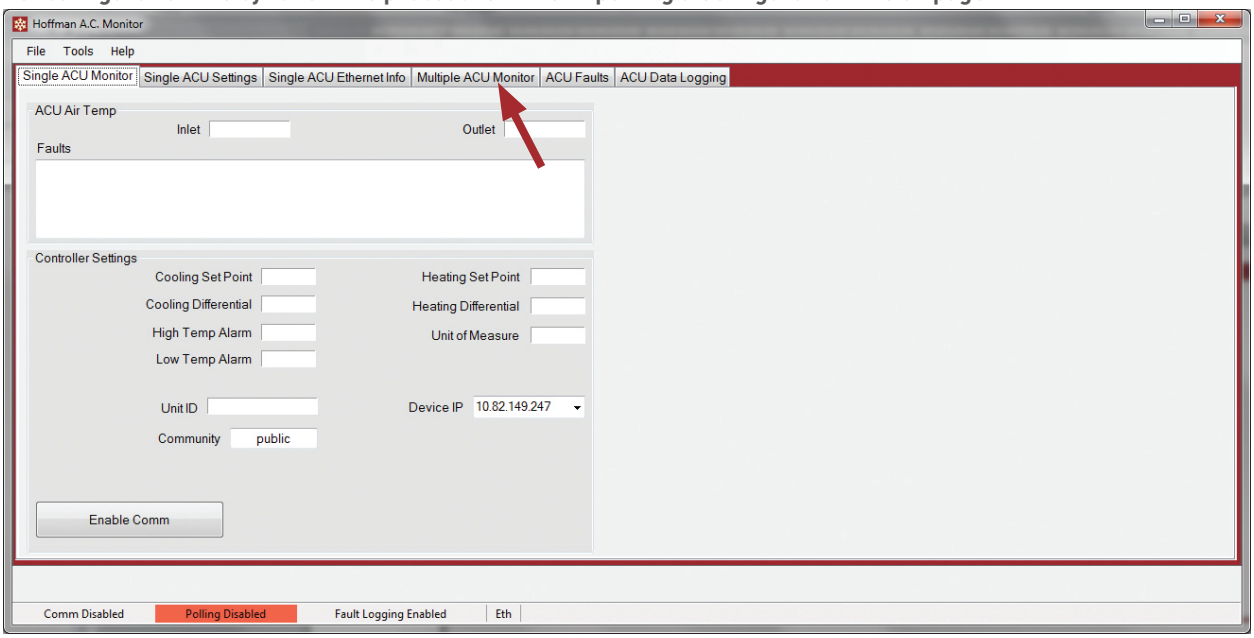
Click on "Hoffman A.C. Monitor" in the "Start->All Programs->Hoffman" menu or double-click on the "Hoffman A.C. Monitor" link on the Desktop to start the program. The program will detect the default language for the PC and configure the program for English, German, Mexican Spanish, Polish, Russian, or Simplified Chinese. If the PC is configured for any other language, the application's language will configure to English.

Note: If no air conditioners have been configured, a window will open stating that the configuration file does not exist.



Click "OK" button to create empty configuration files and to close the window.

Note: If you exported a configuration file from a previous version of the application, now is the time to import the original configuration file by follow the procedure in 4.5 Importing a Configuration File on page 21.



The application will start with the "Single Hoffman A.C. Monitor" tab selected.

Click on the "Multiple Hoffman A.C. Monitor" tab to select the Multiple Hoffman A.C. Monitor mode.

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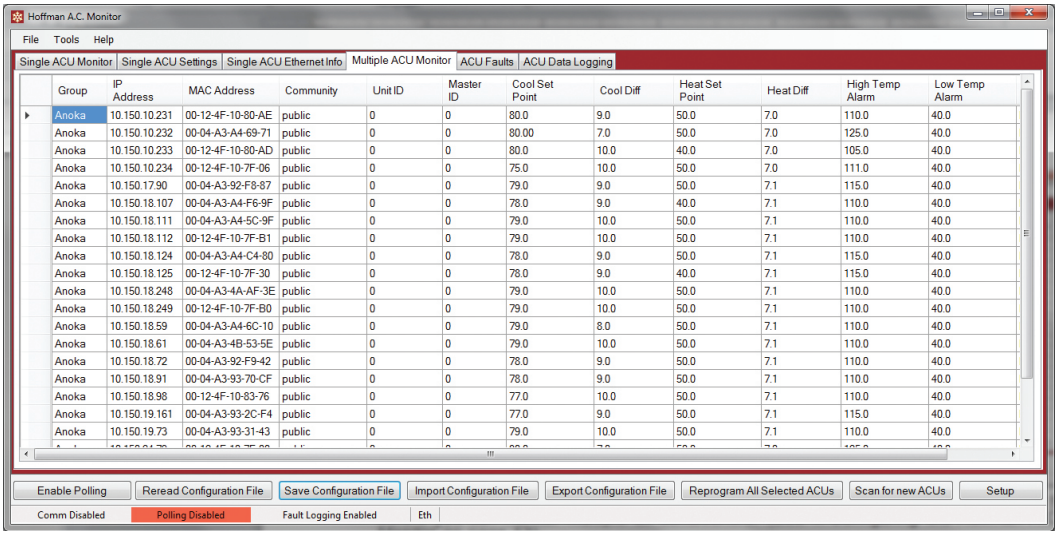
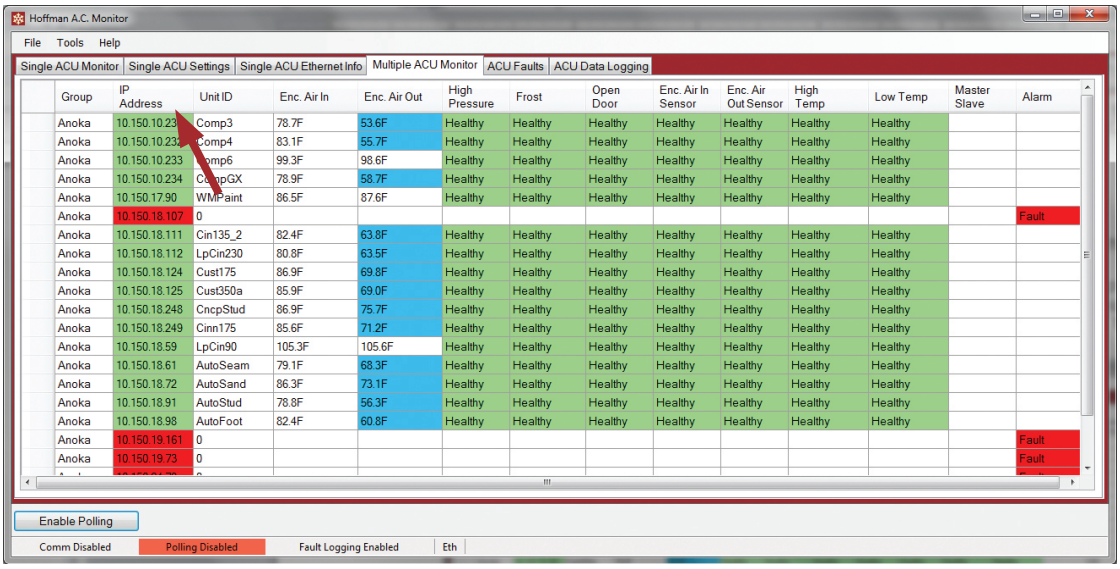


Note: You will need to perform the configuration procedure or import a configuration file before you can monitor multiple air conditioners. (See 4. Configuring the Hoffman A.C. Monitor on page 15)

3.1 Controlling the Hoffman A.C. Monitor Display

When you click on the "Multiple A.C. Monitor" tab, the configuration file is read and the corresponding air conditioners are displayed. You can click on the column headings to change the sequence order of the air conditioners that are displayed and polled.

For example, if you added an air conditioner and want the air conditioners displayed in IP address order, just click on the "IP Address" column header. The air conditioners will now be displayed in increasing IP Address order. You will see an "up arrow" to the right of the "IP Address" that indicates the increasing IP address order.



If you click on the "IP Address" column header again, the air conditioners will now be displayed in decreasing IP Address order. You will see a "down arrow" to the right of the "IP Address" that indicates the decreasing IP address order. The same procedure works with any column in the display.

Note: You can click on the "Alarm" column header to display air conditioners with a fault condition at the top of the list.

Note: If you would like the current display order to be permanent, Click on "Tools" menu, then "Change Multiple ACU Configuration" in the pull-down menu, and, finally, click on the "Save Configuration File" button.

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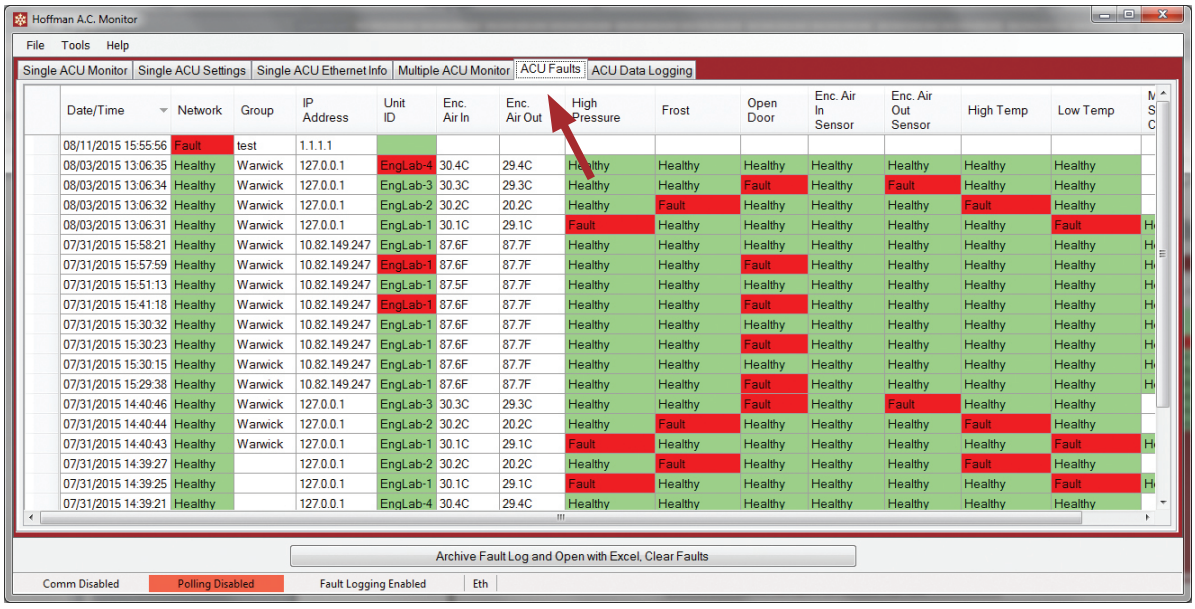
3.2 Displaying ACU Faults

If “Alarm File Logging” is enabled, (See 6.1 Enabling Hoffman A.C. Monitor Auto-Start and/or Alarm File Logging on page 25) and the Hoffman A.C. Monitor application detects an ACU fault, the details of the fault(s) will be stored in an XML file.



Date/Time	Network	Group	IP Address	Unit ID	Enc. Air In	Enc. Air Out	High Pressure	Frost	Open Door	Enc. Air In Sensor	Enc. Air Out Sensor	High Temp	Low Temp
08/11/2015 15:55:56	Fault	test	1.1.1.1										
08/03/2015 13:06:35	Healthy	Warwick	127.0.0.1	EngLab-4	30.4C	29.4C	Healthy	Healthy	Healthy	Healthy	Healthy	Healthy	Healthy
08/03/2015 13:06:34	Healthy	Warwick	127.0.0.1	EngLab-3	30.3C	29.3C	Healthy	Healthy	Fault	Healthy	Fault	Healthy	Healthy
08/03/2015 13:06:32	Healthy	Warwick	127.0.0.1	EngLab-2	30.2C	20.2C	Healthy	Fault	Healthy	Healthy	Healthy	Fault	Healthy
08/03/2015 13:06:31	Healthy	Warwick	127.0.0.1	EngLab-1	30.1C	29.1C	Fault	Healthy	Healthy	Healthy	Healthy	Healthy	Fault
07/31/2015 15:58:21	Healthy	Warwick	10.82.149.247	EngLab-1	87.6F	87.7F	Healthy	Healthy	Healthy	Healthy	Healthy	Healthy	Healthy
07/31/2015 15:57:59	Healthy	Warwick	10.82.149.247	EngLab-1	87.6F	87.7F	Healthy	Healthy	Fault	Healthy	Healthy	Healthy	Healthy
07/31/2015 15:51:13	Healthy	Warwick	10.82.149.247	EngLab-1	87.5F	87.7F	Healthy	Healthy	Healthy	Healthy	Healthy	Healthy	Healthy
07/31/2015 15:41:18	Healthy	Warwick	10.82.149.247	EngLab-1	87.6F	87.7F	Healthy	Healthy	Fault	Healthy	Healthy	Healthy	Healthy
07/31/2015 15:30:32	Healthy	Warwick	10.82.149.247	EngLab-1	87.6F	87.7F	Healthy	Healthy	Healthy	Healthy	Healthy	Healthy	Healthy
07/31/2015 15:30:23	Healthy	Warwick	10.82.149.247	EngLab-1	87.6F	87.7F	Healthy	Healthy	Fault	Healthy	Healthy	Healthy	Healthy
07/31/2015 15:30:15	Healthy	Warwick	10.82.149.247	EngLab-1	87.6F	87.7F	Healthy	Healthy	Healthy	Healthy	Healthy	Healthy	Healthy
07/31/2015 15:29:38	Healthy	Warwick	10.82.149.247	EngLab-1	87.6F	87.7F	Healthy	Healthy	Fault	Healthy	Healthy	Healthy	Healthy
07/31/2015 14:40:46	Healthy	Warwick	127.0.0.1	EngLab-3	30.3C	29.3C	Healthy	Healthy	Fault	Healthy	Fault	Healthy	Healthy
07/31/2015 14:40:44	Healthy	Warwick	127.0.0.1	EngLab-2	30.2C	20.2C	Healthy	Fault	Healthy	Healthy	Healthy	Fault	Healthy
07/31/2015 14:40:43	Healthy	Warwick	127.0.0.1	EngLab-1	30.1C	29.1C	Fault	Healthy	Healthy	Healthy	Healthy	Healthy	Fault
07/31/2015 14:39:27	Healthy		127.0.0.1	EngLab-2	30.2C	20.2C	Healthy	Fault	Healthy	Healthy	Healthy	Fault	Healthy
07/31/2015 14:39:25	Healthy		127.0.0.1	EngLab-1	30.1C	29.1C	Fault	Healthy	Healthy	Healthy	Healthy	Healthy	Fault
07/31/2015 14:39:21	Healthy		127.0.0.1	EngLab-4	30.4C	29.4C	Healthy	Healthy	Healthy	Healthy	Healthy	Healthy	Healthy

The contents of the Alarm XML file can be displayed by clicking on the “ACU Faults” tab. The default order is descending by date/time so the latest faults will be at the top of the list. You can click on the column headings to change the order of the air conditioner faults display.

Note: If a new fault is logged when the “ACU Faults” tab is selected, the screen will refresh and display all of the faults in descending date/time order.

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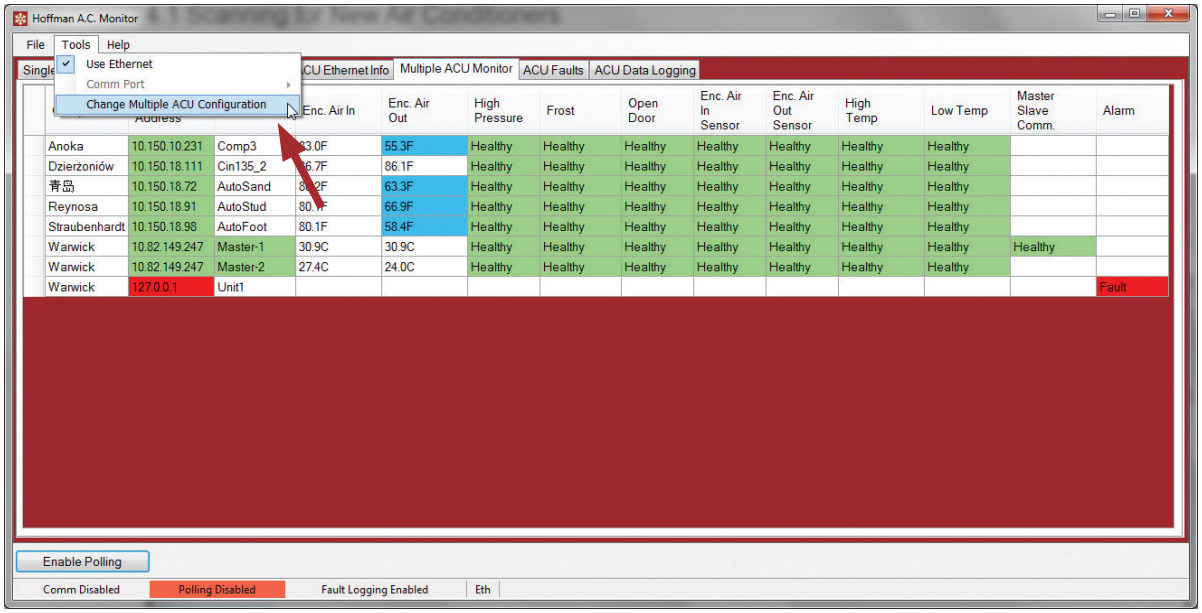
4. Configuring the Hoffman A.C. Monitor

After the Hoffman A.C. Monitor application has been started for the first time, you will need to enter the network IP address of each air conditioner.

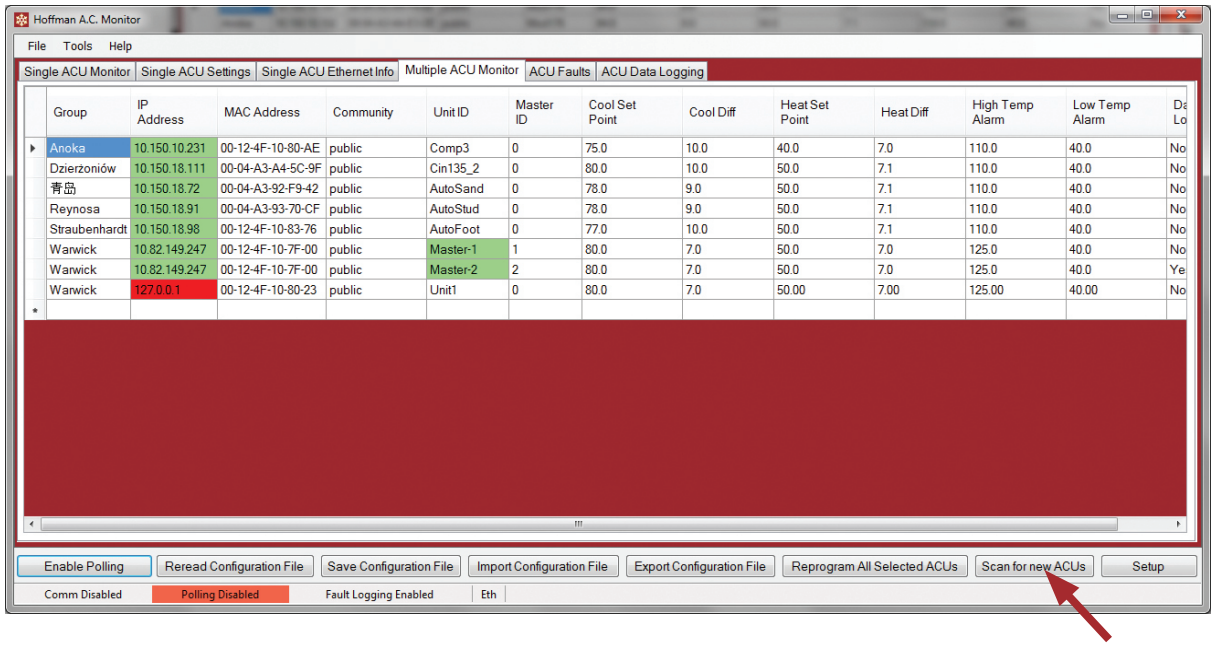
4.1 Scanning for New Air Conditioners

The Hoffman A.C. Monitor application can scan a Class-C network subnet for air conditioners that are not currently configured. The application will poll each IP address on a network subnet. If it finds an air conditioner that is not currently configured, it will add it to the configuration.



Click "Tools" menu and select "Change Multiple ACU Configuration" in the pull-down menu.

Note: The MAC Address displayed to the right of the IP address corresponds to the MAC Address printed on the label on the air conditioner. You can use the MAC Address shown in the A.C. Monitor to confirm that the IP address for a given air conditioner is correct.



Click the "Scan for new ACUs" button. A window will open where the Class-C network subnet to scan can be entered.

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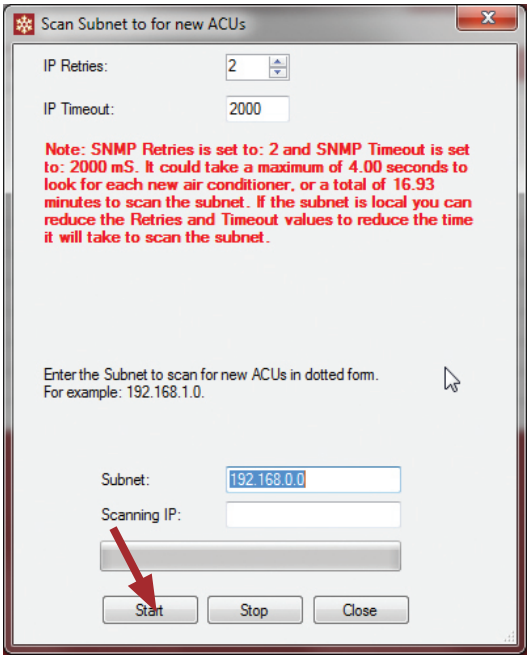


Enter the Class-C network subnet that contains the new air conditioners in dotted format and click on the "Start" button. The last digit should be a "0" (zero). Any new air conditioner found will be added to the configuration.

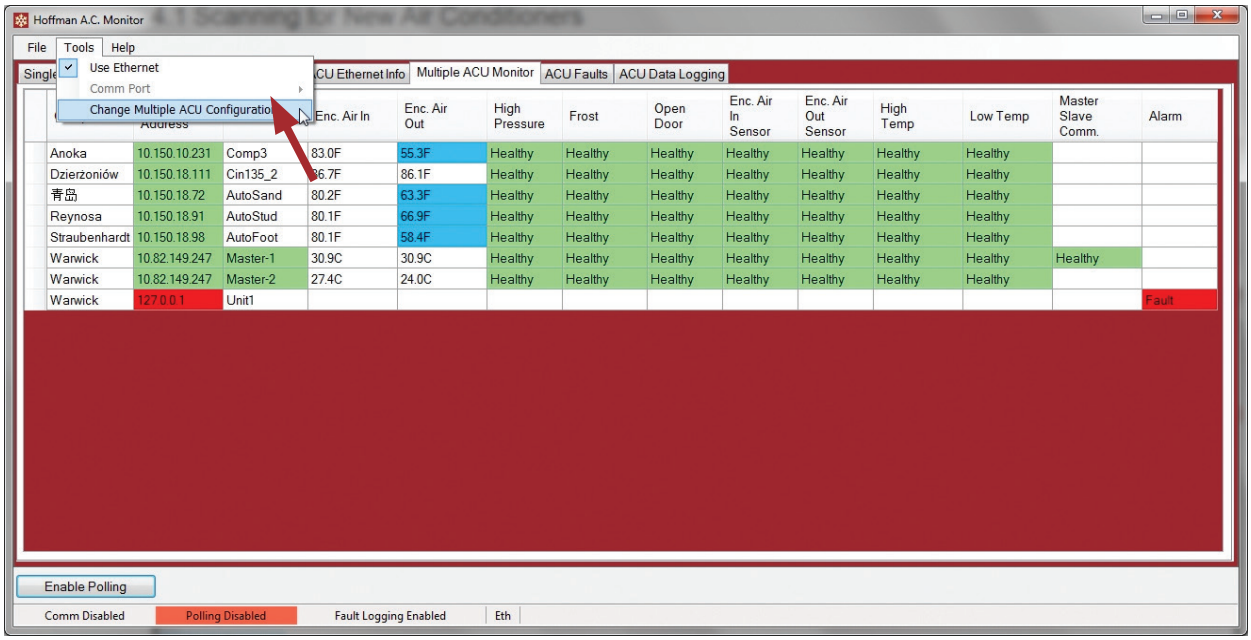
Note: You must save the configuration file to make the new air conditioners permanent.

Note: With the default network configuration, it takes approximately 4 seconds to poll each possible IP address when looking for new air conditioners. There are 254 possible IP addresses on a subnet, so it will take more than 15 minutes to scan a complete subnet. You can reduce the default IP Retries to 1 by clicking on the down-arrow next to the IP Retries box, and reduce the default IP Time out to shorten the scanning time.

Note: A future version of this application will allow the use of an arbitrary subnet mask.

Note: In a Master/Slave configuration the Master ACU is the only ACU connected to the network. The Master ACU will be added to the configuration, but the Slaves will not be added. The Slave ACUs will need to be manually added to the configuration.

4.2 Manually adding an air conditioner to the configuration



Click the "Tools" menu and select "Change Multiple ACU Configuration" from the pull-down menu.

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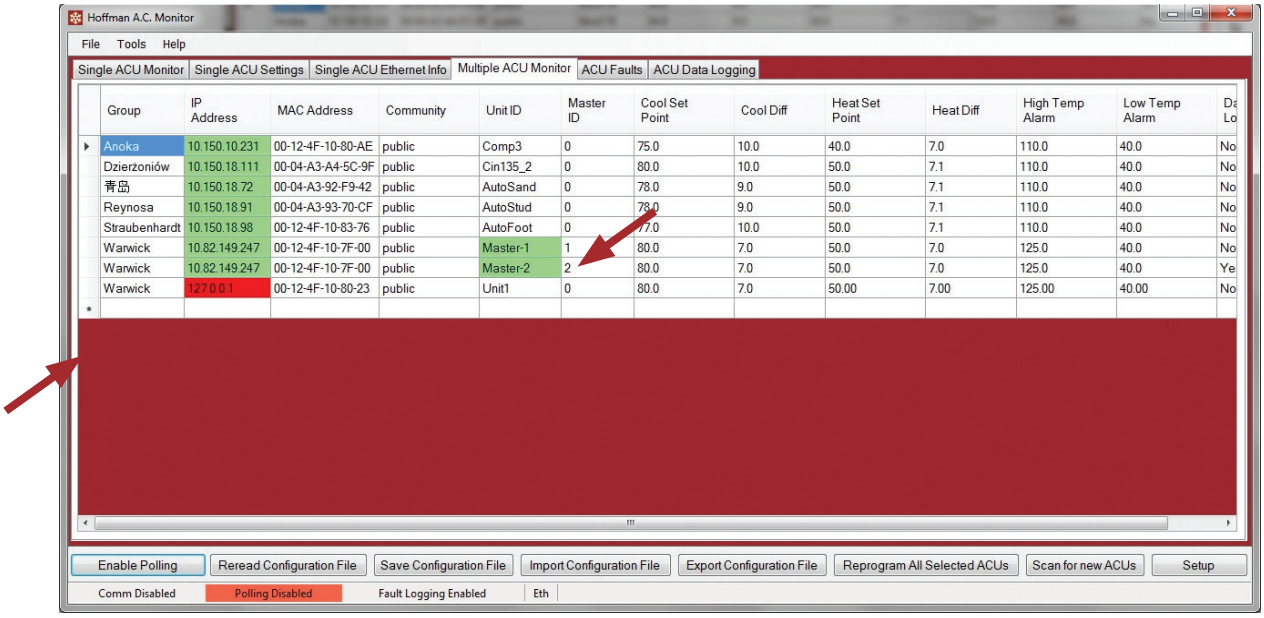

The asterisk"*" at the left of the empty row indicates that it is ready to edit the configuration. Click once on the empty cell to the right of the asterisk "*" and below the "Group" heading to select the cell. Enter the name of the Group for this air conditioner. The Group can be used to organize the air conditioners by geographic location, plant, work cell, etc. The Group can be any text; for example, Anoka, Welding, Router, etc. As you enter the Group you will see a "pencil" icon at the left of the row. When you have finished entering the Group, press the "Tab" key. The "pencil" icon will change to a triangle and the "IP Address" cell will be highlighted. Click on the "IP Address" cell to allow text editing. Enter the IP address for the air conditioner in "dotted" format, for example "10.82.149.247". When you have finished entering the IP address, press the "Tab" key twice and the "Community" cell will be highlighted. Click on the "Community" cell to allow text editing. If the SNMP Community is set to "public" the sensors and alarms can be read, but configuration changes to the air conditioner controller will not be allowed. The factory default value for the SNMP Community can be changed in the air conditioner to another value to improve security. If you plan to use the Hoffman A.C. Monitor application to make configuration changes to the air conditioner controllers, you will need to set the SNMP Community to the factory default value of "private", or to the customized value. When you have finished entering the Community, press the "Enter" key.

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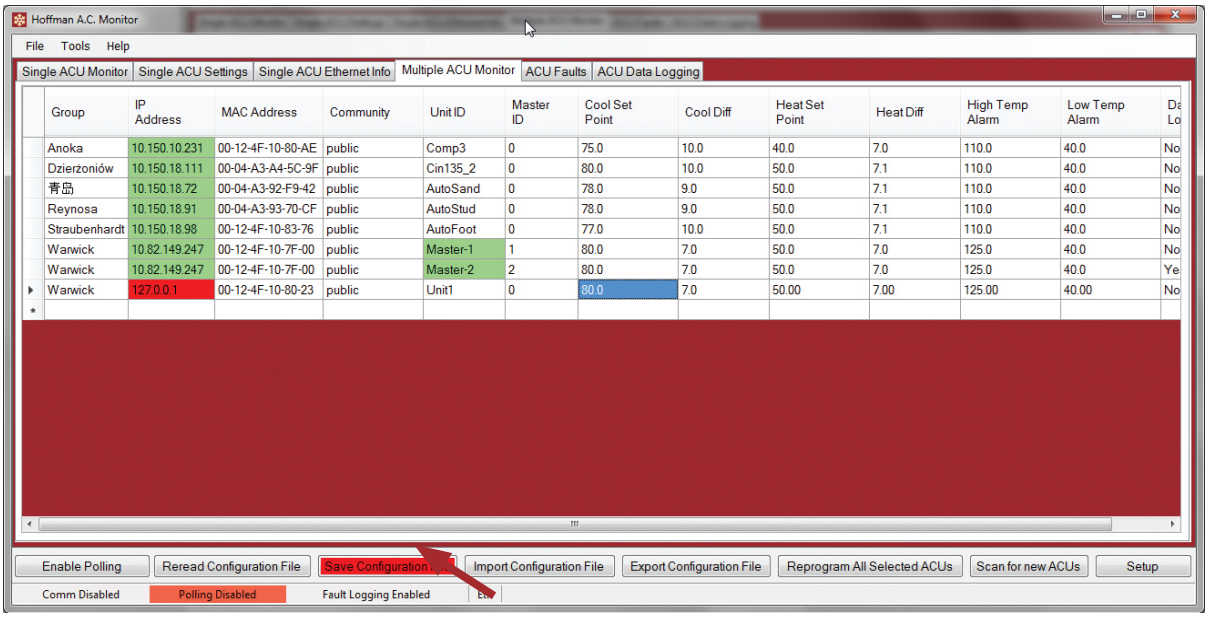
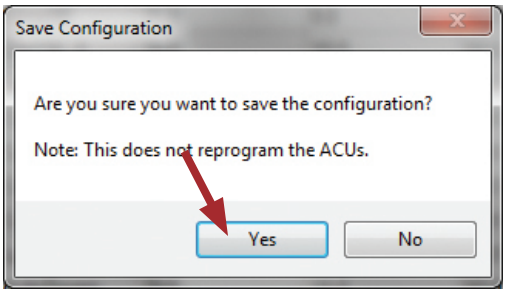
For a Master-Slave configuration, each ACU in the Master-Slave set will need to be configured separately. When you add an ACU, the Master ID will default to 0 to indicate that it is a standalone ACU. You will need to change the Master ID to a 1 for the Master ACU. When you add a Slave ACU, use the same IP address as the Master ACU, but change the Master ID to correspond to the Slave ACUs ID in the range of 2-4. When the ACUs are polled, the application will append the Master/ Slave ID to the Unit ID to make tracking easier.



The Hoffman A.C. Monitor application screen should look like the image above. Click the "Save Configuration File" button to save the current air conditioner configuration.



Click the "Yes" button to save the current Hoffman A.C. Monitor configuration.

Repeat the above steps to add additional air conditioners to the configuration.

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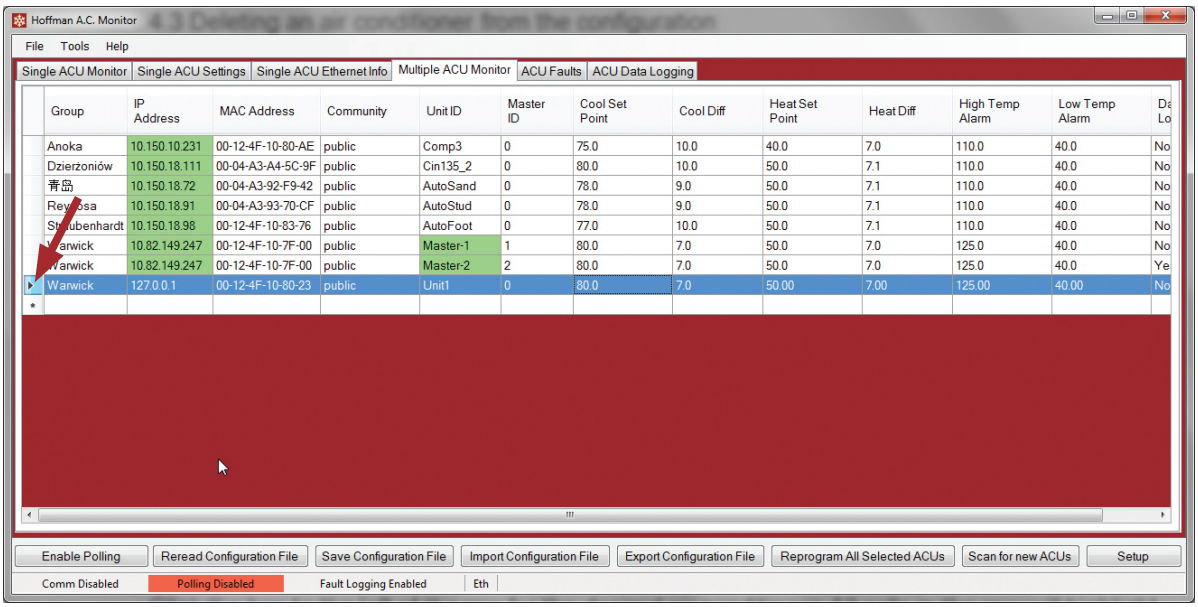
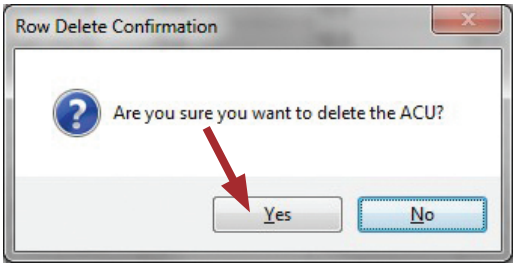
4.3 Deleting an air conditioner from the configuration

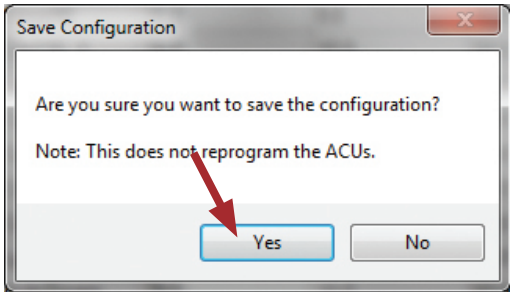
Click the "Tools" menu and select "Change Multiple ACU Configuration" from the pull-down menu.



Click the box to the left of the row for the desired air conditioner. All cells in the row will highlight. Press the "Delete" key.



Click the "Yes" button to confirm deletion of the air conditioner. Click the "Save Configuration File" button to save the current air conditioner configuration.



Click the "Yes" button to save the current air conditioner configuration.

Repeat the above steps to delete more air conditioners from the configuration.

Note: You can hold the "CTRL" key on your keyboard down and click on multiple ACUs. When you press the "Delete" key the application will ask if it is OK to delete each of the selected air conditioners.

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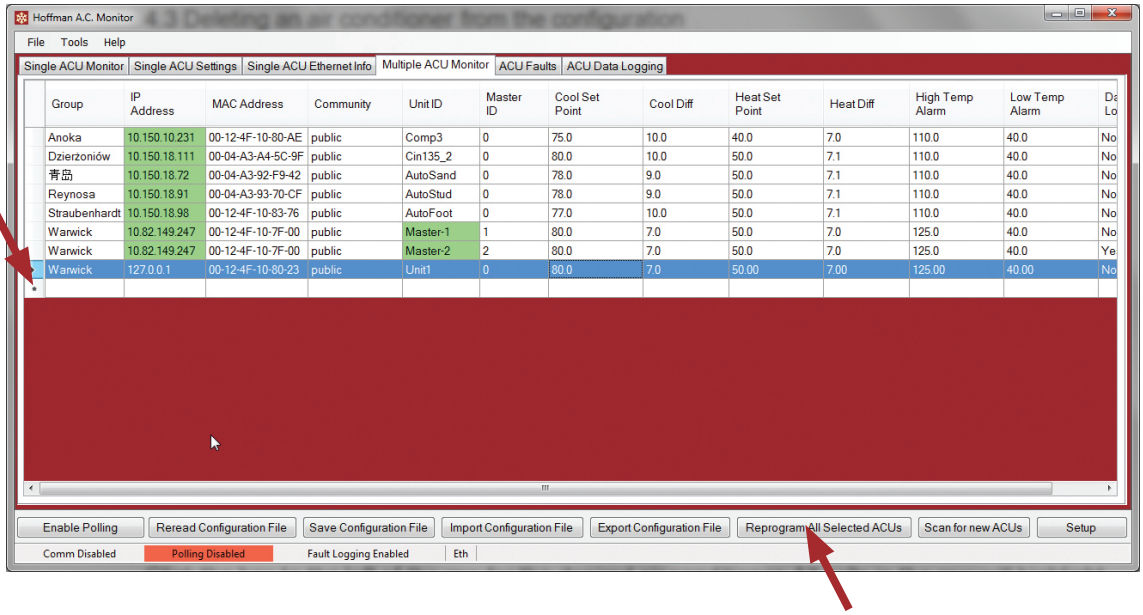
4.4 Modifying the air conditioner settings

When you enable polling of the air conditioners for the first time, the Hoffman A.C. Monitor application will determine that the Unit ID, Cooling Set-Point, Cooling Differential, Heating Set-Point, Heating Differential, High Temperature Alarm and Low Temperature Alarm settings in the configuration file are empty. The application will obtain the current values from the air conditioner and populate the configuration file. To populate these fields, you can click on the "Enable Polling" button, wait for it to cycle through all of the air conditioners, click the "Disable Polling" button, click the "Tools" menu and select "Change Multiple ACU Configuration" from the pull-down menu, and, finally, click the "Save Configuration File" button to save the configuration values from the air conditioners.



If you need to change any of the air conditioner set-points, you can click the "Tools" menu and select "Change Multiple ACU Configuration" from the pull-down menu, click twice on a cell in the configuration display, change the value, and select "Save Configuration File" button. To reprogram the set-points in the air conditioner, click on the box to the left of the "Group" cell for the desired air conditioner, and select "Reprogram All Selected ACUs" button. If you would like to reprogram more than one air conditioner at a time, you can hold the "CTRL" key down while you select more than one air conditioner controller. Clicking on the "Configure All Selected ACUs" button will reprogram all of the selected air conditioners.

Note: If the air conditioner does not respond to the reprogramming commands, the IP address cell will be highlighted in red. If an individual setting cannot be reprogrammed, the settings cell will be highlighted in red.

Note: If the SNMP Community is set to "public", you cannot change the settings of an air conditioner. The SNMP Community must be set to the same value as the air conditioner is programmed. The factory default value is "private".

Note: The IP address and SNMP Community settings cannot be changed from the Multiple Hoffman A.C. Monitor tab. You can use the Single ACU Ethernet Info tab to change the IP address or SNMP Community settings.

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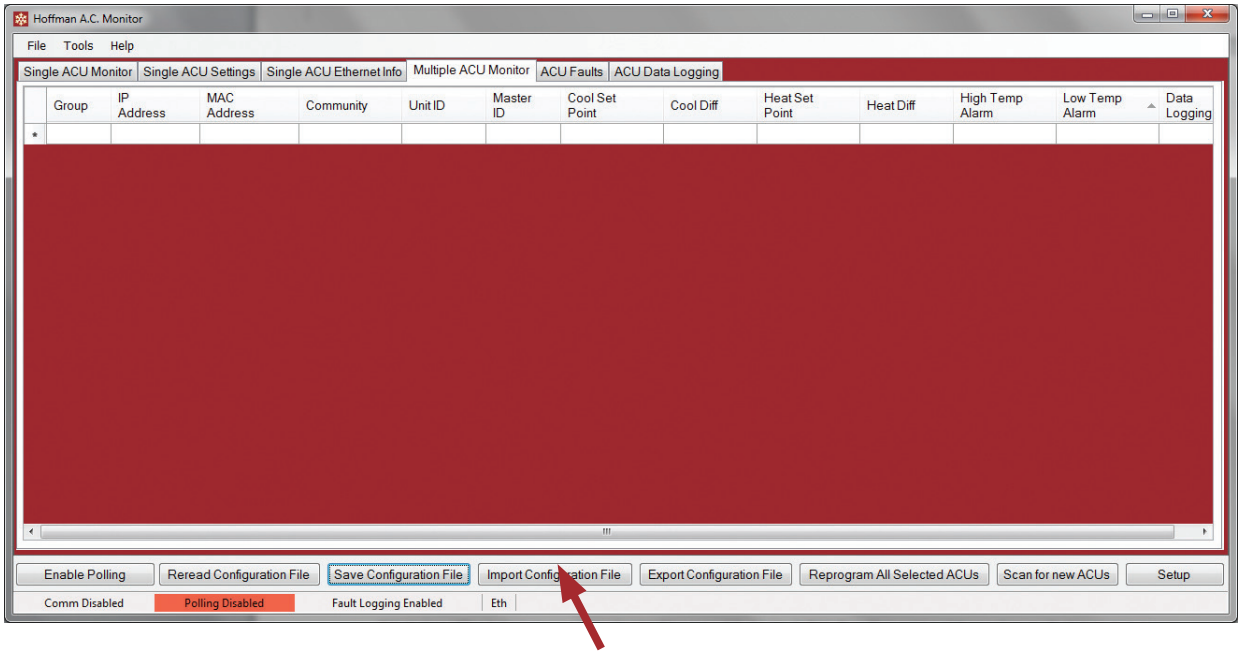
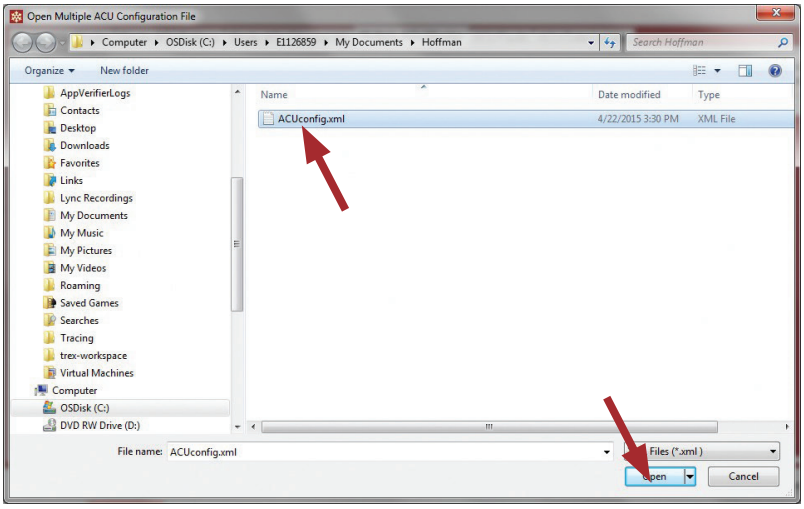
4.5 Importing a Configuration File

An existing XML configuration file can be imported into the Hoffman A.C. Monitor.



Click the "Tools" menu and select "Change Multiple ACU Configuration" from the pull-down menu. and, finally, click "Import Configuration File" button.



Use the "Open Multiple ACU Configuration File" window to find and select the XML configuration file to import, and select "Open" button. You must click the "Save Configuration File" button to make the imported configuration the permanent configuration.

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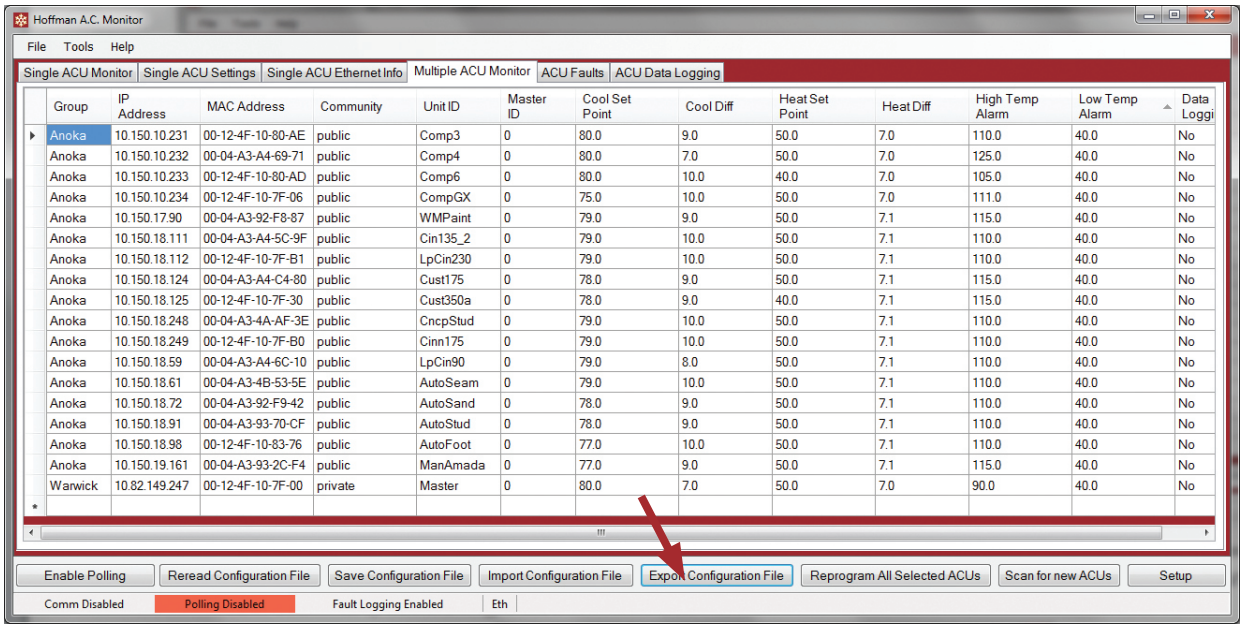
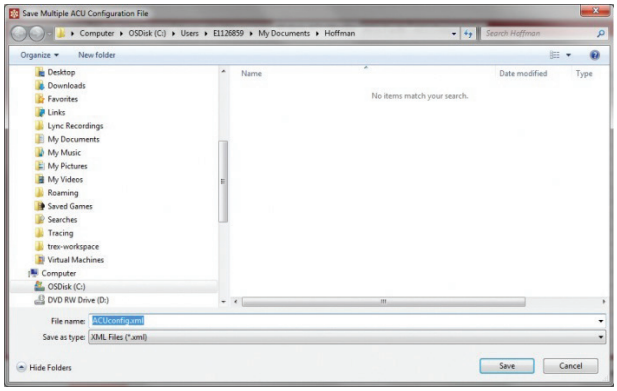
4.6 Exporting a Configuration File

The current Hoffman A.C. Monitor configuration can be exported to an XML file.



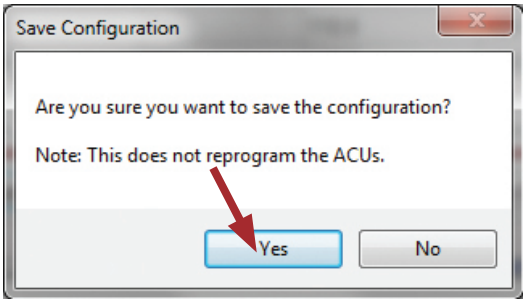
Group	IP Address	MAC Address	Community	Unit ID	Master ID	Cool Set Point	Cool Diff	Heat Set Point	Heat Diff	High Temp Alarm	Low Temp Alarm	Data Loggi
Anoka	10.150.10.231	00-12-4F-10-80-AE	public	Comp3	0	80.0	9.0	50.0	7.0	110.0	40.0	No
Anoka	10.150.10.232	00-04-A3-A4-69-71	public	Comp4	0	80.0	7.0	50.0	7.0	125.0	40.0	No
Anoka	10.150.10.233	00-12-4F-10-80-AD	public	Comp6	0	80.0	10.0	40.0	7.0	105.0	40.0	No
Anoka	10.150.10.234	00-12-4F-10-7F-06	public	CompGX	0	75.0	10.0	50.0	7.0	111.0	40.0	No
Anoka	10.150.17.90	00-04-A3-92-F8-87	public	WMPaint	0	79.0	9.0	50.0	7.1	115.0	40.0	No
Anoka	10.150.18.111	00-04-A3-A4-5C-9F	public	Cin135_2	0	79.0	10.0	50.0	7.1	110.0	40.0	No
Anoka	10.150.18.112	00-12-4F-10-7F-B1	public	LpCin230	0	79.0	10.0	50.0	7.1	110.0	40.0	No
Anoka	10.150.18.124	00-04-A3-A4-C4-80	public	Cust175	0	78.0	9.0	50.0	7.1	115.0	40.0	No
Anoka	10.150.18.125	00-12-4F-10-7F-30	public	Cust350a	0	78.0	9.0	40.0	7.1	115.0	40.0	No
Anoka	10.150.18.248	00-04-A3-4A-AF-3E	public	CncpStud	0	79.0	10.0	50.0	7.1	110.0	40.0	No
Anoka	10.150.18.249	00-12-4F-10-7F-B0	public	Cinn175	0	79.0	10.0	50.0	7.1	110.0	40.0	No
Anoka	10.150.18.59	00-04-A3-A4-6C-10	public	LpCin90	0	79.0	8.0	50.0	7.1	110.0	40.0	No
Anoka	10.150.18.61	00-04-A3-4B-53-5E	public	AutoSeam	0	79.0	10.0	50.0	7.1	110.0	40.0	No
Anoka	10.150.18.72	00-04-A3-92-F9-42	public	AutoSand	0	78.0	9.0	50.0	7.1	110.0	40.0	No
Anoka	10.150.18.91	00-04-A3-93-70-CF	public	AutoStud	0	78.0	9.0	50.0	7.1	110.0	40.0	No
Anoka	10.150.18.98	00-12-4F-10-83-76	public	AutoFoot	0	77.0	10.0	50.0	7.1	110.0	40.0	No
Anoka	10.150.19.161	00-04-A3-93-2C-F4	public	ManAmada	0	77.0	9.0	50.0	7.1	115.0	40.0	No
Warwick	10.82.149.247	00-12-4F-10-7F-00	private	Master	0	80.0	7.0	50.0	7.0	90.0	40.0	No

Click the "Tools" menu and select "Change Multiple ACU Configuration" from the pull-down menu. Then click "Export Configuration File" button.



From the "Open Multiple ACU Configuration File" window, select the desired directory and file name and click "Save" button.

Note: The default directory for saving the configuration file is C:\Users\<your userid>\Documents\Hoffman.



Click "Yes" to save the configuration file.

Note: You can use the Export/Import tools to copy the Multiple ACU Configuration from one PC to another.
Note: You can export the Multiple ACU Configuration file, edit it using an XML editor, and, finally, re-import it.

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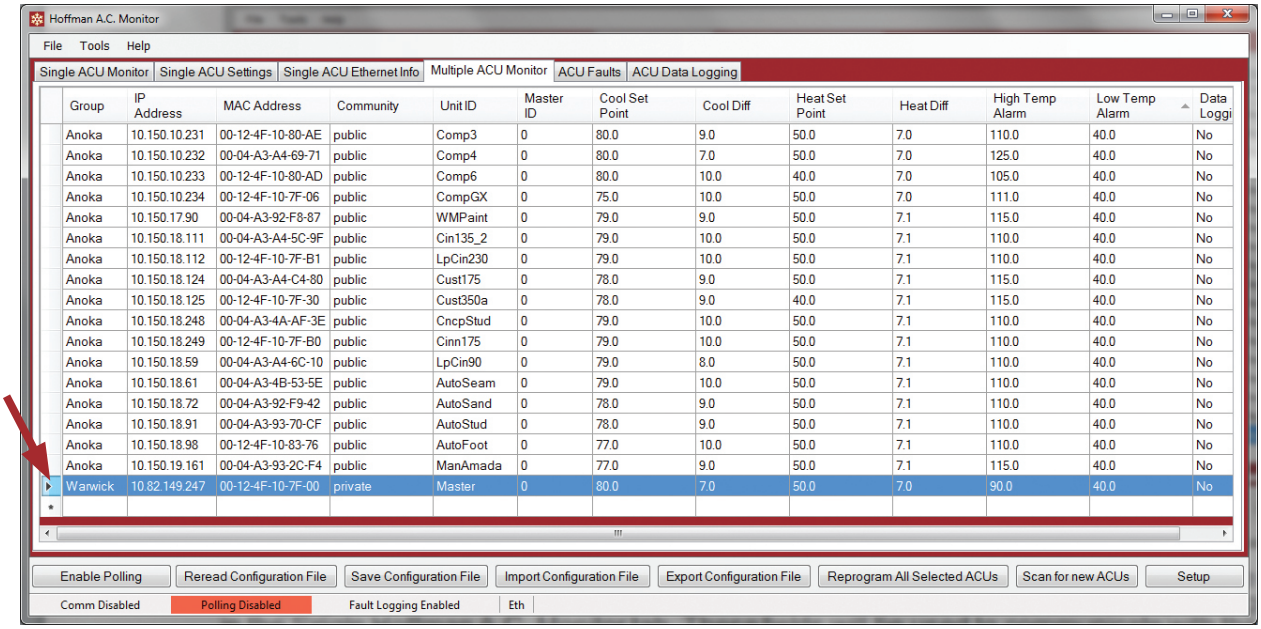
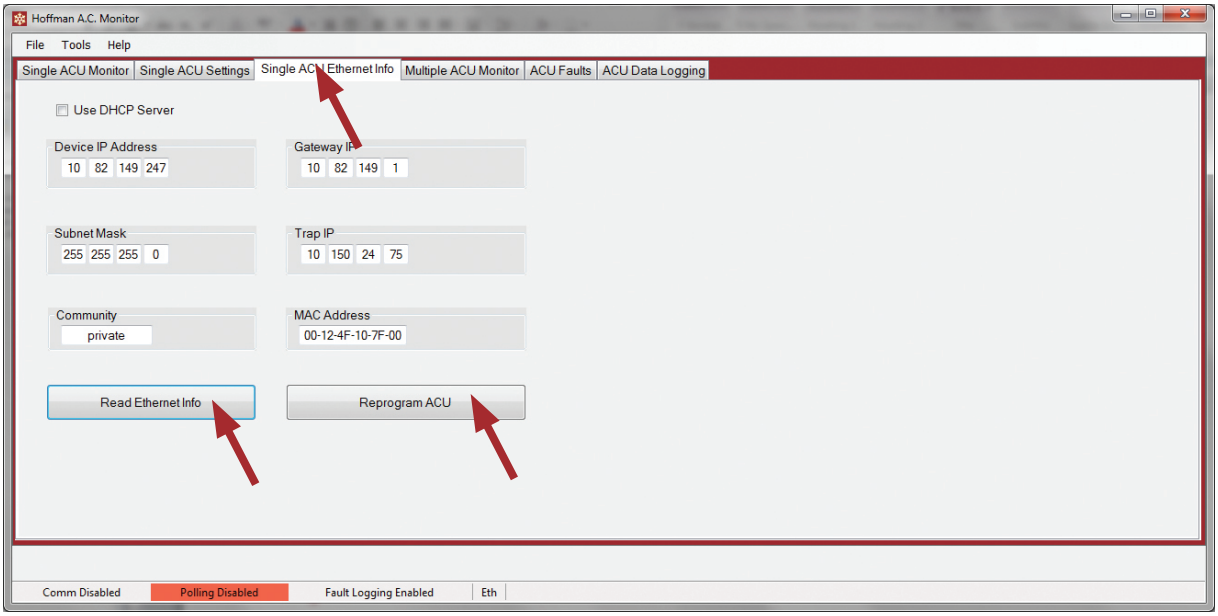
4.7 Changing the ACU IP Address or SNMP Community Setting



Click on the box to the left of the row containing the IP address for the air conditioner. The row will be highlighted and the IP Address and SNMP Community will be set in the corresponding fields in the Single Hoffman A.C. Monitor tab. These fields will be used to communicate with the air conditioner.



Click on the Single ACU Ethernet Info tab. Click on the "Read Ethernet" info button. The current Ethernet configuration will be displayed. Edit the fields as desired and click "Reprogram ACU" button. The updated network configuration will re-program the air conditioner.

Note: The IP address and SNMP Community settings cannot be changed from the Multiple Hoffman A.C. Monitor tab. You can use the Single ACU Ethernet Info tab to change the IP address or SNMP Community settings.

Note: You will need to modify the configuration in the Multiple Hoffman A.C. Monitor tab to correspond to the new network configuration for the air conditioner.

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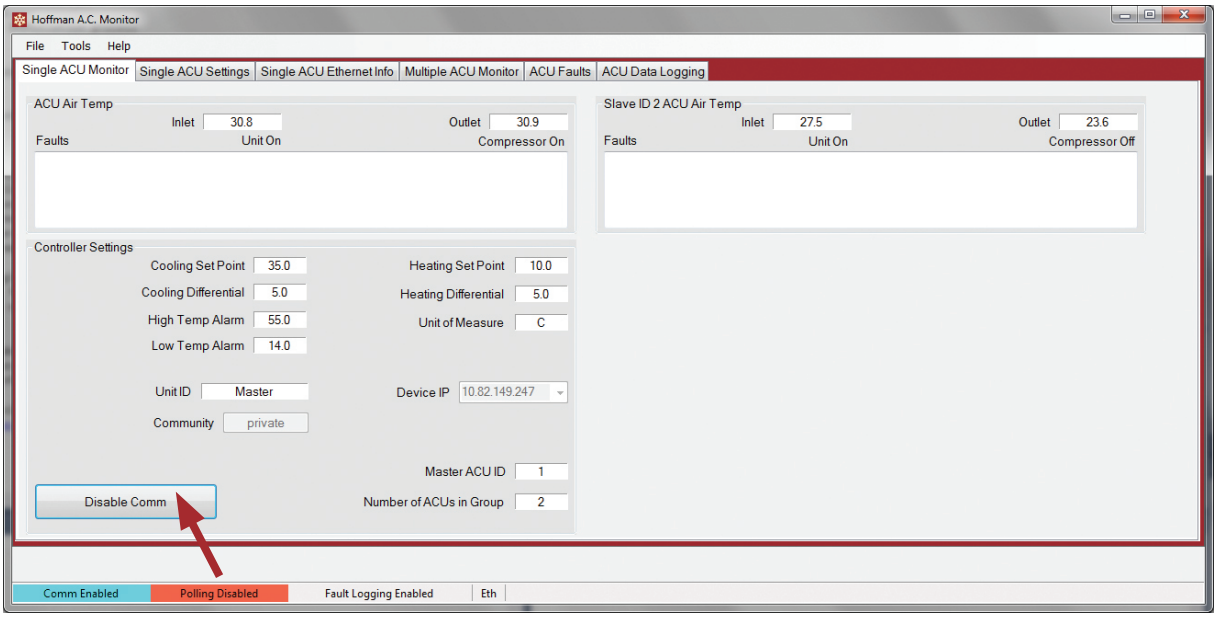
5. Monitoring or Configuring a Single ACU

The Hoffman A.C. Monitor can monitor and configure a single ACU through the network connection.

5.1 Monitoring a Single ACU

To monitor a single ACU, click on the "Single ACU Monitor" tab. Enter the IP Address of the ACU in the "Device ID" field and click on the "Enable Comm" button. The text on the "Enable Comm" button will change to "Disable Comm" when communications with the ACU is established. Click on the "Disable Comm" button to stop monitoring a single ACU.



The Standalone or Master ACU information will be displayed on the left side of the window. If the ACU is a Master in a Master/Slave configuration, a window on the right will open for each Slave ACU. ACU faults will be shown as text messages in the "Faults" window.

5.2 Configuring a Single ACU

To configure a single ACU, click on the "Single ACU Monitor" tab. Enter the IP Address of the ACU in the "Device ID" field, and enter the SNMP Community in the "Community" field. The default SNMP Community of "public" will not allow ACU configuration changes to be made. The default SNMP Community of "private" will allow configuration changes, but it is likely that this default SNMP Community ID was changed when the ACU was installed.

Click on the "Single ACU Settings" tab to open the ACU configuration window. Click on the "Read Settings" button to read the current configuration from the ACU. Change the desired field in the window, and click in the corresponding checkbox (square) to enable changing, and click on the "Change Settings" button.

The Master/Slave configuration and the Door Switch Polarity can be changed using the same method.

Note: the Temperature setpoints can only be changed in 0.1 degree steps. There is an upper and lower limit to all of the temperature settings.

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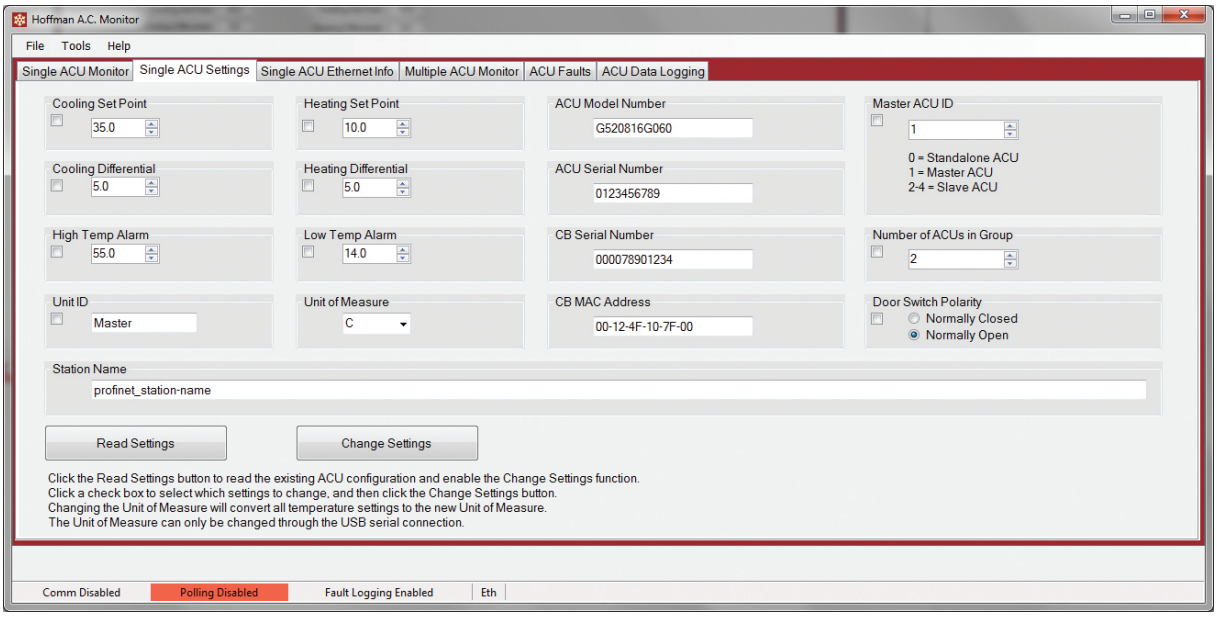
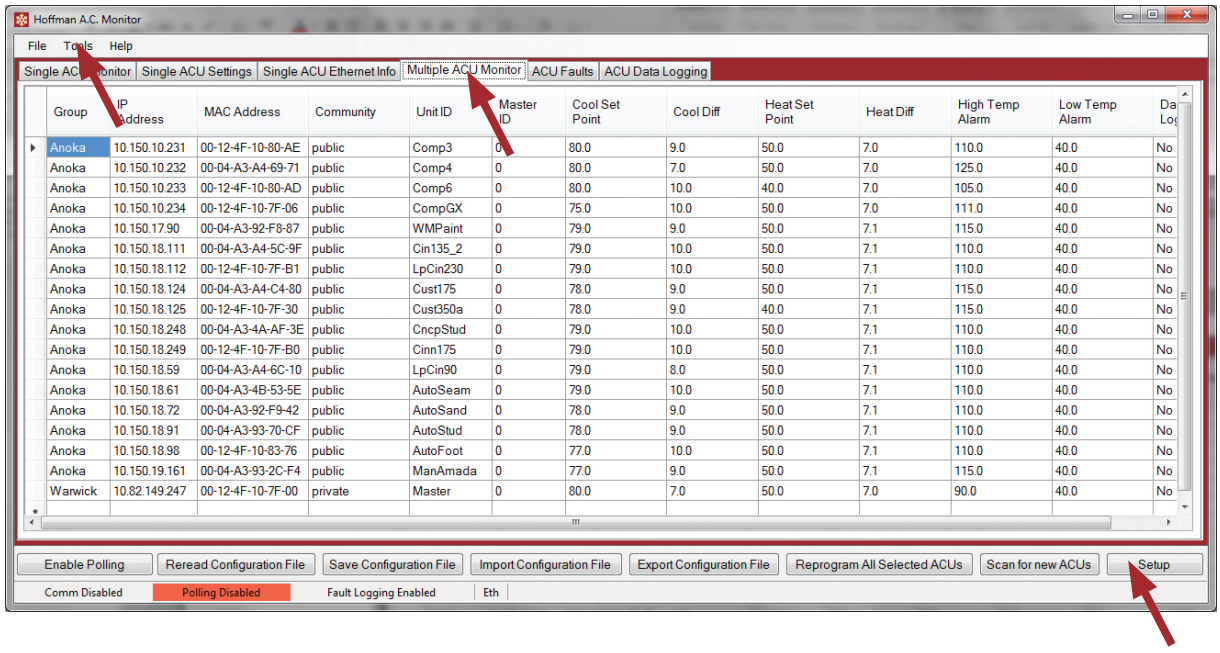


6. Hoffman A.C. Monitor Auto-Start and Alarm File Logging

The Hoffman A.C. Monitor can be configured to automatically start polling the air conditioners in the Multiple ACU mode when the application is started, and/or to enable logging of faults into an alarm file.

6.1 Enabling Hoffman A.C. Monitor Auto-Start and/or Alarm File Logging



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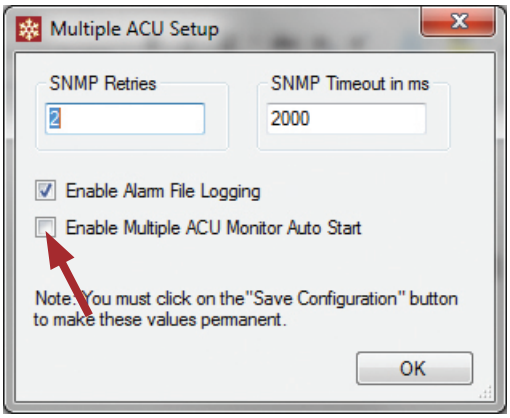
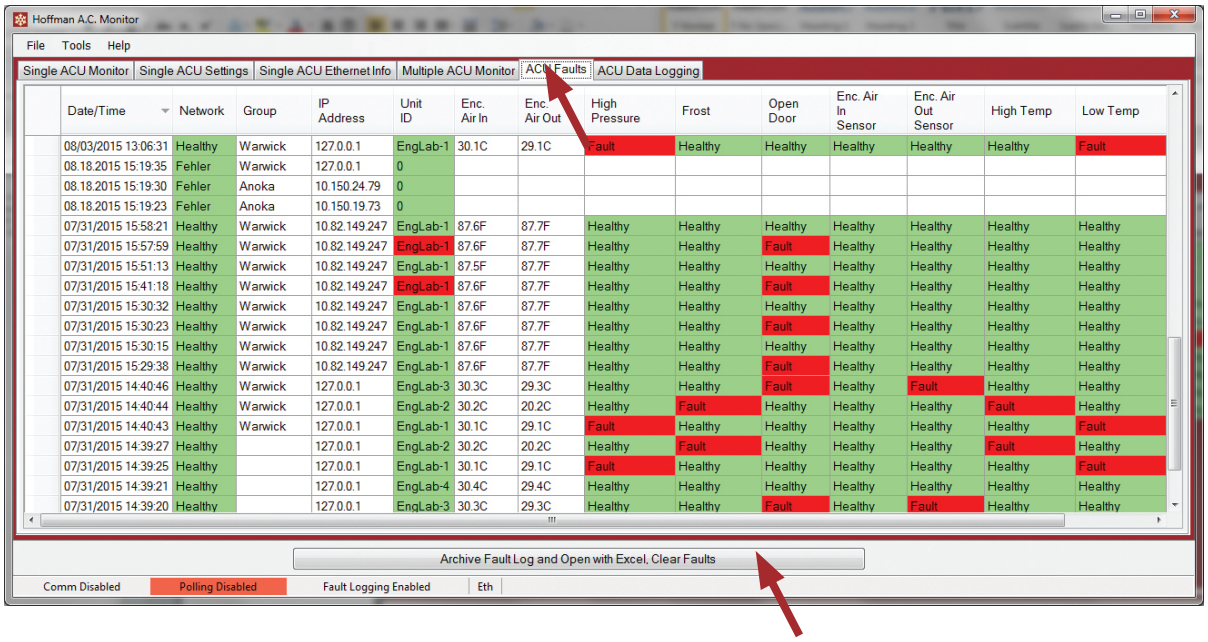
To enable Hoffman A.C. Monitor Auto-Start or Alarm File Logging, click the "Tools" menu, select "Change Multiple ACU Configuration" from pull-down menu and click Setup button.



Select Enable Alarm File Logging check box and/or the Multiple Hoffman A.C. Monitor Auto-Start check box and click OK button.

6.2 Exporting the Alarm File to Microsoft Excel



If you click on the "ACU Faults" tab and select "Archive Fault Log and Open with Excel, Clear Faults" button, the Hoffman A.C. Monitor will copy the fault log file into a new XML archive file. The new XML archive fault log file will be located in the "Hoffman" directory in your local documents directory. The name of the file will be as shown here MMDDYYY-hhmmmssACUAlarm.xml where MMDDYYY is the current month/day/year and hhmmss is the 24 hour version of the current time. If Excel is installed, Excel will be launched to open the XML archive fault log file. The current faults in the display will be cleared. The Alarm File is XML formatted and can be read by Microsoft Excel.

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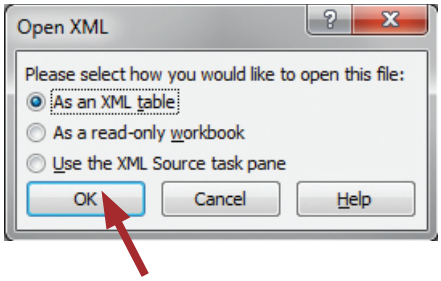
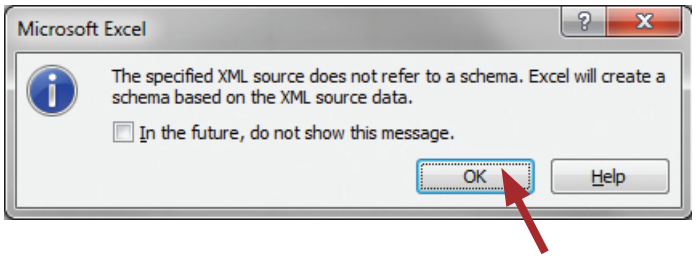
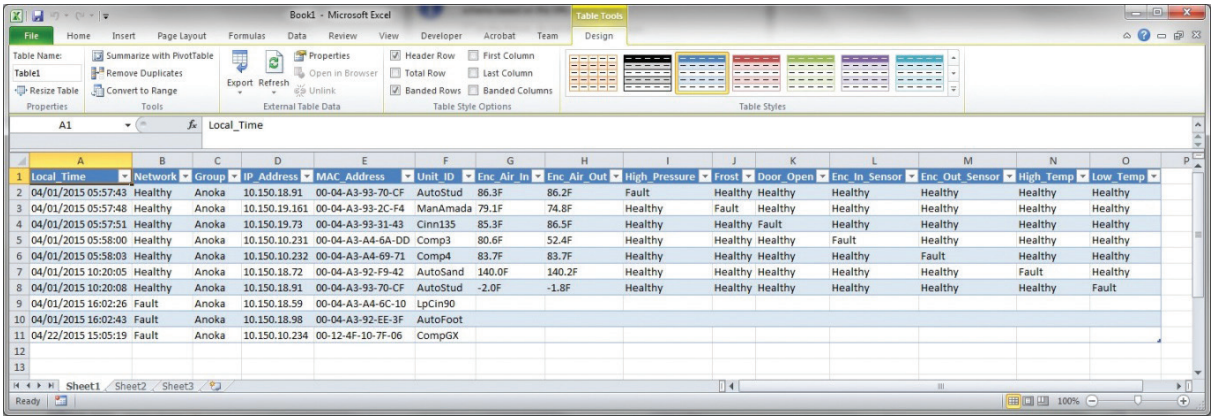


A window will open as shown above. Click OK button.



A window will open as shown above. Click OK button.



	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	Local_Time	Network	Group	IP_Address	MAC_Address	Unit_ID	Enc_Air_In	Enc_Air_Out	High_Pressure	Frost	Door_Open	Enc_In_Sensor	Enc_Out_Sensor	High_Temp	Low_Temp
2	04/01/2015 05:57:43	Healthy	Anoka	10.150.18.91	00-04-A3-93-70-CF	AutoStud	86.3F	86.2F	Fault	Healthy	Healthy	Healthy	Healthy	Healthy	Healthy
3	04/01/2015 05:57:48	Healthy	Anoka	10.150.19.161	00-04-A3-93-2C-F4	ManAmada	79.1F	74.8F	Healthy	Fault	Healthy	Healthy	Healthy	Healthy	Healthy
4	04/01/2015 05:57:51	Healthy	Anoka	10.150.19.73	00-04-A3-93-31-43	Cinn135	85.3F	86.5F	Healthy	Healthy	Fault	Healthy	Healthy	Healthy	Healthy
5	04/01/2015 05:58:00	Healthy	Anoka	10.150.10.231	00-04-A3-A4-6A-DD	Comp3	80.6F	52.4F	Healthy	Healthy	Healthy	Fault	Healthy	Healthy	Healthy
6	04/01/2015 05:58:03	Healthy	Anoka	10.150.10.232	00-04-A3-A4-69-71	Comp4	83.7F	83.7F	Healthy	Healthy	Healthy	Healthy	Fault	Healthy	Healthy
7	04/01/2015 10:20:05	Healthy	Anoka	10.150.18.72	00-04-A3-92-F9-42	AutoSand	140.0F	140.2F	Healthy	Healthy	Healthy	Healthy	Healthy	Fault	Healthy
8	04/01/2015 10:20:08	Healthy	Anoka	10.150.18.91	00-04-A3-93-70-CF	AutoStud	-2.0F	-1.8F	Healthy	Healthy	Healthy	Healthy	Healthy	Healthy	Fault
9	04/01/2015 16:02:26	Fault	Anoka	10.150.18.59	00-04-A3-A4-6C-10	LpCin90									
10	04/01/2015 16:02:43	Fault	Anoka	10.150.18.98	00-04-A3-92-EE-3F	AutoFoot									
11	04/22/2015 15:05:19	Fault	Anoka	10.150.10.234	00-12-4F-10-7F-06	CompGX									

The image above shows an example of the imported alarm file. Each row represents a change in the network connection state or a change in the alarm state for one ACU. The date and time from the PC running the Hoffman A.C Monitor at the time of the fault is listed in column A. If the Network column contains Fault, the ACU did not respond to an SNMP poll, but had previously responded. The group that was assigned to the ACU is listed in column C, and the IP and MAC address of the ACU are in columns D and E respectively. Columns G and H contain the inlet and outlet temperatures when the fault occurred. The remaining columns show the state of the ACU alarms when the fault occurred.

For example, row 9 shows an ACU that failed to respond to an SNMP poll, but had previously responded. Row 2 shows a high pressure fault and row 4 shows a door open fault.

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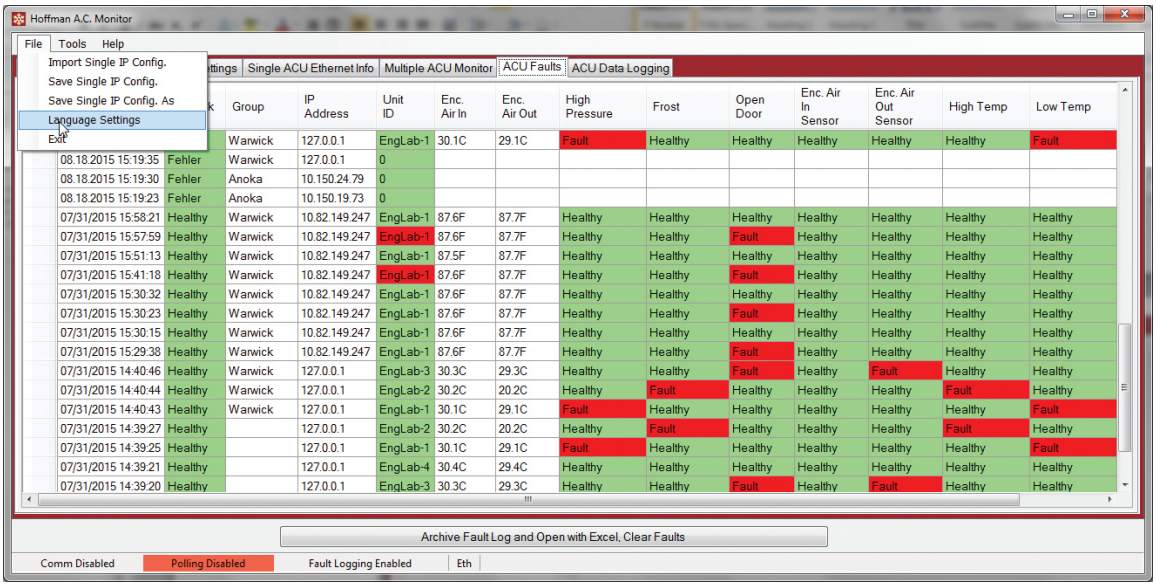
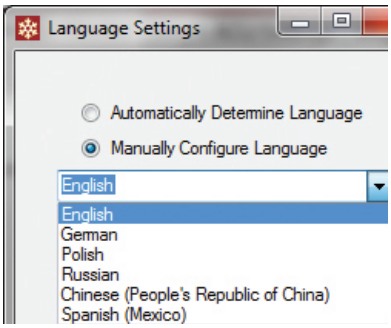
7. Changing the Hoffman A.C. Monitor Language

The Hoffman A.C. Monitor is multilingual. When the application is started, it will detect the native language configured in Windows and set the application's language to English, German, Mexican Spanish, Polish, Russian, or Simplified Chinese. If the PC is configured for any other language, the application's language will configure to English.

7.1 Overriding the detected language setting



You can override the detected language by clicking "File"and selecting "Language Settings".



A window will open as shown above. Select "Manually Configure Language" button. A pull-down menu will be displayed showing the possible languages. Select the desired language and click "OK".

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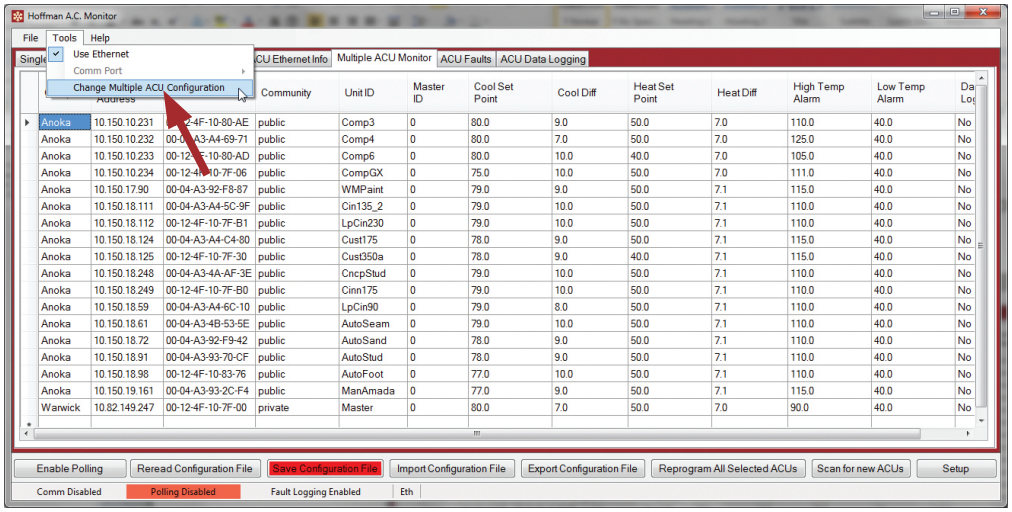
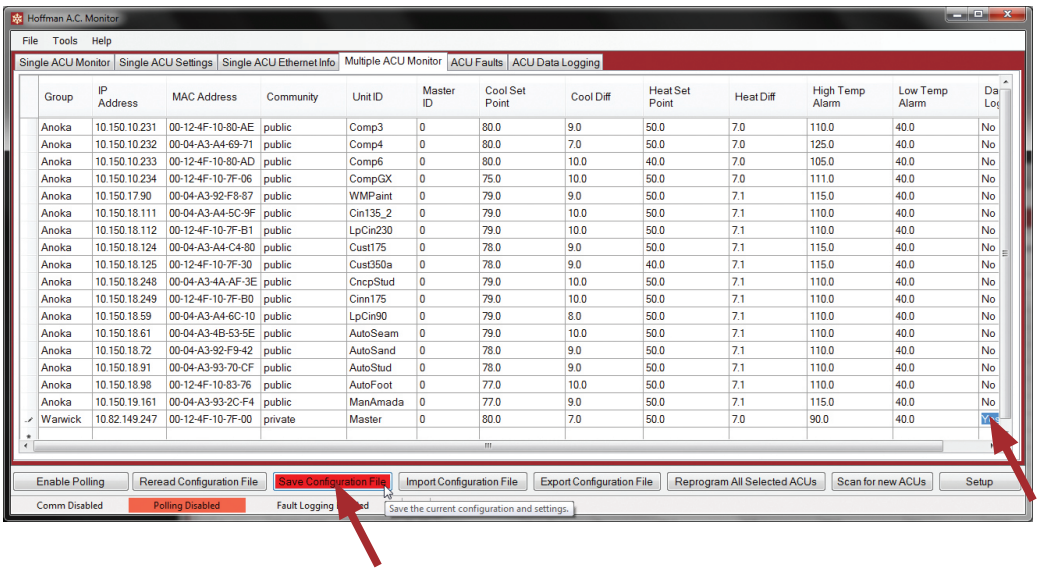
8. Hoffman A.C. Monitor Data Logging

The Hoffman A.C. Monitor can be configured to log sensor data from one or more ACUs into a sensor data file. The sensor data file can then be opened in Excel for analysis.

8.1 Configuring an ACU for Data Logging



To configure an ACU for data logging, click "Tools" menu and select "Change Multiple ACU Configuration" from the pull-down menu. Then click Setup button.



Find the ACU you would like to configure, click on the "Data Logging" column cell to change the "No" to "Yes", and, finally, click "Save Configuration File". Repeat this for each ACU that you would like to configure an ACU for data logging.

When clicking on "Enable Polling" button, the sensor data for each ACU that was configured for data logging will be stored in an XML file.

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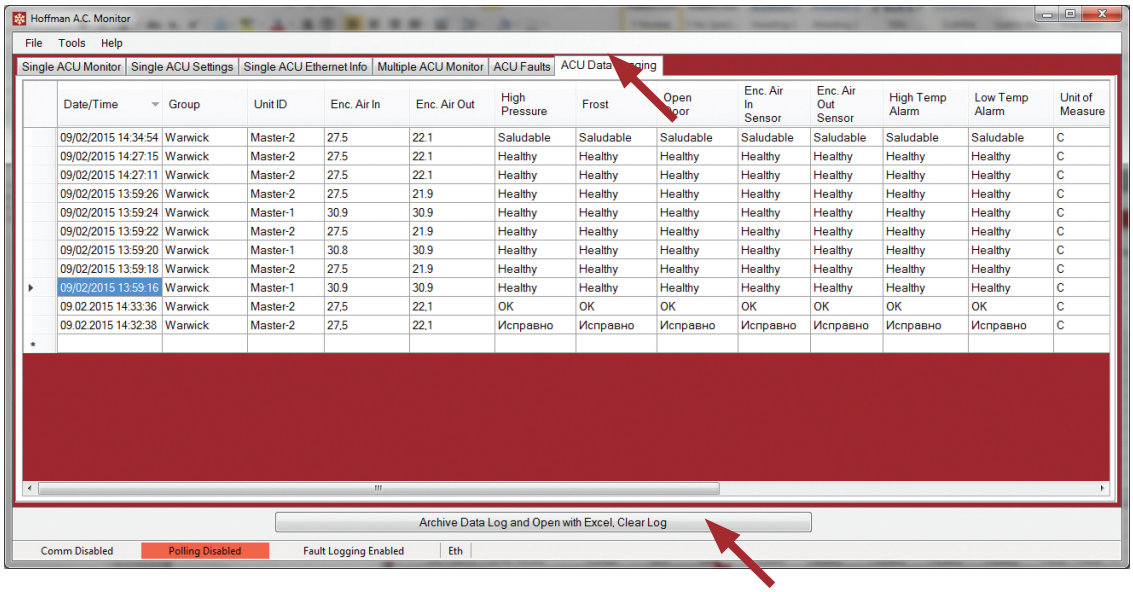
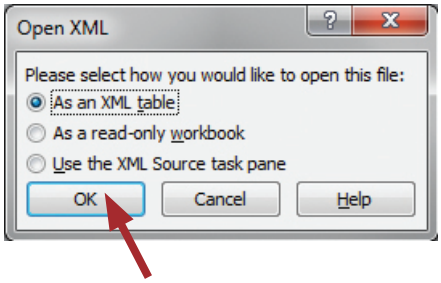
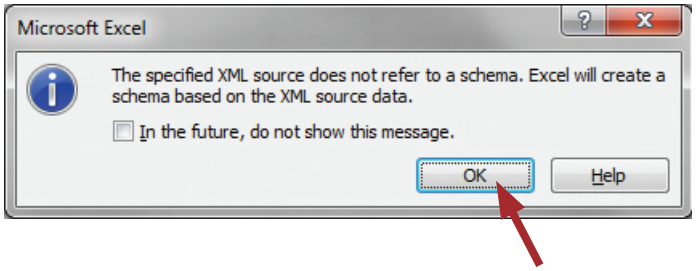
8.2 Exporting the Sensor Data to Microsoft Excel



If the "ACU Data Logging" tab is selected and "Archive Data Log and Open with Excel, Clear Log" button is clicked on, the Hoffman A.C. Monitor will copy the data log file into a new archive file. The new archive fault log file will be located in the "Hoffman" directory in your local documents directory. The name of the file will be formatted as shown here MMDDYYY-hhmmmssACUDataLog.xml where MMDDYYY is the current month/day/year and hhmmss is the 24 hour version of the current time. If Excel is installed, Excel will be launched to open the archive data log file. The current sensor data in the display will be cleared. The data log file is XML formatted and can be read by Microsoft Excel.



A window will open as shown above. Click OK button.



A window will open as shown above. Click OK button.

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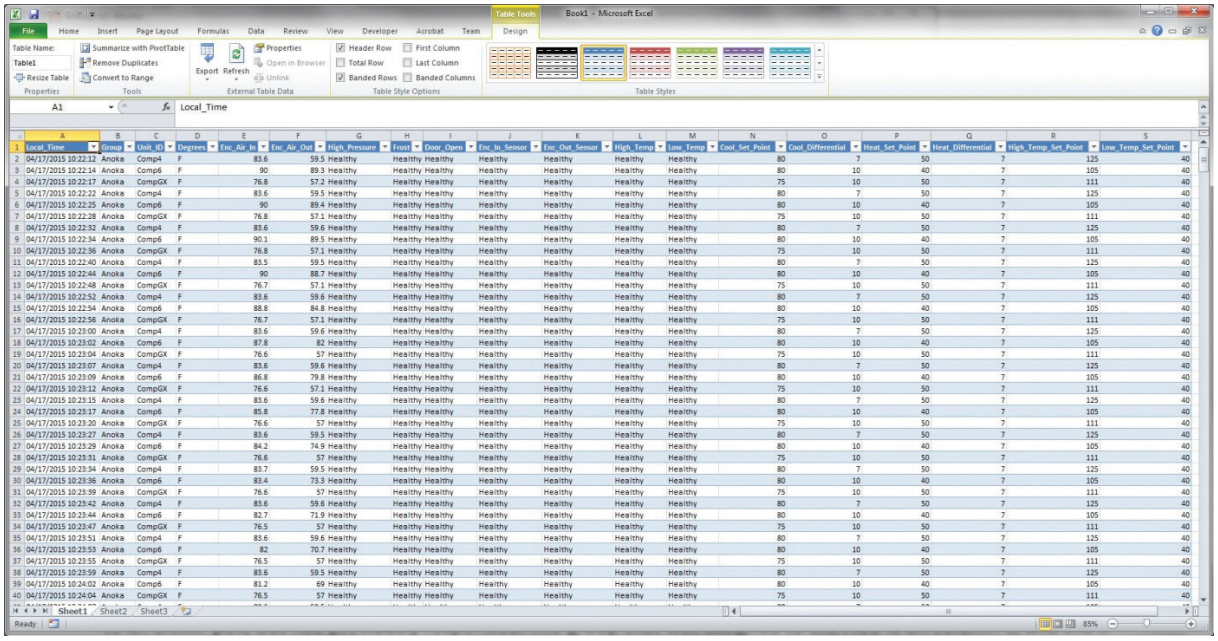
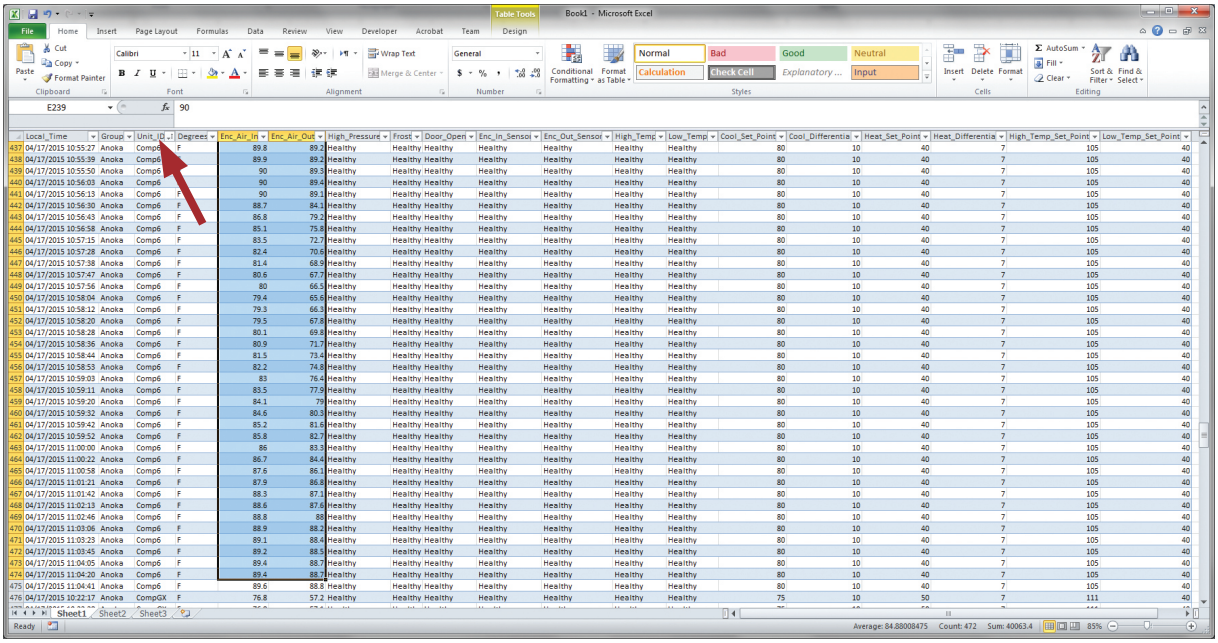


The image above shows an example of the imported data log file. Each row represents sensor data for one ACU. The date and time from the PC running the Hoffman A.C Monitor at the time of the poll is listed in column A. You can sort the data by clicking on the arrow next to the column heading.

8.3 Graphing the Temperature Sensor Data in Microsoft Excel



In order to create a temperature sensor graph, click on the Unit ID arrow to sort all of the data for each ACU into adjacent cells. Select the Enc_Air_In and Enc_Air_Out cells for a single ACU. Click on “Insert”, “Line”, and select the 2D Line chart.

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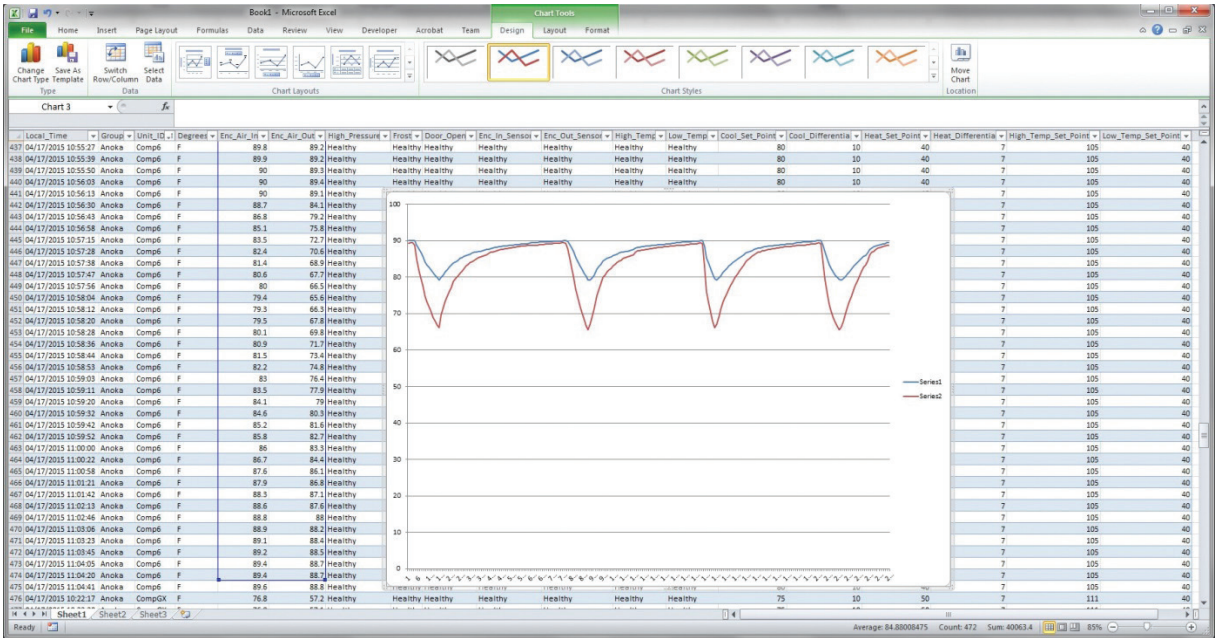
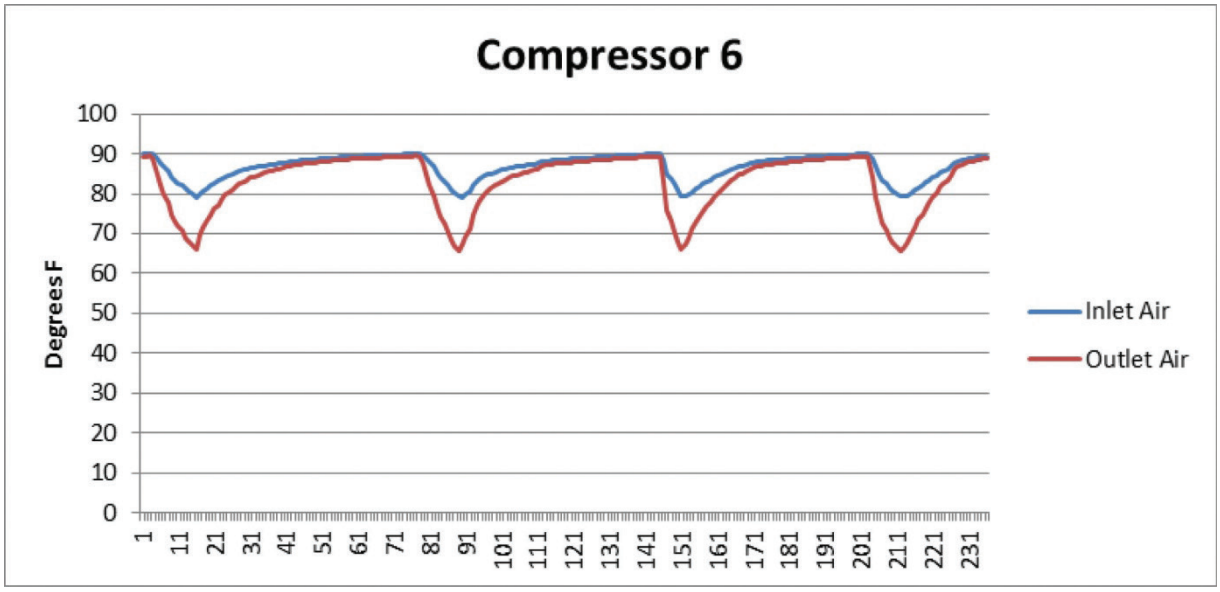


The resulting chart showing the Inlet Air Temperature and the Outlet Air Temperature will appear as shown above.

To change the Legend for the sensor readings, click on the legend at the right side of the chart, right click and click on"Select Data". Then click on "Series 1", click on "Edit", enter "Inlet Air" in text box, and click "OK". Repeat for "Series 2" and name it "Outlet Air".

To add a title to the Y-Axis of the chart, click on the chart, click on "Layout", click on "Axis Titles", click on "Primary Vertical Axis Title", and, finally, click on "Rotated Title". A text box will appear to the left of the numbers. Click on the text and change it to "Degrees F".

If a title on the top of the chart is desired, click on the chart, click on "Layout", click on "Chart Title", click on "Above Chart". A text box will appear above the chart. Click on the text and change it to "Compressor 6".



The above resulting chart had the ACU Cooling Setpoint set to 80F and the Cooling Differential set to 10F. From this graph, one can see that the corresponding Inlet Temperature varied between 80F and 90F.

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BASIC AIR CONDITIONING TROUBLE SHOOTING CHECK LIST - REMOTE ACCESS CONTROL VERSION

1. Check manufacturer's nameplate located on the unit for correct power supply.
2. Turn on power to the unit. The controller will display a start up sequence then revert to the normal temperature display mode. Is the correct enclosure temperature displayed?

Note: The temperature may be alternating with an alarm code.

YES, proceed to step 3.
NO, possible problem: » Open controller fuse » Controller in alarm condition.. » Defective controller » Defective thermistor - check by blowing warm air across the thermistor. If display temperature rises, thermistor is operable. → **Replace part**

3. The cooling status indication (symbol G) should be on. Is the symbol on? If not, press and hold the lower right "snowflake" button for greater than five seconds. Is the cooling mode symbol now on?

YES, proceed to step 4.
NO, possible problem: » Defective controller → **Replace part**

4. The evaporator (Enclosure or "COLD" air) fan/impeller should turn on. Is there airflow?

YES, proceed to step 5.
NO, possible problem: » Controller in alarm condition. » Open motor winding » Stuck fan/impeller » Obstructed blades/wheel » Defective motor capacitor → **Repair or Replace defective part**

5. Start the cooling cycle by changing the cooling setpoint parameter (r01) to the low limit of 72 F (22 C). Symbol 1 should be displayed indicating a call for cooling. If symbol 1 is flashing, the unit is in Restart Time Delay mode. Within 6 minutes, symbol 1 should display without flashing. Is symbol 1 displayed without flashing?

YES, proceed to step 8.
NO, possible problem: » Unit still in Restart Time Delay mode » Enclosure temperature below cooling setpoint temperature → **Wait and/or heat enclosure thermistor T1**

6. The compressor and the condenser (Ambient or "HOT" air) impeller(s) should turn on. Is there adequate airflow?

YES, proceed to step 7.
NO, possible problem: » Open motor winding(s) » Stuck impeller(s) » Obstructed wheel(s) » Defective motor capacitor(s) → **Repair or Replace defective part**

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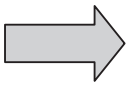
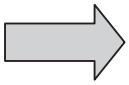
7. Carefully check the compressor for proper operation - motor should cause slight vibration and the outer case of the compressor should be warm. Is the compressor showing signs of this?

YES, wait 5 minutes, proceed to step 8.
NO, possible problem: » Defective start or run capacitor » Defective overload » Defective start relay » Defective contactor » Defective compressor  **Repair or Replace defective part**

8. Make sure the coils are clean then check the evaporator "air in" and "air out" temperatures. If the temperatures are the same:

» Possible loss of refrigerant » Possible bad valves in compressor  **Repair or Replace defective part**

SYMPTOMS AND POSSIBLE CAUSES - REMOTE ACCESS CONTROL VERSION

SYMPTOM	POSSIBLE CAUSE
Unit won't cool	Clogged fins on coil(s)
	Dirty filter
	Impellers not running
	Compressor not running
	Compressor runs, but has bad valves
	Loss of refrigerant
Compressor tries to start but won't run	Low line voltage at start. Should be +/-10% rated voltage.
	Compressor motor stuck
	Bad contactor
	Bad overload switch
	Bad run/start capacitor
Unit blows breakers	Undersized breaker/fuse or not time delayed
	Short in system
Getting water in enclosure	Drain plugged
	Drain tube kinked
	Enclosure not sealed (allowing humidity in)
	Mounting gasket damaged

For additional technical information, contact Pentair Equipment Protection at 800-896-2665.

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WARRANTY

Pentair Equipment Protection warrants that the Goods manufactured by Pentair Equipment Protection will be free from defects in material and workmanship for a period of one (1) year from the date of shipment by Pentair Equipment Protection, subject to the following conditions and exclusions:

I. Conditions. All Goods must be installed and operated according to the following specifications:

1. Maximum voltage variation no greater than plus or minus 10% of nameplate nominal rating;
2. Maximum frequency variation no greater than plus or minus 3 Hz of nameplate nominal rating;
3. Must not exceed minimum and maximum stated temperatures on the nameplate;
4. Must not exceed (BTU/Hr) rating, including any heat sink as indicated on the nameplate;
5. Refrigerant bearing Goods must not be restarted for a period of one (1) minute after intentional or accidental shut-off;
6. The filters (if applicable) must be cleaned regularly;
7. The Goods and any parts thereof must not be modified, unless prior written authorization is received from Pentair Equipment Protection; and
8. All Goods must be installed and grounded in accordance with all relevant electrical and safety codes, as well as the National Electric Code and OSHA rules and regulations.
9. All Goods must be installed in a stationery application, free of vibration.

A violation of any one of these conditions shall render the warranty hereunder void and of no effect.

J. Exclusions. This warranty shall be void if product is misapplied in any way or:

1. Buyer specified product is inappropriate for system or environment in which it is operating.
2. Goods are not installed in accordance with Pentair Equipment Protection specifications.
3. Removal or modification of Pentair Equipment Protection label affixed to product without written Pentair Equipment Protection approval.

Pentair Equipment Protection must be notified of a claim in writing not later than fourteen (14) days from the date when Buyer has become aware of such occurrence, or where the defect is such that it may cause damage, immediately, such notice containing a description of how the defect manifests itself. Failure to provide such prompt notice to Pentair Equipment Protection shall result in forfeiture of Buyer's rights under this warranty.

In the event of a warranty claim, Buyer is to return defective goods to Pentair Equipment Protection in accordance with Pentair Equipment Protection Return Policy. Warranty period for repaired goods remains at 1 year from shipment of original goods. Pentair Equipment Protection sole obligation to Buyer under this warranty will be, at Pentair Equipment Protection option:

A. Repair or replace Pentair Equipment Protection products or parts found to be defective in material or workmanship.

B. Issue credit for the purchase price paid by Buyer relating to such defective Goods or part.

THIS WARRANTY CONSTITUTES THE ENTIRE WARRANTY WITH RESPECT TO THE GOODS AND IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY AND IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE.

RETURN AND REPAIR POLICY

Pentair Equipment Protection products that: (i) are made to order, (ii) have been modified by Buyer, (ii) have special finishes, or (iv) are determined by Pentair Equipment Protection to constitute "custom" products that cannot be returned to stock or resold to other Buyers, will not be accepted for return by Pentair Equipment Protection.

All returns require a Return Material Authorization number (RMA #), regardless of reason for return, whether it be for warranty or out of warranty repair. Returns without an RMA # will be refused by our Receiving Department. An RMA # is valid for 30 days.

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A. An RMA # will be issued by our Product Return Department in Anoka, MN at 763-422-2211. Buyer should have following information available at time of RMA request:
   1. Complete Model Number, Serial Number and description of damaged unit being returned.
   2. Original Buyer Purchase Order number and date product was received by Buyer.
   3. Quantity to be returned and a brief description of failure for each unit, if different.
   4. Contact information of Buyer that must include: name of company, billing and shipping address, phone, number, fax number, freight carrier and the name and phone number of a Buyer contact who can elaborate on the claimed defect in detail.
   5. Buyer must provide a Repair Purchase Order number for both warranty and out of warranty repairs. The PO will not exceed 50% of a new unit. Buyer will be notified of repair charges that exceed approved PO amount.

B. All returns to Pentair Equipment Protection must be securely packed, using original cartons if possible. All returns must have the RMA number visible on the outside of the carton. Pentair Equipment Protection is not responsible for material damaged in transit. Any refrigerant-bearing Goods must be shipped upright for return.

C. Shipping cost for all non-warranty repairs is the responsibility of the sender and must be shipped prepaid. Shipping costs for all warranty related repairs will be covered by Pentair Equipment Protection provided the goods are returned using a Pentair Equipment Protection approved carrier. If after diagnoses the product is determined by Pentair Equipment Protection not be covered under warranty, Buyer will be responsible for all shipping charges and will be billed accordingly.

D. Non-warranty repairs are subject to a $105 minimum analysis fee. If approval is not received within 30 days, material will be scrapped and all shipping expenses and corresponding analysis fees will be billed to Buyer.

E. At Buyer's request, Failure Analysis can be provided by Pentair Equipment Protection for warrantable goods at no charge. Failure analysis for non-warranty repairs are subject to a $150 per hour Engineering charge plus any other incurred testing costs.

F. All returned merchandise must be sent to the following address: Pentair Equipment Protection, 2100 Hoffman Way, Anoka, MN 55303-1745.

G. Credit for accepted returns shall be at the original selling price or the current selling price, whichever is lower, less the restocking charge indicated as follows:
   1. Within 60 days of invoice date - 20% of applicable selling price.
   2. Within 61-120 days of invoice date - 30% of applicable selling price.
   3. Within 121-180 days of invoice date - 40% of applicable selling price.
   4. Beyond 180 days - subject to individual review by Pentair Equipment Protection.

   If product being returned for credit requires repair or modification, the cost of any labor or material necessary to bring product into saleable condition will be deducted from credit. Buyer may not take credit against returns without prior written Pentair Equipment Protection approval.

LIMITATION OF LIABILITY

PENTAIR EQUIPMENT PROTECTION WILL NOT BE LIABLE UNDER ANY CIRCUMSTANCES FOR ANY INCIDENTAL, CONSEQUENTIAL OR SPECIAL DAMAGES, INCLUDING WITHOUT LIMITATION ANY LOST PROFITS OR LABOR COSTS, ARISING FROM THE SALE, USE OR INSTALLATION OF THE GOODS, FROM THE GOODS BEING INCORPORATED INTO OR BECOMING A COMPONENT OF ANOTHER PRODUCT, FROM ANY BREACH OF THIS AGREEMENT OR FROM ANY OTHER CAUSE WHATSOEVER, WHETHER BASED ON WARRANTY (EXPRESSED OR IMPLIED) OR OTHERWISE BASED ON CONTRACT, OR ON TORT OR OTHER THEORY OF LIABILITY, AND REGARDLESS OF ANY ADVICE OR REPRESENTATIONS THAT MAY HAVE BEEN RENDERED BY PENTAIR EQUIPMENT PROTECTION CONCERNING THE SALE, USE OR INSTALLATION OF THE GOODS.

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