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T°Sentry ALERT System SOFTWARE OPERATIONS MANUAL

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SCOPE

This manual is intended to be used by system installers and end users as a guide for the configuration and daily operation of the $T^{\circ}Sentry$ ALERT System Software. It does not cover software installation, or installation and configuration of the system hardware (including the computer, network equipment, and sensors).

Prerequisites

As the T°*Sentry ALERT System Software* is a Microsoft Windows application, a basic knowledge of the Microsoft Windows XP (or later) graphical user interface (GUI) is required.

THE SENSOR STATUS SCREEN (PART 1)

The main window of the $T^{\circ}Sentry$ ALERT System Software is the sensor status screen (shown below). It contains a table of all the sensors that are being monitored by the system, as well as a number of buttons which are used to access information about the system configuration and the configuration and data for each sensor. Initially, the sensor table will be empty.



Logging In

The $T^{\circ}Sentry$ ALERT System Software contains a user list feature to allow for system access control and accountability logging. Initially this list only contains two users: *admin* and *guest*. To configure the system you must login as *admin* (administrator) using the password "adminpass!". Start by clicking the **Log In** button. You will be presented with the user authentication dialog box shown to the right. After entering the username and password, click the **OK** button.

🖿 LOG IN			×
Enter your l	ogin credentials.		
Usemame	admin		
Password			1
Chang	e password	Reset password	
	ОК	Cancel	

If this is the first time you have logged into the system, you will be presented with the Password Expired dialog box. You must change your password at this time. Enter the current *admin* password (adminpass!), and then enter your newly chosen password twice and click **OK**. Initially, the only restriction on the new password is that it must be four or more characters. If there are any errors with the passwords you enter you will be prompted to make corrections, otherwise you will get a "Password change was successful" notification.

Password expired				
Update your login credentials.				
Usemame	admin			
Current Password				
New Password				
Verify New Password				
ОК	Cancel			

After logging in, you will notice that some of the controls on sensor status screen change. The title bar will now display the name of the current logged in user, the sensor list becomes active, and a number of the buttons are enabled. As the system administrator, you now have full control of the system and can begin the steps required to configure the system for operation.

ensor ID	Name	Contact	Address	Units	Data	Set Lo	Set Hi	Status	Sensor
									Add Edit
									Delete
									On Off
									Alarm Mute
									View Data
									Set Location
									Monitor
									Reports
									Event Log
									Floor Plan
									User List
									Contact List
									Settings
									Help

SYSTEM SETTINGS

The system settings dialog box is accessed by clicking the **Settings** button on the system status screen. This is where you will configure the e-mail server settings, user authentication options, and serial communications settings (if equipped), as well as select a floor plan image (for displaying sensor status on a site floor plan or map), and configure audio options for the system computer.

E-mail Server Settings

When the settings dialog box is opened, you will be presented with the e-mail configuration tab (example shown below). In order for the system to be able to send alerts when the sensors are in their alarm state, you must configure the SMTP Settings shown in this tab. This requires that you have an e-mail mailbox created specifically for the system, we recommend using an easily recognizable e-mail account name such as "alerts@mycompany.com" or "sensors@mycompany.com". If required, contact your local IT professional for assistance with creating the E-Mail mailbox.

To allow the system to retrieve e-mail from a POP3 mail server, check the Enable POP3 Mail option and configure the POP3 Settings. This allows users to send certain commands to the system via e-mail, to get status reports, or to mute alarms and make some configuration changes remotely. For added security you can require that a password be added to any e-mail commands, to prevent unintended system modifications. All e-mail commands are logged along with the incoming e-mail address.

🖬 Settings					
E-Mail User Auth SMTP Settings SMTP Server Usemame	smtp.server.net	tions Floor Plan & Sounds Port 587 Vise TLS authentication			
Password Image: Use SSL encryption Image: Enable POP3 Mail (used to send commands remotly) Change requires restart! POP3 Settings POP3 Settings					
POP3 Server Usemame	pop.server.net alerts@mycompany.com	Port 995			
Password		Use SSL encryption			
Command password in E-mail commands					
Save Settings Cancel					

User Authentication Settings

The user authentication settings allow some control over password complexity, password expiration, and user inactivity logout. The default values are shown below.

🖬 Settings
E-Mail User Authentication Serial Communications Floor Plan & Sounds
Enforce password length of 4 or more characters
Enforce complexity: Upper case Lower case Digits Symbols
Enforce password expiration after 90 days
Frequencies Enforce inactivity logout after 5 minutes
Save Settings Cancel

Changing these settings does not affect the security settings of the computer. User authentication is only used by the $T^{\circ}Sentry$ ALERT System Software to log system activity and limit what options within the application are available to specific users. This is described in more detail in a following section.

Serial Communication Settings

The serial communication settings can allow the $T^{\circ}Sentry$ ALERT System to communicate with specific data acquisition systems and external alarm triggers which use the RS-232 or RS-485 serial communication standards.

M Settings					
E-Mail User Authentication	Serial Commu	nications	Floor Plan &	Sounds	
Changing serial communic	ations setti	ngs requ	iires progra	ım restart!	
Enable watchdog on port:	None	-			
Enable translator on port:	None	$\overline{\mathbf{v}}$			
Verbose translator events					
Translator update interval	3	min			
·			1		
Sav	ve Settings	Ca	incel		

CONSULT WITH HAMPSHIRE CONTROLS CORP. BEFORE MAKING ANY CHANGES TO THESE SETTINGS!

Floor Plan & Sound Settings

The last tab in the settings dialog is for selecting a "floor plan" image file, and enabling system alarm sounds.

🗝 Settings
E-Mail User Authentication Serial Communications Floor Plan & Sounds
Floor Plan Image Select File
Sounds
Enable alarm sounds Play system beep Play WAV file
WAV File Select File
Changing sound settings requires program restart!
Save Settings Cancel

The floor plan image can be used to display status icons of the sensors on a map or building floor plan. For best results, the image should be 640x480 pixels or larger, but not larger than the monitor resolution of the computer. The file type should be JPG (JPEG), PNG, GIF or BMP with a resolution of 96 DPI.

If you enable alarm sounds, then the $T^{\circ}Sentry$ ALERT System computer will produce a repetitive audible alarm when any of the sensors are in an alarm condition. The alarm sound can be the system beep (produced by the computers internal speaker), or a short WAV file if the system is equipped with a sound controller and external speakers.

USER LIST

Every person that will need to have access to the $T^{\circ}Sentry$ ALERT System should have an entry in the user list. This allows the system to keep a log of the activities that are performed on the system by any specific person. In addition, each user can have three associated contact addresses for receiving system alert messages. The system has two default users: *admin* and *guest*.

To access the user list click the **User List** button on the sensor status screen.

🛤 User List					
User Add n	ew user 🗨 Usemame				
First Name	Last Name				
Contact 1					
Contact 2					
Contact 3					
Generate	temporary password 🛛 🗖 Force change at next login				
Password exp	pires at:				
Permission	5				
Restricted User C Limited User C Advanced User					
C Limited by contact list C Full permissions					
Allow user to modify system settings					
Allow user to modify user list					
D	elete Add user				

Adding a User

By default the User List dialog box opens in "Add new user" mode. Follow these steps to add a new user to the list:

- 1. Enter the first and last name of the user. The username will be created from the first letter of the users first name followed by the entire last name. If by some chance two users share the same last name and first initial, the system will add an incrementing digit to the duplicate username.
- 2. Enter up to three contact addresses for the user. The contact addresses must be in the form of an email address. For text messaging the address is usually the 10 digit phone number followed by a server name which can be obtained from your mobile service provider. It is

also recommended that "Contact 1" be a true e-mail address, as this is where the temporary passwords are sent. YOU MUST ENTER ONE CONTACT ADDRESS.

- 3. Press the Generate temporary password button. This will send a temporary login password to the user when the user is added to the list. The user will be prompted to change the password at the first login attempt. SMTP server settings MUST be configured for this to work!
- 4. Select the permissions you would like this user to have when accessing the system.
 - a. Restricted User A restricted user may only view sensor data. They cannot make any changes to the system, including muting any alarms. The *guest* user has restricted user permissions.
 - b. Limited User A limited user has additional permission to mute (acknowledge) alarms and add messages to the event log.
 - c. Advanced User An advanced user has additional permission to modify sensor settings. In addition, only advanced users may be given the additional permission to modify system settings and/or modify the user list.
 - d. Limited by contact list This option reduces the permission of limited and advanced users. They are only allowed to modify a sensor if they are included in the sensors contact list.
 - e. Full permissions This option allows the limited or advanced user to access ANY of the sensors in the sensor list.
- 5. Click the Add User button to place the new user into the list.

An example of adding a new user is shown below.

🖬 User List					
User Add new user Usemame hfamsworth					
First Name Hubert Last Name Famsworth					
Contact 1 hfamsworth@planetex.com					
Contact 2 9175553000@sms.provider.net					
Contact 3					
Generate temporary password 🔽 Force change at next login					
Password expires at: 2014-09-30 11:28:18					
Permissions C Restricted User C Limited User C Advanced User Device Permissions C Limited by contact list C Full permissions					
 Allow user to modify system settings Allow user to modify user list 					
Delete Close Add user					

Editing a User

To edit a user, select the username you wish to edit from the drop-down list.

🕶 User List				
User Add new user	Usemame Last Name			
Contad hfamsworth				
Contact 2				
Contact 3				
Generate temporary password	Force change at next login			
Password expires at:				
Permissions				
 Restricted User Lim 	ited User C Advanced User			
C Limited by contact list C Full permissions				
 Allow user to modify system settings Allow user to modify user list 				
Delete	Close Add user			

The dialog box will be populated with the settings for the selected user. You may then make changes to the users settings. When done, click the **Save Changes** button (replaces the **Add User** button).

Deleting a User

To delete a user, select the username you wish to edit from the drop-down list. Click the Delete button. You will be prompted to acknowledge the deletion, click **Yes** to delete the user.

CONTACT LIST

The contact list consists of groups and schedules which may be used to control when certain persons receive alert messages for each sensor during an alarm condition. To access the contact list click the **Contact List** button on the sensor status screen.

🕶 Contact List			
Contact Group Defa	ult	•	Manage Groups
Select a users contact	information or o	or type in an email address	Add
User	Contact	E-mail Address	Remove
			Send Test E-mail
			Create Schedules
			Save and Close

Creating Contact Groups

The first step in editing the contact list is to create groups. From the contact list dialog, click the **Manage Groups** button to open the Contact Groups dialog.

There is always a group named "Default". Adding a group is accomplished by typing a new group name into the text box and clicking **Add Group**. It is recommended to add a group named "Reports" for the distribution of periodic sensor reports generated by the $T^{\circ}Sentry$ ALERT System. If you intend to use schedules then some group names could relate to work shifts or the time of day or week, such as "Days", "Nights", and "Weekends". If the system monitors many sensors then the group names could refer to specific entities within your organization, such as "Vaccine Storage" or "Biology Lab".

The maximum number of groups is 20, including the "Default" group. When you are done adding groups click the **Close** button.

Adding Contacts to a Group

In the Contact List dialog, first select a group from the Contact Group drop-down list.

🕶 Contact List			
Contact Group	ılt	•	Manage Groups
Select a users contact i Type in address	information or o	or type in an email address	Add
User	Contact	E-mail Address	Remove
			Send Test

In this case we have chosen the "Default" group.

Contact Groups	
<u> </u>	Add Group
Contact Groups Default	Delete Group
	Close

There are two ways to enter contacts into the group. First, you may add them by typing any email address into the text box and clicking the **Add** button (as shown in the example below).

Contact List		
Contact Group Default	•	Manage Groups
Select a users contact infor	nation or or type in an email address	Add
User	Contact E-mail Address	Bemove
	security@henchco.com	Send Test

The second method is to select a user name from the left drop-down menu, and then select one of the users contact addresses from the right drop-down menu (as shown in the example below).

H Contact List	
Contact Group Default	Manage Groups
Select a users contact information or or type in an email address	
hfamsworth (Famsworth 🔹 hfamsworth@planetex.com	Add
User 9175553000@sms.provider.net	Remove
	Send Test
H Contact List	
Contact List Contact Group Default	Manage Groups
Contact List Contact Group Default Select a users contact information or or type in an email address	Manage Groups
Contact List Contact Group Default Select a users contact information or or type in an email address Type in address	Manage Groups Add
Contact List Contact Group Default Select a users contact information or or type in an email address Type in address User Contact E-mail Address	Manage Groups Add Remove
Contact List Contact Group Default Select a users contact information or or type in an email address Type in address User Contact E-mail Address Security@henchco.com Ensure the Online and the online an	Manage Groups Add Remove

The second method has the added benefit of linking the contact list with the user list. Therefore, the users contact information is only stored in one location, the user list. If the users contact information is updated, the contact list links will be updated as well.

Creating Contact Schedules

Once you have created the necessary contact groups for your organization, you may then create schedules to control when each group should receive sensor alarm notifications. It is not necessary to create schedules for groups that are intended to receive alerts 24/7.

To add scheduling to your contact list click the Create Schedules button in the main contact list dialog. The Contact Schedules dialog will open.

Enter a name for a schedule in the text box and click the **Add** button. Repeat this procedure for each schedule you would like to create. Up to 20 schedules may be created. When you have added the required schedules, select any one schedule from the list by clicking on it, then click the **Edit Schedule** button.

In the Schedule Editor you may schedule up to 4 contact groups to receive alerts during defined days and hours. Any time period that is not covered by the defined times will be sent to the 5^{th} group. This ensures that

H Contact Schedules	
Add a schedule name to the list Schedules	Add Remove Edit
H Contact Schedules	
Add a schedule name to the list	
Days-Nights-Weekends	Add
🖿 Contact Schedules	
Add a schedule name to the list	- []
	Add
Schedules Days-Nights-Weekends	Remove
	Edit
H Contact Schedules	
Add a schedule name to the list	
	Add
Schedules Days-Nights-Weekends	Remove
	Edit

all times are covered in the event that a mistake was made in the time range selections.

M Schedule Editor		
Schedule: Days-Nights-Weekends		0
Contact Group 1	M Tu W Th F Sa Su Start	5top 13 <u></u> √ :59
Contact Group 2		21 💌 :59
Contact Group 3		5 🚽 :59
Contact Group 4		23 💌 :59
Contact Group 5 Default	All other times (default)	
If the time periods for any two groups overlap, only the first group to mach the event time will be conta	acted.	Save

The following is an example schedule:

🛤 Schedule Edi	tor											
Schedule: Days-N	ights-Weekends	Ν	1 7	Гu	w	Th	F	Sa Su	Start	:	Stop	
Contact Group 1	Days 💌	V	E I	~	•		◄		8	• :00	17	▼ :59
Contact Group 2	Nights	V	i I	~	•				18	▼ :00	7	▼ :59
Contact Group 3	Weekends 💌	Γ	1		Γ			\checkmark	0	▼ :00	23	▼ :59
Contact Group 4	_	Г	1 [_	Γ			${\bf \boxtimes} {\bf \boxtimes}$	0	- :00	23	- :59
Contact Group 5	Default	A	l otł	her	time	s (de	efault)					
If the time periods only the first group	for any two groups overlap, to mach the event time will be cont	tacte	ed.								Sa	ive

The contact group "Days" is scheduled to receive alerts Monday through Friday at 8:00 to 17:59.

The contact group "Nights" is a special case where the stop time is earlier than the start time. In this situation the start time is assumed as "current day" and the stop time is "following day". Therefore, "Nights" will receive alerts starting on each day Monday through Friday at 18:00 and ending the following day Tuesday through Saturday at 8:00.

The "Weekends" contact group is scheduled to receive alerts all day Saturday and Sunday. However, since the "Nights" group is higher priority, and the two schedules overlap on Saturday from 0:00 to 8:00, "Nights" will receive the alerts during the overlapping time and "Weekends" will begin receiving alerts on Saturday at 8:00.

Also notice that the time period on Monday from 0:00 to 7:59 is NOT covered by the three scheduled times. Therefore, the "Default" contact group will receive alerts during that time.

When you are done editing the schedule, click the **Save** button.

REPORT SETTINGS

The $T^{\circ}Sentry$ ALERT System can generate periodic reports which may contain current sensor readings, charts, statistical data, and logged events. Reports are saved to the computer hard disk drive but may also be sent to users via contact list distribution. Click the **Reports** button on the sensor status screen to open the report settings dialog. The default settings are shown to the right.

Automated Reports

The reports can be generated in either plaintext or HTML file format. Either file format allows for a custom page header (title) to be added at the top of the report.

All automatically generated reports start with a table listing the current sensor readings and sensor status. Next, if you are using HTML format, you may choose to add small charts for each sensor which show the data fluctuation over the report period. Following that you may include statistical data for each sensor, showing minimum, maximum, mean, standard deviation, and MKT (Mean Kinetic Temperature; for temperature sensors only).

The event log is the final section of the report. The first option for the event log is sorting by either time or by sensor. If you choose to sort

🖬 Reports
Report Format
Plaintext fixed width): C HTMI
Custom Header:
Hampshire Control Corp.
Environment Monitoring System
Include charts (HTML only)
Include statistical data in report
Soft event log by: C Time (Sensor
Only display ALARM events in sensor event log
Display system messages in event log
Generate report every: 8 Hour(s)
Report Folder
Email to: Default
Manual Report
Report for previous: 8 whour(s) from,
11:51 on 2014/09/30 Now
Generate Report
Save and Close

the event log by time only, the log will be one complete table, showing events as they occur chronologically through the report period. Alternately, you may choose to sort the event log by sensor. In this case, an event log table is created for each sensor, and each individual table is sorted chronologically. To decrease the size of the event log, you may choose to only report the "alarm" events. Additionally, you may choose to disable the display of system events in the log to further decrease its size.

Automated reports can be generated every 1, 2, 4, 6, 8, 12 or 24 hours, depending on your requirements. When the report is generated it is either stored in the application folder, or in a folder you specify. Once the report file has been created, it can then be e-mailed to one of the contact groups. It is recommended that the contact group used for reports only contain true e-mail addresses; **DO NOT** use e-mail-to-SMS gateway addresses, as the report will be broken into a large number of text messages, formatting information will be lost, and the report will be unreadable by the recipient.

Manual Report Generation

You may open the Reports dialog at any time to generate a report for a time period of your choosing (from 1 hour to 28 days in length). The manual report uses the settings in the automated report section for formatting. First, select the report time period from the manual report drop-down hour list. Next, select the end-time of the report period (clicking the **Now** button will set the end-time to the current date and time). Finally, click the **Generate Report** button, a report file will be created and then opened in the default viewer for TXT or HTML files, depending on the chosen format. Manual reports will not be e-mailed to the contact group.

ADDING SENSORS

Now that the $T^{\circ}Sentry$ ALERT System settings have been configured you can start to add sensors. When you click the Add button in the upper right of the sensor status screen, you will be presented with the Sensor Information dialog box shown below.

Sensor Information				
Interface Image: Constraint of the second	fined Channel 1	C 0.1' Resolution	s C Door switch, alarm on open C Door switch, alarm on closed	Enable alarm Alarm delay
Data Unit ID Current Data Alarm Low Alarm High Data Units Senal Units C *C C *F Log: NEVER Take Senser Office	Alarms Alarm delay source: I Enable low data Delays: Low/High Description Sensor Name Location Description	: C Delays set in soft s alarm IV Enable h Marm IV R ndefined ndefined	ware C Delays set in hardware gh data alarm etransmit notification 15 Asset Tag/Serial # Und	lefined
10.20.30.253/255.255.255.0	Auto Detect	Sensors	Save Sensor Details	Cancel/Close

Sensor Interface

Unless you are using the $T^{\circ}Sentry$ ALERT System with legacy serial hardware, the sensor interface will be IP (Internet Protocol). Depending on the type of sensor you have purchased from Hampshire Controls, you may or may not need to specify the sensor IP address when adding the sensor. Contact Hampshire Controls for assistance with adding sensors to your system.

Auto Detecting Sensors

Certain types of sensors can be automatically detected and added to the sensor list. If you have your sensors configured, powered on, and attached to the network, you can use the Auto Detect button to automatically find the networked sensors and add them to the sensor list with default values. If your computer has multiple network interfaces, be sure to select the correct network segment before clicking the Auto Detect button. After the sensors have been detected and added to the list you can edit the sensors individually to change the default values.

Sensor Data Settings

In the Sensor Data section, you need to supply a unique Unit ID for the sensor, and the sensor must be programmed with the same unique ID. The Unit ID may only contain upper and lowercase letters, numbers, the period (.), or the dash (-). It is also limited to 5 characters.

The Current Data, Alarm Low, Alarm High and Data Units fields are populated from data received by the sensor and are not configurable.

By default the sensor data is not logged. To enable the reporting feature of the $T^{\circ}Sentry$ ALERT System you should select a logging interval for the sensor. Currently, sensors supplied by Hampshire Controls transmit data at intervals of 1 or 3 minutes. If you require data to be logged at that rate select "Log: Every reading". If your application can accept a longer delay between sensor readings, you may decrease the logging interval accordingly, this has the added benefit of decreasing the rate of growth of the database file.

By selecting "Take Sensor Offline", the program will not make any attempt to contact the sensor, or to generate any alarm notifications for the sensor. This is useful if the sensor has not been configured or attached to the network, or if you are performing maintenance on the sensor or the equipment that the sensor is monitoring.

Alarm Settings

The Alarms section of the dialog contains the settings to specify when and why the sensor should send alarm notifications. These should be configured in conjunction with the settings in the sensor hardware. This section will describe the operation and interaction of both the sensor hardware settings and the settings in the Alarms section of the Sensor Information dialog.

Sensor Hardware Alarm Settings

In the sensor hardware you can configure the low and high alarm set points and the alarm delay. These settings effect when the sensor activates its local alarm. For instance, if the alarm delay is set to 0 minutes, when the sensor probe data goes above the high set point or below the low set point, the sensor will immediately activate its local alarm (usually indicated by a red flashing LED and loud periodic beeping). The sensor also communicates this information to the $T^{\circ}Sentry$ *ALERT System*.

T°Sentry ALERT System Alarm Settings

The first option in the Alarms settings section is a selection between allowing the sensor hardware to control when the $T^{\circ}Sentry$ ALERT System sends alarm notifications for the sensor (Delays set in hardware), or overriding the hardware and using the software settings to control the alarm notifications (Delays set in software). By selecting "Delays set in hardware" the $T^{\circ}Sentry$ ALERT System will send alarm notifications when the sensor hardware activates its alarm. By selecting "Delays set in software", you may configure a delay between the time the sensor hardware alarm sounds, and when the $T^{\circ}Sentry$ ALERT System sends its alarm notification. If staff is on site at the time of alarm, having this delay may allow for a correction of the alarm event before inactive personnel are notified and required to respond.

If "Delays set in software" is selected, you then have the option of enabling or disabling notifications for both the high-limit alarm and the low-limit alarm, and setting the time delay from sensor hardware alarm activation to transmission of alarm notifications. The "Retransmit notification" delay is the time period between retransmission of alarm notifications should an alarm condition remain in effect.

The following alarm notification conditions cannot be disabled:

- <u>System power alerts</u> notification of when the computer is on AC power or battery backup power (if equipped)
- <u>Communication failure</u> notification of when data is not being received from a sensor, this may indicate a network malfunction, or a problem with the sensor hardware
- <u>Sensor power alerts</u> this may be an indication that the batteries in a battery powered sensor are low, or that an AC powered sensor is running on its internal battery back-up power (depending on sensor hardware options)

Sensor Description

The fields in the sensor description group, except for the contact group, are optional. In the Sensor Information section, you may choose to configure the following items:

- <u>Name</u> a more descriptive name for the sensor (ie. "Freezer 1", "Cold storage", "Server room temperature")
- <u>Asset Tag</u> an optional asset tag or serial number related to the sensor or the equipment the sensor is monitoring
- <u>Location</u> a description of the physical location of the sensor (ie. room number, lab location, floor number)
- <u>Description</u> a description of what the sensor is monitoring (ie. the contents of the freezer or refrigerator)
- <u>Contact Group</u> the selection of which contact group, or contact schedule should receive alarm notifications from this sensor

SENSOR STATUS SCREEN (PART 2)

After the sensor list has been populated, the sensor status screen will display information pertaining to the operational condition of each sensor. If you have added sensors to the list prior to installing the sensors, you will see a status screen similar to the one shown below, with all of the sensors off-line.

ensor ID	Name	Contact	Address	Units	Data	Set Lo	Set Hi	Status	Sensor
CHEST	Chest Freezer	Group:Default	IP: Undefined					Sensor is OFFLINE.	Add Ed
FRZ01	Freezer 1	Group:Default	IP: Undefined					Sensor is OFFLINE.	
FRZ02	Freezer 2	Group:Default	IP: Undefined					Sensor is OFFLINE.	Delete
FRZ03	Freezer 3	Group:Default	IP: Undefined					Sensor is OFFLINE.	
FRZ04	Freezer 4	Group:Default	IP: Undefined					Sensor is OFFLINE.	Un Ut
FRZ05	Freezer 5	Group:Default	IP: Undefined					Sensor is OFFLINE.	Alarm Mine
FRZ06	Freezer 6	Group:Default	IP: Undefined					Sensor is OFFLINE.	
FRZ07	Freezer 7	Group:Default	IP: Undefined					Sensor is OFFLINE.	View Data
FRZ08	Freezer 8	Group:Default	IP: Undefined					Sensor is OFFLINE.	
FRZ09	Freezer 9	Group:Default	IP: Undefined					Sensor is OFFLINE.	Set Locatio
FRZ10	Freezer 10	Group:Default	IP: Undefined					Sensor is OFFLINE.	
FRZ11	Freezer 11	Group:Default	IP: Undefined					Sensor is OFFLINE.	Monitor
FRZ12	Freezer 12	Group:Default	IP: Undefined					Sensor is OFFLINE.	Reports
FRZ13	Freezer 13	Group:Default	IP: Undefined					Sensor is OFFLINE.	
FRZ15	Freezer 15	Group:Default	IP: Undefined					Sensor is OFFLINE.	Event Log
FRZ16	Freezer 16	Group:Default	IP: Undefined					Sensor is OFFLINE.	Floor Plan
FRZ17	Freezer 17	Group:Default	IP: Undefined					Sensor is OFFLINE.	
FRZ18	Freezer 18	Group:Default	IP: Undefined					Sensor is OFFLINE.	User List
RSRCH	Research Freezer	Group:Default	IP: Undefined					Sensor is OFFLINE.	
WLKIN	Walk-in Freezer	Group:Default	IP: Undefined		Sensor is OFFLINE.	Contact Lis			
									Settings
									Help

When you have installed the sensor probes in the equipment each sensor is monitoring, and made sure all sensors are turned on, then you can select one or more of the sensors in the list (see image below, top) and click the **On** button to activate sensor monitoring. The sensor status icon will change from red to yellow and the sensors will then show a status of "Waiting for data" (see image below, bottom).

ensor ID	Name	Contact	Address	Units	Data	Set Lo	Set Hi	Status	Sensor
CHEST	Chest Freezer	Group:Default	IP: Undefined					Sensor is OFFLINE	Add Ec
FRZ01	Freezer 1	Group:Default	IP: Undefined					Sensor is OFFLINE.	
FRZ02	Freezer 2	Group:Default	IP: Undefined				1	Sensor is OFFLINE.	Delete
FRZ03	Freezer 3	Group:Default	IP: Undefined					Sensor is OFFLINE.	
FRZ04	Freezer 4	Group:Default	IP: Undefined					Sensor is OFFLINE.	
FRZ05	Freezer 5	Group:Default	IP: Undefined					Sensor is OFFLINE.	Alarm Mutr
FRZ06	Freezer 6	Group:Default	IP: Undefined					Sensor is OFFLINE	
FRZ07	Freezer 7	Group:Default	IP: Undefined					Sensor is OFFLINE.	View Data
FRZ08	Freezer 8	Group:Default	IP: Undefined					Sensor is OFFLINE.	
FRZ09	Freezer 9	Group:Default	IP: Undefined					Sensor is OFFLINE.	Set Locatio
FRZ10	Freezer 10	Group:Default	IP: Undefined					Sensor is OFFLINE.	Monitor
FRZ11	Freezer 11	Group:Default	IP: Undefined					Sensor is OFFLINE.	MOTILO
FRZ12	Freezer 12	Group:Default	IP: Undefined					Sensor is OFFLINE.	Reports
FRZ13	Freezer 13	Group:Default	IP: Undefined					Sensor is OFFLINE.	-
FRZ15	Freezer 15	Group:Default	IP: Undefined					Sensor is OFFLINE	Event Log
FRZ16	Freezer 16	Group:Default	IP: Undefined					Sensor is OFFLINE.	Floor Plan
FRZ17	Freezer 17	Group:Default	IP: Undefined					Sensor is OFFLINE.	
FRZ18	Freezer 18	Group:Default	IP: Undefined					Sensor is OFFLINE.	User List
RSRCH	Research Freezer	Group:Default	IP: Undefined			1		Sensor is OFFLINE.	
WLKIN	Walk-in Freezer	Group:Default	IP: Undefined					Sensor is OFFLINE.	Contact Lis
									Settings
									Help

ensor ID	Name	Contact	Address	Units	Data	Set Lo	Set Hi	Status	Sensor
CHEST	Chest Freezer	Group:Default	IP: Undefined					Waiting for data	Add Edit
FRZ01	Freezer 1	Group:Default	IP: Undefined					Waiting for data	
FRZ02	Freezer 2	Group:Default	IP: Undefined					Waiting for data	Delete
FRZ03	Freezer 3	Group:Default	IP: Undefined					Waiting for data	
FRZ04	Freezer 4	Group:Default	IP: Undefined					Waiting for data	Un Uff
FRZ05	Freezer 5	Group:Default	IP: Undefined					Waiting for data	Alarm Mute
FRZ06	Freezer 6	Group:Default	IP: Undefined					Waiting for data	
FRZ07	Freezer 7	Group:Default	IP: Undefined					Waiting for data	View Data
FRZ08	Freezer 8	Group:Default	IP: Undefined					Waiting for data	1
FRZ09	Freezer 9	Group:Default	IP: Undefined					Waiting for data	Set Location
FRZ10	Freezer 10	Group:Default	IP: Undefined					Waiting for data	Martin
FRZ11	Freezer 11	Group:Default	IP: Undefined					Waiting for data	Monitor
FRZ12	Freezer 12	Group:Default	IP: Undefined					Waiting for data	Reports
FRZ13	Freezer 13	Group:Default	IP: Undefined					Waiting for data	
FRZ15	Freezer 15	Group:Default	IP: Undefined					Waiting for data	Event Log
FRZ16	Freezer 16	Group:Default	IP: Undefined					Waiting for data	Floor Plan
FRZ17	Freezer 17	Group:Default	IP: Undefined					Waiting for data	
FRZ18	Freezer 18	Group:Default	IP: Undefined					Waiting for data	User List
RSRCH	Research Freezer	Group:Default	IP: Undefined					Waiting for data	
WLKIN	Walk-in Freezer	Group:Default	IP: Undefined					Waiting for data	Contact List
									Settings
									Help

As the $T^{\circ}Sentry$ ALERT System begins to receive data from each sensor, the sensor icons will turn green and the fields in the sensor table will be populated with the data received from the sensors. The image below shows an example where all sensors are within their alarm limits.

ensor ID	Name	Contact	Address	Units	Data	Set Lo	Set Hi	Status	Sensor
CHEST	Chest Freezer	Group:Default	IP: 10.20.30.67	°C	-17.6	-50.0	0.0	S, Delay: 0/15, Log: all	Add Ed
FRZ01	Freezer 1	Group:Default	IP: 10.20.30.1	°C	-23.9	-50.0	0.0	S, Delay: 0/15, Log: all	
FRZ02	Freezer 2	Group:Default	IP: 10.20.30.2	°C	-15.9	-50.0	0.0	S, Delay: 0/15, Log: all	Delete
FRZ03	Freezer 3	Group:Default	IP: 10.20.30.3	°C	-24.2	-50.0	0.0	S, Delay: 0/15, Log: all	
FRZ04	Freezer 4	Group:Default	IP: 10.20.30.4	°C	-24.0	-50.0	0.0	S, Delay: 0/15, Log: all	On Of
FRZ05	Freezer 5	Group:Default	IP: 10.20.30.5	°C	-25.1	-50.0	0.0	S, Delay: 0/15, Log: all	Alarm Mute
FRZ06	Freezer 6	Group:Default	IP: 10.20.30.6	°C	-25.1	-50.0	0.0	S, Delay: 0/15, Log: all	
FRZ07	Freezer 7	Group:Default	IP: 10.20.30.7	°C	-27.5	-50.0	0.0	S, Delay: 0/15, Log: all	View Data
FRZ08	Freezer 8	Group:Default	IP: 10.20.30.8	°C	-24.0	-50.0	0.0	S, Delay: 0/15, Log: all	
FRZ09	Freezer 9	Group:Default	IP: 10.20.30.9	°C	-28.2	-50.0	0.0	S, Delay: 0/15, Log: all	Set Locatio
FRZ10	Freezer 10	Group:Default	IP: 10.20.30.10	°C	-23.0	-50.0	0.0	S, Delay: 0/15, Log: all	Maritan
FRZ11	Freezer 11	Group:Default	IP: 10.20.30.11	°C	-16.1	-50.0	0.0	S, Delay: 0/15, Log: all	MONILOF
FRZ12	Freezer 12	Group:Default	IP: 10.20.30.12	°C	-22.6	-50.0	0.0	S, Delay: 0/15, Log: all	Reports
FRZ13	Freezer 13	Group:Default	IP: 10.20.30.13	°C	-23.4	-50.0	0.0	S, Delay: 0/15, Log: all	-
FRZ15	Freezer 15	Group:Default	IP: 10.20.30.15	°C	-24.5	-50.0	0.0	S, Delay: 0/15, Log: all	Event Log
FRZ16	Freezer 16	Group:Default	IP: 10.20.30.16	°C	-20.6	-50.0	0.0	S, Delay: 0/15, Log: all	Floor Plan
FRZ17	Freezer 17	Group:Default	IP: 10.20.30.17	°C	-22.1	-50.0	0.0	S, Delay: 0/15, Log: all	
FRZ18	Freezer 18	Group:Default	IP: 10.20.30.18	°C	-24.6	-50.0	0.0	S, Delay: 0/15, Log: all	User List
RSRCH	Research Freezer	Group:Default	IP: 10.20.30.82	°C	-26.1	-50.0	0.0	S, Delay: 0/15, Log: all	
WLKIN	Walk-in Freezer	Group:Default	IP: 10.20.30.87	°C	-23.7	-50.0	0.0	S, Delay: 0/15, Log: all	Contact Lis
									Settings
									Help

The Sensor List

For the most part, the data in the sensor list is relatively self-explanatory. This section discusses a few key features and controls within the sensor list.

Selecting Sensors

Sensors are selected by clicking on the table row for any particular sensor. To select multiple sensors use the CTRL or SHIFT key in conjunction with your mouse click (basic Microsoft Windows operations).

Column Headers (Sorting the List)

The column headers in the sensor list are clickable. Clicking on any particular header will cause

the table to be sorted based on the values in the selected column. The default sorting is based on the "Sensor ID" column.

Context Menu

By using the context-click (usually the right mouse button) you can get pop-up menus that relate to the selected item (or items). The context menu may duplicate some functions that are also available as buttons on the sensor status screen. An example context menu is show to the right. Two features that are only available via the sensor list context

Sensor ID	Name		Contact		Ad
FRZR1	Ultra-col	d Franz	Schedule-Da	vs	IP:
		Edit Se	nsor		
		Put On	line		
		Delete	Sensor		
		Set Loo	ation		
		Add Lo	g Note		
		Event	Log		
		Data L	og	<u> </u>	
		Import	from CSV		
		Export	to CSV		

menu are import and export of CSV files. CSV import/export allows easier editing of a large list of sensors, by using a text editor, Microsoft Excel, or another program capable of reading and editing CSV files.

Sensor Status Icons

The following list shows examples of the status icons and their meanings.

- **Offline:** The sensor is not being monitored
- **O Stand-by:** The system is waiting to receive data from the sensor
- **Online:** The sensor is online an within the alarm limits
- 2. Communication fault: The sensor is online but no data has been received for 15 minutes (normal time between data packets is 1 or 3 minutes, depending on sensor type)
- **1 Exceeding high limit:** The sensor data is above the high limit, but the alarm delay has not elapsed
- **4 High limit alarm:** The sensor data has remained above the high limit for the alarm delay period and is now in the alarm state
- **U Exceeding low limit:** The sensor data is below the low limit, but the alarm delay has not elapsed
- **U** Low limit alarm: The sensor data has remained below the low limit for the alarm delay period and is now in the alarm state
- Door open: The sensor door switch input indicates the door is open (not supported by all sensors)
- **Door open alarm:** The sensor door switch input indicates the door is open and the alarm delay has elapsed (not supported by all sensors)
- **Battery low / on battery:** The sensor batteries are low or the sensor is running on its back-up battery (not supported by all sensors)

Sensor Status Column

The right-most column in the sensor table displays a short message about the status of the sensor. When the sensor is online and within its alarm limits it contains three comma separated fields about the sensor settings.

The possible contents of the first field are three characters which have the following meanings:

- S____ Sensor controls alarm notifications ("Delays set in hardware" is enabled)
- _L_ Low limit alarm enabled ("Delays set in software" is enabled)
- ___H High limit alarm enabled ("Delays set in software" is enabled)
- _LH Both low and high limit alarms are enabled ("Delays set in software" is enabled)

The second field shows the alarm delay and the retransmit delay separated by a "/". If "Delays set in hardware" is selected, the alarm delay will be "0".

The final field shows the data logging rate of the sensor.

If the sensor is in any state other that online, then the Status column will display a brief message about the current sensor condition.

Alarm/Offline

The Alarm/Offline checkbox at the bottom right of the sensor list is used to limit the number of displayed sensors for easier visibility of problems. By checking the box, only sensors that are offline or are in a warning or alarm state will be displayed in the list. This allows quick access to the problem sensor on a system with a large number of sensors.

Sensor Controls

The sensor control buttons, located at the top left of the sensor status screen, are activated based on the selected sensor (or sensors) and the sensor status. Add, edit, delete, on and off are fairly self-explanatory. However, for information about the **View Data** button, please refer to Data Visualization on page 28. For information on the **Set Location** button, please refer to Floor Plan on page 32.

Monitor Controls

Most of the button controls in the monitor section of the sensor status screen have been discussed previously, and concern the configuration of the $T^{\circ}Sentry$ ALERT System. However, for information about the **Event Log** button, please refer to Event Log on page 33. For information about the **Floor Plan** button, please refer to Floor Plan on page 32.

DATA VISUALIZATION

The $T^{\circ}Sentry$ ALERT System has two data visualization dialogs, both of which are activated by the **View Data** button on the sensor status screen (or in the sensor list context menu). The dialog you open is dependent on the number of sensors you select.

Single Sensor Data

For the single sensor data dialog, select one sensor from the list and click the View Data button. You will be presented with the single sensor data dialog as shown below. This presents the sensor description, along with current data and a fixed chart showing the last 120 received data points (raw data). By hovering over any point you will get a pop-up showing the data for that point.

Soling Die					We Make 272 Nord Protocol	
Unit ID	WS001	Name	Proto 4100	Asset	tag/Serial # Unde	fined
Current data	76.3	Location	Undefined			
Nam low	32.0	Description	Undefined			
Nam high	95.0	Alarm Settings:	Sensor Low Limit	High Limit C	ommunication Fault	ONLINE
Data units	°F	Contact group	Schedule:Default	Data a	arm delay 8 C	omm. alarm delay
			73	.4 .16	•	82.4
10/8 — Da	15:00 1 Ita — M	0/8 14:00 1(inimum — M ow min/max •	D/8 13:00 10/8 aximum — Ala Raw data Avg:	12:00 10/8 rm Low Limit	Alarm High Lir):00 nit Table Chart

At the bottom of the chart are a few options to show or hide certain features. "Display limits" will show a red and blue horizontal line denoting the high and low alarm set points respectively. You may also choose to display data-point averages of 5, 15 or 60 points. If the sensor transmits every three minutes they represent 15, 45 and 180 minute averages. All options display the last 120 data points of each type. So, for a sensor with three minute period, the time ranges for each

type (raw, 5, 15 and 60) are 6 hours, 30 hours, 3.75 days and 15 days. The example below shows the 60 point average with limits disabled. A min and max line are plotted, showing the min and max during each 60 point sample period. Also visible in this image is a period of time when the sensor was disabled (data gap).



By clicking Events, Table, or Chart you will be presented with dialogs for the Event Log, the Data Log, and a time selectable chart specifically for this sensor. These dialogs are discussed in more detail in later sections. The Chart button opens the multi-sensor graph discussed in the next section.

Multi-sensor Data

If you select multiple sensors in the sensor list, then the View Data button opens the Multi-sensor Graph as shown below. By default the time range for the graph is set to the current full day.



You can select time ranges in two ways. The first is to explicitly set a start and end time in the Chart Date Range date selectors, and then click the **Update** button. Alternately, you may start by selecting a time span in the hours of data drop-down. This will automatically set the end time to the current time and the start time to the number of hours selected, prior to the current time, then click the **Update** button. The **<--** Forward and Back **-->** buttons will then allow jumping the set number of hours forward or back in time through the sensor data.

Another option for data visualization is the box plot. The box plot allows you to show data for a large time range in a very condensed visual format. By changing the chart type to box, selecting a large time range, and clicking the Update button, you will be presented with a box plot similar to that shown in the example below.



The whiskers of the box plot (which look like a T and an inverted T) show the high and low alarm limits for the sensor. The upper and lower extent of the box show the minimum and maximum data value during the time span. The dashed line inside the box shows the average value for the time span (or MKT for temperature sensors). Finally, the solid line inside the box shows the value of the most recent data point in the range. Also, if you hover the mouse over one of the boxes, you will get a pop-up which lists the box plot values (as shown in the above image).

FLOOR PLAN

The floor plan is another, optional way of visualizing sensor data, or in this case, sensor status. You may create an image with as many or few details about the location of the sensors as you want. The image should be at least 640x480 pixels with a resolution of 96 DPI, and saved as a JPG (JPEG), PNG, GIF or BMP image file. The 16x16 pixel sensor status icons may then be placed on the image using the **Set Location** button on the sensor status screen, or from the sensor list context menu. Click on the image to position the sensor icon, and then click the **Set Location** button in the Floor Plan dialog. The result is interactive map showing the current status and location of each sensor in your system. An example is shown below.



In the above example, the walk-in freezer is in high-limit alarm, the chest freezer is offline, and the door is open on the research freezer. If you click the middle mouse button on any of the sensor icons, a pop-up will display the sensor data (not shown). Also, if you right-click on a sensor icon, you will be presented with a context menu of available options for the sensor (not shown).

EVENT AND DATA LOGS

The event and data logs display tables of dat directly from the database. This allows you t view the data from the sensors and the event logged by the monitoring system. You ma select specific sensors and time ranges an then export the data to CSV files for us outside of the T°Sentry ALERT System. Th event log dialog also allows you to ad message into the event log, to annotate other events that may have occurred. Examples of event and data logs are shown here.

Unit ID

2014/10/03 16:10:48 FRZ17

2014/10/03 16:22:15 FRZ17

2014/10/03 16:22:15 FRZ17

2014/10/03 16:37:27 FRZ17

2014/10/03 16:52:38 FRZ17

2014/10/03 17:07:50 FRZ17

2014/10/03 17:23:01 FRZ17

2014/10/03 17:38:14 FRZ17

Name

Event Log

Time

	HI Data Log						
	NOTE: All data	log tempera	tures are	in unite	s of ℃		
of data	Time		Sensor	Data	Low	High	
s you to	2014/10	/03 15:11:33	FRZ17	-0.8	-50.0	0.0	
e events	2014/10	/03 15:14:15	FRZ17	-0.2	-50.0	0.0	
ou may	2014/10	/03 15:17:24	FRZ17	-0.2	-50.0	0.0	
ou may	2014/10	/03 15:20:24	FRZ17	-0.2	-50.0	0.0	
ges and	2014/10	/03 15:23:24	FRZ17	-0.3	-50.0	0.0	
for use	2014/10	/03 15:26:15	FRZ17	-0.3	-50.0	0.0	
m. The	2014/10	/03 15:29:16	FRZ17	-0.2	-50.0	0.0	
to add	2014/10	/03 15:32:14	FRZ17	-0.2	-50.0	0.0	
te other	2014/10	/03 15:35:17	FRZ17	-0.2	-50.0	0.0	
nples of	2014/10	/03 15:38:15	FRZ17	0.0	-50.0	0.0	
1	2014/10	/03 15:41:42	FRZ17	0.0	-50.0	0.0	
	2014/10	/03 15:44:17	FRZ17	0.0	-50.0	0.0	
	2014/10	/03 15:47:18	FRZ17	0.0	-50.0	0.0	
	2014/10	/03 15:50:22	FRZ17	0.0	-50.0	0.0	
	2014/10	/03 15:53:21	FRZ17	0.0	-50.0	0.0	
	2014/10	/03 15:56:27	FRZ17	0.0	-50.0	0.0	
	2014/10	/03 15:59:32	FRZ17	0.2	-50.0	0.0	
	2014/10	/03 16:02:30	FRZ17	0.2	-50.0	0.0	
	2014/10	/03 16:04:19	FRZ17	0.3	-50.0	0.0	
	2014/10	/03 16:06:33	FRZ17	0.3	-50.0	0.0	
	2014/10	/03 16:07:09	FRZ17	3.1	-50.0	0.0	
	2014/10	/03 16:10:48	FRZ17	1.6	-50.0	0.0	
	2014/10	/03 16:13:18	FRZ17	1.1	-50.0	0.0	
	2014/10	/03 16:16:14	FR717	0.8	-50.0	0.0	
	Filter by date	Start: 201	4/10/02 00	0:00:00	•		
		End: 201	4/10/04 2	3:59:59	•	Update	
	Eltor by Conso	- ED717			_		
	Filter by Sensor						
	CSV file name	data_log.cs	SV.			Export to CS	5V
and the second se				40	1.00	Teste 10	
Event				Data	Limit	Elapsed	-
Notice: Above hig	gh limit			1.6	0.0		
ALARM: Above H	HGH limit			5.2	0.0	11	
Alert sent for HIG	H			5.2	0.0	11	
Alert sent for HIG	н			2.5	0.0	27	
Alert sent for HIG	н			4.1	0.0	42	
Alert sent for HIG	н		1	5.7	0.0	57	
Alert sent for HIG	н			6.8	0.0	72	
Alert sent for HIG	н			8.2	0.0	87	
Alert sent for HIG	н			9.4	0.0	102	

CSV file name	event_log.	csv	Exp	ort to CSV						
Filter by date	Start: 20	14/10/02 00:00:00] En	d: 2014/10/08 23:59:59 💌	Filter by ID	FRZ17	- U	pdate	Add Mess	age
2014/10/	03 18:08:37	FRZ17		Alert sent for HIGH			10.5	0.0	118	-
2014/10/	03 17:53:26	FRZ17		Alert sent for HIGH			9.4	0.0	102	

EXAMPLE ALARM E-MAILS AND REPORTS

E-Mail Notifications

High Limit Alarm

From: [SMTP Username] To: [Contact list address(es)] Subject: ALARM! Above HIGH limit on: FRZ17 - Freezer 17 ALARM! Above HIGH limit on: FRZ17 - Freezer 17 Time of deviation: 10/7/2014 5:41:38 PM Time of alarm: 10/7/2014 5:56:43 PM Duration: 15 minutes Current data: 1.5 Limit: 0.0

High Limit Recovery

```
From: [SMTP Username]
To: [Contact list address(es)]
Subject: RECOVERY. Data within limits on: FRZ17 - Freezer 17
RECOVERY. Data within limits on: FRZ17 - Freezer 17
Time of deviation: 10/7/2014 5:41:38 PM
Time of alarm: 10/7/2014 5:56:43 PM
Time of recovery: 10/7/2014 5:58:56 PM
Duration: 17 minutes
Current data: -0.4 Lo/Hi limits: -50.0/0.0
```

Automated HTML Report

Here is an example of an 8 hour periodic system report formatted in HTML (no charts).

ACME Cold Storage

System Temperature Report

Report generated on 2014/10/08 at 00:00 for the previous 8 hours

CURRENT READINGS

Unit	Name	Data		Low	High	Statu
CHEST	Chest Freezer	-20.0	°C	-50.0	0.0	
FRZ01	Freezer 1	-23.3	°C	-50.0	0.0	

FRZ02	Freezer 2	-17.6	°C	-50.0	0.0	
FRZ03	Freezer 3	-20.0	°C	-50.0	0.0	
FRZ04	Freezer 4	-18.9	°C	-50.0	0.0	
FRZ05	Freezer 5	-26.1	°C	-50.0	0.0	
FRZ06	Freezer 6	-24.3	°C	-50.0	0.0	
FRZ07	Freezer 7	-30.2	°C	-50.0	0.0	
FRZ08	Freezer 8	-27.2	°C	-50.0	0.0	
FRZ09	Freezer 9	-29.0	°C	-50.0	0.0	
FRZ10	Freezer 10	-24.9	°C	-50.0	0.0	
FRZ11	Freezer 11	-20.0	°C	-50.0	0.0	
FRZ12	Freezer 12	-20.5	°C	-50.0	0.0	
FRZ13	Freezer 13	-21.3	°C	-50.0	0.0	
FRZ15	Freezer 15	-27.4	°C	-50.0	0.0	
FRZ16	Freezer 16	-24.3	°C	-50.0	0.0	
FRZ17	Freezer 17	-20.6	°C	-50.0	0.0	
FRZ18	Freezer 18	-24.1	°C	-50.0	0.0	
RSRCH	Research Freezer	-19.6	°C	-50.0	0.0	
WLKIN	Walk-in Freezer					Offline

STATISTICAL DATA

CHEST - C	CHEST - Chest Freezer (°C)											
Readings:	158	Mean:	-19.5	Std. Dev:	1.713	MKT:	-19.5					
Min:	-21.0	Minimum	occured	on 2014/	10/07 at 1	17:36						
Max:	-18.3	Maximum	n occured	d on 2014/	′10/07 at	19:33						
FRZ01 - Freezer 1 (°C)												
Readings:	156	Mean:	-24.4	Std. Dev:	3.025	MKT:	-23.9					
Min:	-26.4	Minimum	occured	on 2014/	10/07 at 2	21:36						
Max:	Max: -14.3 Maximum occured on 2014/10/07 at 17:09											
FRZ02 - Fr	FRZ02 - Freezer 2 (°C)											

Readings:	158	Mean:	-24.2	Std.	Dev: 3.681	MKT:	-22.8
Min:	-28.4	Minimum	occured	on 2	2014/10/07 at	19:36	
Max:	-8.4	Maximum	n occured	d on	2014/10/07 at	16:07	
FRZ03 - Fr	reezer 3 ((°C)					
Readings:	153	Mean:	-20.2	Std.	Dev: 2.033	MKT:	-20.1
Min:	-22.2	Minimum	occured	on 2	2014/10/07 at	23:37	
Max:	-15.6	Maximum	n occured	d on	2014/10/07 at	22:46	
FRZ04 - Fr	reezer 4 ((°C)					
Readings:	153	Mean:	-23.0	Std.	Dev: 2.862	MKT:	-22.7
Min:	-25.1	Minimum	occured	on	2014/10/07 at	22:51	
Max:	-18.6	Maximum	n occured	d on	2014/10/07 at	20:06	
FRZ05 - Fr	reezer 5 ((°C)					
Readings:	156	Mean:	-24.0	Std.	Dev: 3.446	MKT:	-23.4
Min:	-26.3	Minimum	occured	on 2	2014/10/07 at	18:22	
Max:	-17.4	Maximum	n occured	d on	2014/10/07 at	20:14	
FRZ06 - Fr	eezer 6 ((°C)					
Readings:	157	Mean:	-20.6	Std.	Dev: 3.849	MKT:	-19.7
Min:	-24.3	Minimum	occured	on 2	2014/10/07 at	23:59	
Max:	-14.5	Maximum	n occured	d on	2014/10/07 at	19:03	
FRZ07 - Fr	eezer 7 ((°C)					
Readings:	156	Mean:	-30.0	Std.	Dev: 2.397	MKT:	-30.0
Min:	-30.2	Minimum	occured	on 2	2014/10/07 at	23:58	
Max:	-29.8	Maximum	n occured	d on	2014/10/07 at	18:54	
FRZ08 - Fr	eezer 8 ((°C)					
Readings:	155	Mean:	-26.9	Std.	Dev: 2.139	MKT:	-26.8
Min:	-27.3	Minimum	occured	on 2	2014/10/07 at	23:48	
Max:	-26.4	Maximum	n occured	d on	2014/10/07 at	16:12	
FRZ09 - Fi	eezer 9 ((°C)					
Readings:	155	Mean:	-24.4	Std.	Dev: 5.179	MKT:	-22.7
Min:	-29.3	Minimum	occured	on 2	2014/10/07 at	16:30	
Max:	-16.6	Maximum	n occured	d on	2014/10/07 at	22:11	
FRZ10 - Fr	eezer 10	(°C)					
Readings:	154	Mean:	-24.3	Std.	Dev: 1.937	MKT:	-24.3
Min:	-25.0	Minimum	occured	on 2	2014/10/07 at	23:49	
Max:	-23.4	Maximum	n occured	d on	2014/10/07 at	16:09	
FRZ11 - Fr	eezer 11	(°C)					
Readings:	152	Mean:	-19.5	Std.	Dev: 1.565	MKT:	-19.5

Min:	-20.0	Minimum	occured	on 2014/10/0	7 at 23:57	
Max:	-18.7	Maximun	n occured	d on 2014/10/0	7 at 16:07	
FRZ12 - Fi	eezer 12	2 (°C)				
Readings:	156	Mean:	-22.6	Std. Dev: 2.14	7 MKT :	-22.5
Min:	-23.5	Minimum	occured	on 2014/10/0	7 at 23:37	
Max:	-19.4	Maximun	n occured	d on 2014/10/0	7 at 16:47	
FRZ13 - Fr	eezer 13	(°C)				
Readings:	153	Mean:	-17.8	Std. Dev: 5.43	4 MKT :	-15.8
Min:	-27.6	Minimum	occured	on 2014/10/0	7 at 16:44	
Max:	-3.2	Maximun	n occured	d on 2014/10/0	7 at 16:50	
FRZ15 - Fr	eezer 15	o (°C)				
Readings:	156	Mean:	-25.5	Std. Dev: 3.16	7 MKT :	-24.8
Min:	-27.5	Minimum	occured	on 2014/10/0	7 at 20:21	
Max:	-16.0	Maximun	n occured	d on 2014/10/0	7 at 20:51	
FRZ16 - Fi	eezer 16	6 (°C)				
Readings:	157	Mean:	-23.8	Std. Dev: 1.96	9 MKT :	-23.8
Min:	-24.3	Minimum	occured	on 2014/10/0	7 at 23:58	
Max:	-22.7	Maximun	n occured	d on 2014/10/0	7 at 17:37	
FRZ17 - Fi	eezer 17	′ (°C)				
Readings:	146	Mean:	-15.4	Std. Dev: 6.72	0 MKT:	-11.9
Min:	-21.7	Minimum	occured	on 2014/10/0	7 at 19:21	
Max:	3.6	Maximun	n occured	d on 2014/10/0	7 at 17:53	
FRZ18 - Fr	eezer 18	6 (°C)				
Readings:	157	Mean:	-21.3	Std. Dev: 3.00	7 MKT :	-20.7
Min:	-24.1	Minimum	occured	on 2014/10/0	7 at 23:57	
Max:	-9.3	Maximun	n occured	d on 2014/10/0	7 at 16:45	
RSRCH - F	Research	Freezer ((°C)			
Readings:	158	Mean:	-20.7	Std. Dev: 2.01	5 MKT:	-20.5
Min:	-24.4	Minimum	occured	on 2014/10/0	7 at 21:56	
Max:	-12.9	Maximun	n occured	d on 2014/10/0	7 at 21:41	
WLKIN - W	/alk-in Fi	reezer				
Not enoug	n data for	statistical	analysis			

EVENT LOG

No event log entries for CHEST

No event log entries for FRZ01 No event log entries for FRZ03 No event log entries for FRZ04 No event log entries for FRZ05 No event log entries for FRZ05 No event log entries for FRZ07 No event log entries for FRZ07 No event log entries for FRZ08 No event log entries for FRZ09 No event log entries for FRZ10 No event log entries for FRZ11 No event log entries for FRZ12 No event log entries for FRZ13 No event log entries for FRZ13 No event log entries for FRZ13 No event log entries for FRZ15 No event log entries for FRZ16

Time	Unit	User ID (Name)	Event	DataL	.imit D	uration
2014/10/07 17:56	FRZ17		ALARM: Above HIGH limit	1.5	0.0	15
2014/10/07 17:58	FRZ17		RECOVERY: From HIGH	-0.4	0.0	17

No event log entries for FRZ18 No event log entries for RSRCH

No event log entries for WLKIN

End of report

REVISIONS

Revision	Date	Changes
Rev A	19 Jun 2013	Initial draft
Rev B	21 Oct 2014	Re-write to incorporate changes and new features