PENTAIR

Raychem ACS-30-EU-UIT2

PROGRAMMING GUIDE

FOR USE ONLY WITH THE ACS-30-EU-UIT2 USER INTERFACE TERMINAL
SOFTWARE VERSION 1.0.X

SECTION CONTENTS

SECTION 1 – INTRODUCTION

1.1 ACS-30

1.1.1 PRODUCT OVERVIEW

The Raychem ACS-30 Advanced Control System is a multipoint electronic control and monitoring system for Raychem and Pyrotenax heating cables. The ACS-30 supports the following applications: hot water temperature maintenance, freezer frost heave prevention, floor heating, pipe freeze protection, fuel oil flow maintenance, greasy waste disposal flow maintenance, roof & gutter de-icing and surface snow melting. The system can control and monitor up to 260 heating circuits with multiple networked ACS-30-EU-PCM2-xx-yyA modules (xx = 5, 10, 15 circuits; yy = 20, 32A max load per circuit). Each ACS-30-EU-PCM2 module can control up to 5, 10, or 15 individual circuits depending on the version chosen. The ACS-30 is available with Electromechanical Relays (EMRs) that allow switching up to 20 or 32A (depending on model) at 230V. Each heating cable circuit can have up to four Resistance Temperature Detector (RTD) sensor inputs allowing for a variety of combinations of temperature control, monitoring and alarming.

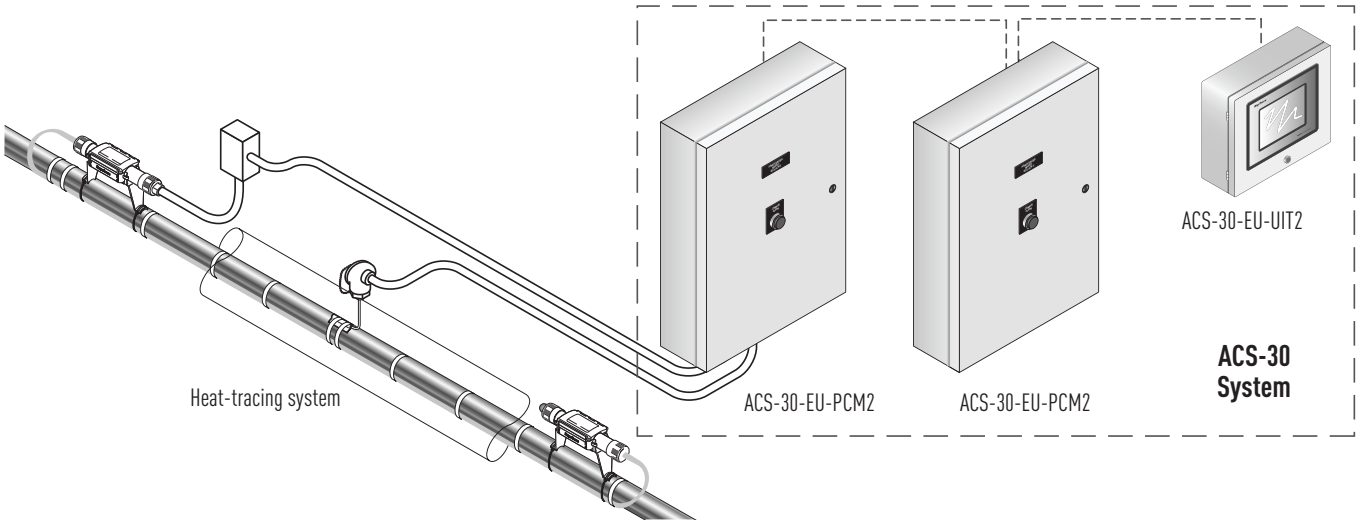

Fig. 1.1 ACS-30 System

1.1.2 CONTROL

The ACS-30 is a control system that measures temperatures with 3-wire, 100-ohm platinum RTDs connected directly to the ACS-30-EU-PCM2, or through optional Remote Monitoring Modules (ACS-30-EU-MONI-RMM2-E). Each ACS-30-EU-PCM2 accepts up to five RTDs and each ACS-30-EU-MONI-RMM2-E accepts up to eight RTDs. The ACS-30-EU-MONI-RMM2-Es are typically located near the desired measurement location. Multiple ACS-30-EU-MONI-RMM2-Es are networked to the ACS-30-EU-UIT2, significantly reducing the cost of RTD field wiring. The ACS-30 system supports up to 260 temperature inputs via the PCM boards contained within the ACS-30-EU-PCM2 module. Using ACS-30-EU-MONI-RMM2-Es, an additional 128 temperature inputs can be supported for a maximum of 388 temperature inputs. ACS-30 can be configured for On/Off, ambient sensing, and timed duty cycle control modes.

1.1.3 MONITORING AND ALARMING

The ACS-30 can monitor ground-fault, temperature, and current during system operation. Configurable alarm settings provide options for local or remote alarms. Dry contact relays are provided for alarm annunciation back to a local LAN, fire control panel or Building Management System (BMS). Optional ProtoNode multi-protocol gateways are available for integrating the ACS-30 controller into a BACnet®, Metasys N2, or LonWorks® system.

1.1.4 GROUND-FAULT PROTECTION

To protect personnel against ground-faults, minimize the danger of fire from sustained electrical arcing if the heating cable is damaged or improperly installed, and to comply with Pentair Thermal Management requirements, agency certifications, and national electrical codes, ground-fault equipment protection must be used on each heating cable branch circuit.

ACS-30 provides this protection. Each circuit in the ACS-30-EU-PCM2 module is protect by a certified 30mA RCD (Residual Current device).

Note: RCDs protects personnel against ground-faults.

The ACS-30-EU-PCM2 module provides also additional ground-fault features. Ground fault leakage is constantly monitored by the ACCS-CRM board, circuit by circuit, providing alarm and switching of the branch when the maximum limit defined is exceeded.

1.1.5 INSTALLATION

The ACS-30 system is programmed using the User Interface Terminal (ACS-30-EU-UIT2) comprising an LCD color touch-screen display technology. The ACS-30-EU-UIT2 provides a user interface for easy and efficient programming without keyboards or cryptic labels. The ACS-30-EU-UIT2 is mounted in non-hazardous, indoor locations.

Heating cable circuits are connected to the ACS-30-EU-UIT2 via ACS-30-EU-PCM2 control panels. The ACS-30-EU-PCM2 modules can be distributed throughout the installation (building) where the heating cable circuits are located. The control modules are connected to the ACS-30-EU-UIT2 with RS-485 cable.

1.1.6 COMMUNICATIONS

ACS-30-EU-UIT2 supports the Modbus® protocol and is available with an RS-232, RS-485 or 10/100Base-T Ethernet communication interface. ACS-30 may be integrated into BACnet, Metasys N2 and LonWorks Building Management Systems (BMS) using the ProtoNode gateway translators available.

1.1.7 COMPLETE SYSTEM

A complete ACS-30 system consists of an ACS-30-EU-UIT2 and up to 52 modular power control modules ACS-30-EU-PCM2 ready for field connections of power wiring, heat tracing and temperature sensors. The maximum number of modules that can be connected to a UIT2 depends on the model of the control modules. (see the datasheet for more information.

1.1.8 ACS-30 PROGRAMMING GUIDE

This guide assists in the set up and operation of the ACS-30 system.

The ACS-30 software, installed in the ACS-30-EU-UIT2 (User Interface Terminal), supports the ACS-30-EU-PCM2 Power & Control modules and additional RTD inputs via the ACS-30-EU-MONI-RMM2-E.

The software provides several features to help configure and maintain the devices. This document is not intended to provide detailed explanations of the specific features of each product, but rather to show how to access various parameters within the devices using the ACS-30 software. Please refer to specific detailed product documentation:

- ACS-30-EU-PCM2 Document < EN-RaychemACS30PCM220A-DS-EU0015, EN-RaychemACS30PCM232A-DS-EU0013 >
- ACS-30-EU-UIT2 Document < EN-RaychemACS30PCM2UIT-DS-EU0014 >
- ACS-30-EU-UIT2 Modbus Protocol Interface Mapping for ACS-30 Systems Document < EN-RaychemACS30EUUIT2Modbus-IM-EU0085 >
- ProtoNode Document < EN-RaychemACS30ProtoNode-DS-EU0044 >
- ACS-30-EU-MONI-RMM2-E Document < EN-RaychemACS30RMMMOD-DS-EU0012 >
- ACS-30-EU-VIA-DU-20-MOD Document < EN-RaychemACS30VIADU20MOD-DS-EU0009 >
- ACS-30-EU-EMDR-10-MOD Document < EN-RaychemACS30EMDR10-DS-EU0011>

1.2 Important Information

This manual is a guide for the setup and operation of ACS-30, a multipoint electronic control and monitoring system.

Important: All information, including illustrations, is believed to be reliable. Users, however, should independently evaluate the suitability of each product for their particular application.

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Europe, Middle East, Africa
Pentair Thermal Management
Romeinse straat 14
3001 Leuven
België / Belgique
Tel: +32 16 213 511
Fax: +32 16 213 603

1.4 User Responsibilities

The performance, reliability and safety of your heating cable system depend on proper design, selection, and installation. The ACS-30 Software will help you configure and monitor a system that meets your requirements, but it is only a tool. It assumes that your input is accurate, that you are familiar with heating system design and configuration, and that you will ensure that all components of the heating system are installed, maintained and used as intended. The configuration of the ACS-30 Software should be reviewed by a knowledgeable engineer to ensure it is appropriate for your application. Additional information relating to safety, design, and installation is contained in Design Guides, Installation Manuals, Data Sheets, and other literature available from Pentair Thermal Management. Be sure to consult these documents as needed.

1.5 Safety Warnings

There are important safety warnings shipped with Pentair Thermal Management products and printed in the ACS-30-EU-UIT2 Installation Instructions <EN-RaychemACS30PCM2UIT-DS-EU0014> the ACS-30-EU-PCM2 document <EN-RaychemACS30PCM220A-DS-EU0015, EN-RaychemACS30PCM232A-DS-EU0013 >. Be sure to read and follow these safety warnings to reduce the risk of fire, shock, or personal injury. If you have any questions, contact your local representative or contact Pentair Thermal Management.

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Europe, Middle East, Africa
Pentair Thermal Management
Romeinse straat 14
3001 Leuven
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Tel: +32 16 213 511
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1.7 Starting the ACS-30

1.7.1 INITIAL SETUP

The ACS-30 software is designed to run only on the ACS-30-EU-UIT2 hardware platform. Prior to shipment, the ACS-30 software is installed into a nonvolatile area of the ACS-30-EU-UIT2 memory. During the initial power-up, you will see a blue background "splash" window for approximately 30 seconds as the system software is loaded and initializes.
This V1.0.0 program update is compatible only with the ACS-30-EU-UIT2 User Interface Terminal.

1.7.2 SYSTEM REQUIREMENTS

The minimum configuration to use the ACS-30 software is:

- ACS-30-EU-UIT2
- At least one ACS-30-EU-PCM2

Maximum equipment configuration:

- Up to 52 ACS-30-EU-PCM2-5-yyA power control modules or 26 ACS-30-EU-PCM2-10-yyA power control modules or 17 ACS-30-EU-PCM2-15-yyA power control modules
- Up to 16 ACS-30-EU-MONI-RMM2-E (8 channel RTD multiplexing hubs)

1.8 Control Mode Matrix

The ACS-30 is designed for Raychem commercial heating cable systems and their applications. The programming is focused on eight heating cable applications, and a monitor only mode, with control parameters embedded in the software to simplify assigning heating cable circuits. The application designs and assumptions are detailed in their associated design guides and installation manuals which can be found on www.thermal.pentair.com. The control mode functions programmed in the ACS-30 for each application are summarised in Table 1.1. These control modes will be discussed in more detail in the configuration section of this programming guide.

Table 1.1 ACS-30: Heating Cable Application Programming Summary

Control Mode Functions

Application	Heating cable	Control Mode	Control setpoints
Hot Water Temperature Maintenance	• HWAT-L • HWAT-M • HWAT-R	• Preset power duty cycle (HWAT Design Wizard)	• Constant temp • Variable schedule - Maintain - Economy - Off - Heat Cycle 100% (HWAT-R only) • Trace Boiler
Floor Heating	• T2Red • T2Quicknet • T2Blue • CeraPro	• Floor sensing • Room sensing • Room sensing with Floor Limiter	• Constant temp • Variable schedule - Maintain - Economy - Off • Floor Limiter • Circuit override through external device
Greasy Waste Disposal and Temperature Maintenance	• WinterGard FS-C-2X	• Line sensing	• Constant temp • Variable schedule - Maintain - Economy - Off
Pipe Freeze Protection	• WinterGard (FS-A-2X, FS-B-2X, FS-C10-2X, FS-C-2X), R-ETL-A • Ambient, PASC or line sensing		• Constant temp • Circuit override through external device
Fuel Oil Flow Maintenance	• WinterGard (FS-A-2X, FS-B-2X, FS-C10-2X, FS-C-2X) • Ambient, PASC or line sensing		• Constant temp • Circuit override through external device
Freezer Frost Heave Prevention	• T2Red	• Floor sensing	• Constant temp • Variable schedule - Maintain - Off
Surface Snow Melting	• EM2-XR (ViaGard) EM2-CM • MI Heating Cable	• Ambient, Surface, Bracketed Ambient Temp	• Constant temp
		• External controller	• ACS-30-EU-VIA-DU-20-MOD
Roof & Gutter De-icing	• IceStop • GM2-X or GM-2XT	• Ambient or Surface Temp	• Constant temp
		• External controller	• ACS-30-EU-EMDR-10-MOD

Temperature Monitor Only
Five temperature monitor only channels
Low and high temperature alarms

Variable Schedule
Setpoint calendar with:
• 7 days/week calendar
• 48 1/2-hr time blocks/day
• Daily schedule copy function

1.9 Software Organization

The ACS-30 is organized around the concept of heating control circuits connected to relay outputs from the ACCS-CRM boards within the ACS-30-EU-PCM2 power control modules. A simple circuit consists of one output relay and one RTD sensor input.

ACS-30-EU-PCM2 modules can manage up to 5, 10 and 15 circuits with a maximum current load of 20 or 32A. Each module contains 1, 2 or 3 CRM boards depending on the number of circuits controlled.

Module	# Circuits	# CRMs	Max load per circuit
ACS-30-EU-PCM2-5-20A	5	1	20A
ACS-30-EU-PCM2-5-32A	5	1	32A
ACS-30-EU-PCM2-10-20A	10	2	20A
ACS-30-EU-PCM2-10-32A	10	2	32A
ACS-30-EU-PCM2-15-20A	15	3	20A
ACS-30-EU-PCM2-15-32A	15	3	32A

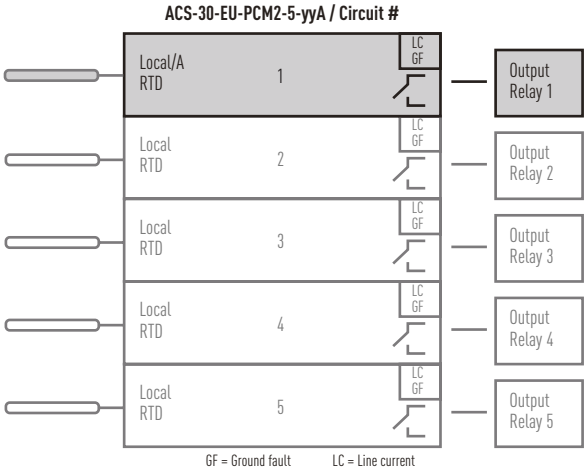


Fig. 1.2 Simple control circuit (5 circuits)

Heating control circuits can also be connected to the dry contact output of BMS systems or external devices to provide overriding features as well as to external controllers for roof & gutter and snow melting applications (ACS-30-EU-VIA-DU-20-MOD, ACS-30-EU-EMDR-10-MOD). Refer to Appendix 5.4 Connecting External Control Devices on page 149 for more detailed information.

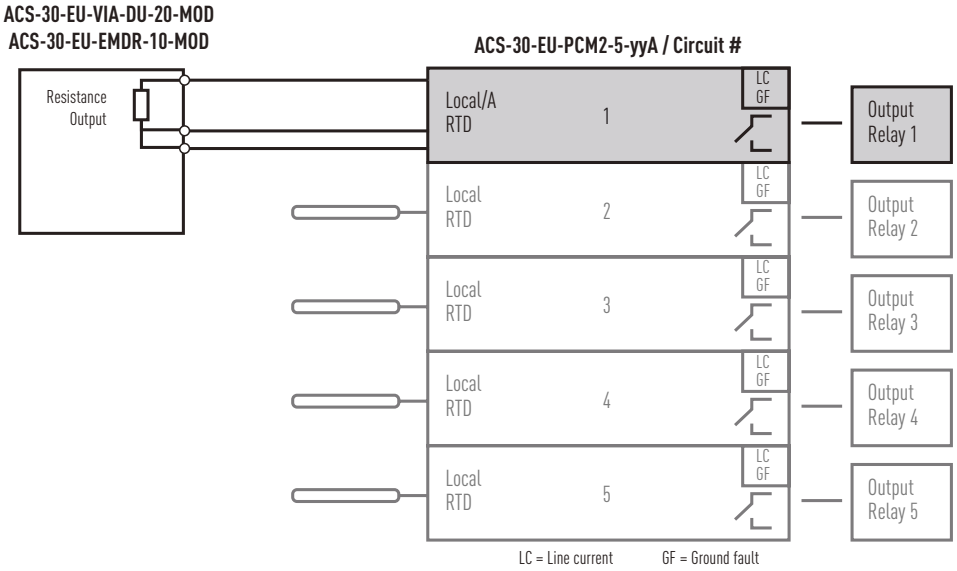


Fig. 1.3 External Control Device for snow melting, roof & gutter de-icing (5 circuits)

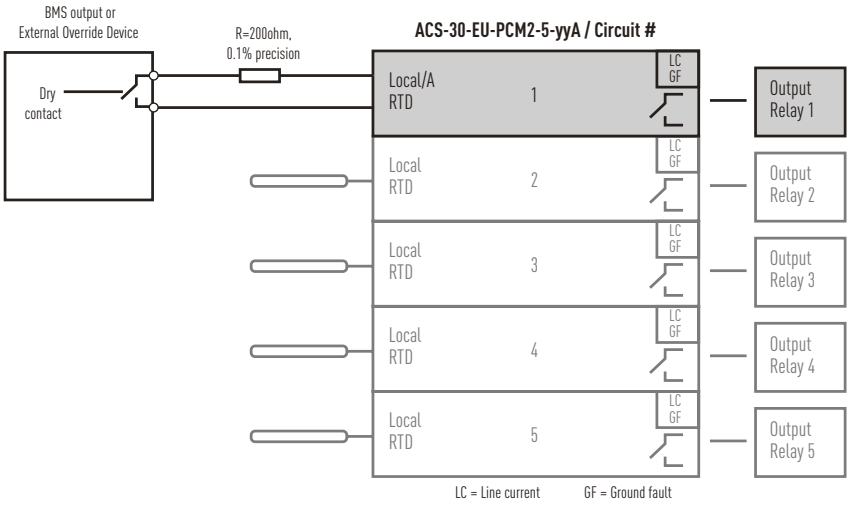


Fig. 1.4 External Override Device for floor heating, pipe freeze protection and fuel oil maintenance (5 circuits)

A circuit may also be controlled by multiple RTD inputs by adding a ACS-30-EU-MONI-RMM2-E module to the network. Multiple RTDs may be used for control or monitoring of a heating circuit.

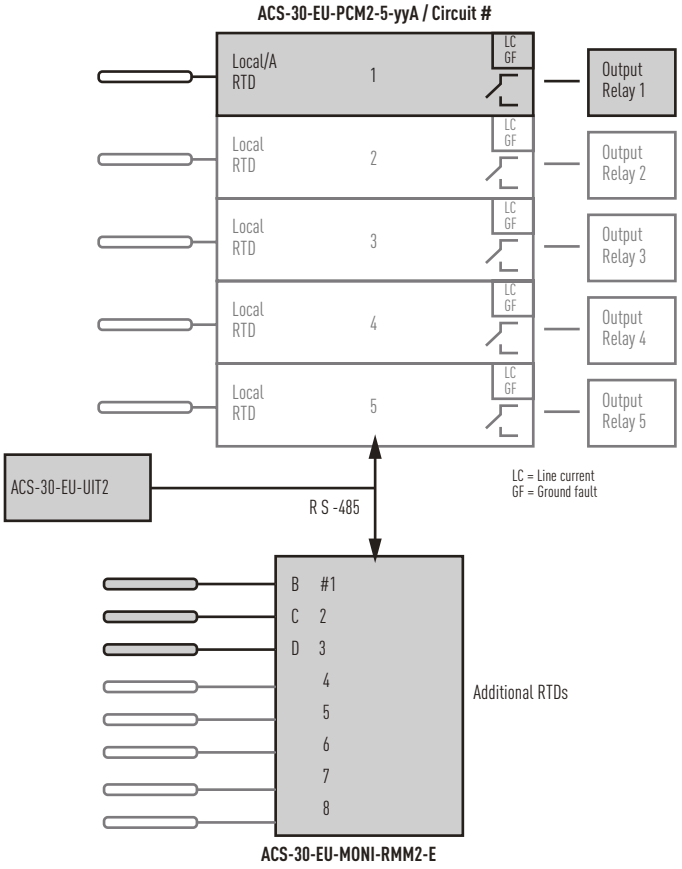


Fig. 1.5 Multiple RTD input control circuit (5 circuits)

More advanced systems can have multiple heating circuits sharing RTDs for control and monitoring.

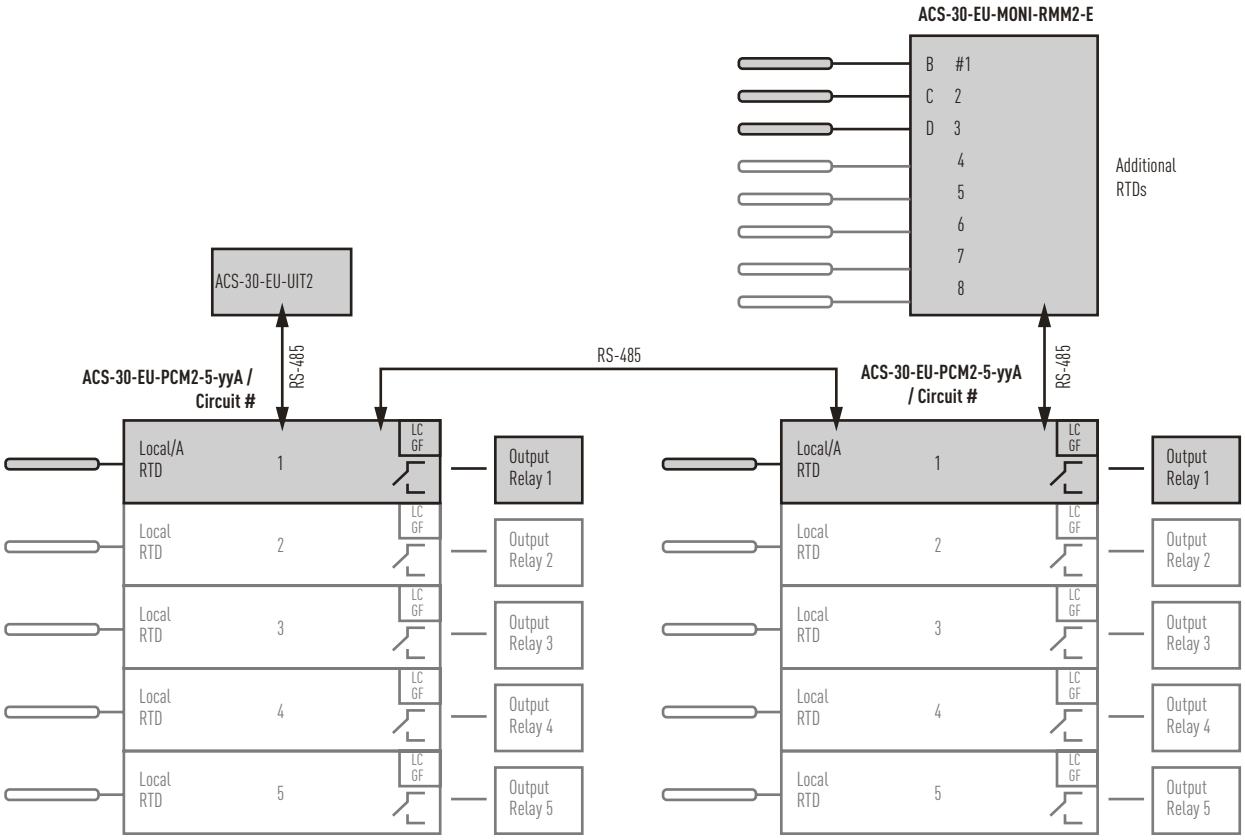


Fig. 1.6 Multiple ACS-30-EU-PCMs (5 circuits) and ACS-30-EU-MONI-RMM2-E

1.10 Windows

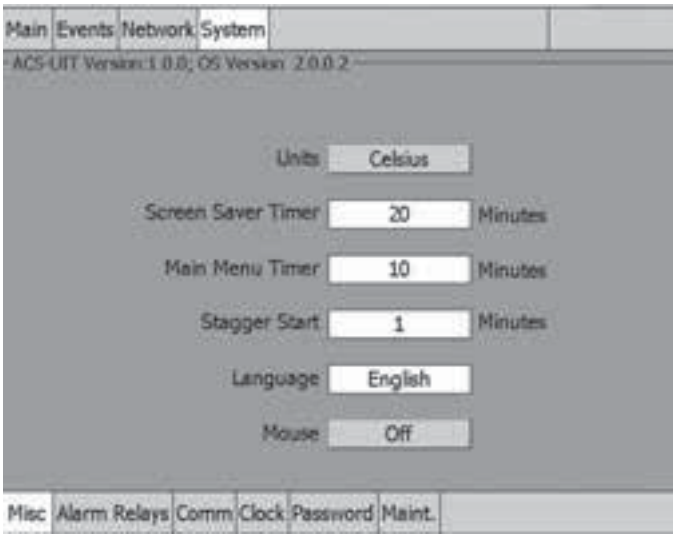


Fig. 1.7 Window layout

The top row of the window contains the main menu buttons, and the bottom row contains subsets of those main menu buttons

When asked to navigate between windows in this manual, tap the main menu and submenu buttons.

1.10.1 NAVIGATIONAL HEADER

At the top of the Setup and Status windows, a navigational header displays the following data (from left to right):

A. ID tag "Hot water line 1"
B. ACS-30-EU-PCM2 address "1"
C. Relay output number "1"
D. Application control mode "HWAT"

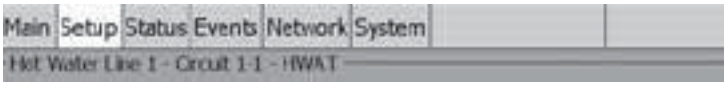


Fig. 1.8 Navigational header

1.10.2 MAIN MENU WINDOW

The main menu window displays the status of all circuits (PCM/relay numbers) that have been set up. The circuits can be accessed from this window by tapping anywhere on the row for the circuit. If the circuit is unassigned tapping on the row will allow you to set the control mode and parameters. If it is already assigned tapping on the row will allow you to edit the control mode and parameters.

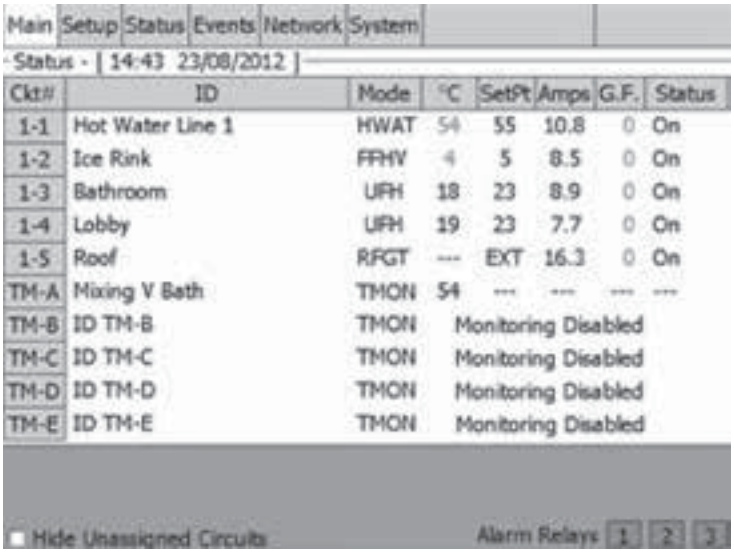


Fig. 1.9 Main window with circuit status

The main window displays:

Status: Time and Date: The current time and date is displayed

Ckt#: Displays the connected ACS-30-EU-PCM2 power modules and the pre-assigned circuit number for each of their five relays (e.g. 1-1, 1-2, 1-3, 1-5) of each CRM board.

Module	#CRM boards
ACS-30-EU-PCM2-5-yyA	1
ACS-30-EU-PCM2-10-yyA	2
ACS-30-EU-PCM2-15-yyA	3

ID Identification tag for the circuit

Mode Displays the application control mode for the circuit. Refer to Section 3 and the associated Pentair Thermal Management product design guide for further information concerning the application.

N/A Circuit has not been set up and is unassigned.

HWAT Circuit has been set up for a hot water maintenance application.

FFHV Circuit has been set up for a freezer frost heave application.

UFH Circuit has been set up for a floor heating application.

PFP Circuit has been set up for a pipe freeze protection application. FMFO Circuit has been set up for a fuel oil flow maintenance application. GWTM Circuit has been set up for a greasy waste flow maintenance application or non-freeze protection temperature maintenance applications.

RFGT Circuit has been set up for roof & gutter de-icing.

SMLT Circuit has been set up for snow melting.

TMON Temperature monitoring only has been set up, no relay or circuit is dedicated.

°C or °F The current lowest measured temperature of any RTD assigned to monitor the circuit

SetP Desired maintain/control temperature setpoint

Amps Heating cable circuit current draw (A)

G.F. Heating cable ground-fault current (mA)

Status Relay (on, off or ground-fault trip) and communication status (Com)

Color Coding of Main Window
The data in the °C/°F, Amps, and G.F. columns are displayed in color to identify their current state.

Green When heating cable is energized (status On), within normal range of setup parameters

Red In alarm condition

Orange Temperature not within setpoint plus hysteresis range (°C/°F)

 **Note:** This is not applicable for the HWAT control mode.

Blue Trace Boiler function active (applicable only for the SetPt column in HWAT control mode)

Alarm Relay Status

Green No alarm

Red In alarm condition

Main Window and Events Navigation

Navigation Buttons: At the bottom of the Main window and Events window, the navigation buttons will appear once six circuits are displayed. Use buttons to scroll up and down to view the status of the circuits on the Main window, and on the Events/Alarms on the Events window. When in the Main or Events windows, tap on anywhere on a row for a circuit to see the Status window for that circuit.

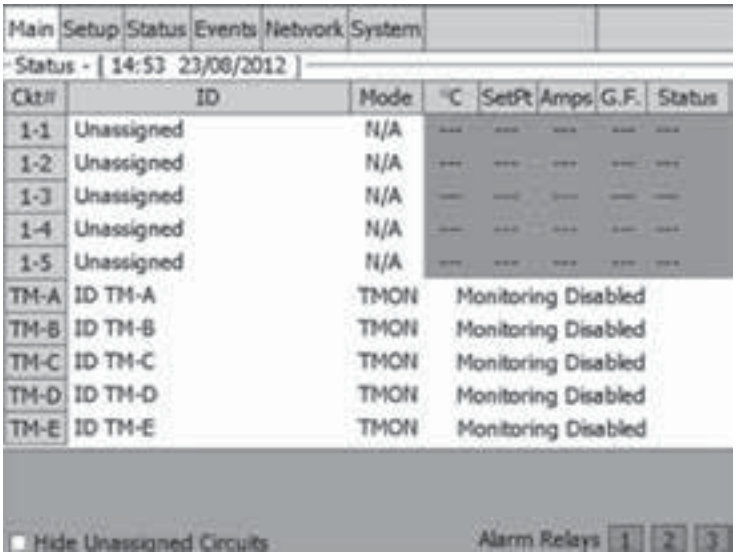


Fig. 1.10 Main window and navigation buttons

Table 1 Navigation Buttons

	Top of list	When selected, displays the first five circuits of the Main and the Events windows.
	Page up	When selected, displays the previous five circuits of the Main and the Events windows.
	Move up one circuit	When selected, displays the previous circuit on the Main and the Events windows.
	Move down one circuit	When selected, displays the next circuit on the Main and the Events windows.
	Page down	When selected, displays the next five circuits of the Main and the Events windows.
	Bottom of list	When selected, displays the last five circuits of the Main and the Events windows.

SECTION 2 – SYSTEM CONFIGURATION

The following gives an overview of where to enter data to configure a heating system.

2.1 Initializing the System

When the ACS-30-EU-UIT2 is first powered, it will display the Start-up window showing the program loading progress.

Fig. 2.1 Initial ACCS software loading display window

When the ACS-30-EU-UIT2 is powered on for the first time, date and units will not been assigned. In addition, the ACS-30-EU-UIT2 has not yet scanned the network for connected external devices such as ACS-30-EU-PCM2 Heat-Trace Control module (containing the CRM card rack modules) and ACS-30-EU-MONI-RMM2-E RTD multiplexing hubs.

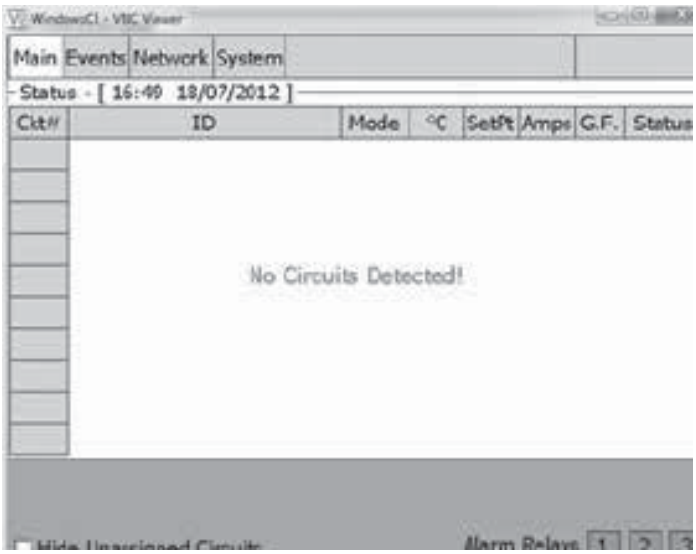


Fig. 2.2 Start-up window with no CRMs detected

2.1.1 SETTING UP GENERAL SYSTEM PARAMETERS

Tap System|Misc to enter the appropriate units and general system parameters

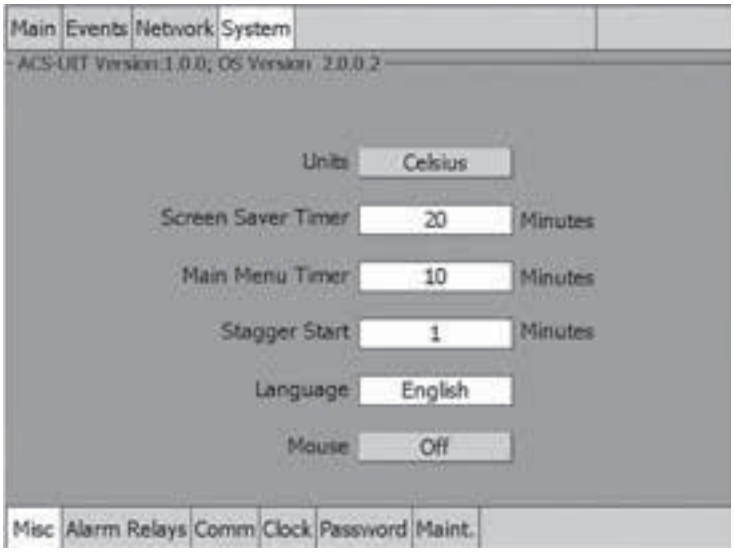


Fig. 2.3 System|Misc window

The System|Misc window provides the following controls:

Units: Select Celsius (ºC) or Fahrenheit (ºF) as temperature units.

Screen Saver Timer: Select the number of minutes the display remains visible with no user activity before moving into Screen Saver mode. The Screen Saver mode turns the screen to black (no backlight) and no alarms will be visible.

If an alarm occurs, a red light on the front of the enclosure illuminates. The window must be touched to show the circuit's alarm status.

IMPORTANT: Using the screen saver enhances the lifetime of the screen.

Range: 1 to 300 minutes

Default: 20 minutes

Main Menu Timer: Sets the number of minutes before the display automatically reverts to the Main window.

Range: 1 to 100 minutes

Default: 10 minutes

Note: This time entry also determines how long a password entry will remain valid (see System|Password section)

Stagger Start: Set the time delay for energizing each relay in a ACS-30-EU-PCM2 module to reduce the additive start-up current load for the system.

Range: 0 to 30 minutes

Default: 0 minutes

Mouse: Allows the USB port on the ACS-30-EU-UIT2 to function with a mouse installed. If enabled, a mouse pointer will be visible on the UIT window and will allow the user to navigate through the windows.

Options: OFF, ON

Default: OFF

Language: Select the language of the ACS-30-EU-UIT2 user interface.

Options: English, German, French, Dutch, Swedish, Russian, Slovak, Polish, Czech.

Default: English

2.1.2 SETTING TIME AND DATE

Tap System|Clock to set the time and date.

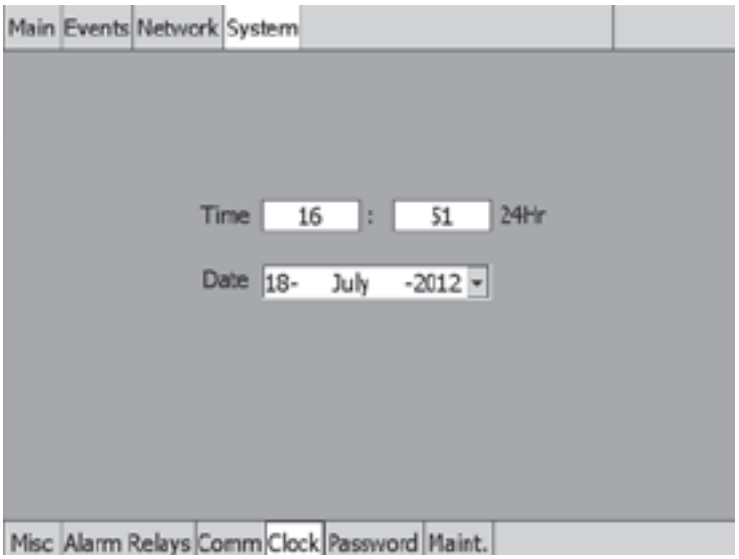


Fig. 2.4 System|Clock window

Time: Enter the current time using 24 hour format

Date: Enter the correct date from the pop-up calendar

2.1.3 SCANNING THE NETWORK

After the ACS-30-EU-UIT2 is connected to the external ACS-30-EU-PCM2 power control module and any ACS-30-EU-MONI-RMM2-E via the RS-485 network, and all circuits have been installed and commissioning tests completed, the ACS-30-EU-UIT2 is ready to scan the network for connected devices.

The first time the system is started this list will be empty.

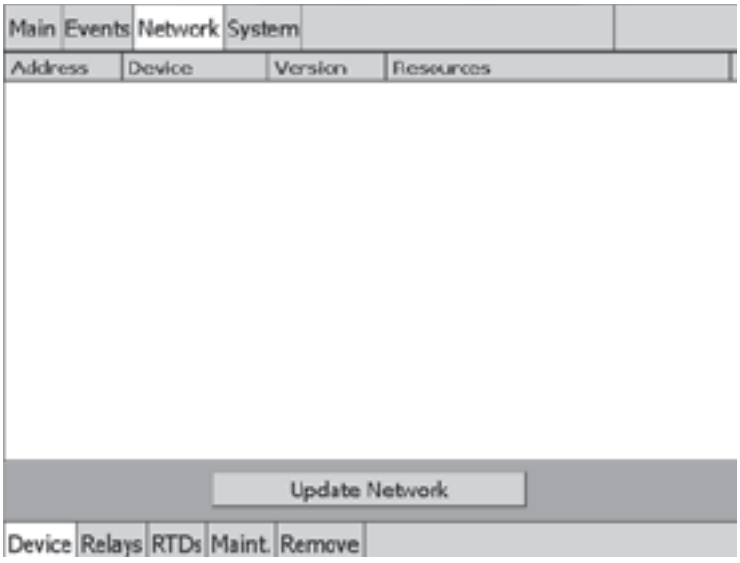


Fig. 2.5 Update Network button

Tap the Update Network button to start the network scan. A progress bar will be displayed as the system scan proceeds.

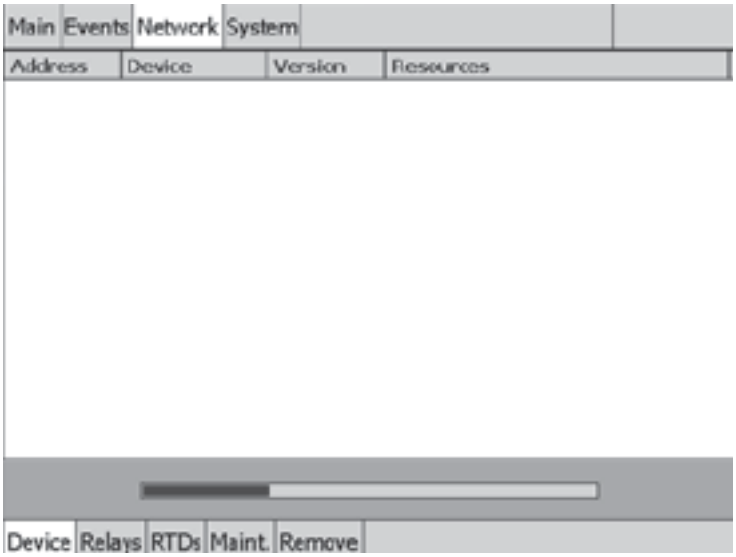


Fig. 2.6 Scanning network

The program scans for Device Addresses for the ACS-CRM board in the ACS-30-EU-PCM2 module, attached RTDs, ACS-30-EU-MONI-RMM2-E modules, and creates a database within the system. Once the database exists, no further scanning is done. A device address is the number assigned via the rotary switches on the ACS-30-EU-PCM2 module or ACS-30-EU-MONI-RMM2-E circuit board. Each device must have a unique device address number. For example, if the design requires both an ACS-30-EU-PCM2 and a ACS-30-EU-MONI-RMM2-E, and 32 is chosen for device address number for the ACS-CRM, then the ACS-30-EU-MONI-RMM2-E cannot also use address 32. (See Table 2.1 Available Device Addresses on page 22). See the ACS-PCM2-5 Installation Instructions <EN-RaychemACS30PCM220A-DS-EU0015, EN-RaychemACS30PCM232A-DS-EU0013> and ACS-30-EU-MONI-RMM2-E Installation Instructions <EN-RaychemACS30RMMMOD-DS-EU0012> for more information.

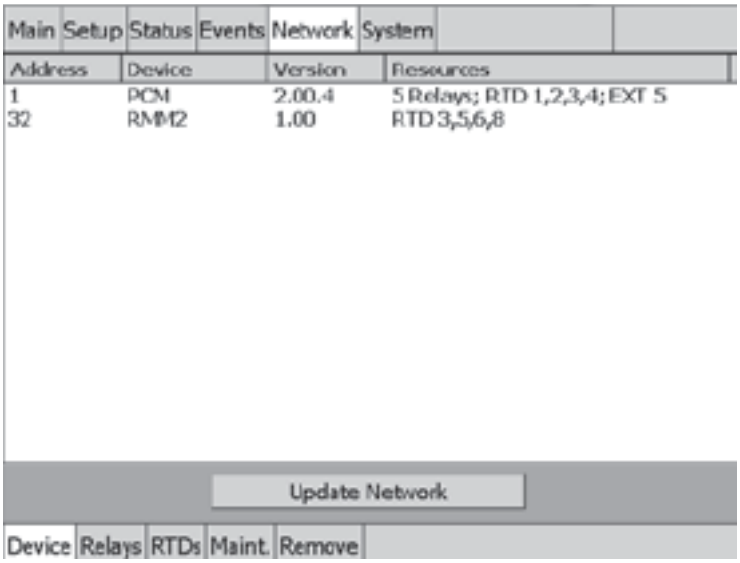


Fig. 2.7 Network|Device window after system scan

Verify that all of the expected hardware devices were found by checking the Network|Device display. If a device appears to be missing, manually initiate a new scan by taping the Update Network button. If an expected device does not appear on the list after several scans, it is most likely physically disconnected from the RS-485 network wiring, or is not powered. Troubleshoot and verify all network and power connections.

Note: If a new external hardware device is added after the initial manual scan, you must initiate a new scan by going to the Network|Device window and tapping the Update Network button.

To add a new device (ACS-30-EU-PCM2-xx-yyA or ACS-30-EU-MONI-RMM2-E), make sure it:

- Has a unique address
- Has power
- Is connected to the RS-485 wiring

Then push Update Network to add the device to the list.

Note: Removal of Device: If you remove a device or RTD from the network, using the Update Network button will not remove the device from memory. You must use the Remove Device button found in the Network|Remove window.

Table 2.1 below shows the available device addresses for Relay Outputs and RTDs. If ACS-30-EU-MONI-RMM2-E(s). They must NOT share the same address as the ACS-30-EU-PCM2-xx-yyA (CRM).

Table 2.1 Available Device Addresses

Device	Device type	Switch setting	Device address
ACS-30-EU-PCM2	Relay Output/RTD	1–99	1–99
ACS-30-EU-MONI-RMM2-E	RTD	0-9	32-41
ACS-30-EU-MONI-RMM2-E	RTD	A-F	42-47

2.1.4 MAIN WINDOW

After the first system scan has been completed, tap the Main menu button and the main window appears.

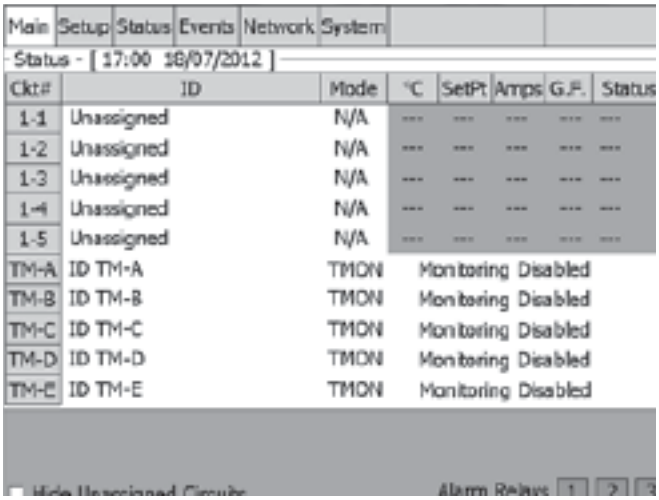


Fig. 2.8 Main window with one CRM board detected

The Main menu window displays the status of all circuits (relays) that are available in the connected system. In addition to all the available circuits that are assigned to ACS-30-EU-PCM2 relays there are 5 Monitor Only circuits available (TM-A through TM-E). The monitor only circuits are not assigned to any relays in the ACS-30-EU-PCM2 and do not require any additional hardware.

The circuits may be accessed from this window by tapping anywhere on the row for the desired circuit. If the circuit is unassigned, tapping on the row will allow you to set the control mode and parameters. If it is already assigned, tapping the row will allow you to edit the control mode and parameters.

Tap anywhere on the row for the circuit you wish to set up.

2.2 Setup Window

The Setup window is displayed after tapping the circuit on the Main window you wish to configure, or by tapping the Setup button on the Main menu at the top of the window.

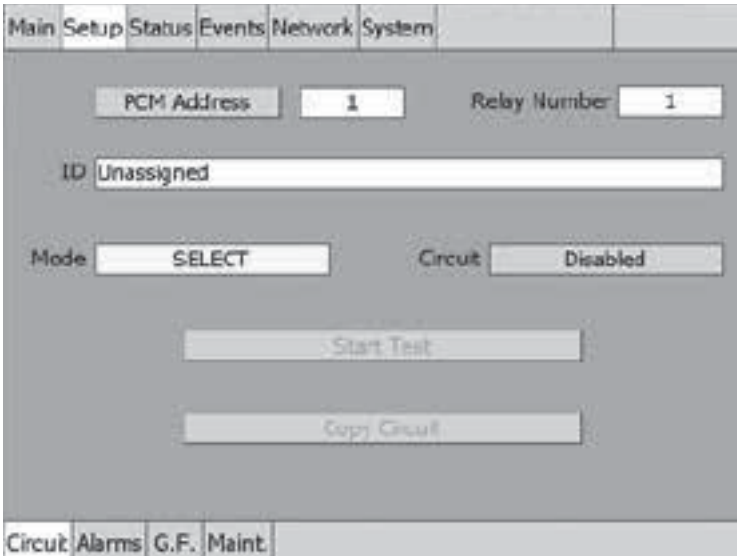


Fig. 2.9 Setup window for unassigned circuit

2.2.1 ASSIGNING CIRCUIT IDENTIFICATION

In this window you will be assigning an ACS-30-EU-PCM2 address and relay number or Temp Monitor address and providing a name for your circuit.

Setup Window Fields

Address Toggle Button:
This button toggles between the PCM Address and the Temperature Channel.

PCM Address: Displays the ACS-30-EU-PCM2 address that was detected from the network scan. If you enter the Setup screen without selecting a PCM (circuit), the first PCM-relay detected in your network will be displayed. You may enter the desired PCM and relay number on the setup window to configure the circuit.

Relay Number: The circuit # label is assigned when scanning the network with the ACS-30 program. By default each of the five relays are numbered as the CRM number and relay number (e.g. 1-1, 1-2, 1-3, 1-4 and 1-5). The CRM number and relay number are a primary reference for all windows. Once a circuit is added, you cannot delete it or change its PCM number. To remove the entire PCM, you must go to the Network|Remove window.

Temp Monitor: Displays an entry field to configure a temperature monitor only channel. Tap the entry field and select the temperature monitor channel (TM-A to TM-E) you wish to configure. Refer to Section 4 Temperature Monitor Only Circuits on page 119 for further information.

ID: A user defined circuit identification text field. The default is "ID X-X" (where X-X is the Circuit number). Before the circuit is assigned the ID tag is set as "unassigned."
When selected, a text-editing window appears that works similar to cell phone text messaging. There are selection keys for uppercase letters, lowercase letters, and special characters. The keypad portion allows you to enter text by pushing the appropriate keys.

Limit: 40 characters (character strings are truncated on the Main window after 16 characters but displayed in full on Status and Setup windows)

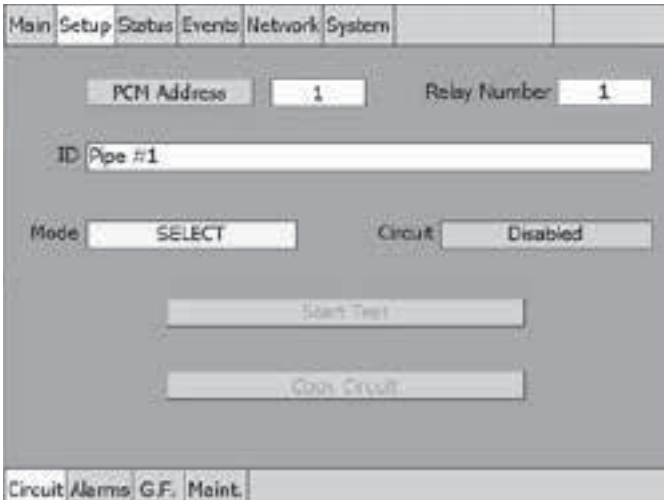


Fig. 2.10 ID pop-up window

Circuit

Enabled: The ACS-30-EU-UIT2 monitors and generates circuit alarms and the ACCS- PCM2-5 turns the relay on or off based upon set-up parameters for the selected control mode and/or RTD inputs.

Disabled: The ACS-30-EU-UIT2 has disabled the circuit, and does NOT generate alarms or control the relay assigned to the circuit. The relay remains in the off position. The circuit is grayed out in the Main window to show it is Disabled.

Force On: The ACS-30-EU-UIT2 has turned the circuit on, overriding the control mode, but generates alarms and enables high temperature cut out.

Force Off: The ACS-30-EU-UIT2 has turned the circuit off, but generates low temperature and system alarms.

2.2.2 ASSIGNING CONTROL MODE

In the control mode you will be selecting your application and entering temperature setpoints, assigning RTDs, alarm parameters and ground-fault protection levels.

Mode: Select the desired control mode from the Mode Select window.

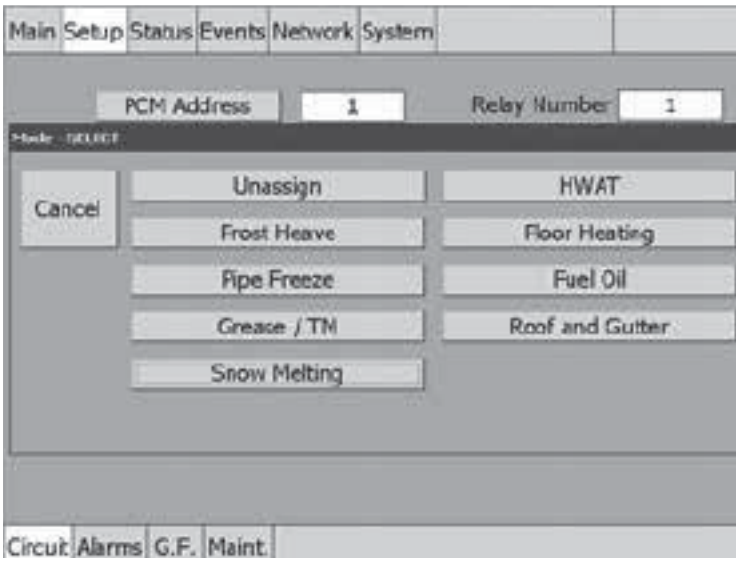


Fig. 2.11 Mode Select window

Follow the window prompts to enter temperature setpoints, assign RTDs, alarm parameters and ground-fault protection levels. Table 2.2 Control Mode Description and Index lists the ten application control modes and references where the programming details are described in.

Table 2.2 Control Mode Description and Index

Control mode	Description	Heating cables	Section number	Page number
UNASSIGN	Clears all parameters set for a circuit	NA	3.1	59
HWAT	Opens HWAT design wizard Variable temperature settings can be assigned using the 24/7 Scheduler[1]	HWAT	3.2	59
Frost Heave	Freezer frost heave prevention Variable temperature settings can be assigned using the 24/7 Scheduler[1]	T2Red	3.3	69
Floor Heating	Floor heating applications	T2Red, T2Blue, CeraPro, QuickNet	3.4	73
	Variable temperature settings can be assigned using the 24/7 Scheduler			
	Floor Heating in Floor sensing Mode	T2Red, T2Blue, CeraPro, QuickNet	3.4	73
	Floor Heating in Room sensing Mode	T2Red, T2Blue, CeraPro, QuickNet	3.4	78
	Floor Heating in Room sensing Mode with Floor Limiter	T2Red, T2Blue, CeraPro, QuickNet	3.4	83
Pipe Freeze	Pipe freeze protection applications	WinterGard (FS-A, B, C, C10-2X)/R-ETL-A	3.5	87
	Pipe freeze protection with ambient control	WinterGard (FS-A, B, C, C10-2X)/R-ETL-A	3.5.1	87
	Pipe freeze protection with line control	WinterGard (FS-A, B, C, C10-2X)/R-ETL-A	3.5.2	91
	Pipe freeze protection with PASC[2] control	WinterGard (FS-A, B, C, C10-2X)/R-ETL-A	3.5.3	95
Fuel Oil	Fuel oil flow maintenance applications	FS-C-2X	3.6	100
	Fuel oil flow maintenance with ambient control	FS-C-2X	3.6.1	100
	Fuel oil flow maintenance with line control	FS-C-2X	3.6.2	104
	Fuel oil flow maintenance with PASC[2] control	FS-C-2X	3.6.3	108
Greasy Waste/TM	Greasy waste and other temperature maintenance control Variable temperature settings can be assigned using the 24/7 Scheduler1	FS-C-2X	3.7	112
Roof and Gutter	Roof and gutter de-icing applications	IceStop (GM-2X / GM-2XT)	3.8	118
	Roof and gutter de-icing with external device	IceStop (GM-2X / GM-2XT)	3.8.1	118
	Roof and gutter de-icing with ambient control	IceStop (GM-2X / GM-2XT)	3.8.2	123
	Roof and gutter de-icing with bracketed ambient control	IceStop (GM-2X / GM-2XT)	3.8.3	126
	Roof and gutter de-icing with surface temperature control	IceStop (GM-2X / GM-2XT)	3.8.4	129
Snow Melting	Surface snow melting applications	EM2-XR, EM2-CM and MI heating cables	3.9	132
	Surface snow melting with external device	EM2-XR, EM2-CM and MI heating cables	3.9.1	132
	Surface snow melting with ambient control	EM2-XR, EM2-CM and MI heating cables	3.9.2	135
	Surface snow melting with surface temperature control	EM2-XR, EM2-CM and MI heating cables	3.9.3	138
Temperature Monitor Only	Monitors any critical temperature defined by the user	N/A	4	142

1 Variable temperature setpoint 24/7 Scheduler is described in Appendix 5.2 24/7 Scheduler.
2 Proportional Ambient Sensing Control (PASC) described in related control mode section and Appendix 5.1 Proportional Ambient Sensing Control (PASC) Control Mode.

Start Test

The Start Test button closes the relay on the **ACS-30-EU-PCM2-xx-yyA** and energizes the heating cable circuit for 30 minutes to help in commissioning and troubleshooting. When the Start Test button is tapped, it turns red, and is renamed to Stop Test. Within the Stop Test window, a count down timer is displayed showing the progress in the 30 minute test cycle. The relay remains closed for 30 minutes, or until the button is tapped again.

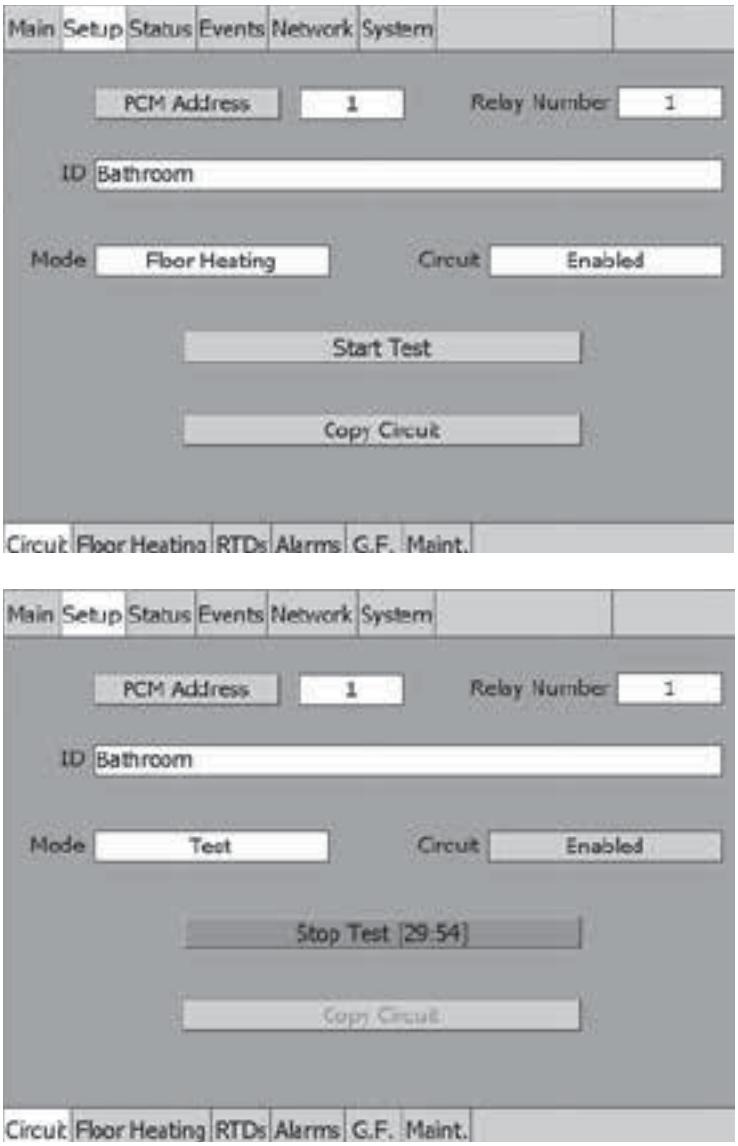


Fig. 2.12 Start/Stop test

Copy Circuit
The Copy Circuit button allows you to assign other available circuit number (circuit) with identical control parameters.

- Select the circuit containing parameters you wish to copy from the Main window or Setup window, then tap Copy Circuit.
- Highlight the available circuit where you wish to copy the circuit parameters, then tap >>.

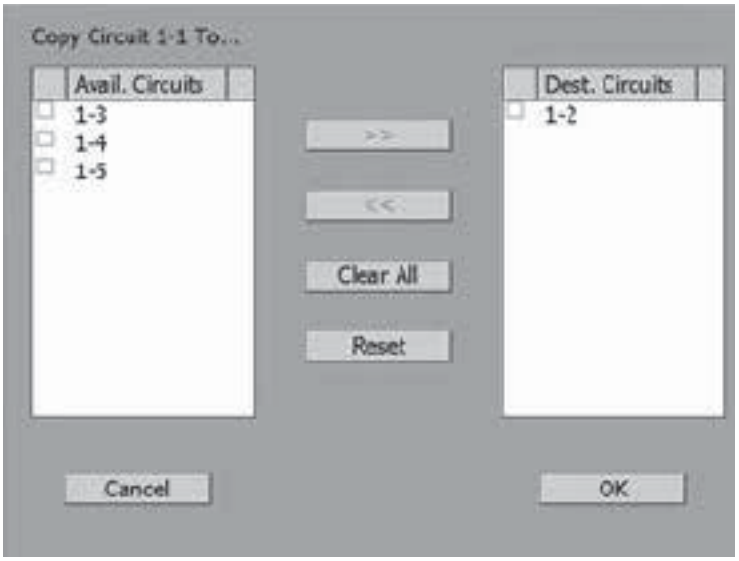


Fig. 2.13 Copy Circuit window

Once all intended circuits have been moved to the destination circuit box, tap OK.

Note: When circuits are copied, all parameters except RTD association and ID tag are carried to the new relay position. After the circuit is copied you must associate RTD and enter a new ID tag.

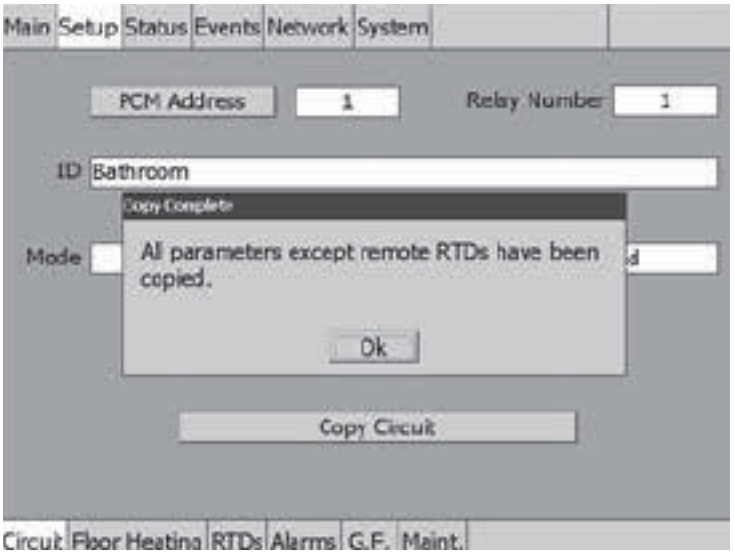


Fig. 2.14 Circuits Copied message

2.2.3 ASSIGNING AND SHARING RTD CONTROL AND MONITORING

By default, each channel of the ACS-30-EU-PCM2 has an associated RTD input. On any ACS-CRM board, the first RTD input is automatically coupled with the first relay output; the second RTD is linked with the second output relay, etc.

The Setup|RTDs window displays the default RTD assignment in the A field. This selection is grayed out because you cannot alter this default selection.

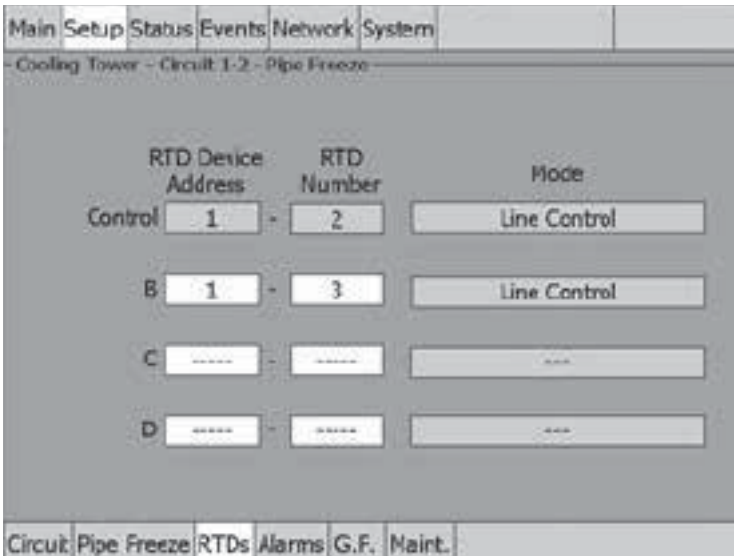


Fig. 2.15 Setup|RTDs window with Line Control

If no RTD is connected to the input terminals for this circuit, then all four lines can be used to assign RTDs from elsewhere in the system. However, in the event of a communications or UIT failure, no RTD input is available and the relay output for this circuit goes to the failsafe mode established in the Setup|Circuit window.

Up to three additional RTDs can be associated with a given circuit. When the system is operating, the lowest temperature value from the array of multiple RTDs will be used as the control temperature.

If no RTD is connected to the input terminals of a given relay, then all four RTD inputs can be used to assign RTDs from elsewhere in the system. However, in the event of a communications or UIT failure, no RTD input will be available and the relay output for this circuit will go into its failsafe mode established in the Setup|Circuit window.

Using RTDs with the Different Application Control Modes

In certain modes, you have an option of choosing if the circuit is controlled by RTDs that are measuring line (pipe, slab,floor or surface) temperature, by RTDs that are measuring the ambient temperature or by using inputs from external controllers (see Table 2.3 RTD and External Control Functions on page 30 for more detail).

Line and Surface Temperature Control:
RTD assignment will be the same as described in the previous section.

Ambient or PASC Control:
RTDs must be assigned for either ambient control or line monitoring

Ambient Control inputs will be used to turn the heating cable on or off. RTDs in this mode will not trigger any temperature alarms.

Line Monitoring with temperature alarms

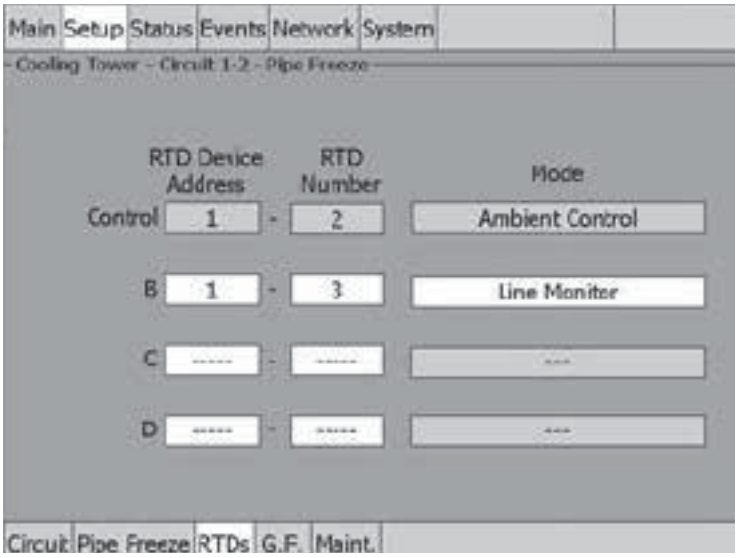


Fig. 2.16 Ambient Control or Line Monitor

HWAT Mode:
Whenever the Trace Boiler is enabled at least one RTD is required to monitor and control the Trace Boiler function.

Otherwise, no RTDs are required or can be used for control. However RTDs can be assigned for line monitoring with temperature alarms.

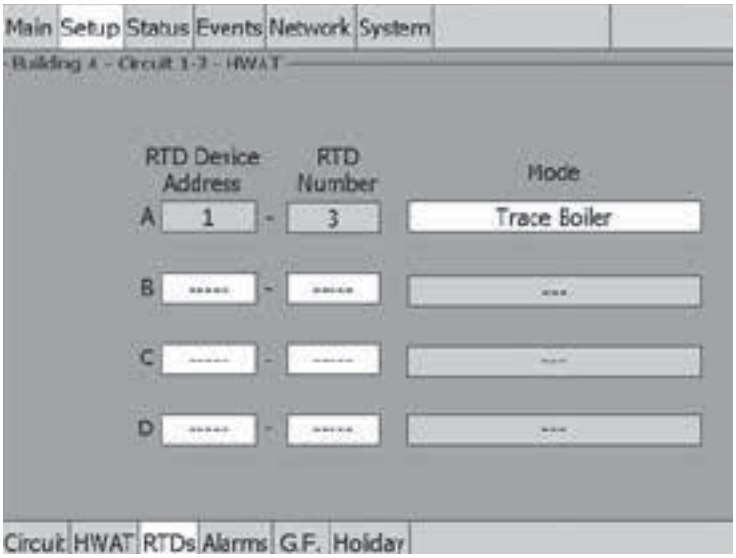


Fig. 2.17 Trace Boiler control in HWAT

Floor Heating Mode:
Depending on the Sensing Mode selected a Floor and/or a Room Sensor can be configured (in the picture below Room Sensing with Floor Limiter is selected).

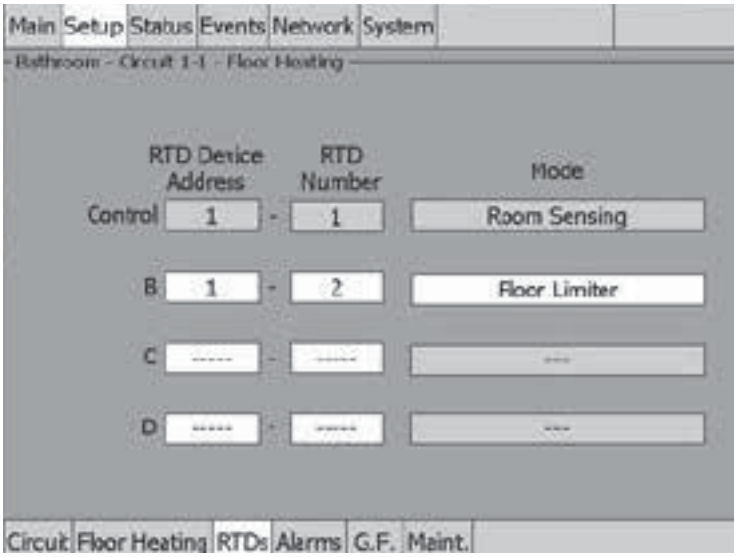


Fig. 2.18 Room Sensing with Floor Limiter Control in floor heating

External Device Control:
An external module (ACS-30-EU-VIA-DU-20-MOD, ACS-30-EU-EMDR-10-MOD) may be used as external device control in snow melting and roof & gutter applications. The output of the external device module is connected to the RTD input on the ACS-30-EU-PCM2 module or ACS-30-EU-MONI-RMM2-E (see Appendix 5.4). The circuit is powered on or off depending on the resistance value provided by the external device module.

RTDs may be associated to the circuit for high temperature override. RTDs in this mode will not trigger any temperature alarms.

External Device Override:
An external device or BMS system with dry contacts may be used to override the local RTD input to force the circuit on or off (see Appendix 5.4). All programmed temperature alarms and high temperature cut-out values will still be active.

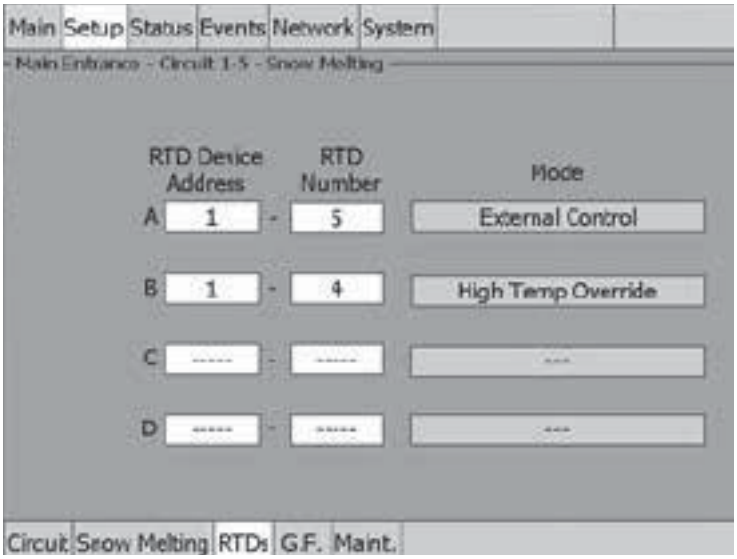


Fig. 2.19 External Control and High Temperature Override

Note: If an RTD is connected to the PCM address it will be used as primary control for the circuit.

Table 2.3 RTD and External Control Functions

Mode	Mode	Control	Monitor	Control	Override
Hot Water Maintenance (HWAT)	Timed duty cycle	-	X	Trace Boiler[2]	-
Freezer Frost Heave	Line/slab sensor	X	-	-	-
Floor Heating	Floor sensing Room Sensing Room Sensing with Floor Limiter	X - X	- - -	- X X	Ext Ext EXt
Pipe Freeze Protection	Line sensing	X	-	-	Ext
	Ambient or PASC[1]	-	X	X	Ext
Fuel Oil Flow Maintenance	Line sensing	X	-	-	Ext
	Ambient or PASC[1]	-	X	X	Ext
Greasy Waste Temperature Maintenance	Line sensing	X	-	-	-
Roof and Gutter De-icing	External device	-	-	Ext	X
	Ambient and Bracketed Ambient sensing	-		X	X
	Surface sensing	X	-	-	-
Surface Snow Melting	External Device	-	-	Ext	X
	Ambient sensing	-	-	X	X
	Surface sensing	X	-	-	-
Temperature Monitoring Only	N/A	-	X	-	-

1 PASC mode described in Section 3.5.3/3.6.3 Temp Control – PASC Control, on pages 70 and 94.
2 Trace Boiler is optional in HWAT – described in section 3.2, pg. 51.

Assigning RTDs in Monitor only mode

The same process is used to assign RTDs to Monitor Only mode. Any RTD in the system can be assigned whether from an ACS-30-EU-PCM2 relay number or from a ACS-30-EU-MONI-RMM2-E module. These RTDs do not have any control function associated with them, however, they can be assigned alarm values.

Assigning additional RTDs to a circuit

RTDs can be assigned to a circuit from ACCS-CRM boards or ACS-30-EU-MONI-RMM2-E modules. To assign the additional RTDs to a circuit enter the device address and RTD number as listed under your Network|Device window.

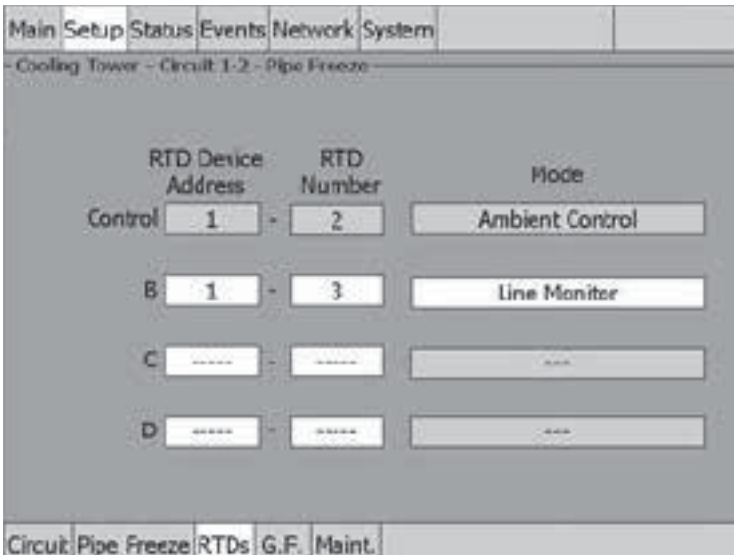


Fig. 2.20 Assigning additional RTDs.qfwe

2.2.4 SETUP|ALARMS

The Setup|Alarms window lists all of the temperature alarm conditions for line control/monitoring. The minimum and maximum values for each alarm condition are included for each application control mode in Section 3.

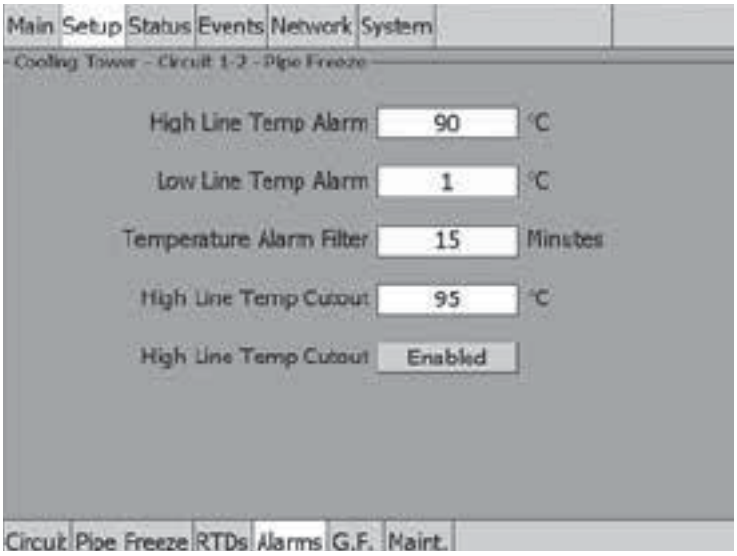


Fig. 2.21 Setup|Alarms window

Specific alarms are foreseen for HWAT when the Trace Boiler function is enabled and for Floor Heating depending on the Room Sensing Mode selected (in the picture below Room Sensing with Floor Limiter is selected).

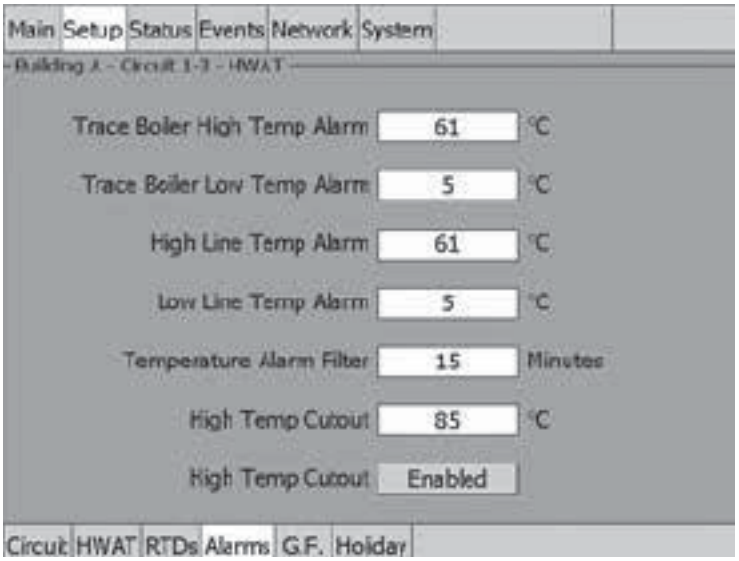


Fig. 2.22 Setup|Alarms window for HWAT

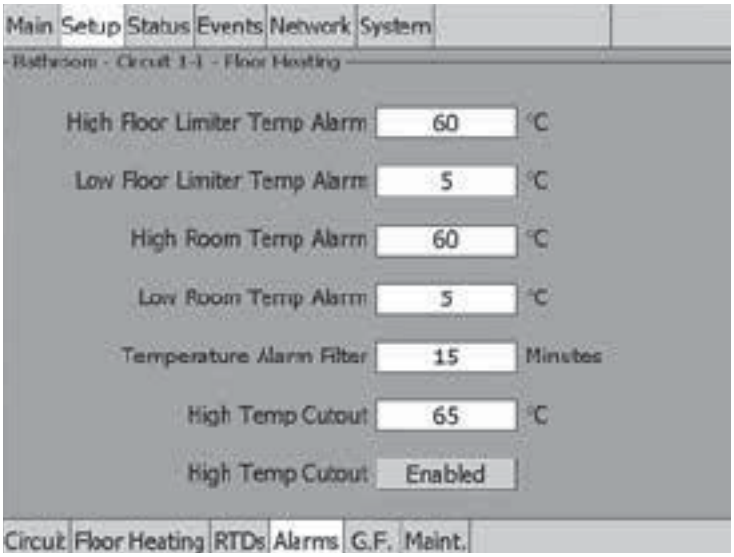


Fig. 2.23 Setup|Alarms window for Floor heating

2.2.5 SETUP|G.F.

The Setup|G.F. window configures ground-fault alarm and trip values for the circuit. The alarm/ trip conditions are latching and must be manually reset.

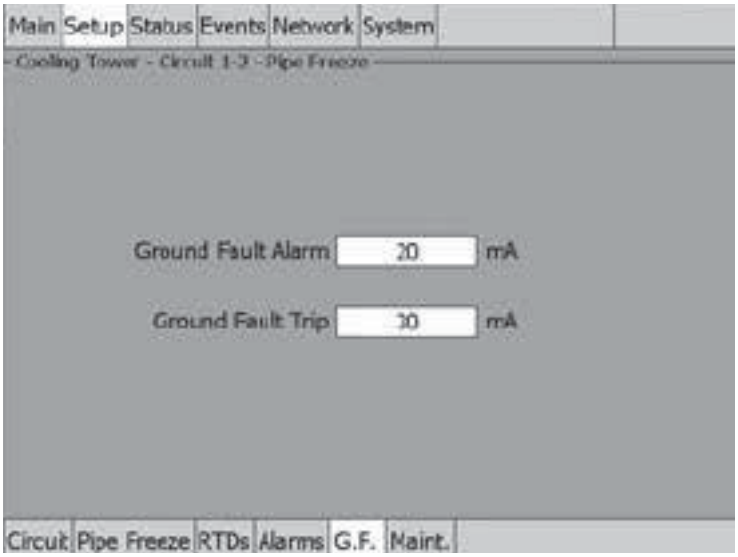


Fig. 2.24 Setup|G.F. window

2.2.6 SETUP|MAINT.

The Setup|Maint. window enables a heating cable circuit diagnostic feature to be engaged on a automatic schedule. This feature powers the circuit for 2 minutes when not in demand to ensure the circuit, RTD or communications have not been damaged and will be working when needed. The user can select the time of day the test will be conducted.

Note: If the circuit is disabled, forced on, or forced off, the power cycle test will be disabled until the circuit is enabled.

Fig. 2.25 Setup|Maint. window

The interval field opens a window where the timed interval of this diagnostic can be selected.

Range: Never, daily, weekly or monthly

Default: Never

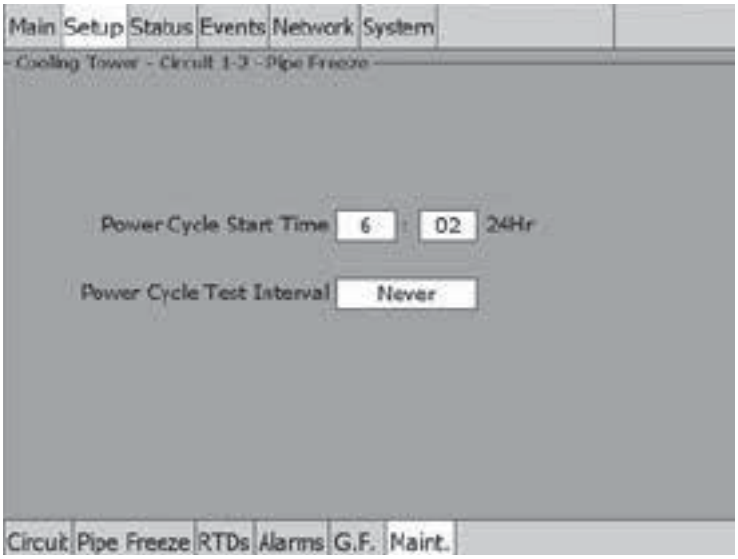


Fig. 2.25 Power Cycle Interval selection window

2.3 Status|Circuit Window

The Status|Circuit window displays the status information for individual circuits. Data in the status menus cannot be changed.

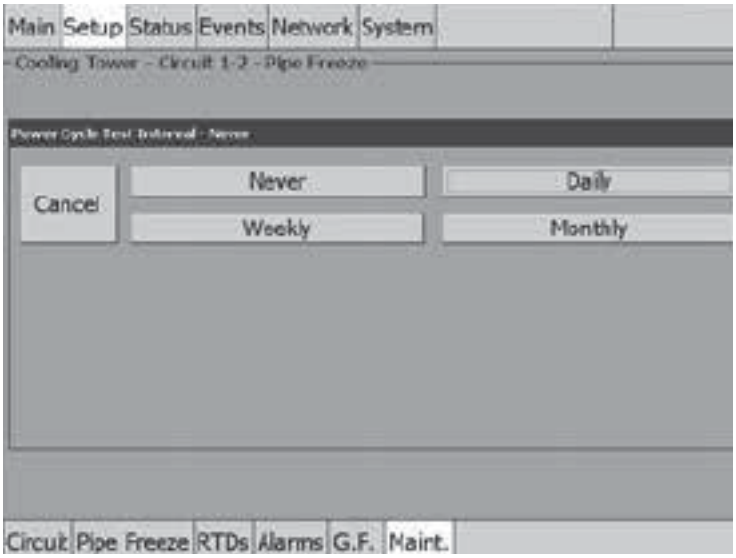


Fig. 2.26 Status|Circuit window

The fields and displays in the Status|Circuit provide the following information:

PCM Address and Relay Number

Enter the PCM Address and Relay Number to view the status of a specific circuit.

ID: Displays the ID tag defined in Setup/Circuit window.

Mode: Displays the Control Mode selected in Setup|Circuit window.

Alarm Reset: In normal state, the Alarm Reset button is grayed out. If a latching alarm occurs, the Alarm Reset blinks orange/red. The alarm cannot be reset until the fault has been cleared.

Line Temp: The Line Temp displays the temperature the ACS-30-EU-UIT2 is currently measuring. If more than one RTD is connected to a circuit, the system displays the lowest. Temp of all the RTDs assigned to that circuit.

Status: Displays the relay output status (On, Off, or Trip) of the EMR. If communication is lost to the output device, a red COMM appears and alarms.

G.F.: Displays the ground-fault current for the circuit.

Current: Displays the heating cable amperage of the circuit when the relay output is on.

Energy: Displays the power currently consumed by the heating cable (Watts).

Voltage: Display the system voltage (230VAC for all applications).

The data in the Control Temp, G.F. and Current windows are displayed in color to identify their state:

Color

Code: State

Black: Circuit is off

Green: Within normal range of setup parameters

Red: In alarm condition

Orange: Temperature is not within setpoint plus hysteresis range

Blue: Trace Boiler function active (available only for HWAT circuit when Trace Boiler is Enabled)

Blinking

Red/Orange: An alarm event has occurred

2.4 Status|RTDs Window

The Status|RTDs window lists the RTD devices and numbers assigned to the selected circuit, along with the last reported temperature from each RTD. Data in this status window cannot be changed.

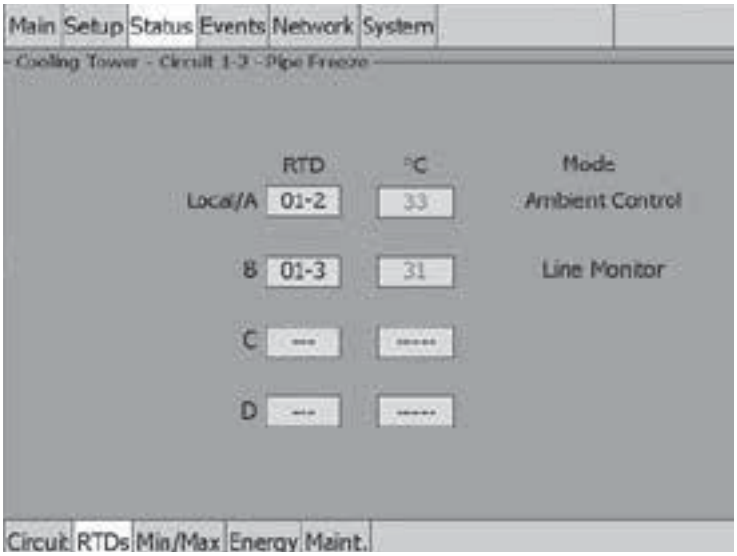


Fig. 2.27 Status|RTDs window

For a circuit in the external device control mode the RTD status screen will indicate whether the input provided is closed (powering the circuit) or open (turning the circuit off).

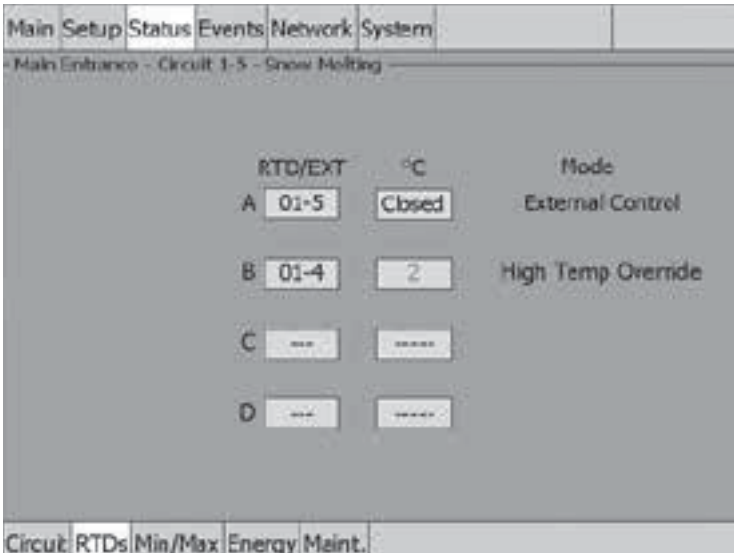


Fig. 2.28 Status|RTDs window - external device

2.5 Status|Min/Max Window

The Status|Min/Max window displays an historical record of minimum and maximum values recorded since the last reset time.

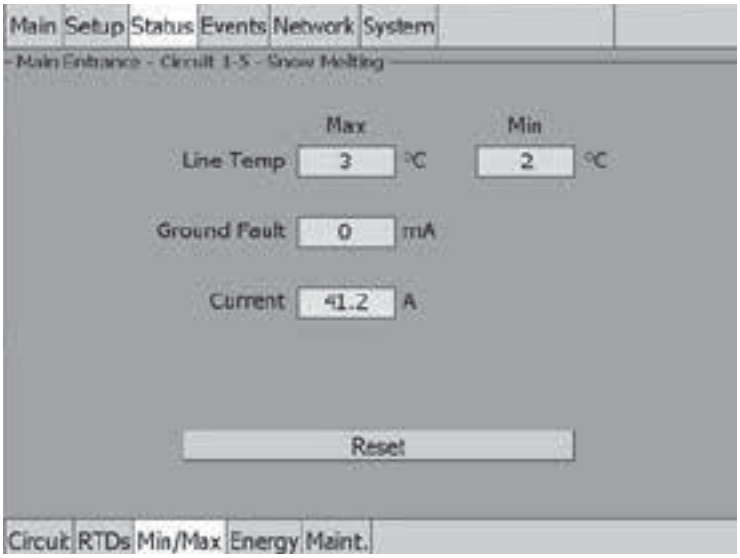


Fig. 2.29 Status|Min/Max window

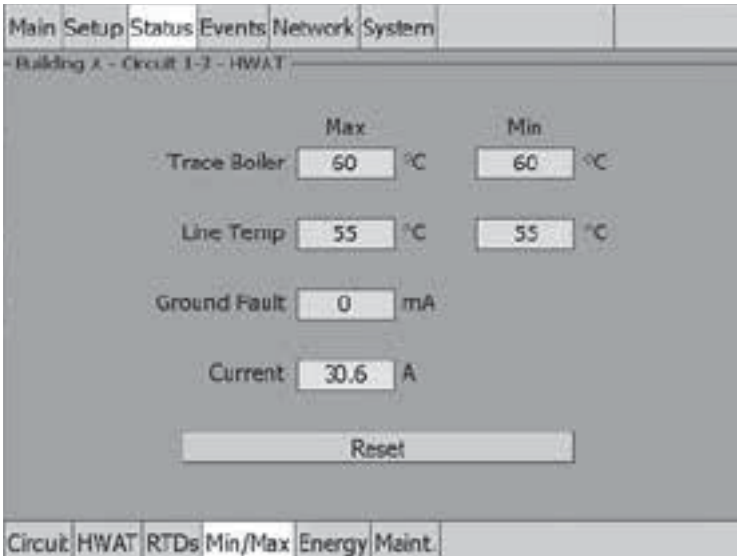


Fig. 2.30 Status|Min/Max window for HWAT

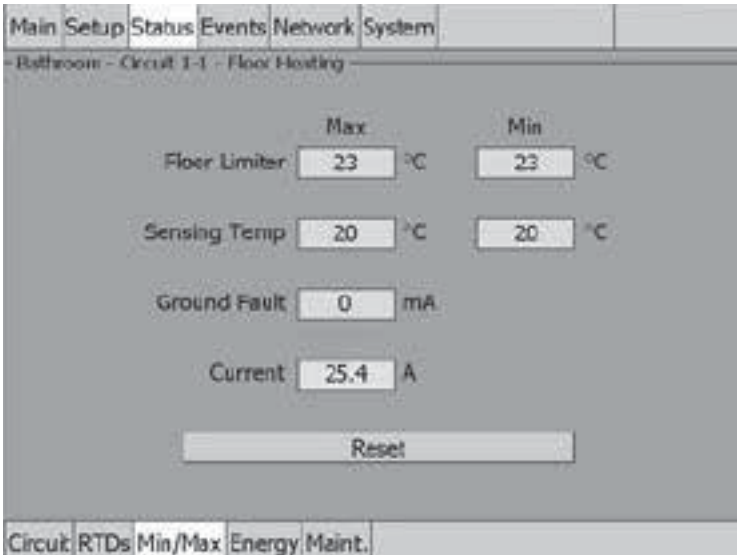


Fig. 2.31 Status|Min/Max window for floor heating

The Status|Min/Max window provides the following controls:

Control Temp

Max The highest temperature reported by any line RTD associated with the circuit since the last reset time.

Min The lowest temperature of any line RTD associated with the circuit since the last reset time.

Max GF Current: The highest ground-fault value recorded for the circuit since the last reset time.

Max Current: The highest current recorded for the circuit since the last reset.

Reset Button: Clear all Min/Max values and begins updating Min/Max fields with new values.

2.6 Status|Energy Window

The Status|Energy window displays the power consumed by the heating cable circuit since the last reset.

The energy consumption is recorded every hour in the ACS-30 system which can store data for a maximum of 5 years. After that time the first year data is deleted from the database.

The energy consumption database can be downloaded as XML file in order store or statistically analyze the data. See Appendix 5.5 for more information.

Different views are available and selectable by a dedicate menu:

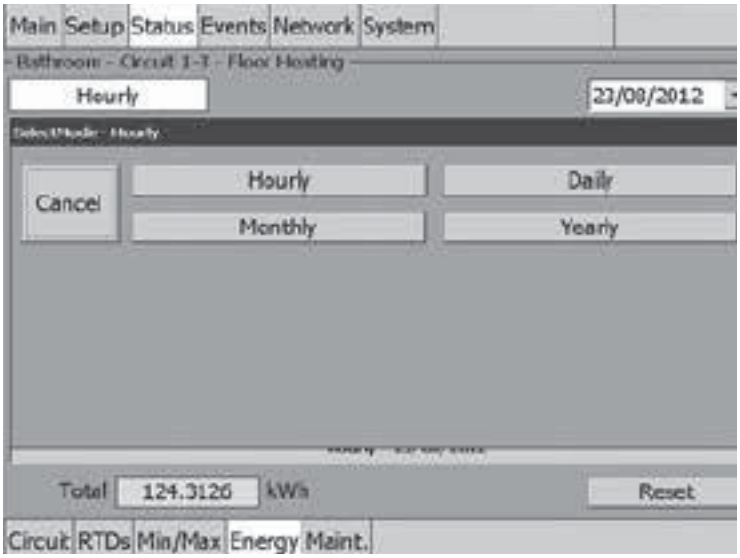


Fig. 2.32 Status|Energy window View selection

The hourly view plots the energy consumption over the selected day with a time interval of one hour. The actual and the previous 7 days can be selected.

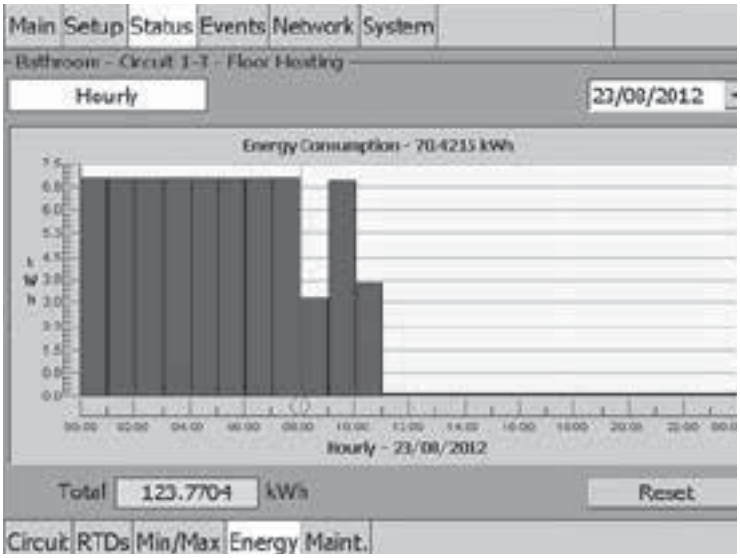


Fig. 2.33 Status|Energy window (Hourly view)

The Total value displayed (bottom/left position) represents the total energy consumption of the circuit since the last reset, while the Energy Consumption value (on the plot's headline) represents the consumption for the shown view.

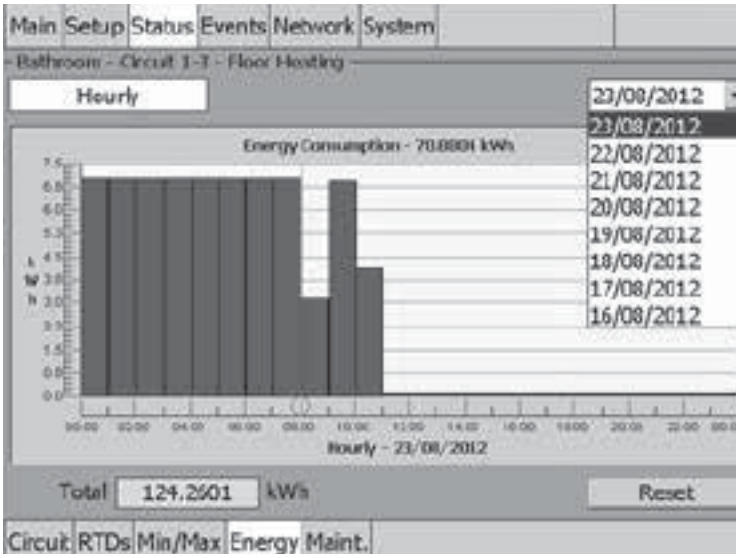


Fig. 2.34 Status|Energy window Day Selection (Hourly view)

The daily view plots the energy consumption over the selected month & year with a time interval of one day.

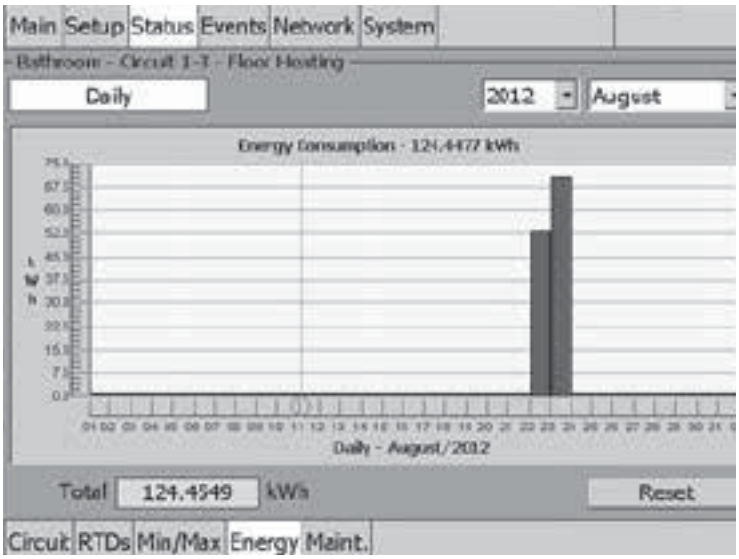


Fig. 2.35 Status|Energy window (Daily view)

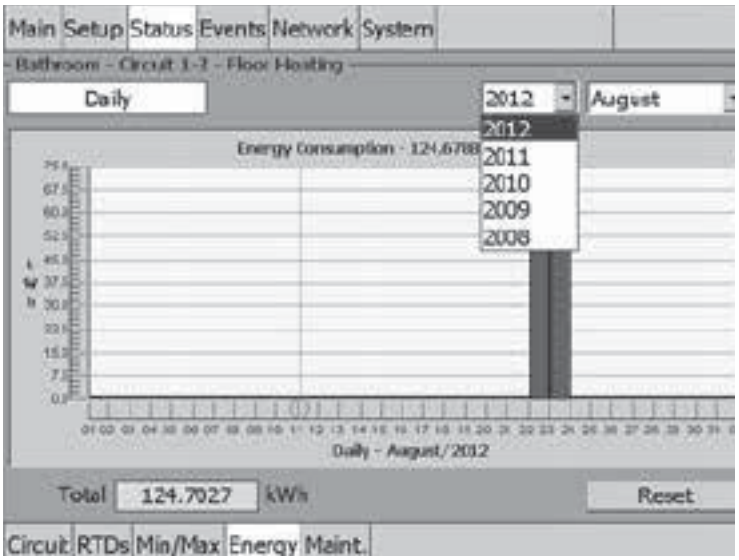


Fig. 2.36 Status|Energy window Year selection (Daily view)

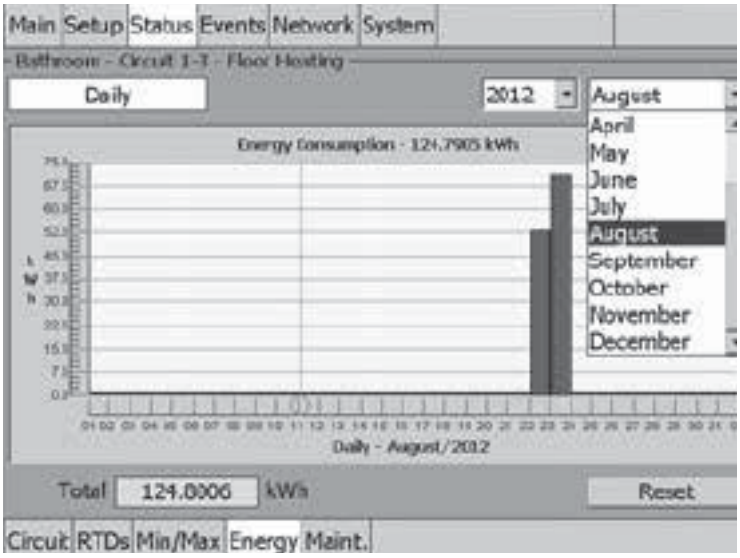


Fig. 2.37 Status|Energy window Month selection (Daily view)

The monthly view plots the energy consumption over the selected year with a time interval of one month.

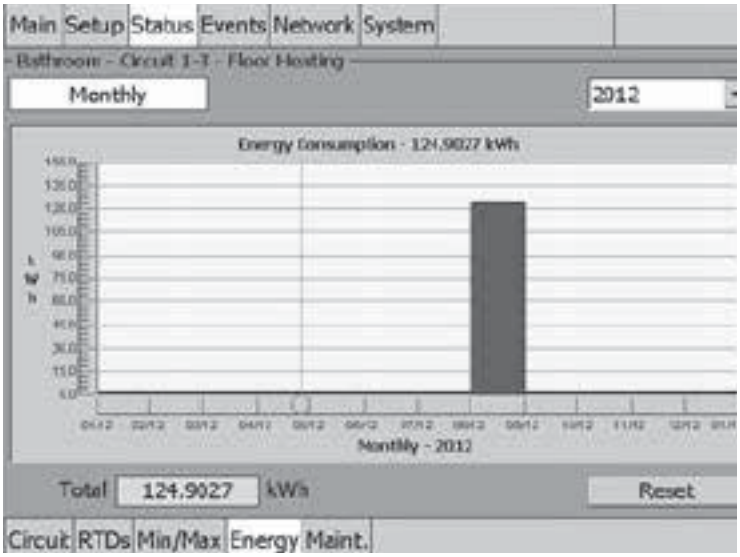


Fig. 2.38 Status|Energy window (Monthly view)

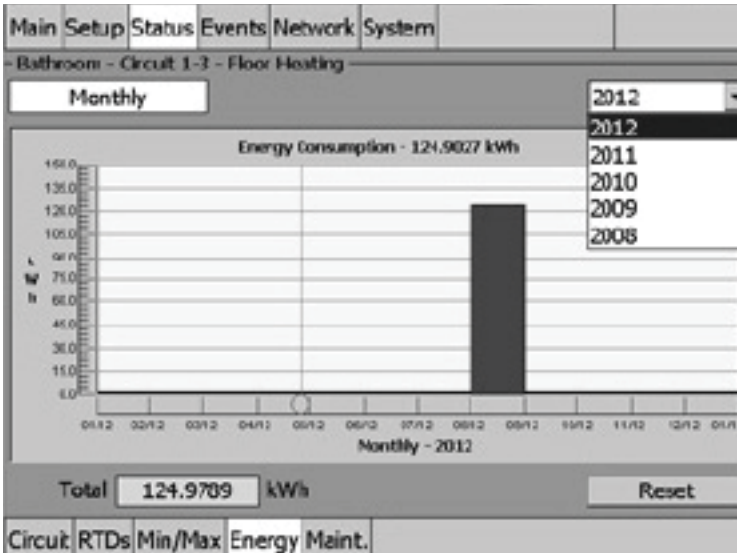


Fig. 2.39 Status|Energy window Year Selection (Monthly view)

The yearly view plots the energy consumption over the last 5 years with a time interval of one year.

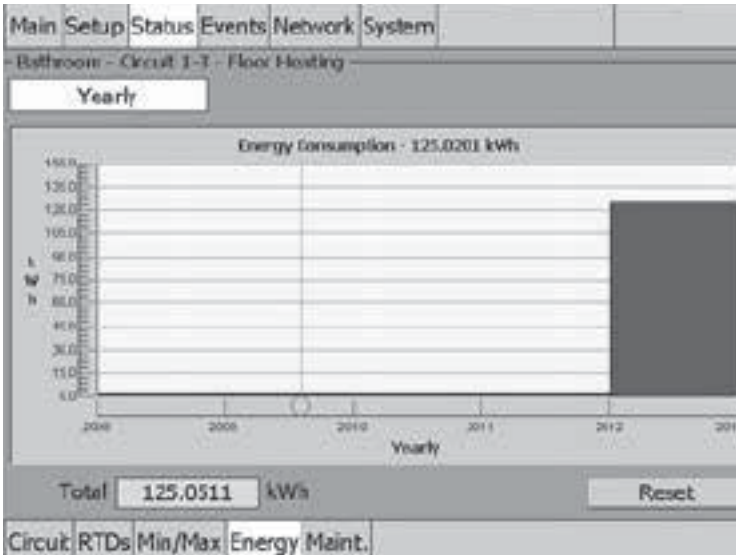


Fig. 2.40 Status|Energy window (Yearly view)

The Status|Energy window provides the Reset Button which clears the logged kWh and begins updating the field with new values.

2.7 Status|Maint. Window

The Status|Maint. window displays the cumulative time in hours the heating cable has been powered and the number of cycles the EMR has turned on and off for the selected circuit. If the Power Cycle feature is turned on the date and time of the last and next power cycle is displayed. The power cycle test energizes the heating cable selected for 2 minutes to verify it is in working order.

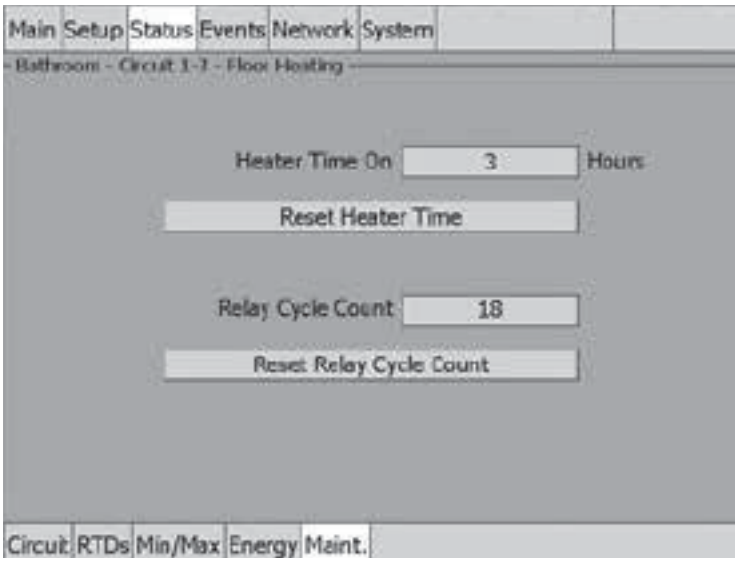


Fig. 2.41 Status|Maint. window

The Status|Maint. window provides the following controls:

Heater Time On: Total time the heating cable has been energized since it was last Reset.

Reset Heater Time: Resets heating cable time to 0, and begins updating the field with new values.

Relay Cycle Count: Total number of times the EMR has switched on since it was last reset.

Reset Relay Cycle Count: Resets the Relay Cycle count to 0, and cycle counts begin again.

Power Cycle Test: Shows the time of the last automatic power cycle test and when the next test will be conducted.

2.8 Events Window

The Events window displays a chronological history of all events and alarms. It retains the most recent 2000 entries; after 2000 entries are recorded, the oldest entries are discarded as new entries are added.

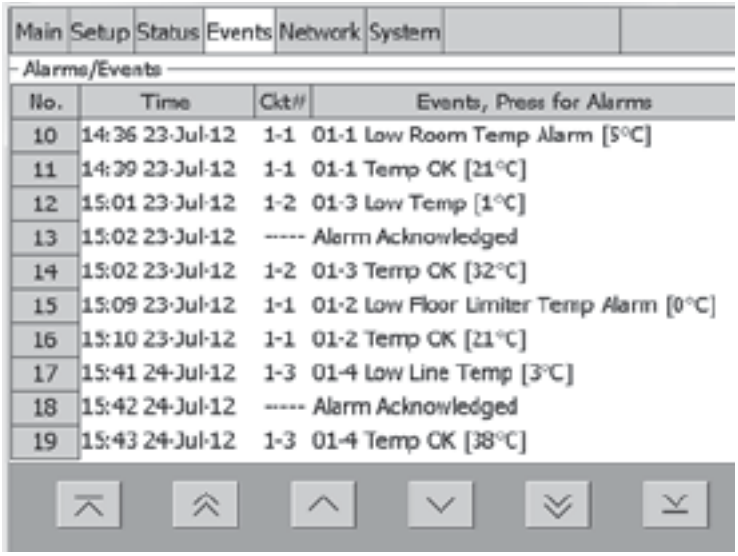


Fig. 2.42 Events window

The Events status listing window provides the following information:

Time: By taping the Time column heading, the display of times of the events or alarms changes to descending or ascending order based on time of occurrence.

Circuit: By taping the circuit heading, the display of events or alarms is sorted by the circuit number. Circuits are first displayed in ascending order. Taping the circuit again toggles between ascending or descending order.

Events, Press for Alarms: By taping the Events heading, the Events display filters events or alarms by type. Time and Circuit column headings can then be used to further sort the selected events or alarms for display.

Note: The program automatically skips an alarm type if no alarms of that type exist)

Table 2.4 Alarm Type Headings and Descriptions

Alarm Type Headings	Description
Comm Alarm	ACS-30-EU-UIT2 display lost communication with an ACS-30-EU-PCM2 control module and/or ACS-30-EU-MONI-RMM2-E device(s).
Fail Safe Alarm	Control mode of circuit has been switched to Fail Safe control mode. Ground-Fault Alarm
current alarm setting.	Heating cable's ground-fault current went above high ground-fault
Ground-Fault Trip	Heating cable's ground-fault current went above the ground-fault trip setting.
High Temp	RTD temperature went above high temp alarm setting.
High Temp Cut-Out	RTD temperature went above high temp cut-out alarm setting. Low Temp
Low Temp	RTD temperature went below low temp alarm setting.
Relay Failure Alarm	• EMR was commanded to turn off. However, a heating cable current was still being detected. This condition can indicate a failed contactor (stuck on). • EMR was commanded to turn on. However, a heating cable current was not detected. This condition can indicate a failed contactor (stuck off) or no line voltage.
RTD Failure	Open or shorted RTD detected
No RTD	RTD is missing (it needs to be configured)
EXT Failure	External Control RTD failure (open, short circuit, out of range)

Table 2.5 Events and Descriptions	
Event	**Description**
Alarm Ack	Date and time stamps when an alarm was acknowledged.
Comm Alarm	Communication with a specified device has been interrupted. Comm OK
	Communication with device/s was restored.
Events Cleared	Date and time stamps when Events menu was cleared in System|Maint. window.
Fail Safe Alarm	Control mode of circuit has been switched to Fail Safe control mode.
Fail Safe OK	At least one valid RTD value was restored, allowing normal control to resume.
Ground-Fault Alarm	Heating cable's ground-fault current has exceeded Ground-Fault Alarm limit for circuit.
Ground-Fault OK	Ground fault returned to acceptable range.
Ground-Fault Trip	Heating cable's ground-fault current has exceeded Ground-Fault Trip limit for circuit and has disabled the contactor or SSR.
Ground-Fault Trip OK	Ground-fault current returned to acceptable range and Alarm Reset Button was pushed.
Heating cable Time Reset	Heating cable hours counter field was reset to 0.
High Temp	RTD temperature has exceeded high temp alarm limit for circuit.
High Temp Cut-Out OK	RTD temperature return to acceptable range.
Low Temp	RTD temperature has dropped below the low temp alarm limit for circuit.
Normal	The alarm condition noted has been cleared.
Relay Cycle Reset	The relay cycles counter field was reset to 0.
Relay Failure Alarm	• EMR was commanded to turn off. However, a heating cable current was still being detected. This condition can indicate a failed contactor (stuck on). • EMR was commanded to turn on. However, a heating cable current was not detected. This condition can indicate a failed contactor (stuck on).
Relay OK	Heating cable current returned to 0 when EMR was commanded to be off. This indicates EMR is working properly.
RTD OK	RTD failure indications (open or short) returned to acceptable range.
RTD Failure	The specified RTD has failed.
No RTD	The specific RTD needs to be configured.
EXT OK	External Control failure indications (open,short, out of range) returned to acceptable range.
EXT Failure	The specified External Control RTD has failed
System Restart	ACS-30 system has restarted at time noted.
Temp OK	Control Temp returned to acceptable range.

Table 2.6 Color Coding of Events and Alarms	
Color	**Description**
Black	All events
Orange	Alarm that has been acknowledged.
Red	In alarm condition and has not been acknowledged.
Blinking Red/Orange	Latching alarm condition which requires reset in the Status|Circuit window.

2.9 Network|Relays Window

The Network|Relays window lists all the available output devices and relay numbers.

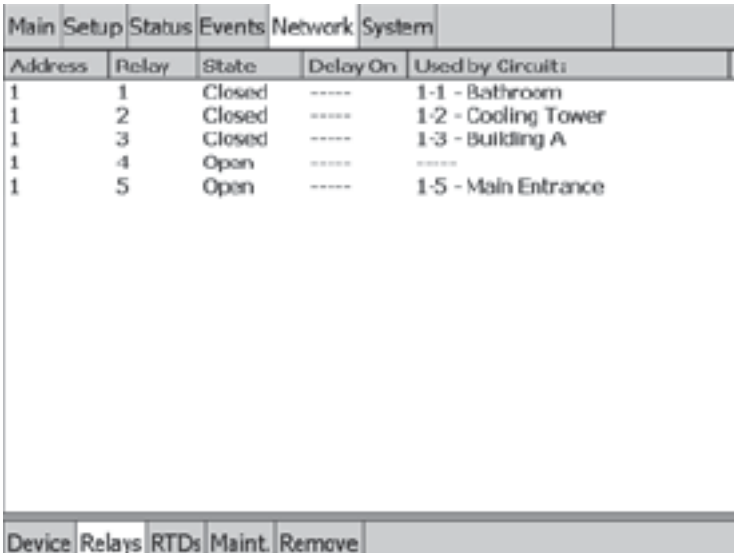


Fig. 2.43 Network|Relays window

2.10 Network|RTDs Window

The Network|RTDs window lists all the available RTD addresses. Tap the desired RTD connected to the system on the left side of the screen and the right side of the window shows where the RTD has been assigned.

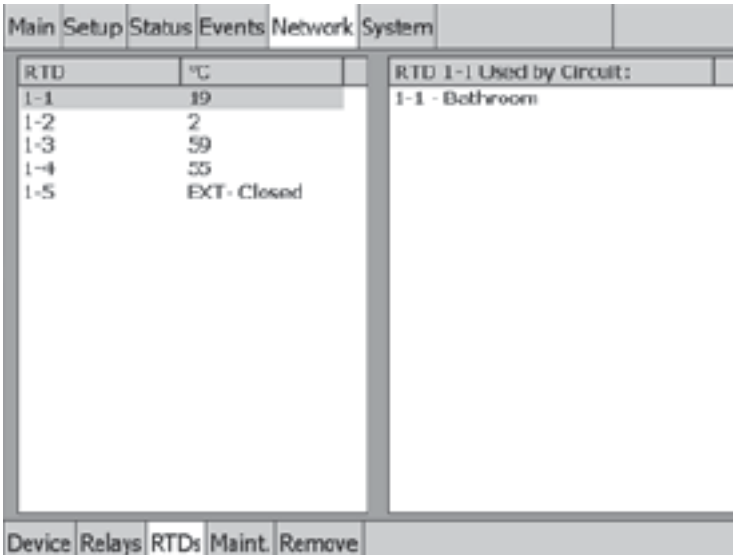


Fig. 2.44 Network|RTDs window

2.11 Network|Maint. Window

This Network|Maint. window shows the communication success rate with all of the devices connected to the RS-485 network. This is helpful in troubleshooting the RS-485 network.

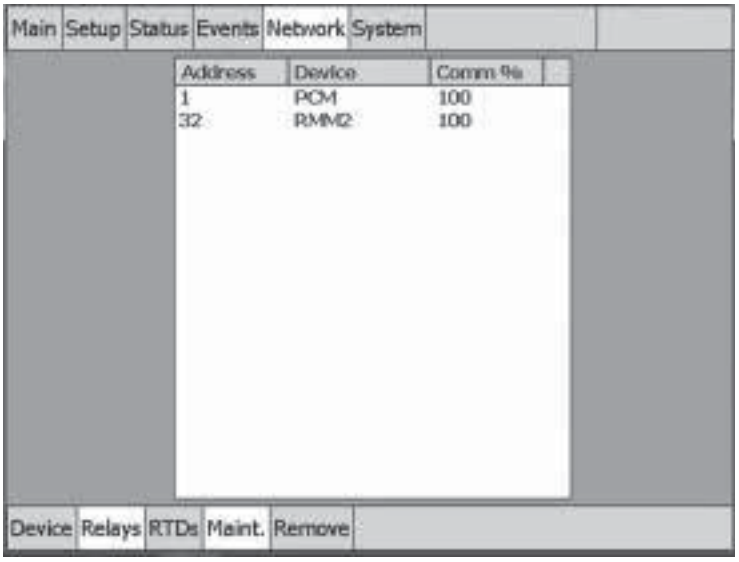


Fig. 2.45 Network|Maint. window

2.12 Network|Remove Window

The Network|Remove window is Level 2 password-protected. Once accessed, it allows you to remove device addresses for ACS-30-EU-PCM2 and ACS-30-EU-MONI-RMM2-E from memory.

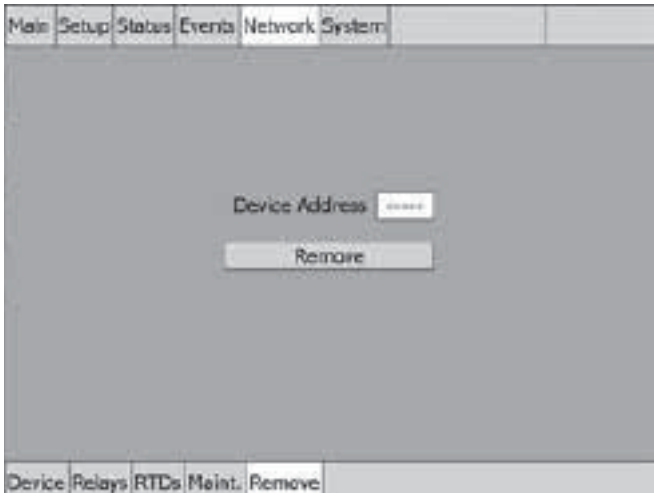


Fig. 2.46 Network|Remove window

The Network|Remove window provides the following controls:

Device Address: Enter the device address you wish to removal from memory.

Remove: Removes entered device address from memory.

2.13 System|Alarm Relays Window

The System| Alarm Relays window lets you configure alarm relays.

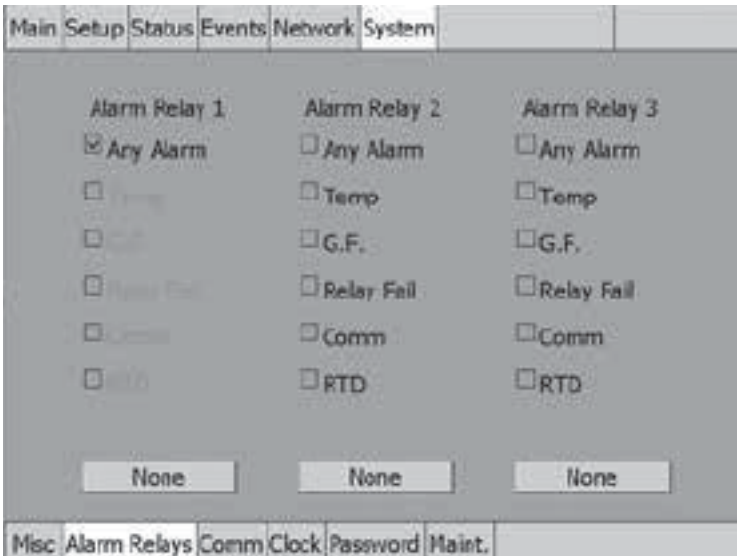


Fig. 2.47 System|Relays window

There are three independent alarm relays in the ACS-30-EU-UIT2 that can be used for remote annunciation of alarms. Each relay can be programmed for a specific alarm type, multiple alarm types, or none. If "Any Alarm" is chosen for a relay, any alarm condition will activate that relay.

2.14 System|Comm Window

The System|Comm window lets you set up communications with host systems.

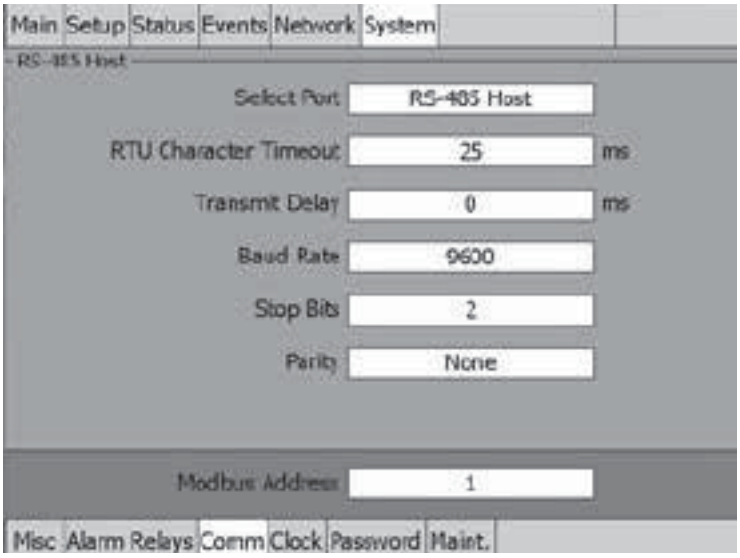


Fig. 2.48 System|Comm window (i.e. RS-485 Host)

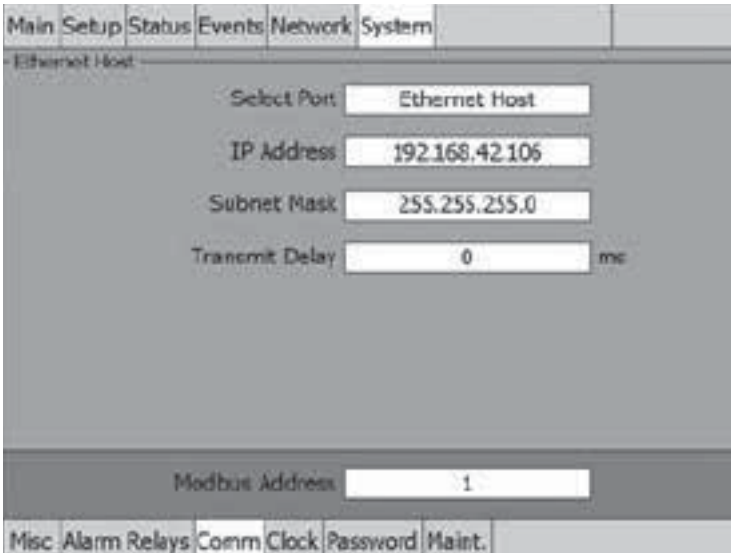


Fig. 2.49 System|Comm window (i.e. Ethernet)

The ACS-30-EU-UIT2 can be connected to a distributed control system (DCS) or host computer using an RS-485, RS-232, or 10/100Base-T Ethernet connection. All data and setup options are accessed with communications that follow the Modbus (RTU/Modbus/TCP) protocol. To enable DCS communications, please refer to the ACS-30-EU-UIT2 Modbus Protocol document <EN-RaychemACS30EUUIT2Modbus-IM-EU0085>). BACnet and LonWorks gateways are available though Pentair Thermal Management.

Select Port Mode

This activates a window which allows selection and parameter configuration of RS-232, RS-485 ports or Ethernet.

Options: RS-485 Host, RS-485 Field-Bus, RS232-Host, Ethernet

Default: RS-485 Host

IP Address/Subnet Mask

By default, the IP Address and Subnet Mask are automatically inserted. However, if the IP Address or Subnet Mask needs to be changed, click on the IP Address or Subnet window and then on the LAN91C1111 icon.

To enter an IP address and Subnet Mask manually, click on the IP Address tab, select "Specify an IP Address," enter the IP Address, the Subnet Mask, and Default Gateway.

Note: The set-up parameters above should be provided by your network administrator. The "Name Server" tab is not applicable for this application.

Transmit Delay

This sets the time the ACS-30-EU-UIT2 will wait after it receives a message before it replies.

Range: 0 to 5000 milliseconds

Default: 0

RTU Character Timeout

This sets the time the ACS-30-EU-UIT2 waits after last character is received before it determines that the message has ended.

Range: 0 to 1000 milliseconds

Default: 50 (RS-232-Host), 25 (RS-485-Field Bus, RS-485-Host)

Received Message Timeout

Whenever RS-485-Field Bus is setup, receive message timeout is how much time it takes for the receiving device to timeout and indicate no message.

Range: 0 to 1000 milliseconds

Default: 100 (RS-485-Field Bus)

Baud Rate

Allows you to select the baud rate of the external serial communication port.

Selection: 2400, 4800, 9600, 19200, 38400, 57600

Default: 9600

Stop Bits

This sets the Stops Bit in the serial communication.

Range: 1, 2

Default: 1(RS-485 Field Bus), 2 (RS-485-Host, RS-232 Host)

Parity

This sets the Parity in the serial communication.

Range: None, Odd, Even

Default: None

Modbus Address

Each ACS-30-EU-UIT2 must have a unique Modbus address which is set by you. The DCS or host computer can communicate with up to 247 separate ACS-30-EU-UIT2 units by using Modbus protocol.

Range: 1 to 247

Default: 1

2.15 System|Password Window

The System|Password window lets you set up passwords for Level 1 and Level 2.

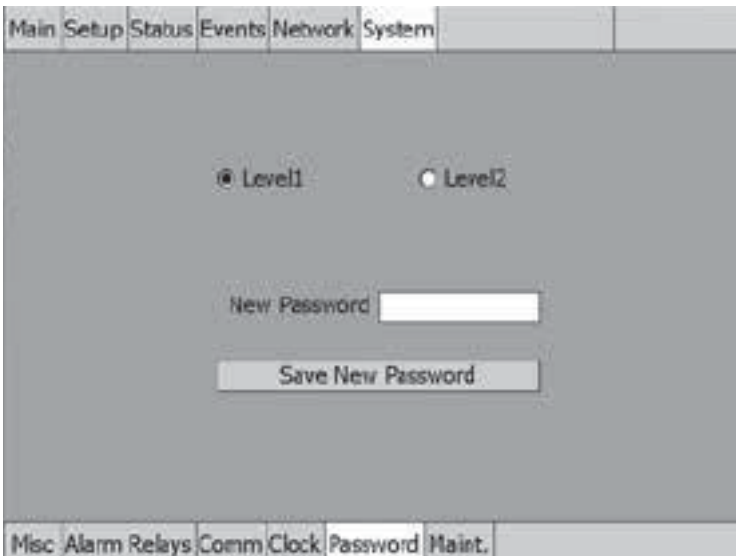


Fig. 2.50 System|Password window

The System|Password window provides the following controls:

Level 1: Allows setup of all configuration windows except for the System|Maint. window. This Level 1 password is left "blank" from the factory; however, it can be set to a new designated password. If a Level 1 password is chosen, the "Main Menu" timer value determines how long the password remains active before it has to be re-entered. The password is limited to 40 characters.

Default: Level 1 disabled

New Password: Enter the user-defined password.

Save New Password: Confirms password has been saved.

Level 2: Allows access to System|Maint. window, which permits clearing of Events and program exit.

Default password: 1234

Note: Change the Level 2 password after commissioning.

Old Password: 1234

New Password: Enter your user-defined Level 2 password. The password is limited to 40 characters.

Save New Password: Confirms password has been saved.

Note: Save and protect the Level 2 password in a secure location. Contact a Pentair Thermal Management representative for lost password recovery.

2.16 System|Maint. Window

(Level 2 Password Required) This window allows for clearing the Events List and to exit the program.

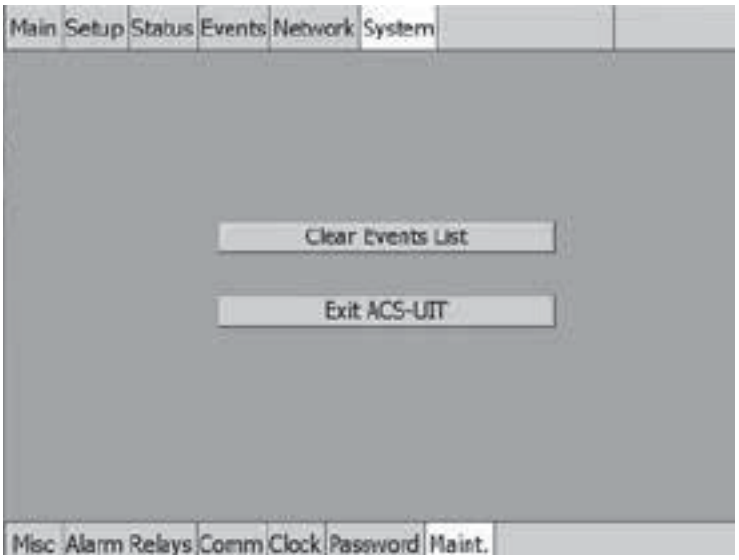


Fig. 2.51 System|Maint. window

The System|Maint. window provides the following controls:

Clear Events List: Clears all events and alarms history.

Note: By clearing the event, all the events and alarms history information for all circuits is lost. If the program exit is chosen, heating cables are no longer monitored.

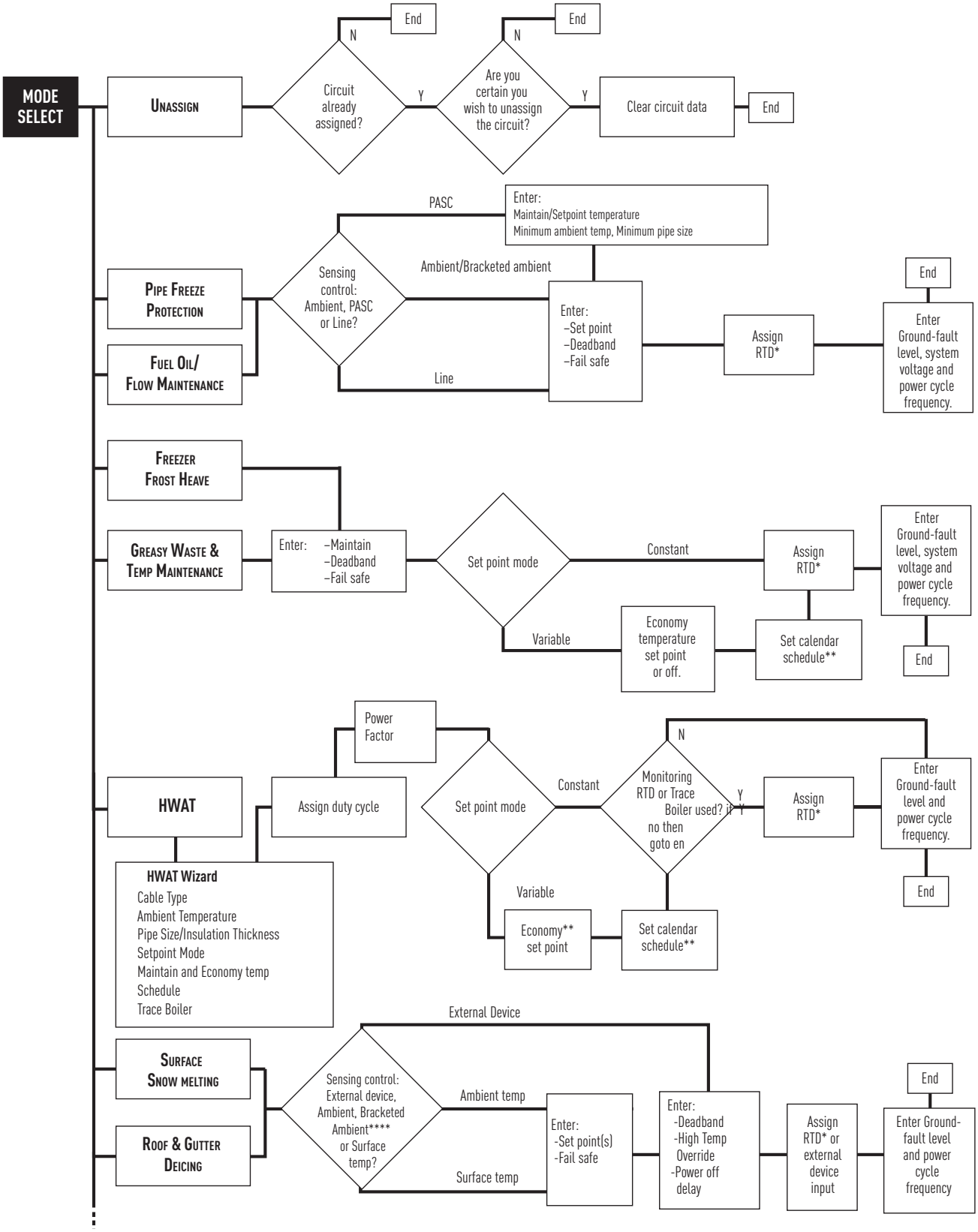
Exit ACS-UIT: Allows user to exit ACS-30 program. This ends the monitoring of all circuits.

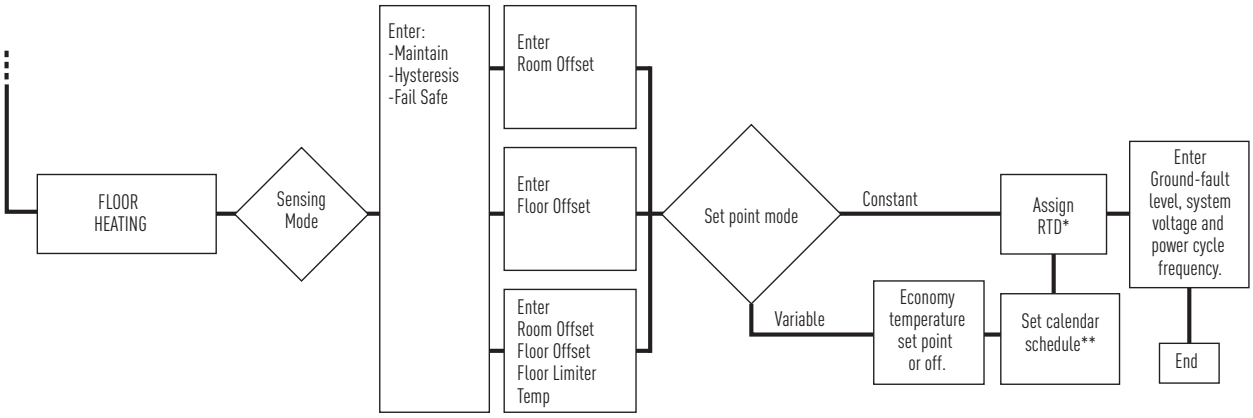
Note: Make sure you disable the Watch Dog timer located on the side of the ACS-30-EU-UIT2. Otherwise, the program will continually attempt to restart the ACS-30-EU-UIT2 program.

WARNING: Qualified Pentair Thermal Management Personnel Only. It is recommended that only Pentair Thermal Management personnel exit the ACS-30-EU-UIT2 program.

SECTION 3 – CONTROL MODE CONFIGURATIONS

Depending on Control Mode that was selected, the configuration sub menu windows will query for the necessary inputs required for the circuit to function. Figure 3.1 presents a flow chart to help visualize the programming steps and required input for each of the control modes. This section will present each control mode and guide you through the steps and windows required.





* RTD and external device override or control Sub Routine
** Schedule Sub Routine
*** Excluding Frost Heave (only Maintain and OFF levels are available)
**** Bracketed Ambient Temp control mode available only for Roof and Gutter De-Icing

Fig. 3.1 Select cable type

3.1 Unassign Mode

The UNASSIGN mode clears all parameters set for a circuit so that it may be reassigned to a new control mode.

3.2 HWAT Mode

When the HWAT control mode is selected, the HWAT Design Wizard is initiated. The design wizard prompts you for information necessary to maintain the hot water piping system at the desired temperature.

3.2.1 ENTER SYSTEM INFORMATION

Select Cable Type: Select the heating cable type being used with this circuit: HWAT-L, HWAT-M or HWAT-R.

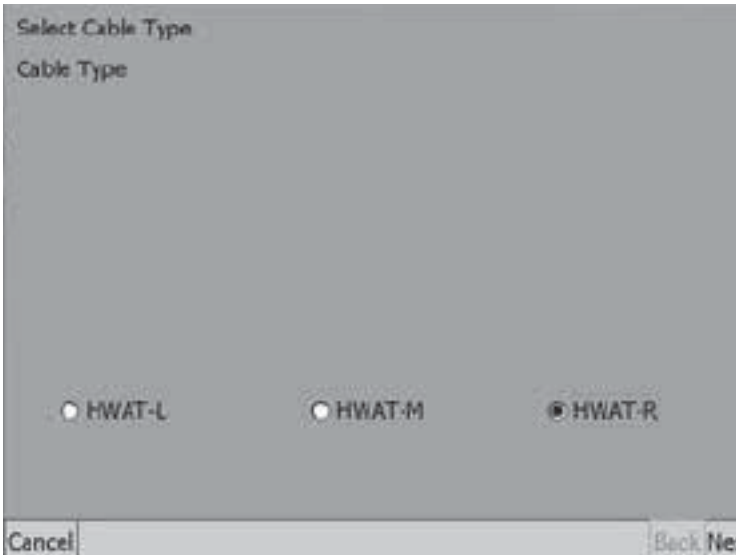


Fig. 3.2 Select cable type

Enter Ambient Temperature: Enter the estimated indoor ambient temperature where the pipe is situated.

Range: 0°C to 25°C

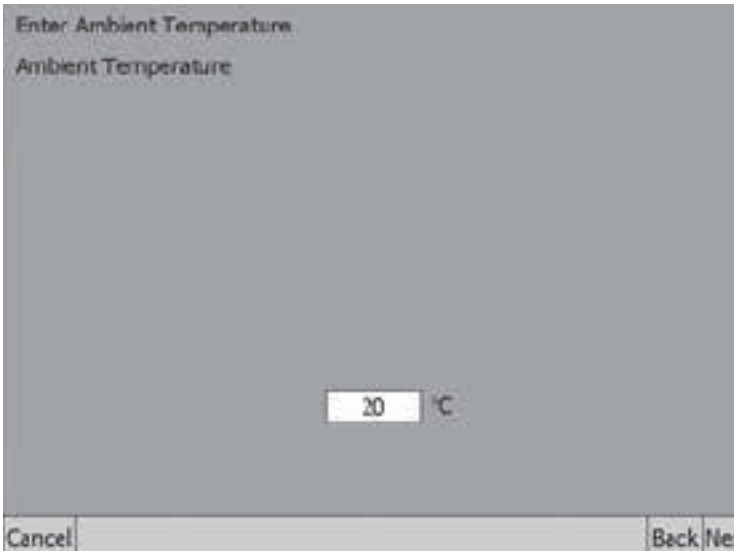


Fig. 3.3 Select ambient temperature

Enter Pipe Size: Enter the pipe size (diameter) of the circuit.

Range: 15mm to 100mm

Default: 25mm

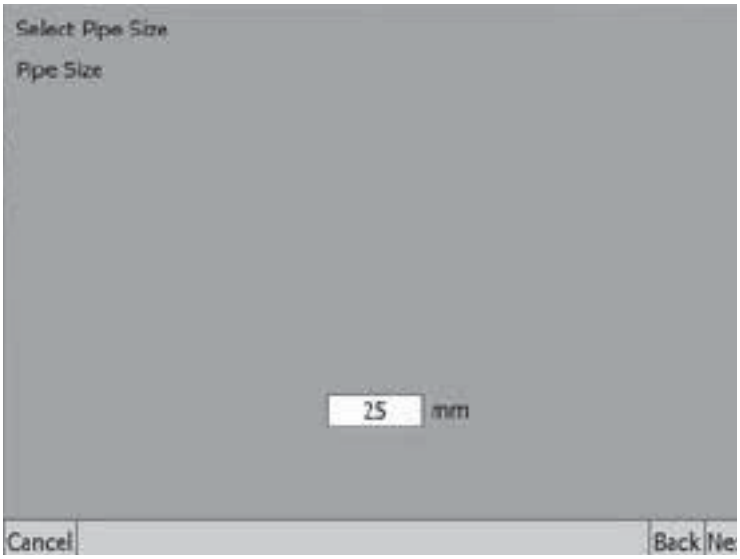


Fig. 3.4 Enter pipe size

Enter Insulation Thickness: select the insulation thickness, the range depends on the Pipe Size as shown in the table below.

Range: 9mm to 100mm

Default: Minimum value for the selected Pipe Size

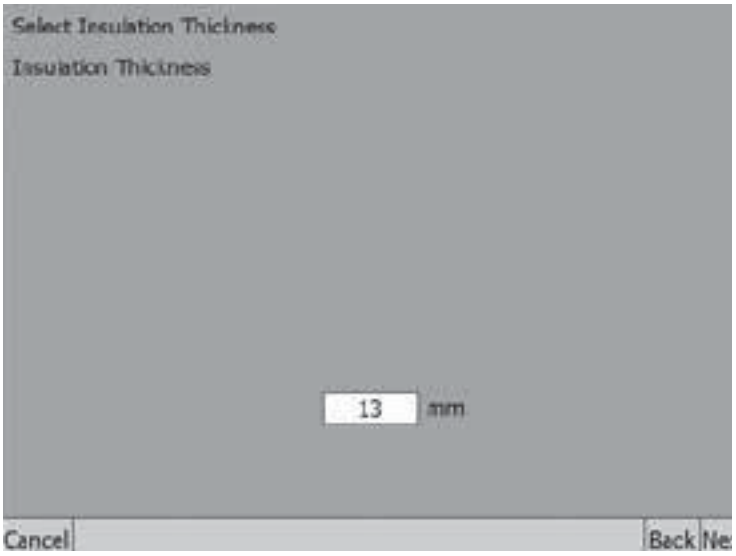


Fig. 3.5 Enter insulation thickness

Pipe size and insulation characteristics have a considerable influence on the temperatures achieved by the HWAT circuit and the self-regulating cables.

Increasing insulation thickness, better insulating materials and/or smaller pipe sizes generally results in higher temperatures as the heat losses decrease. Decreasing insulation thickness, less insulating materials or bigger pipe sizes results in lower temperatures as the heat losses increase.

The HWAT algorithm is based on standard sets of values for pipe size and insulation characteristics in accordance with Fig. 3.6. Any deviations from these standard sets will result in a deviation from the target temperatures. The system compensates for this by using the 'Power Factor' (See page 58).

Installations with different pipe sizes

If the HWAT circuit is maintaining a piping system comprising different pipe sizes (and assuming similar insulation materials and appropriate thickness), a compromise pipe size should be selected:

- Thinner pipes will run hotter, thicker pipes will run cooler if average pipe size is selected.
- The minimum pipe size should be selected if the maximum temperature should be limited (for safeguarding against scalding).
- Thinner pipes will run hotter if maximum pipe size is selected.

In these cases, it is possible to compensate for temperature deviations by using the 'Power Factor' (see page 55).

This factor is able to compensate for up to a few degrees. Lowering the factor will decrease the temperature, increasing the factor will increase the temperature. As the 'Power Factor' can compensate for only a few degrees, it is not advised to use pipe size – insulation type combinations varying appreciably from the combinations given in the figure 3.4.

Note: Increasing the 'Power Factor' does not result in further temperature increase when the HWAT circuit is set to maintain temperatures close to the maximum temperatures achievable with a given heating cable type.

Installation using plastic pipes

When using plastic pipes, the general installation principles for heat-tracing of plastic pipes should be respected (i.e. using Aluminium tape ATE-180 as installation method). If correctly installed, the temperature behaviour will be comparable with metal piping. Deviations of temperature can be compensated for by using the 'Power Factor'.

Special applications

If special applications are wanted, heat loss calculations must be performed to predict achievable temperatures. Contact your local Pentair Thermal Management supplier for assistance and advice.

	Pipe Sizes						
Insulation	**15 mm**	**20 mm**	**25 mm**	**32 mm**	**40 mm**	**50 mm**	**100 mm**
9 mm							
13 mm							
20 mm							
25 mm							
30 mm							
40 mm							
50 mm							
60 mm							
70 mm							
80 mm							
90 mm							
100 mm							

Fig. 3.6 Insulation thickness by Pipe Size

Enter Trace Boiler: it enables/disables the Trace Boiler function.

This setting is included to ensure that the heating cable temperature does not exceed the boiler temperature. The boiler temperature is measured with an external temperature sensor.

If enabled, each day (at midnight) the ACS-30 memorises the highest measured temperature over the last 24 hours keeping a difference of at least 5°C between the boiler temperature and the maintain temperature.

If the boiler temperature is too low, each day at midnight, the maintain temperature is lowered to the boiler temperature minus the trace temperature which is equal to +5°C.

The function is applicable also to the Economy Temperature when required.

Range: Enabled, Disabled

Default: Disabled

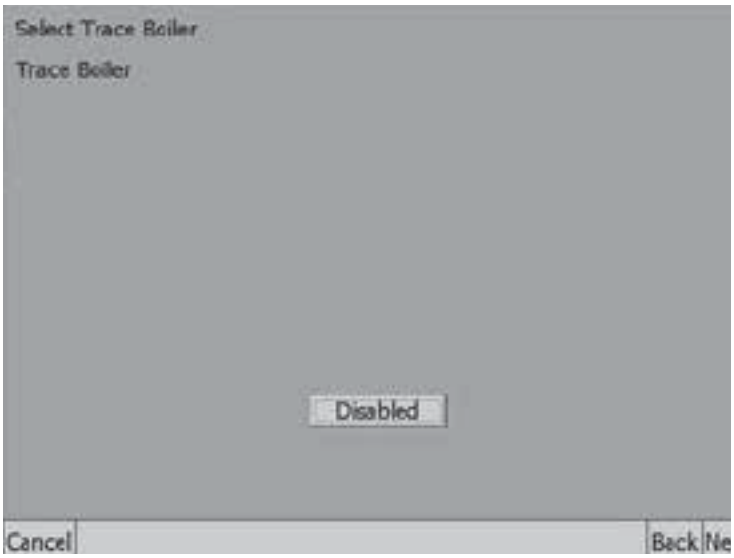


Fig. 3.7 Enter trace boiler

Select Setpoint Mode: Allows you to configure how the scheduling is done over a weekly timed calendar with 48 1/2-hour program intervals per day available.

Constant will allow a single temperature setpoint for your system. Variable allows you to set different setpoints using the 24/7 weekly scheduler.

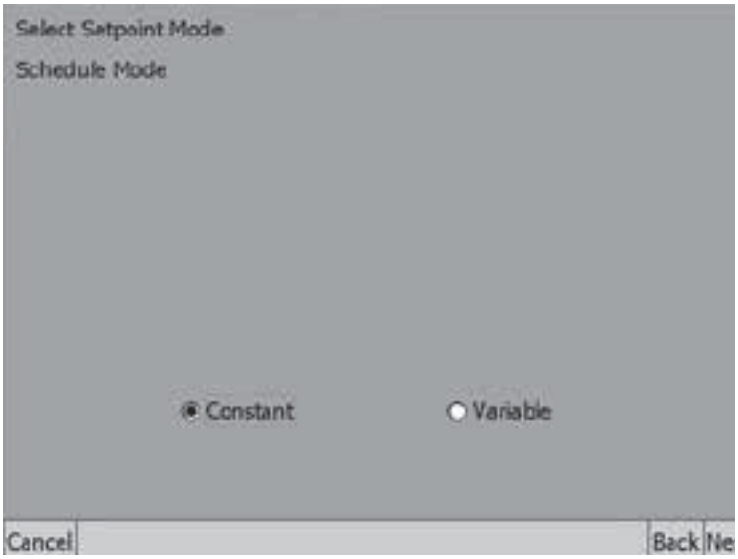


Fig. 3.8 Select setpoint mode

Enter Temperature Setpoints: Enter the temperature setpoints that you want to maintain the hot water pipe.

Maintain Temperature. This value represents the temperature that you want the pipe to maintain when in maintain mode.

Range: Minimum setpoint temperature: 37°C or Economy Temperature

Maximum setpoint temperatures are dependant upon cable type, pipe size, insulation thickness and ambient temperature accordingly to the graphs shown below.

Default: HWAT-R 55°C
HWAT-M50°C
HWAT-L45°C

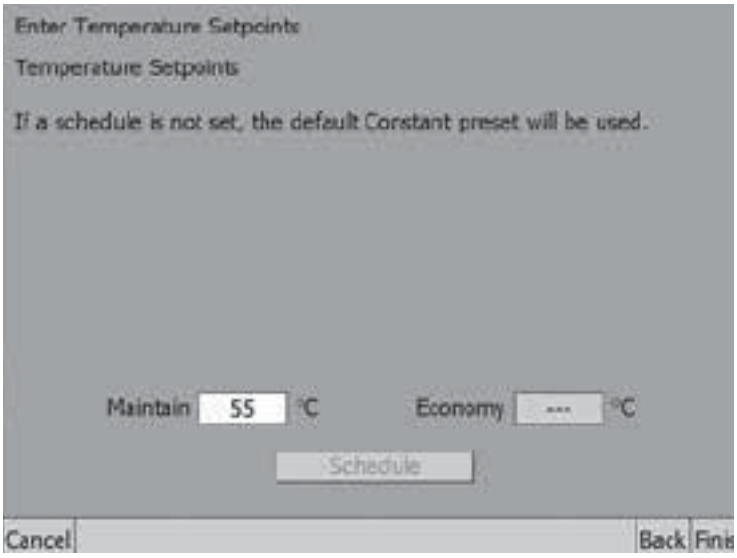


Fig. 3.9 Enter temperature setpoints (schedule mode = constant)

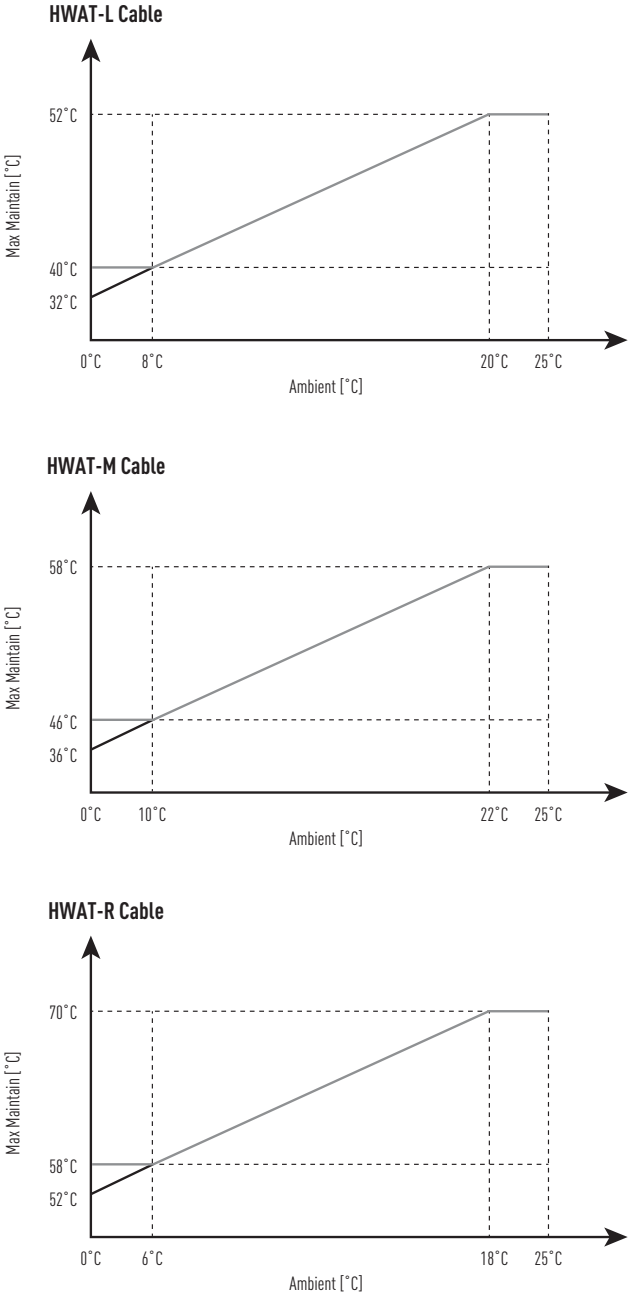


Fig. 3.10 Maximum maintain temperature for the different cables type

Economy Temperature (optional): This value represents the temperature that you want the pipe to maintain when in economy mode. This input is only accessible if the setpoint mode is set to Variable which applies the temperature weekly setpoint 24/7 Scheduler function described in Appendix 5.2 24/7 Scheduler on page 138.

Range: 37°C - maintain temperature

Default: 41°C

Schedule: Opens the weekly scheduler. Allows you to configure how the scheduling is done over weekly timed calendar with 48 1/2-hour program intervals per day available. Several preset programs for an easy configuration in different applications.

Different Setpoint options are available in the schedule menu depending on the type of cable:

- HWAT-L, HWAT-M: Maintain, economy or off
- HWAT-R: Maintain, economy, off or heat cycle 100% (Legionella prevention, see annex 5.3)

See Appendix 5.2 24/7 Scheduler on page 138 for more information.

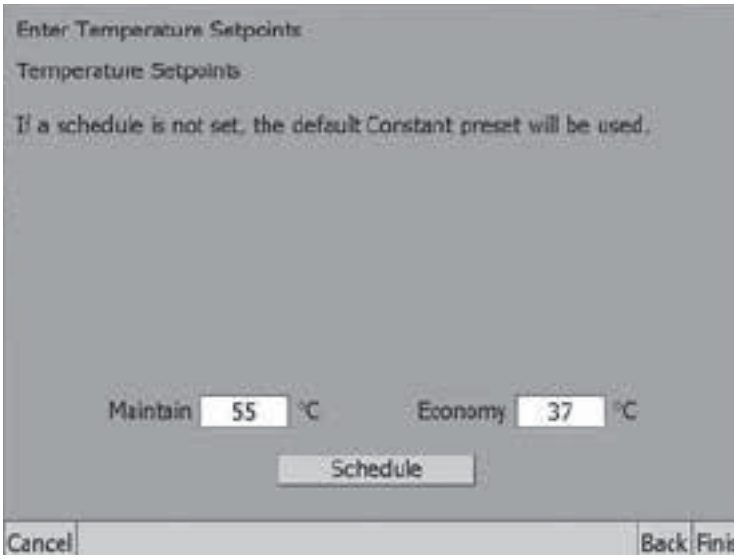


Fig. 3.11 Enter temperature setpoints (schedule mode = variable)

At this point the HWAT design wizard is complete and the HWAT circuit configuration window is displayed.

3.2.2 CONFIGURING HWAT

After completing the HWAT design wizard the Setup HWAT window appears where you can adjust the input variables established in the design wizard and enter access additional menu windows.

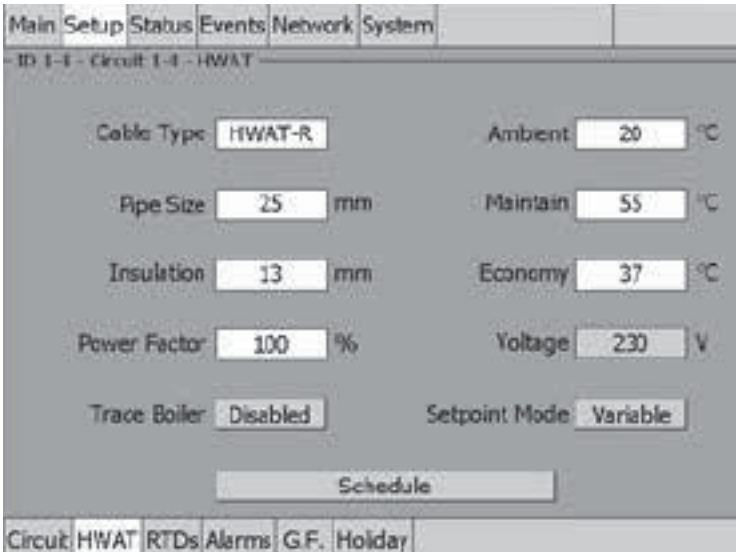


Fig. 3.12 Setup|HWAT window

Voltage: it shows the supply voltage 230 V. It's a fixed value, it cannot be changed.

Power Factor: The factor is used to decrease or increase the final pipe temperature. Increasing this value above 100% will result in a longer duty cycle, while adjusting it lower than 100% will decrease the duty cycle.

Range: 40% to 160%

Default: 100%

Assigning RTDs

Whenever the Trace Boiler is enabled at least one RTD is required to monitor and control the Trace Boiler function.

Otherwise, RTDs are not required for HWAT system control. If you wish to use RTDs to monitor pipe or water heater temperatures tap Setup|RTDs window and enter the device address and RTD number. For detailed information on the Setup|RTD window refer to Section 2.2.3 Assigning and Sharing RTD Control and Monitoring on page 28.

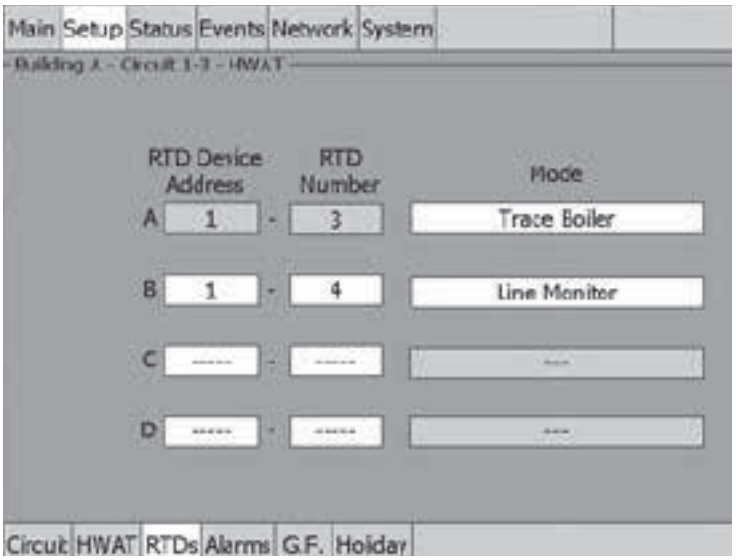


Fig. 3.13 Setup|RTDs window (HWAT)

Assigning Temperature Alarms

Once RTDs have been assigned to the circuit high and low temperature alarms may be set. The alarm button will only appear if a RTD has been assigned to the circuit.

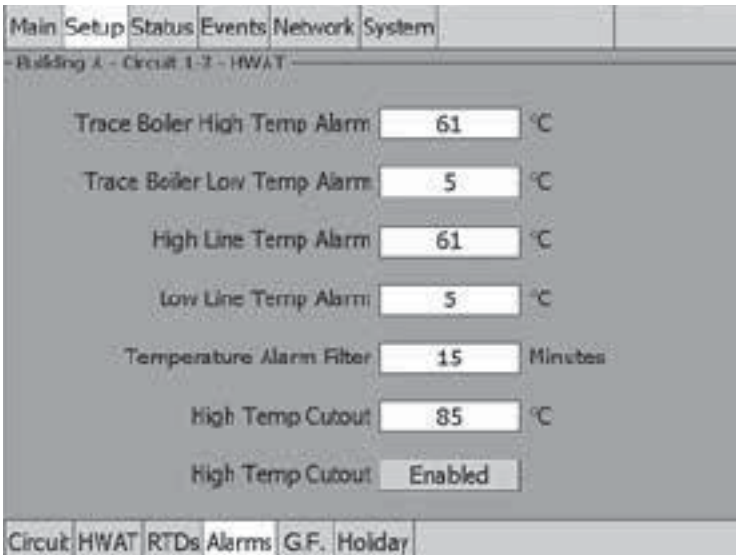


Fig. 3.14 Setup|Alarms window (HWAT)

Assigning Temperature Alarms

Once RTDs have been assigned to the circuit high and low temperature alarms may be set. The alarm button will only appear if a RTD has been assigned to the circuit.

Trace Boiler High Temp Alarm:	If the RTDs assigned to the Trace Boiler measures a temperature above this threshold, the ACS-UIT2 generates an alarm.
Range:	Maintain setpoint plus 6°C to 85°C (HWAT-R) / 68°C (HWAT-M, HWAT-L)
Default:	Maintain setpoint plus 6°C
Trace Boiler Low Temp Alarm:	If the RTDs assigned to the Trace Boiler measures a temperature below this threshold, the ACS-UIT2 generates an alarm.
Range:	5°C to Maintain temperature
Default:	5°C
High Line Temp Alarm:	If any RTDs assigned to a circuit as Line Monitor measures a temperature above this threshold, the ACS-UIT2 generates an alarm.
Range:	Maintain setpoint plus 6°C to 85°C (HWAT-R) / 68°C (HWAT-M, HWAT-L)
Default:	Maintain setpoint plus 6°C
Low Line Temp Alarm:	If any RTDs assigned to a circuit as Line Monitor measures a temperature below this threshold, the ACS-UIT2 generates an alarm.
Range:	5°C to Maintain temperature
Default:	5°C
Temperature Alarm Filter:	This minimizes nuisance alarms by forcing the ACS-UIT2 to verify that the alarm condition continually exists over the selected period of time before alarming.
Range:	0 to 999 minutes
Default:	15 minutes

Note: Setting the Alarm Filter to 0 minutes is mainly for testing and demonstration purposes. Choosing this option for normal use may cause nuisance alarming since this option may not allow the ACS-UIT2 time to verify that the alarm conditions exist.

High Temp Cut-Out:	If any RTDs assigned to a circuit (Trace Boiler, Line Monitor) measures a temperature above this threshold, the ACS-UIT2 generates an alarm and the relay output is turned off. If the high line temperature drops below this threshold minus 6°C, the output is turned on and normal duty cycle control is resumed.
Range:	High Line Temp Alarm to 85°C (HWAT-R) / 68°C (HWAT-M, HWAT-L)
Default:	HWAT-R 85°C HWAT-M 68°C HWAT-L 68°C

High Temp Cut-Out Enable/Disable:

Enables or disables the high cut-out capability. When enabled, the ACS-UIT2 alarms and the output relay turns OFF if any RTDs exceeds the cut-out value for the alarm filter time period. If the high temp cut-out is disabled, the relay output will continue to function normally without the high temperature cut-out feature.

Range:	Enable or Disable
Default:	Enable

Assigning Ground-Fault Alarm and Trip Levels

The Setup|G.F. window allows you to set the alarm and trip levels.

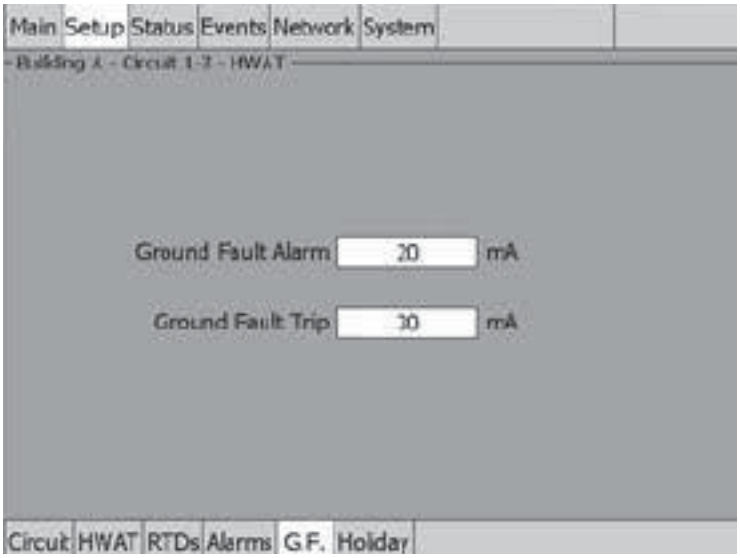


Fig. 3.15 Setup|G.F. window (HWAT)

Input the Ground-Fault Alarm and Ground-Fault Trip:

Ground-Fault Alarm: When the ground-fault current exceeds this level the ACS-30-EU-UIT2 goes in alarm.

Range: 10 to 200 mA

Default: 20 mA

Holiday

The Setup|Holiday window allow to set the unit off for a specified period of time.

When Enabled, a number of days between 1 and 99 can be chosen. The unit will be off and it will automatically returns to timer mode (standard regulation) when the selected number of days have passed. Once entered, the actual time that the holiday expires will be displayed right below on same input menu.
On Main display, a label "Holiday" shows the status of the circuit. When Disabled the unit uses the timer program.

Holiday

Range: Enabled, Disabled

Default: Disabled

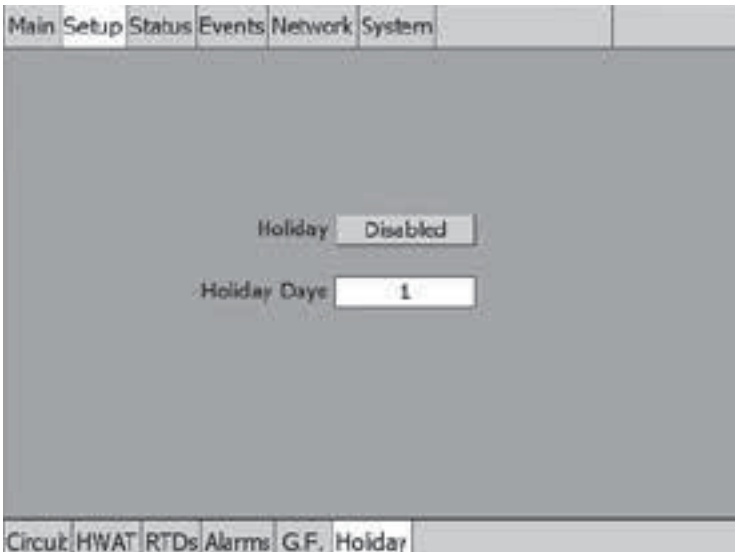


Fig. 3.16 Setup|Holiday window

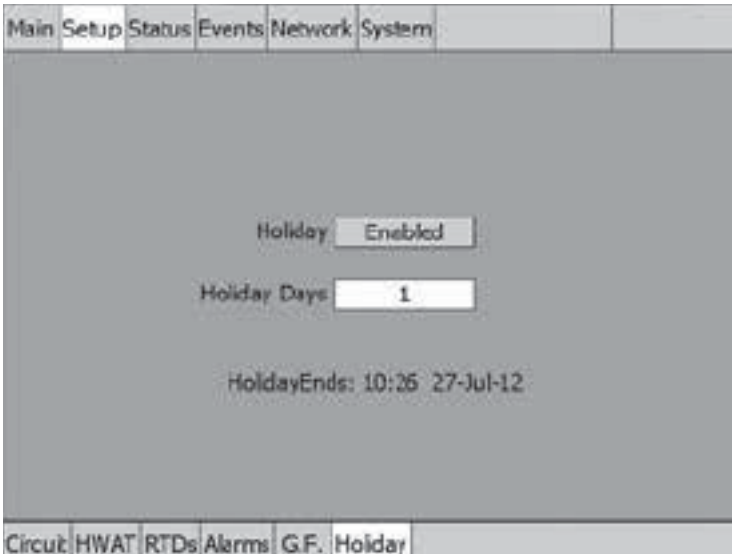


Fig. 3.17 Setup|Holiday window

3.3 Frost Heave Mode

The Frost Heave control mode prompts you to enter the control parameters for your Freezer Frost Heave Prevention application.

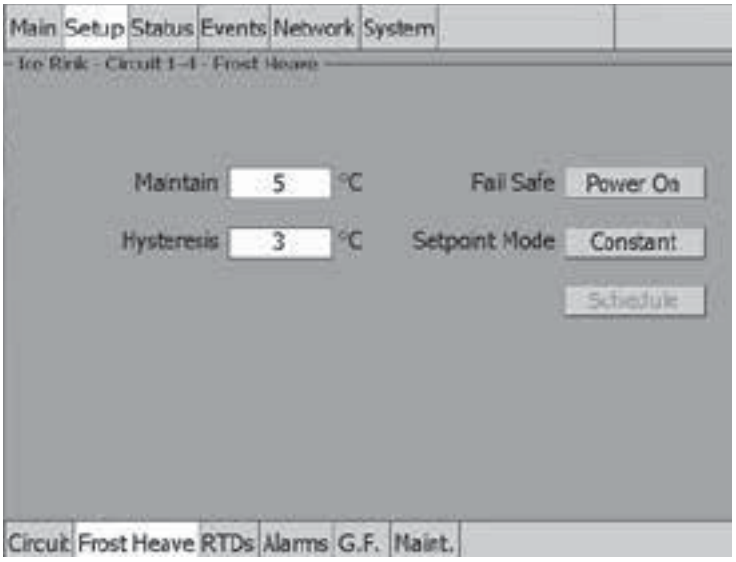


Fig. 3.18 Setup|Frost Heave window

Slab Temp Setpoint: The slab temp setpoint is the desired maintain temperature for the freezer floor. Based on the measured control temperature, the ACS-30-EU-UIT2 will switch the relay output to maintain the system at the desired setpoint.

Range: -7°C - 10°C

Default: 5°C

Hysteresis: If the control temperature is above the setpoint temperature plus hysteresis, the relay output is turned off. If the control temperature is below the setpoint temperature, the output is turned on.

Range: 1°C to 6°C

Default: 3°C

Fail Safe: The Fail Safe control button turns the power on or off to the heating cable if the circuit loses all valid RTDs. When the last remaining sensor for control fails (or communication with the sensor is lost), the ACS-30-EU-UIT2:

- Signals an alarm for the failure of the sensor
- Changes control of the circuit to the fail safe control selected
- Changes the control status display to indicate that control of the circuit is in the fail safe state
- Records the events

When the sensor for control is returned to service, the ACS-30-EU-UIT2 signals the alarm has been cleared, returns the circuit to its normal control mode, and records both of these events.

Options: Power On or Power Off

Default: Power On

Schedule: Tapping on this button will bring up the Scheduler. See Appendix 5.2 24/7 Scheduler on page 138 for more information.

Assigning RTDs

In this mode you have the option of setting up to four RTDs for slab sensing. For detailed information on the Setup|RTD window, see 2.2.3 Assigning and Sharing RTD Control and Monitoring on page 28.

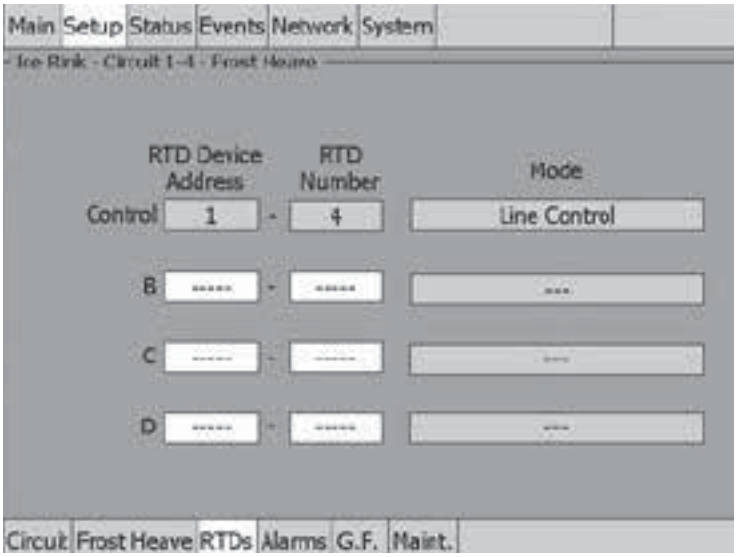


Fig. 3.19 Setup|RTDs window (Frost Heave)

Assigning Temperature Alarms

Once RTDs have been assigned to the circuit the alarm button appears then high and low temperature alarms may be set.

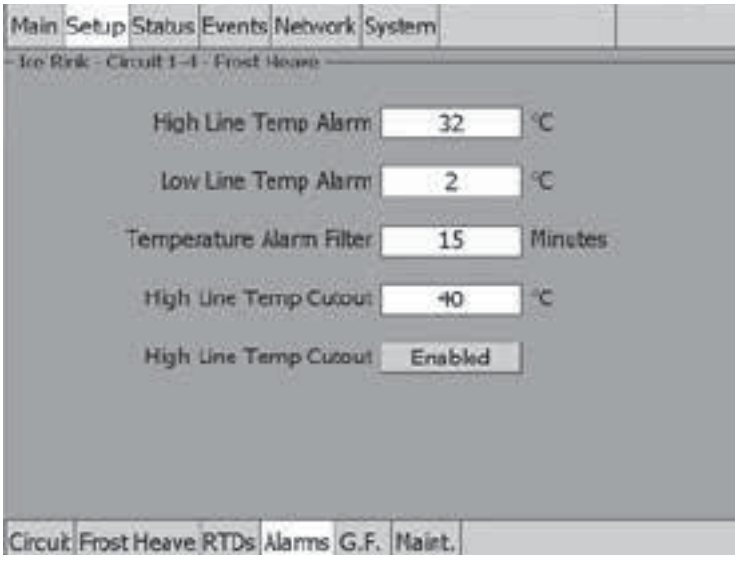


Fig. 3.20 Setup|Alarms window (Frost Heave)

High Line Temp Alarm: If any RTDs assigned to a circuit measures a temperature above this threshold, the ACS-30-EU-UIT2 generates an alarm. The limit can be set for any temperature value you desire for your application within the range allowed.

Range: Maintain setpoint plus 6°C to 32°C

Default: 32°C

Low Line Temp Alarm: If any RTDs assigned to a circuit measures a temperature below this threshold, the ACS-30-EU-UIT2 generates an alarm.

Range: -18ºC to Maintain setpoint

Default: 2°C

Note: One RTD must be connected to the circuit for this control mode to function or an RTD failure alarm will be announced.

Temperature Alarm Filter: This minimizes nuisance alarms by forcing the ACS-30-EU-UIT2 to verify that the alarm condition continually exists over the selected period of time before alarming.

Range: 0 to 999 minutes

Default: 15 minutes

Note: Setting the Alarm Filter to 0 minutes is mainly for testing and demonstration purposes. Choosing this option for normal use may cause nuisance alarming since this option may not allow the ACS-30-EU-UIT2 time to verify that the alarm conditions exist.

High Line Temp Cut-Out: If any RTDs assigned to a circuit measures a temperature above this threshold, the ACS-30-EU-UIT2 generates an alarm and the relay output is turned off. If the high line temperature drops below this threshold minus the hysteresis, the output is turned on and normal control is resumed.

Range: High Temperature Alarm value plus 6°C to 40ºC

Default: 40ºC

High Line Temp Cut-Out Enable: Enables or disables the high line temp cut-out capability. When enabled, the ACS-30-EU-UIT2 alarms and the output relay turns OFF if any RTDs exceeds the cut-out value for the alarm filter time period. If the high line temp cut-out is disabled, the relay output will continue to function normally without the high temperature cut-out feature.

Options: Enable or Disable

Default: Enable

Assigning Ground-Fault Alarm and Trip Levels

The Setup|G.F. window allows you to set the alarm and trip levels.

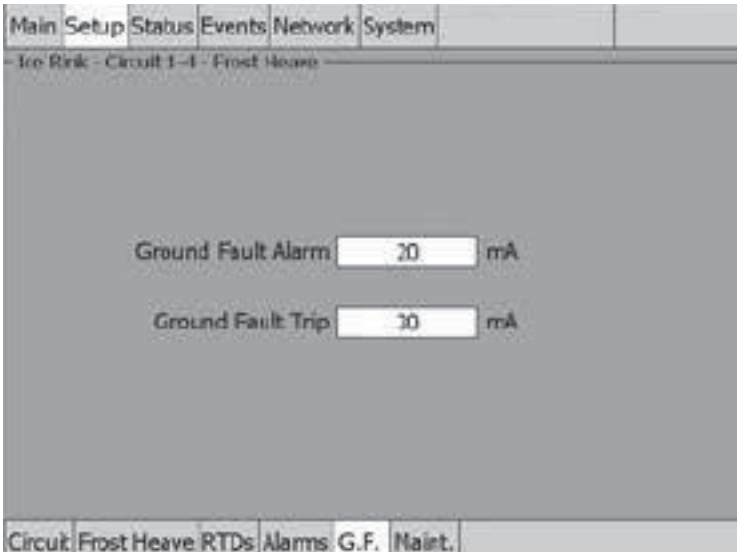


Fig. 3.21 Setup|G.F. window (Frost Heave)

Input the Ground-Fault Alarm and Ground-Fault Trip:

Ground-Fault Alarm: When the ground-fault current exceeds this level the ACS-30-EU-UIT2 goes in alarm.

Range: 10 to 200 mA Default: 20 mA

Ground-Fault Alarm: When the ground-fault current exceeds this level the ACS-30-EU-PCM2 turns off the circuit relay.

Range: 10 to 200 mA Default: 30 mA

Assigning Power Cycle Test

The Setup|Maint. window allows you to enable the Power Cycle test start time and frequency. After the start time and frequency are entered the time of the next test will be displayed on this screen.

Note: If the circuit is disabled, forced on, or forced off, the power cycle test will be disabled until the circuit is enabled.

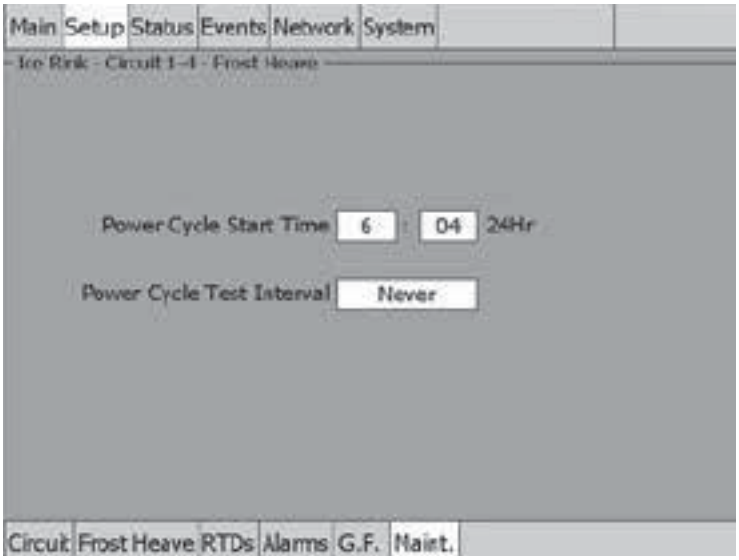


Fig. 3.22 Setup|Maint. window (Frost Heave)

Input the start time and frequency for the Power Cycle test:

Power Cycle Start Time: The time of day to start the Power Cycle test

Range: 00:00 to 23:59

Default: Each circuit is assigned a unique default start time calculated from the device address and relay number.

Power Cycle Test Interval: The frequency to run the Power Cycle Test

Range: Never, Daily, Weekly and Monthly

Default: Never

3.4 Floor Heating Mode

The Floor Heating control mode prompts you to enter the control parameters for a Floor Heating application. In this mode, you will be given three different control method options: Floor Sensing, Room Sensing, Room Sense plus Floor Limiter.

3.4.1 SENSING MODE - FLOOR SENSING

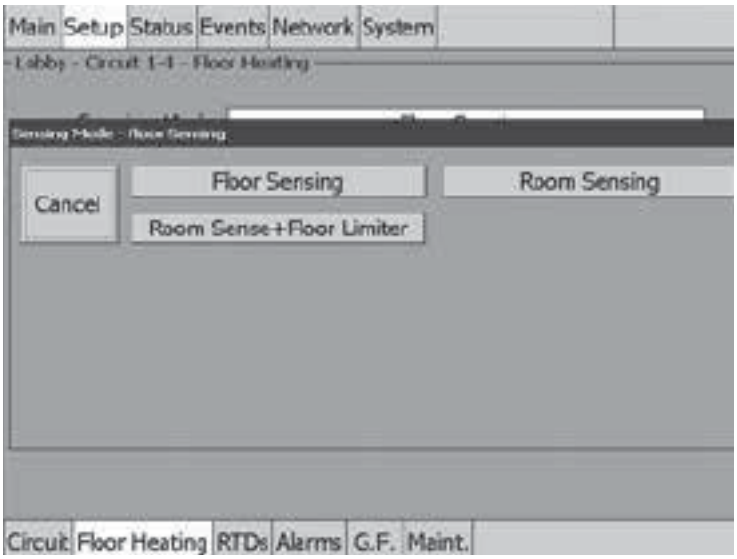


Fig. 3.23 Setup|Floor Heating control window (Floor Sensing Mode)

The Sensing Mode window allows you to select the sensing control mode to Floor Sensing, Room Sensing or Room Sense plus Floor Limiter. This option depends on where the controlling RTD inputs are situated and utilized: either measuring the temperature of the floor or of the room, eventually limiting the maximum temperature of the floor. Tap: Floor Sensing.

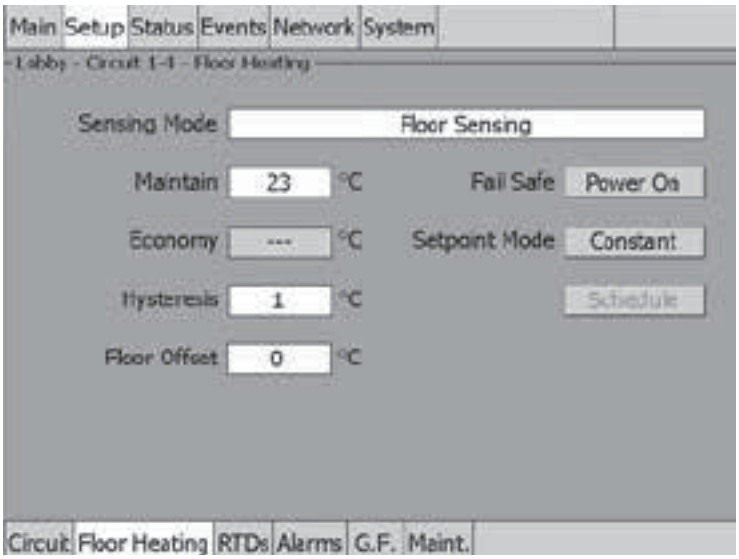


Fig. 3.24 Setup|Floor Heating window (Floor Sensing Mode)

Maintain: The slab setpoint is the desired maintain temperature for the floor. Based on the measured control temperature, the ACS-30-EU-UIT2 will switch the relay output to maintain the system at the desired setpoint.

Range: 5°C to 40°C

Default: 23°C

Economy Temperature (optional): This value represents the temperature that you want the floor to maintain when in economy mode. This input is only accessible if the Setpoint Mode is set to Variable which applies the temperature setpoint scheduler function described in **Appendix 5.2** 24/7 Scheduler on page 138.

Enter the Economy temperature Range:

Range:	5°C to Maintain
Default:	16°C
Hysteresis:	If the control temperature is above the setpoint temperature plus hysteresis, the relay output is turned off. If the control temperature is below the setpoint temperature, the output is turned on.
Range:	1°C to 6°C
Default:	1°C
Fail Safe:	The Fail Safe control button turns the power on or off to the heating cable if the circuit loses all valid RTDs. When the last remaining sensor for control fails (or communication with the sensor is lost), the ACS-30-EU-UIT2: – Signals an alarm for the failure of the sensor – Changes control of the circuit to the fail safe control selected – Changes the control status display to indicate that control of the circuit is in the fail safe state – Records the events

When the sensor for control is returned to service, the ACS-30-EU-UIT2 signals the alarm has been cleared, returns the circuit to its normal control mode, and records both of these events.

Options:	Power On or Power Off
Default:	Power On
Floor Offset:	the Floor Offset allows to adjust the temperature read by the floor sensor (Floor Temperature = Floor Sensor Temperature – Floor Offset)
Range:	0°C to10°C
Default:	0°C
External Override:	The dry contacts from a BMS system or external device may be assigned to the circuit to de-energize the circuit to save power when it is not needed. See Appendix 5.4 for detailed information about the connections. All temperature and system alarms are still active.
Schedule:	Tapping on this button will bring up the Scheduler. See Appendix 5.2 24/7 Scheduler on page 138 for more information.

Assigning RTDs

Tap Setup|RTDs window to assign RTDs after the control mode and parameters have been set.In this mode you have the option of setting up to four RTDs for floor sensing. For detailed information on the Setup|RTD window refer to 2.2.3 Assigning and Sharing RTD Control and Monitoring on page 28. Input from an external dry contact may also be assigned to override the system. See Appendix 5.4 for detailed information about the connections.

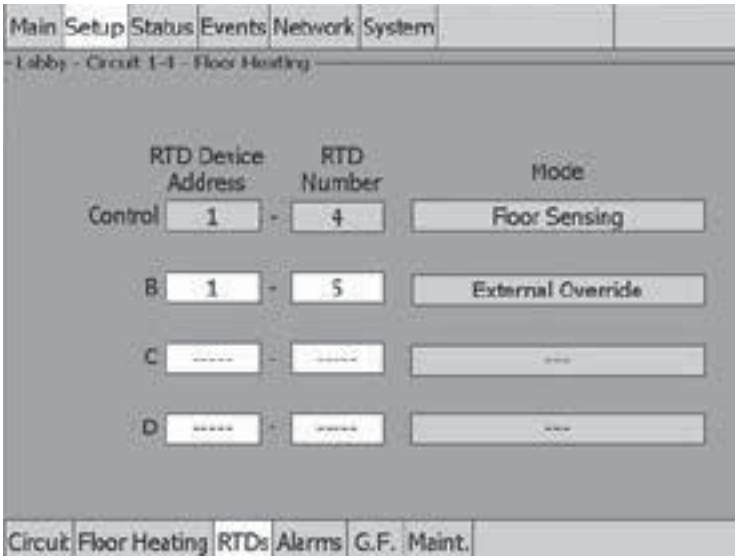


Fig. 3.25 Setup|RTDs window (Floor Heating, Floor Sensing Mode)

Assigning Temperature Alarms

Once RTDs have been assigned to the circuit the alarm button appears then high and low temperature alarms may be set.

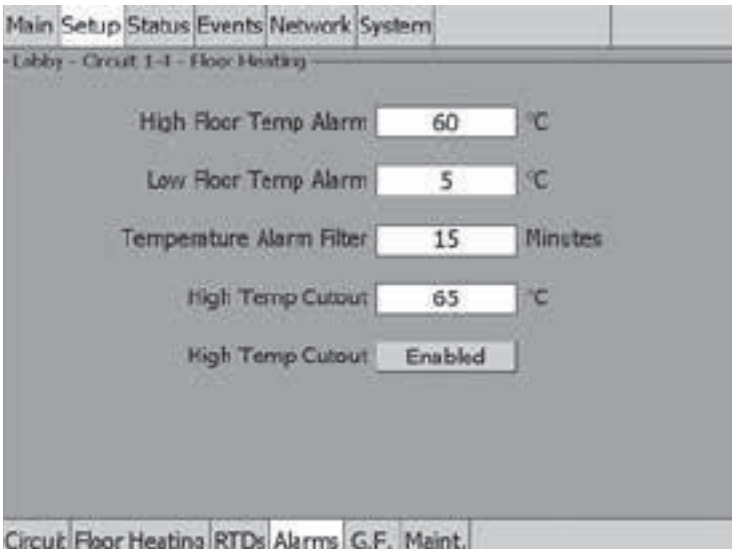


Fig. 3.26 Setup|Alarms window (Floor Heating, Floor Sensing Mode)

High Floor Temp Alarm: If any RTDs assigned to a circuit measures a temperature above this threshold, the ACS-30-EU-UIT2 generates an alarm. The limit can be set for any temperature value you desire for your application within the range allowed.

Range: Maintain setpoint plus 6°C to 60°C

Default: 60°C

Low Floor Temp Alarm: If any RTDs assigned to a circuit measures a temperature below this threshold, the ACS-30-EU-UIT2 generates an alarm.

Range: 0°C to Maintain/Economy setpoint minus 6°C (0°C as minimum)

Default: 5°C

Note: One RTD must be connected to the circuit for this control mode to function or an RTD failure alarm will be announced.

Temperature Alarm Filter: This minimizes nuisance alarms by forcing the ACS-30-EU-UIT2 to verify that the alarm condition continually exists over the selected period of time before alarming.

Range: 0 to 999 minutes

Default: 15 minutes

Note: Setting the Alarm Filter to 0 minutes is mainly for testing and demonstration purposes. Choosing this option for normal use may cause nuisance alarming since this option may not allow the ACS-30-EU-UIT2 time to verify that the alarm conditions exist.

High Line Temp Cut-Out: If any RTDs assigned to a circuit measures a temperature above this threshold, the ACS-30-EU-UIT2 generates an alarm and the relay output is turned off. If the high line temperature drops below this threshold minus the hysteresis, the output is turned on and normal control is resumed.

Range: Maintain setpoint plus 6°C to 65°C

Default: 65°C

High Line Temp Cut-Out Enable/Disable: Enables or disables the high line temp cut-out capability. When enabled, the ACS-30-EU-UIT2 alarms and the output relay turns OFF if any RTDs exceeds the cut-out value for the alarm filter time period. If the high line temp cut-out is disabled, the relay output will continue to function normally without the high temperature cut-out feature.

Options: Enable or Disable

Default: Enable

Assigning Ground-Fault Alarm and Trip Levels

The Setup|G.F. window allows you to set the alarm and trip levels.

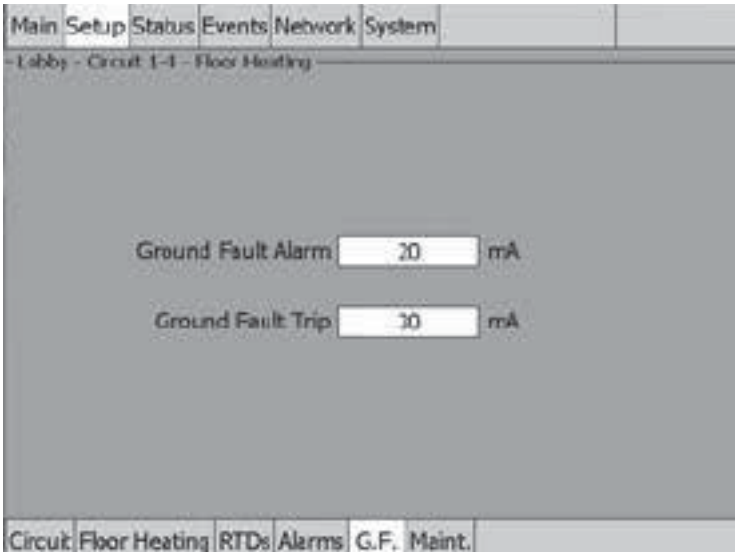


Fig. 3.27 Setup|G.F. window (Floor Heating, Floor Sensing Mode)

Input the Ground-Fault Alarm and Ground-Fault Trip:

Ground-Fault Alarm: When the ground-fault current exceeds this level the ACS-30-EU-UIT2 goes in alarm.

Range: 10 to 200 mA

Default: 20 mA

Ground-Fault Trip: When the ground-fault current exceeds this level the ACS-30-EU-PCM2 turns off the circuit relay.

Range: 10 to 200 mA

Default: 30 mA

Assigning Power Cycle Test

The Setup|Maint. window allows you to enable the Power Cycle test start time and frequency. After the start time and frequency are entered the time of the next test will be displayed on this screen.

Note: If the circuit is disabled, forced on, or forced off, the power cycle test will be disabled until the circuit is enabled.

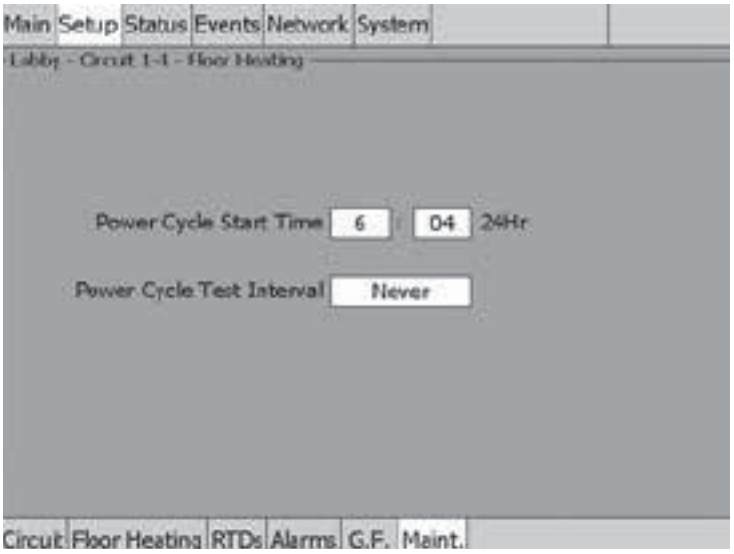


Fig. 3.28 Setup|Maint. window (Floor Heating, Floor Sensing Mode)

Input the start time and frequency for the Power Cycle test:

Power Cycle Start Time: The time of day to start the Power Cycle test

Range: 00:00 to 23:59

Default: Each circuit is assigned a unique default start time calculated from the device address and relay number.

Power Cycle Test Interval: The frequency to run the Power Cycle Test

Range: Never, Daily, Weekly and Monthly

Default: Never

3.4.2 SENSING MODE - ROOM SENSING

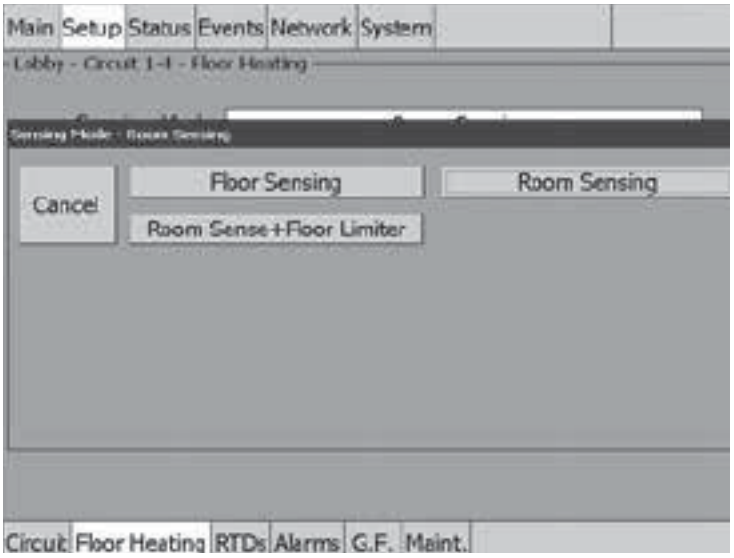


Fig. 3.29 Setup|Floor Heating control window (Floor Sensing Mode)

The Sensing Mode window allows you to select the sensing control mode to Floor Sensing, Room Sensing or Room Sense plus Floor Limiter. This option depends on where the controlling RTD inputs are situated and utilized: either measuring the temperature of the floor or of the room, eventually limiting the maximum temperature of the floor. Tap: Room Sensing.

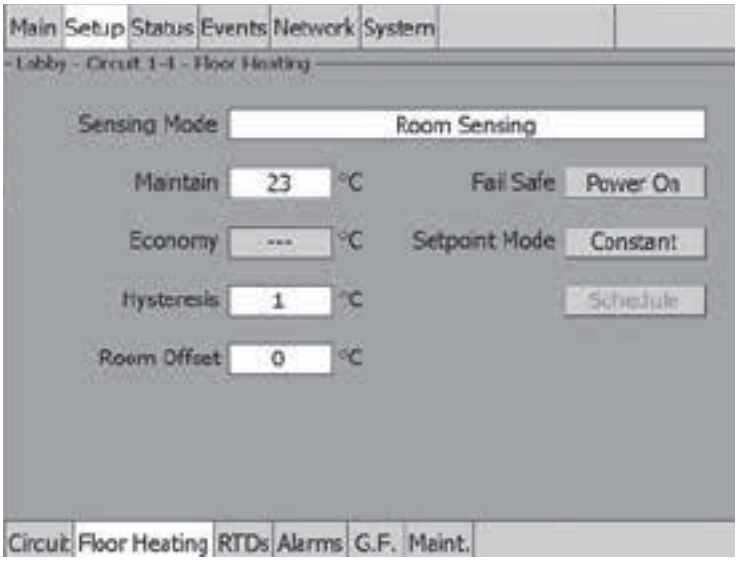


Fig. 3.30 Setup|Floor Heating window (Room Sensing Mode)

Maintain: The room setpoint is the desired maintain temperature for the room. Based on the measured control temperature, the ACS-30-EU-UIT2 will switch the relay output to maintain the system at the desired setpoint.

Range: 5°C to 40°C

Default: 23°C

Economy Temperature (optional): This value represents the temperature that you want the room to maintain when in economy mode. This input is only accessible if the Setpoint Mode is set to Variable which applies the temperature setpoint scheduler function described in Appendix 5.2 24/7 Scheduler on page 138.

Enter the Economy temperature

Range: 5°C to Maintain

Default: 16°C

Hysteresis: If the control temperature is above the setpoint temperature plus hysteresis, the relay output is turned off. If the control temperature is below the setpoint temperature, the output is turned on.

Range: 1°C to 6°C

Default: 1°C

Fail Safe: The Fail Safe control button turns the power on or off to the heating cable if the circuit loses all valid RTDs. When the last remaining sensor for control fails (or communication with the sensor is lost), the ACS-30-EU-UIT2:

- Signals an alarm for the failure of the sensor
- Changes control of the circuit to the fail safe control selected
- Changes the control status display to indicate that control of the circuit is in the fail safe state
- Records the events

When the sensor for control is returned to service, the ACS-30-EU-UIT2 signals the alarm has been cleared, returns the circuit to its normal control mode, and records both of these events.

Options: Power On or Power Off

Default: Power On

Room Offset: the Room Offset allows to adjust the temperature read by the room sensor (Room Temperature = Room Sensor Temperature – Room Offset)

Range: 0°C to10°C

Default: 0ºC

External Override: The dry contacts from a BMS system or external device may be assigned to the circuit to de-energize the circuit to save power when it is not needed. See Appendix 5.4 for detailed information about the connections. All temperature and system alarms are still active.

Schedule: Tapping on this button will bring up the Scheduler. See Appendix 5.2 24/7 Scheduler on page 138 for more information.

Assigning RTDs

Tap Setup|RTDs window to assign RTDs after the control mode and parameters have been set.In this mode you have the option of setting up to four RTDs for floor sensing. For detailed information on the Setup|RTD window refer to 2.2.3 Assigning and Sharing RTD Control and Monitoring on page 28. Input from an external dry contact may also be assigned to override the system. See Appendix 5.4 for detailed information about the connections..

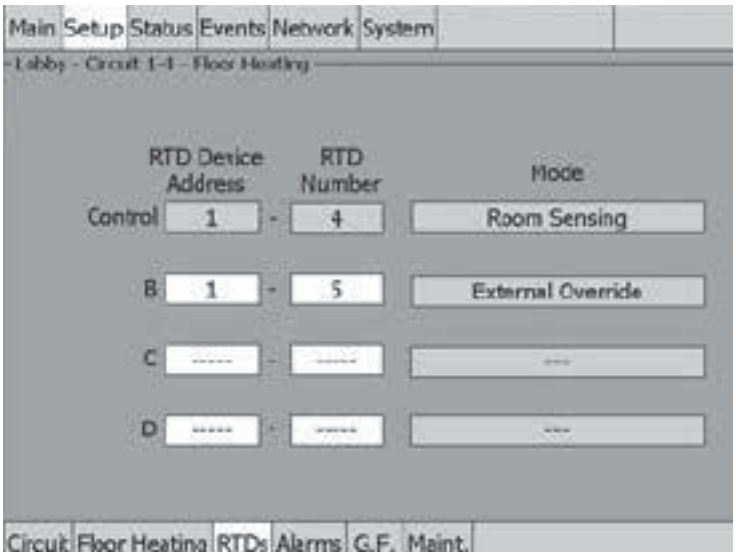


Fig. 3.31 Setup|RTDs window (Floor Heating, Room Sensing Mode)

Assigning Temperature Alarms

Once RTDs have been assigned to the circuit the alarm button appears then high and low temperature alarms may be set.

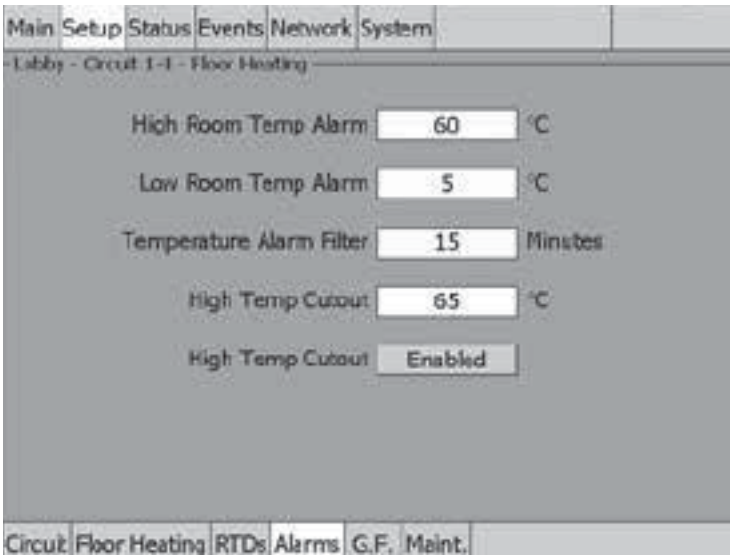


Fig. 3.32 Setup|Alarms window (Floor Heating, Room Sensing Mode)

High Room Temp Alarm: If any RTDs assigned to a circuit measures a temperature above this threshold, the ACS-30-EU-UIT2 generates an alarm. The limit can be set for any temperature value you desire for your application within the range allowed.

Range: Maintain setpoint plus 6°C to 60°C

Default: 60°C

Low Room Temp Alarm: If any RTDs assigned to a circuit measures a temperature below this threshold, the ACS-30-EU-UIT2 generates an alarm.

Range: 0°C to Maintain/Economy setpoint minus 6°C (0°C as minimum)

Default: 5°C

Note: One RTD must be connected to the circuit for this control mode to function or an RTD failure alarm will be announced.

Temperature Alarm Filter: This minimizes nuisance alarms by forcing the ACS-30-EU-UIT2 to verify that the alarm condition continually exists over the selected period of time before alarming.

Range: 0 to 999 minutes

Default: 15 minutes

Note: Setting the Alarm Filter to 0 minutes is mainly for testing and demonstration purposes. Choosing this option for normal use may cause nuisance alarming since this option may not allow the ACS-30-EU-UIT2 time to verify that the alarm conditions exist.

High Line Temp Cut-Out: If any RTDs assigned to a circuit measures a temperature above this threshold, the ACS-30-EU-UIT2 generates an alarm and the relay output is turned off. If the high line temperature drops below this threshold minus the hysteresis, the output is turned on and normal control is resumed.

Range: Maintain setpoint plus 6°C to 65°C

Default: 65°C

High Line Temp Cut-Out Enable/Disable: Enables or disables the high line temp cut-out capability. When enabled, the ACS-30-EU-UIT2 alarms and the output relay turns OFF if any RTDs exceeds the cut-out value for the alarm filter time period. If the high line temp cut-out is disabled, the relay output will continue to function normally without the high temperature cut-out feature.

Options: Enable or Disable

Default: Enable

Assigning Ground-Fault Alarm and Trip Levels

The Setup|G.F. window allows you to set the alarm and trip levels.

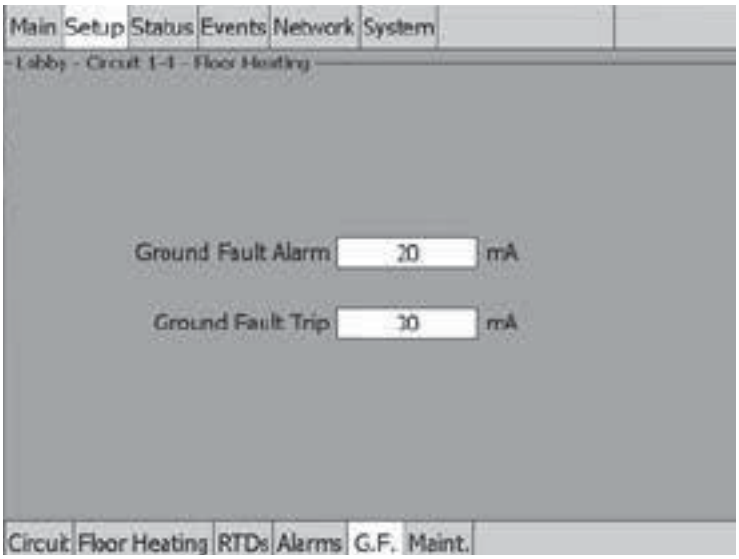


Fig. 3.33 Setup|G.F. window (Floor Heating, Room Sensing Mode)

Input the Ground-Fault Alarm and Ground-Fault Trip:

Ground-Fault Alarm: When the ground-fault current exceeds this level the ACS-30-EU-UIT2 goes in alarm.

Range: 10 to 200 mA

Default: 20 mA

Ground-Fault Trip: When the ground-fault current exceeds this level the ACS-30-EU-PCM2 turns off the circuit relay.

Range: 10 to 200 mA Default: 30 mA

Assigning Power Cycle Test

The Setup|Maint. window allows you to enable the Power Cycle test start time and frequency. After the start time and frequency are entered the time of the next test will be displayed on this screen.

Note: If the circuit is disabled, forced on, or forced off, the power cycle test will be disabled until the circuit is enabled.

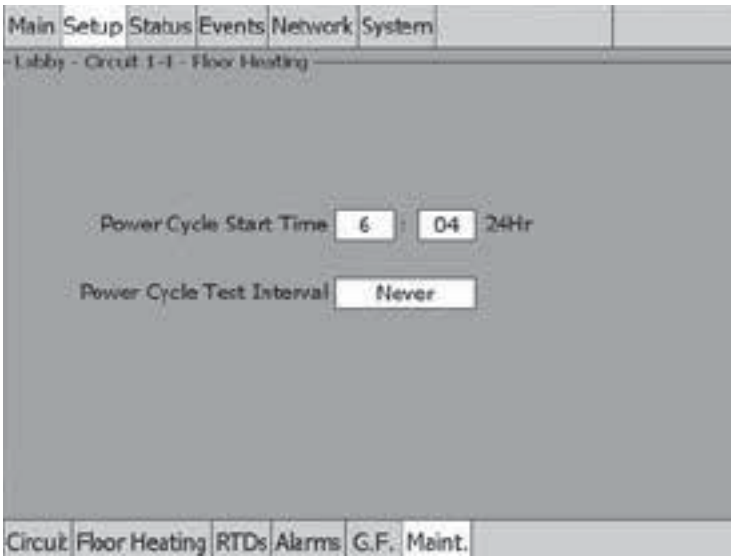


Fig. 3.34 Setup|Maint. window (Floor Heating, Room Sensing Mode)

Input the start time and frequency for the Power Cycle test:

Power Cycle Start Time: The time of day to start the Power Cycle test

Range: 00:00 to 23:59

Default: Each circuit is assigned a unique default start time calculated from the device address and relay number.

Power Cycle Test Interval: The frequency to run the Power Cycle Test

Range: Never, Daily, Weekly and Monthly

Default: Never

3.4.3 SENSING MODE – ROOM SENSE PLUS FLOOR LIMITER

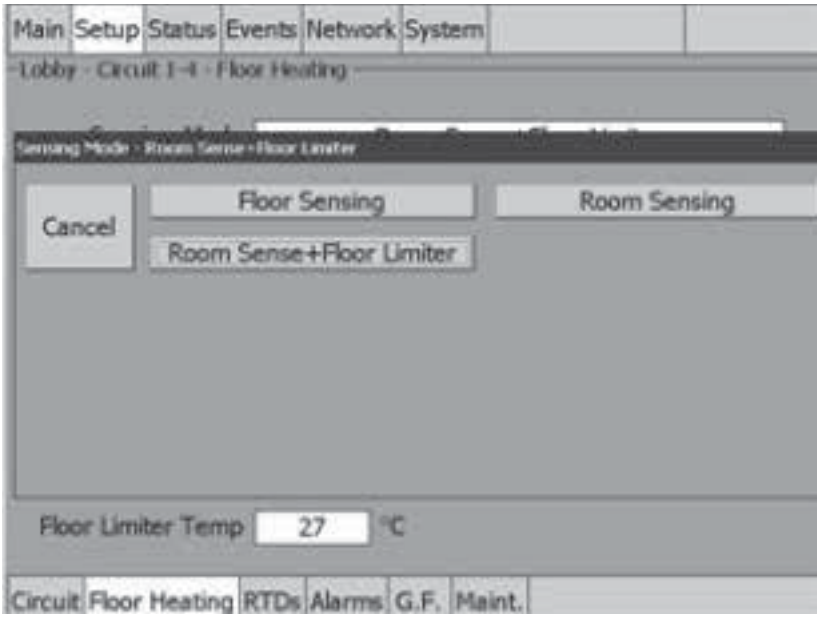


Fig. 3.35 Setup|Floor Heating control window (Floor Sensing Mode plus Floor Limiter)

The Sensing Mode window allows you to select the sensing control mode to Floor Sensing, Room Sensing or Room Sense plus Floor Limiter. This option depends on where the controlling RTD inputs are situated and utilized: either measuring the temperature of the floor or of the room, eventually limiting the maximum temperature of the floor. Tap: Room Sense+Floor Limiter.

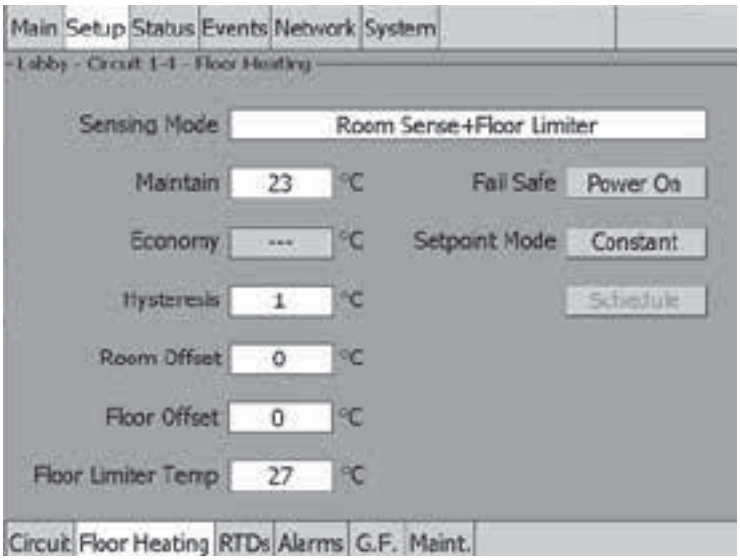


Fig. 3.36 Setup|Floor Heating window (Room Sensing plus Floor Limiter Mode)

Maintain: The room setpoint is the desired maintain temperature for the room. Based on the measured control temperature, the ACS-30-EU-UIT2 will switch the relay output to maintain the system at the desired setpoint.

Range: 5°C to (40°C – Hysteresis)

Default: 23°C

Economy Temperature (optional): This value represents the temperature that you want the room to maintain when in economy mode. This input is only accessible if the Setpoint Mode is set to Variable which applies the temperature setpoint scheduler function described in Appendix 5.2. 24/7 Scheduler on page 138.

Enter the Economy temperature Range: 5°C – Maintain

Default: 16°C

Hysteresis: If the control temperature is above the setpoint temperature plus hysteresis, the relay output is turned off. If the control temperature is below the setpoint temperature, the output is turned on.

Range: 1°C to 6°C

Default: 1°C

Room Offset: the Room Offset allows to adjust the temperature read by the room sensor (Room Temperature = Room Sensor Temperature – Room Offset)

Range: 0°C to 10°C

Default: 0°C

Floor Offset: the Floor Offset allows to adjust the temperature read by the Floor sensor (Floor Temperature = Floor Sensor Temperature – Floor Offset)

Range: 0°C to 10°C

Default: 0°C

Floor Limiter Temp: the Floor Limiter Temp limits the floor temperature to this value. The heating circuit is switched off when the floor temperature exceed this value, it is switched on again when the floor temperatures goes below Floor Limiter Temp – Hysteresis.

Range: Maintain + Hysteresis to 40°C

Default: 27°C

Fail Safe: The Fail Safe control button turns the power on or off to the heating cable if the circuit loses all valid RTDs. When the last remaining sensor for control fails (or communication with the sensor is lost), the ACS-30-EU-UIT2:

- Signals an alarm for the failure of the sensor
- Changes control of the circuit to the fail safe control selected
- Changes the control status display to indicate that control of the circuit is in the fail safe state
- Records the events

When the sensor for control is returned to service, the ACS-30-EU-UIT2 signals the alarm has been cleared, returns the circuit to its normal control mode, and records both of these events.

Options: Power On or Power Off

Default: Power On

External Override: The dry contacts from a BMS system or external device may be assigned to the circuit to de-energize the circuit to save power when it is not needed. See Appendix 5.4 for detailed information about the connections. All temperature and system alarms are still active.

Schedule: Tapping on this button will bring up the Scheduler. See Appendix 5.2 24/7 Scheduler on page 138 for more information.

Assigning RTDs

Tap Setup|RTDs window to assign RTDs after the control mode and parameters have been set.In this mode you have the option of setting up to four RTDs for floor sensing. For detailed information on the Setup|RTD window refer to 2.2.3 Assigning and Sharing RTD Control and Monitoring on page 28. Input from an external dry contact may also be assigned to override the system. See Appendix 5.4 for detailed information about the connections.

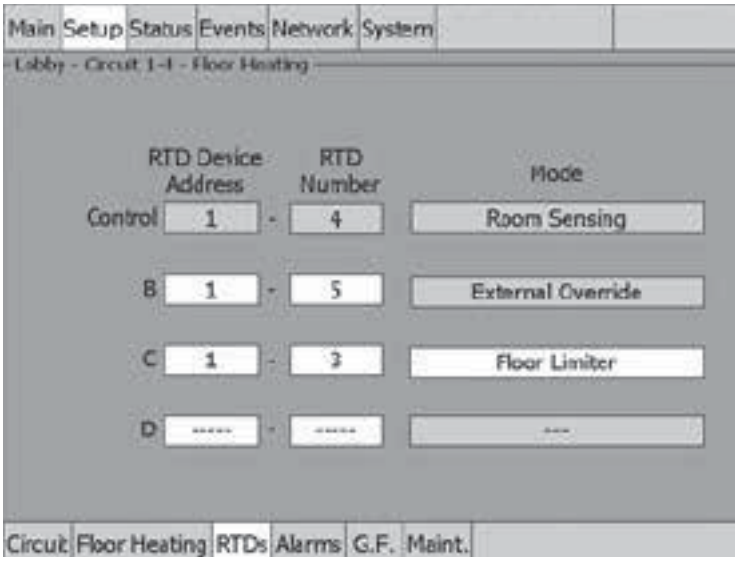


Fig. 3.37 Setup|RTDs window (Floor Heating, Room Sensing plus Floor Limiter Mode)

Assigning Temperature Alarms

Once RTDs have been assigned to the circuit the alarm button appears then high and low temperature alarms may be set.

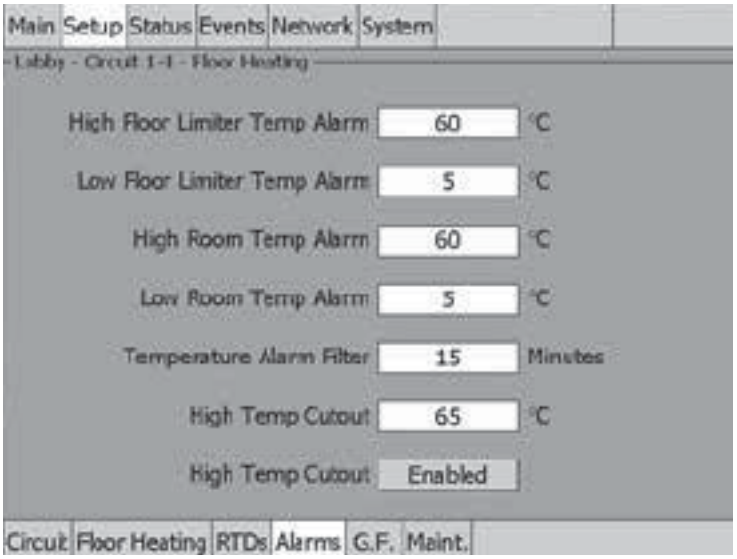


Fig. 3.38 Setup|Alarms window (Floor Heating, Room Sensing plus Floor Limiter Mode)

High Floor Limiter Temp Alarm: If any RTDs assigned to a circuit as Floor Limiter measures a temperature above this threshold, the ACS-30-EU-UIT2 generates an alarm. The limit can be set for any temperature value you desire for your application within the range allowed.

Range: Maintain setpoint plus 6°C to 60°C

Default: 60°C

Low Floor LImiter Temp Alarm: If any RTDs assigned to a circuit as Floor Limiter measures a temperature below this threshold, the ACS-30-EU-UIT2 generates an alarm.

Range: 0°C to Maintain/Economy setpoint minus 6°C (0°C as minimum)

Default: 5°C

High Room Temp Alarm: If any RTDs assigned to a circuit as Room Sensing measures a temperature above this threshold, the ACS-30-EU-UIT2 generates an alarm. The limit can be set for any temperature value you desire for your application within the range allowed.

Range: Maintain setpoint plus 6°C to 60°C

Default: 60°C

Low Room Temp Alarm: If any RTDs assigned to a circuit as Room Sensing measures a temperature below this threshold, the ACS-30-EU-UIT2 generates an alarm.

Range: 0°C to Maintain/Economy setpoint minus 6°C (0°C as minimum)

Default: 5°C

Note: One RTD must be connected to the circuit for this control mode to function or an RTD failure alarm will be announced.

Temperature Alarm Filter: This minimizes nuisance alarms by forcing the ACS-30-EU-UIT2 to verify that the alarm condition continually exists over the selected period of time before alarming.

Range: 0 to 999 minutes

Default: 15 minutes

Note: Setting the Alarm Filter to 0 minutes is mainly for testing and demonstration purposes. Choosing this option for normal use may cause nuisance alarming since this option may not allow the ACS-30-EU-UIT2 time to verify that the alarm conditions exist.

High Line Temp Cut-Out: If any RTDs assigned to a circuit measures a temperature above this threshold, the ACS-30-EU-UIT2 generates an alarm and the relay output is turned off. If the high line temperature drops below this threshold minus the hysteresis, the output is turned on and normal control is resumed.

Range: Maintain setpoint plus 6°C to 65°C

Default: 65°C

High Line Temp Cut-Out Enable/Disable: Enables or disables the high line temp cut-out capability. When enabled, the ACS-30-EU-UIT2 alarms and the output relay turns OFF if any RTDs exceeds the cut-out value for the alarm filter time period. If the high line temp cut-out is disabled, the relay output will continue to function normally without the high temperature cut-out feature.

Options: Enable or Disable

Default: Enable

Assigning Ground-Fault Alarm and Trip Levels

The Setup|G.F. window allows you to set the alarm and trip levels.

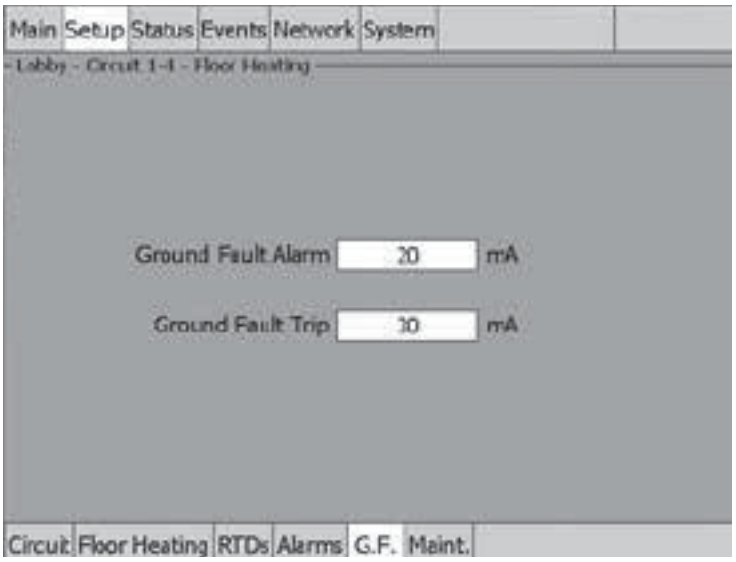


Fig. 3.39 Setup|G.F. window (Floor Heating, Room Sensing plus Floor Limiter Mode)

Input the Ground-Fault Alarm and Ground-Fault Trip:

Ground-Fault Alarm: When the ground-fault current exceeds this level the ACS-30-EU-UIT2 goes in alarm.

Range: 10 to 200 mA

Default: 20 mA

Ground-Fault Trip: When the ground-fault current exceeds this level the ACS-30-EU-PCM2 turns off the circuit relay.

Range: 10 to 200 mA

Default: 30 mA

Assigning Power Cycle Test

The Setup|Maint. window allows you to enable the Power Cycle test start time and frequency. After the start time and frequency are entered the time of the next test will be displayed on this screen.

Note: If the circuit is disabled, forced on, or forced off, the power cycle test will be disabled until the circuit is enabled.

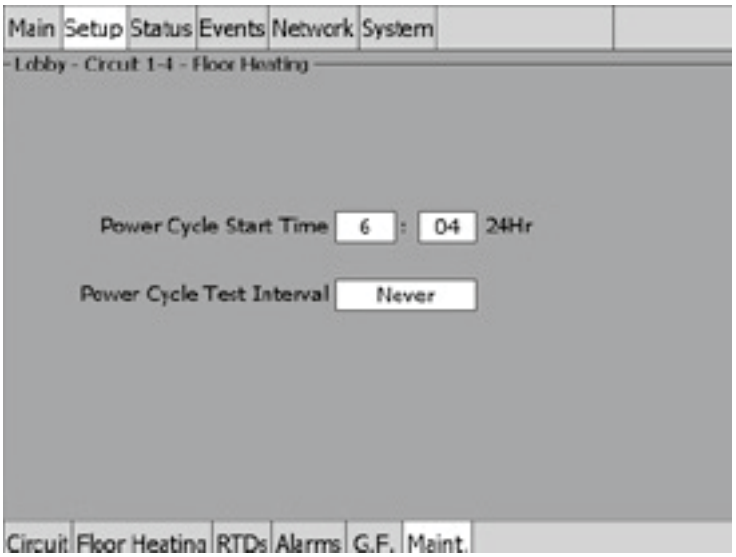


Fig. 3.40 Setup|Maint. window (Floor Heating, Room Sensing plus Floor Limiter Mode)

Input the start time and frequency for the Power Cycle test:

Power Cycle Start Time: The time of day to start the Power Cycle test

Range: 00:00 to 23:59

Default: Each circuit is assigned a unique default start time calculated from the device address and relay number.

Power Cycle Test Interval: The frequency to run the Power Cycle Test

Range: Never, Daily, Weekly and Monthly

Default: Never

3.5 Pipe Freeze Mode

The Pipe Freeze control mode prompts you to enter the control parameters for a Pipe Freeze Protection application. In this mode, you will be given three different control method options: Ambient, Line and PASC.

3.5.1 TEMP CONTROL – AMBIENT CONTROL

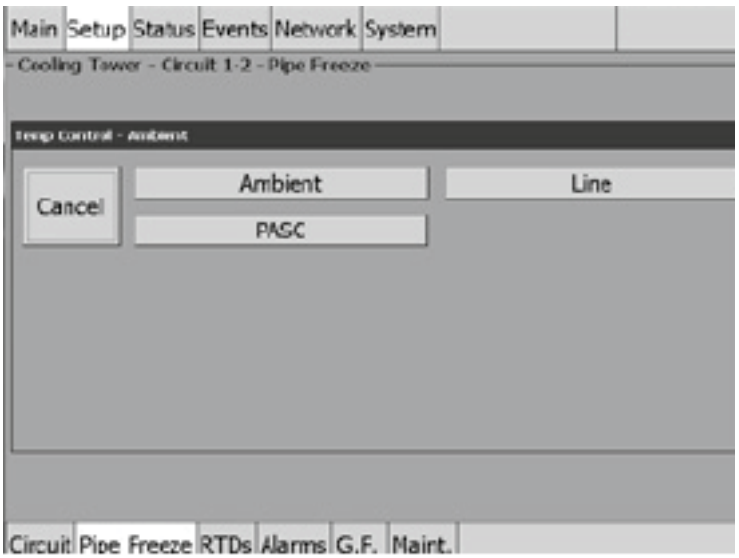


Fig. 3.41 Pipe Freeze Temperature Ambient Control window

The Temp Control window allows you to select the temperature control mode to Ambient Control, Line Control or PASC. This option depends on where the controlling RTD inputs are situated and utilized: either measuring the temperature of the environment surrounding the pipe (ambient), or directly on the pipe itself (line). Tap: Ambient.

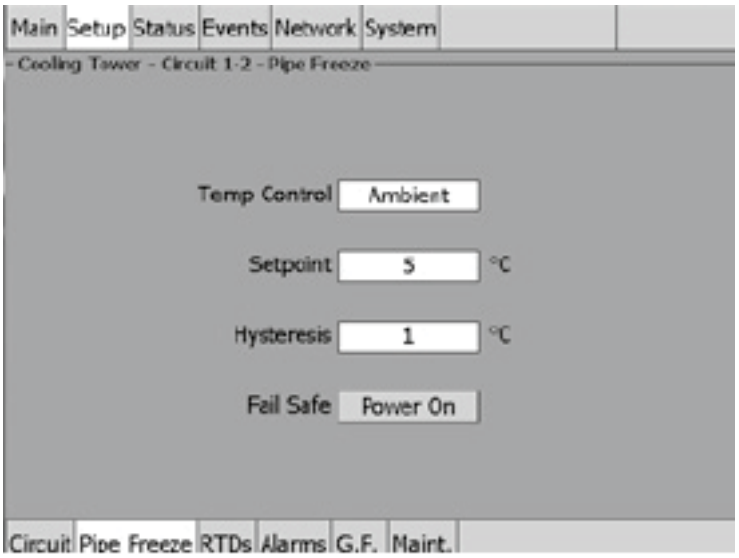


Fig. 3.42 Setup|Pipe Freeze Ambient Control window

Setpoint Temperature: The setpoint temperature is the desired maintain temperature for the water pipe. Based on the measured control temperature, the ACS-30-EU-PCM2 will switch the relay output to maintain the system at the desired setpoint.

Range: 0ºC to 10ºC

Default: 5°C

Hysteresis: If the control temperature is above the setpoint temperature plus hysteresis, the relay output is turned off. If the control temperature is below the setpoint temperature, the output is turned on.

Range: 1°C to 6°C

Default: 3°C

Fail Safe: The Fail Safe control button turns the power on or off to the heating cable if the circuit loses all valid RTDs.

When the last remaining sensor for control fails (or communication with the sensor is lost), the ACS-30-EU-UIT2:

- Signals an alarm for the failure of the sensor
- Changes control of the circuit to the fail safe control selected
- Changes the control status display to indicate that control of the circuit is in the fail safe state
- Records the events

When the sensor for control is returned to service, the ACS-30 controller signals the alarm has been cleared, returns the circuit to its normal control mode, and records both of these events.

Range: Power On or Power Off

Default: Power On

External Override: The dry contacts from a BMS system or external device may be assigned to the circuit to de-energize the circuit to save power when it is not needed. See Appendix 5.4 for detailed information about the connections. All temperature and system alarms are still active.

Assigning RTDs

When in Ambient Control mode you must have one RTD assigned as ambient control. The remaining three RTDs may be assigned to ambient control or line monitor. For detailed information on the Setup|RTD window refer to 2.2.3 Assigning and Sharing RTD Control and Monitoring on page 28. Input from an external dry contact may also be assigned to override the system. See Appendix 5.4 for detailed information about the connections.

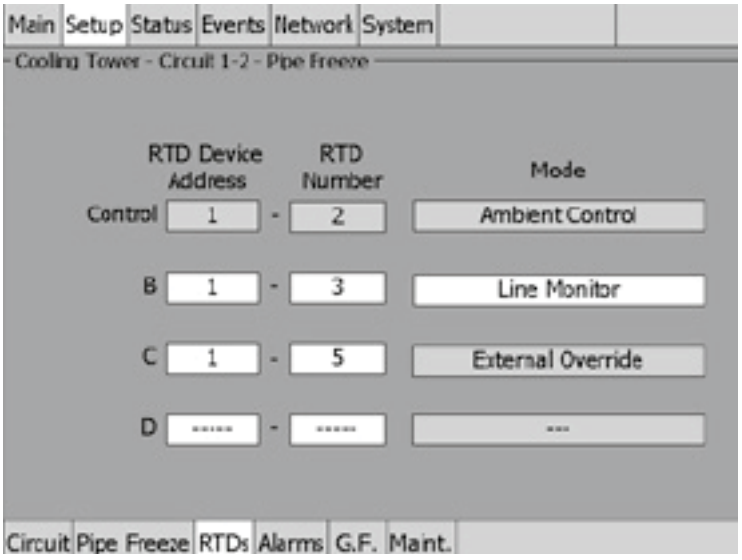


Fig. 3.43 Setup|RTDs window (Pipe Freeze Ambient Control)

Assigning Temperature Alarms

Once RTDs have been assigned to the circuit high and low temperature alarms may be set.

Note: Temperature alarms can only be associated to line monitoring RTDs.

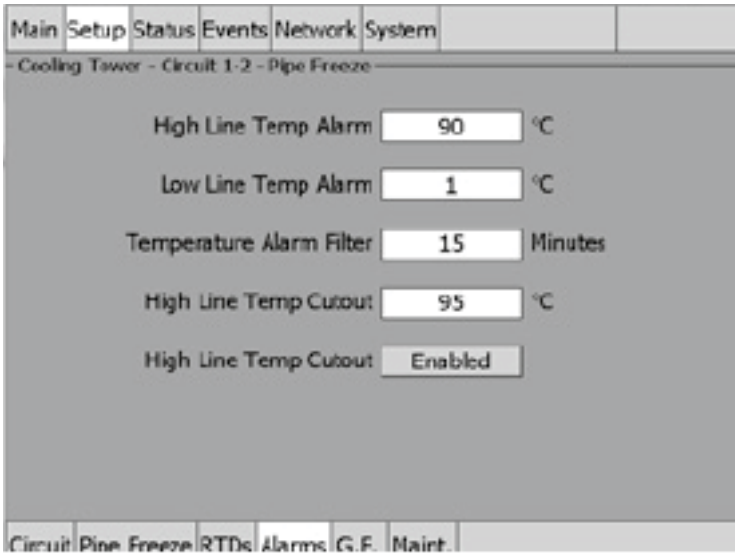


Fig. 3.44 Setup|Alarms window (Pipe Freeze Ambient Control)

High Line Temp Alarm: If any RTDs assigned to a circuit measures a temperature above this threshold, the ACS-30-EU-UIT2 generates an alarm. The limit can be set for any temperature value you desire for your application within the range allowed.

Range: 35°C to 90°C

Default: 90°C

Low Line Temp Alarm: If any RTDs assigned to a circuit measures a temperature below this threshold, the ACS-30-EU-UIT2 generates an alarm.

Range: 1°C to maintain setpoint

Default: 1°C

Temperature Alarm Filter: This minimizes nuisance alarms by forcing the ACS-30-EU-UIT2 to verify that the alarm condition continually exists over the selected period of time before alarming.

Range: 0 to 999 minutes

Default: 15 minutes

Note: Setting the Alarm Filter to 0 minutes is mainly for testing and demonstration purposes. Choosing this option for normal use may cause nuisance alarming since this option may not allow the ACS-30-EU-UIT2 time to verify that the alarm conditions exist.

High Line Temp Cut-Out: If any RTDs assigned to a circuit measures a temperature above this threshold, the ACS-30-EU-UIT2 generates an alarm and the relay output is turned off. If the high line temperature drops below this threshold minus the hysteresis, the output is turned on and normal duty cycle control is resumed.

Range: 40°C to 95°C

Default: 95°C

High Line Temp Cut-Out Enable/Disable: Enables or disables the high line temp cut-out capability. When enabled, the ACS-30-EU-UIT2 alarms and the output relay turns OFF if any RTDs exceeds the cut-out value for the alarm filter time period. If the high line temp cut-out is disabled, the relay output will continue to function normally without the high temperature cut-out feature.

Options: Enable or Disable

Default: Enable

Assigning Ground-Fault Alarm and Trip Levels

The Setup|G.F. window allows you to set the alarm and trip levels.

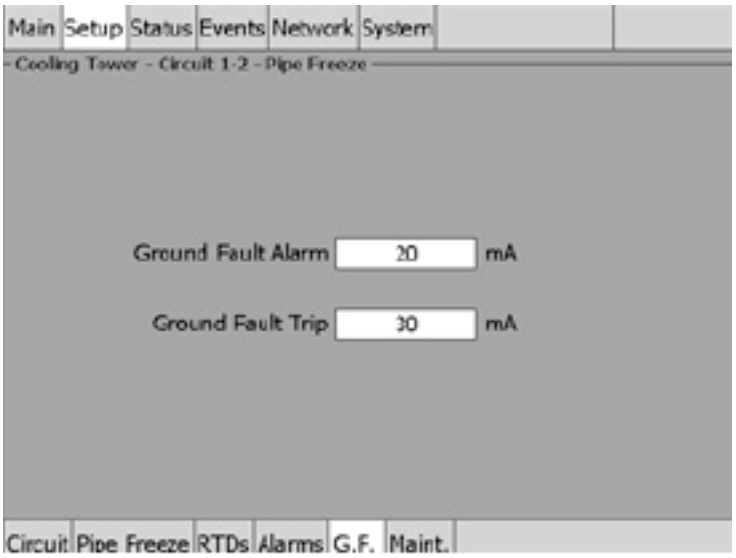


Fig. 3.45 Setup|G.F. window (Pipe Freeze Ambient Control)

Input the Ground-Fault Alarm and Ground-Fault Trip:

Ground-Fault Alarm: When the ground-fault current exceeds this level the ACS-30-EU-UIT2 goes in alarm.

Range: 10 to 200 mA

Default: 20 mA

Ground-Fault Trip: When the ground-fault current exceeds this level the ACS-30-EU-PCM2 turns off the circuit relay.

Range: 10 to 200 mA

Default: 30 mA

Assigning Power Cycle Test

The Setup|Maint. window allows you to enable the Power Cycle test start time and frequency. After the start time and frequency are entered the time of the next test will be displayed on this screen.

Note: If the circuit is disabled, forced on, or forced off, the power cycle test will be disabled until the circuit is enabled.

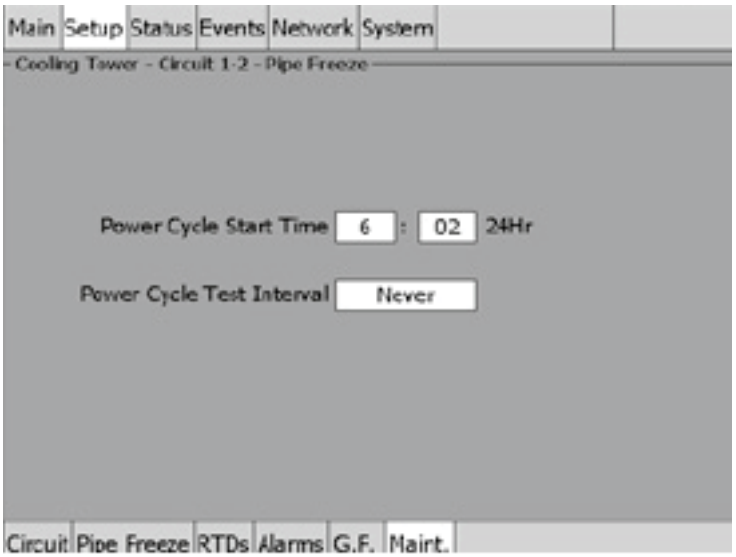


Fig. 3.46 Setup|Maint. window (Pipe Freeze Ambient Control)

Input the start time and frequency for the Power Cycle test:

Power Cycle Start Time: The time of day to start the Power Cycle test

Range: 00:00 to 23:59

Default: Each circuit is assigned a unique default start time calculated from the device address and relay number.

Power Cycle Test Interval: The frequency to run the Power Cycle Test

Range: Never, Daily, Weekly and Monthly

Default: Never

3.5.2 TEMP CONTROL – LINE CONTROL

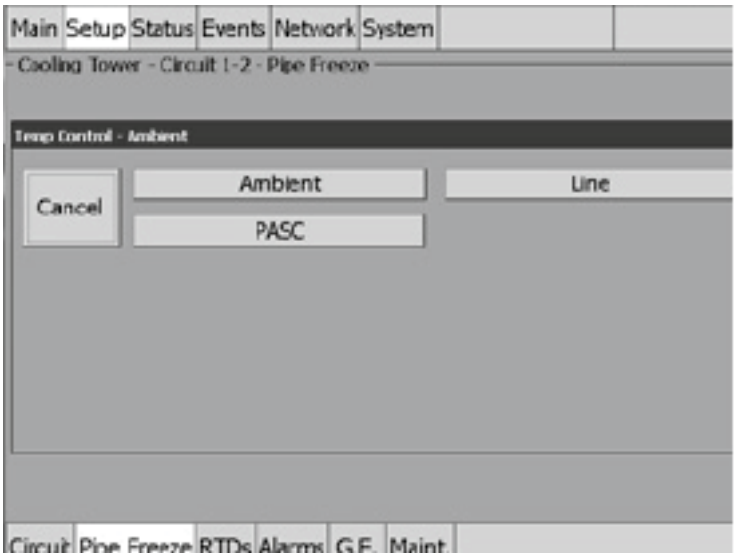


Fig. 3.47 Pipe Freeze Temperature Line Control window

The Temp Control window allows you to select the temperature control mode to Ambient Control, Line Control or PASC. This option depends on where the controlling RTD inputs are situated and utilized: either measuring the temperature of the environment surrounding the pipe (ambient), or directly on the pipe itself (line). Tap: Line.

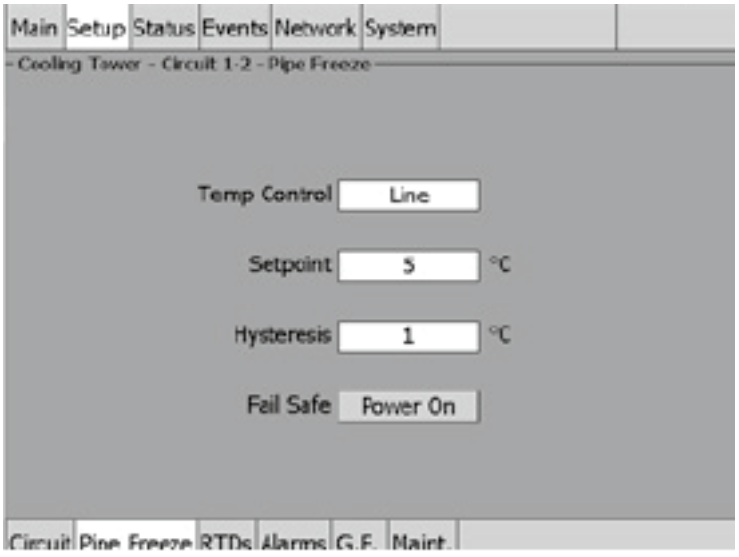


Fig. 3.48 Setup|Pipe Freeze Line Control window

Setpoint Temperature: The setpoint temperature is the desired maintain temperature for the water pipe. Based on the measured control temperature, the ACS-30-EU-PCM2 will switch the relay output to maintain the system at the desired setpoint.

Range: 0°C to 10°C

Default: 5°C

Hysteresis: If the control temperature is above the setpoint temperature plus hysteresis, the relay output is turned off. If the control temperature is below the setpoint temperature, the

output is turned on.

Range: 1°C to 6°C

Default: 3°C

Fail Safe: The Fail Safe control button turns the power on or off to the heating cable if the circuit loses all valid RTDs. When the last remaining sensor for control fails (or communication with the sensor is lost), the ACS-30-EU-UIT2:

- Signals an alarm for the failure of the sensor
- Changes control of the circuit to the fail safe control selected
- Changes the control status display to indicate that control of the circuit is in the fail safe state
- Records the events

When the sensor for control is returned to service, the ACS-30 controller signals the alarm has been cleared, returns the circuit to its normal control mode, and records both of these events.

Range: Power On or Power Off

Default: Power On

External Override: The dry contacts from a BMS system or external device may be assigned to the circuit to de-energize the circuit to save power when it is not needed. See Appendix 5.4 for detailed information about the connections. All temperature and system alarms are still active.

Assigning RTDs

After the control mode and parameters have been set tap Setup|RTDs window to assign RTDs to the circuit. When in line control mode you have the option of setting up to four RTDs for pipe line sensing. For detailed information on the Setup|RTD window refer to 2.2.3 Assigning and Sharing RTD Control and Monitoring on page 28. Input from an external dry contact may also be assigned to override the system. See Appendix 5.4 for detailed information about the connections.

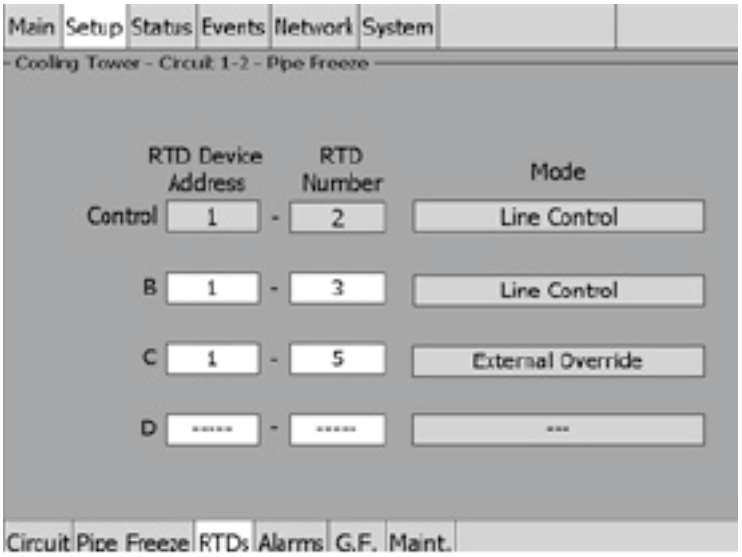


Fig. 3.49 Setup|RTDs window (Pipe Freeze Line Control)

Assigning Temperature Alarms

Once RTDs have been assigned to the circuit high and low temperature alarms may be set.

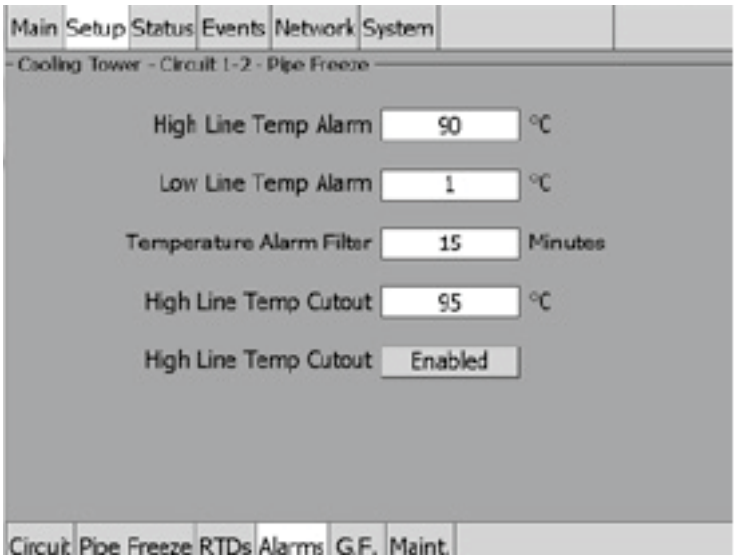


Fig. 3.50 Setup|Alarms window (Pipe Freeze Line Control)

High Line Temp Alarm: If any RTDs assigned to a circuit measures a temperature above this threshold, the ACS-30-EU-UIT2 generates an alarm. The limit can be set for any temperature value you desire for your application within the range allowed.

Range: 35°C to 90ºC

Default: 90°C

Low Line Temp Alarm: If any RTDs assigned to a circuit measures a temperature below this threshold, the ACS-30-EU-UIT2 generates an alarm.

Range: 1ºC to maintain setpoint

Default: 1°C

Temperature Alarm Filter: This minimizes nuisance alarms by forcing the ACS-30-EU-UIT2 to verify that the alarm condition continually exists over the selected period of time before alarming.

Range: 0 to 999 minutes

Default: 15 minutes

Note: Setting the Alarm Filter to 0 minutes is mainly for testing and demonstration purposes. Choosing this option for normal use may cause nuisance alarming since this option may not allow the ACS-30-EU-UIT2 time to verify that the alarm conditions exist.
High Line Temp Cut-Out: If any RTDs assigned to a circuit measures a temperature above this threshold, the ACS-30-EU-UIT2 generates an alarm and the relay output is turned off. If the high line temperature drops below this threshold minus the hysteresis, the output is turned on and normal control is resumed.
Range: 40°C to 95ºC

Default: 95ºC

High Line Temp Cut-Out Enable/Disable: Enables or disables the high line temp cut-out capability. When enabled, the ACS-30-EU-UIT2 alarms and the output relay turns OFF if any RTDs exceeds the cut-out value for the alarm filter time period. If the high line temp cut-out is disabled, the relay output will continue to function normally without the high temperature cut-out feature.

Options: Enable or Disable

Default: Enable

Assigning Ground-Fault Alarm and Trip Levels

The Setup|G.F. window allows you to set the alarm and trip levels.

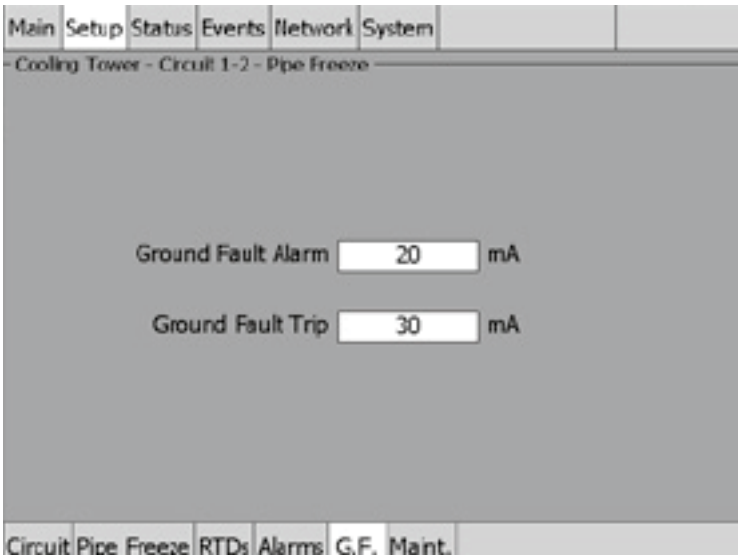


Fig. 3.51 Setup|G.F. window (Pipe Freeze Line Control)

Input the Ground-Fault Alarm and Ground-Fault Trip:
Ground-Fault Alarm: When the ground-fault current exceeds this level the ACS-30-EU-UIT2 goes in alarm.

Range: 10 to 200 mA

Default: 20 mA

Ground-Fault Trip: When the ground-fault current exceeds this level the ACS-30-EU-PCM2 turns off the circuit relay.

Range: 10 to 200 mA

Default: 30 mA

Assigning Power Cycle Test

The Setup|Maint. window allows you to enable the Power Cycle test start time and frequency. After the start time and frequency are entered the time of the next test will be displayed on this screen.

Note: If the circuit is disabled, forced on, or forced off, the power cycle test will be disabled until the circuit is enabled.

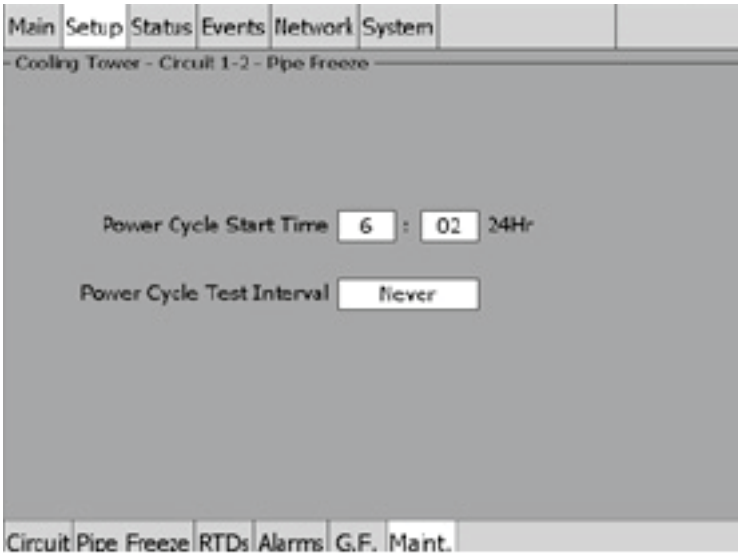


Fig. 3.52 Setup|Maint. (Pipe Freeze Line Control)

Input the start time and frequency for the Power Cycle test:

Power Cycle Start Time: The time of day to start the Power Cycle test

Range: 00:00 to 23:59

Default: Each circuit is assigned a unique default start time calculated from the device address and relay number.

Power Cycle Test Interval: The frequency to run the Power Cycle Test

Range: Never, Daily, Weekly and Monthly

Default: Never

3.5.3 TEMP CONTROL – PASC CONTROL

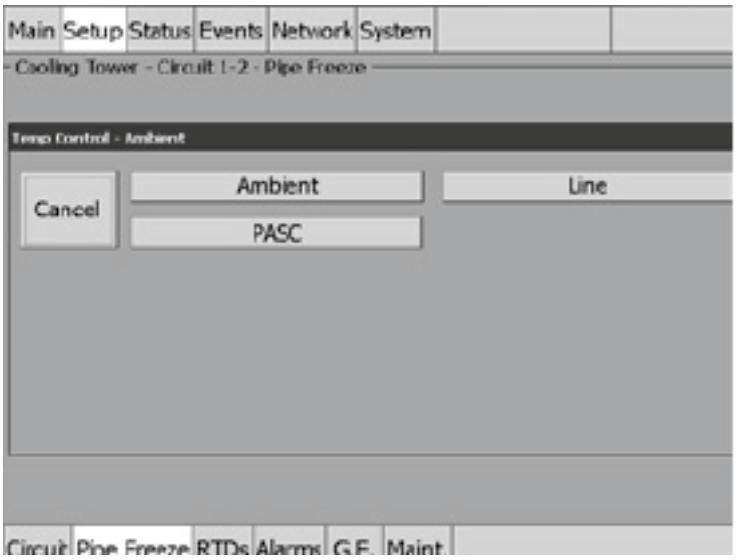


Fig. 3.53 Pipe Freeze Temperature PASC Control window

The Temp Control window allows you to select the temperature control mode to Ambient Control, Line Control or PASC. This option depends on where the controlling RTD inputs are situated and utilized: either measuring the temperature of the environment surrounding the pipe (ambient), or directly on the pipe itself (line). Tap PASC.

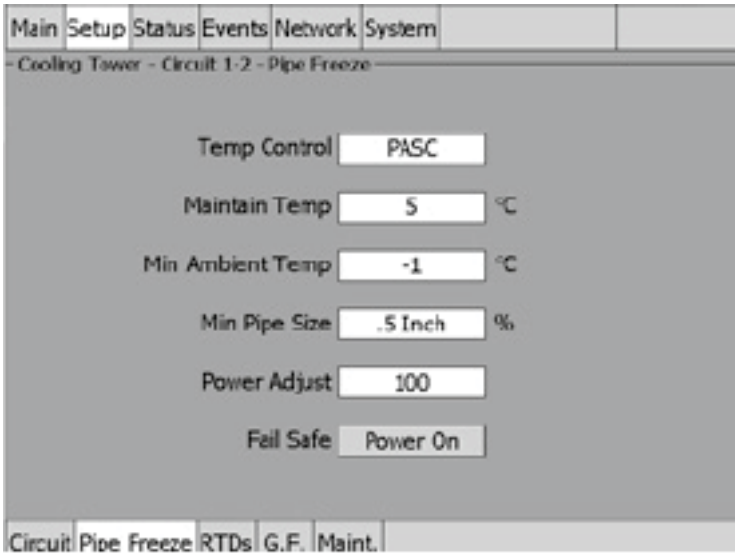


Fig. 3.54 Setup|Pipe Freeze PASC Control window

PASC (Proportional Ambient Sensing Control): PASC takes advantage of the fact that the heat loss from a pipe is proportional to the temperature difference between the pipe and the ambient air. This is true regardless of heater type, insulation type, or pipe size. Once the heat tracing and insulation on a pipe has been designed to balance heat input with heat loss for maintaining at the maintain temperature the pipe, the main variable in controlling the pipe temperature becomes the ambient air temperature.

The ACS-30 system has a control algorithm that uses the measured ambient temperature, the desired maintain temperature, minimum ambient temperature assumption used during design, and size of the smallest pipe diameter to calculate how long the heater should be on or off to maintain a near-constant pipe temperature.

Maintain temperature setpoint: enter the maintain temperature for your installation:

Range: 0°C to 10°C

Default: 5°C

Minimum Ambient: Enter the minimum ambient temperature for your installation

Range: -40°C to Maintain temperature

Default: -1°C

Min Pipe Size: Min. Pipe Size is the diameter of the smallest heat-traced pipe in the group controlled by this circuit. Small diameter pipes heat up and cool down more rapidly than larger diameter pipe. Therefore, the PASC duty cycle is calculated over a shorter time base. Larger diameter pipes heat and cool less rapidly, so the on/off periods for the heater system can be stretched over a longer period. If electromechanical contactors are being used to control the heater circuit, the longer time base reduces the number of contactor on/off cycles and extends the contactor life.

Select: 0.5, 1, ⩾ 2 inches

Default: 0.5 inches

Power Adjust: This allows the PASC control to be adjusted when the heating cable output is greater than the design assumption, or if the pipe insulation proves to be more efficient than assumed. Pipe temperature may run higher or lower than desired if the heating cable has a different output than required to offset the heat loss. The Power Adjust parameter enables a reduction or an increase in the heating effective power by entering a value less or greater than 100%

Range: 10 to 200% Default: 100%

IMPORTANT: If improperly used, the Power Adjust parameter can cause the piping to get too cold or too hot. If unsure, leave at 100%. Do not change this value unless an engineer calculates the temperature impact on the system and determines that it is safe to do so. Be particularly cautious if the circuit has more than one diameter of pipe or type of heat tracing. Contact a Pentair Thermal Management representative for assistance with this factor.

Fail Safe: The Fail Safe control button turns the power on or off to the heating cable if the circuit loses all valid RTDs.

When the last remaining sensor for control fails (or communication with the sensor is lost), the ACS-30-EU-UIT2:

- Signals an alarm for the failure of the sensor
- Changes control of the circuit to the fail safe control selected
- Changes the control status display to indicate that control of the circuit is in the fail safe state
- Records the events

When the sensor for control is returned to service, the ACS-30 controller signals the alarm has been cleared, returns the circuit to its normal control mode, and records both of these events.

Range: Power On or Power Off

Default: Power On

External Override: The dry contacts from a BMS system or external device may be assigned to the circuit to de-energize the circuit to save power when it is not needed. See Appendix 5.4 for detailed information about the connections. All temperature and system alarms are still active.

Assigning RTDs

After the control mode and parameters have been set tap Setup|RTDs window to assign RTDs to the circuit. When in PASC control mode you have the option of setting up to four RTDs for ambient sensing PASC control. In this mode you can have up to three of the four RTDs set to monitor the pipe. For detailed information on the RTD window refer to 2.2.3 Assigning and Sharing RTD Control and Monitoring on page 28. Input from an external dry contact may also be assigned to override the system. See Appendix 5.4 for detailed information about the connections.

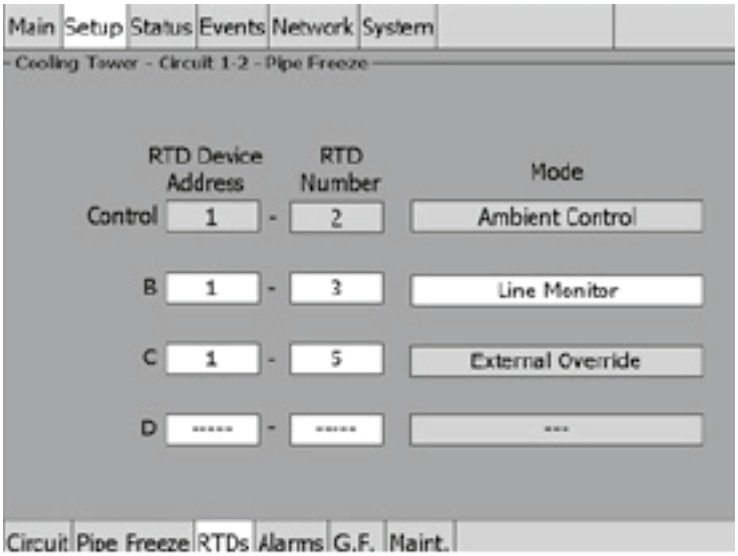


Fig. 3.55 Setup|RTDs window (Pipe Freeze PASC Control)

Assigning Temperature Alarms

Once RTDs have been assigned to the circuit high and low temperature alarms may be set.

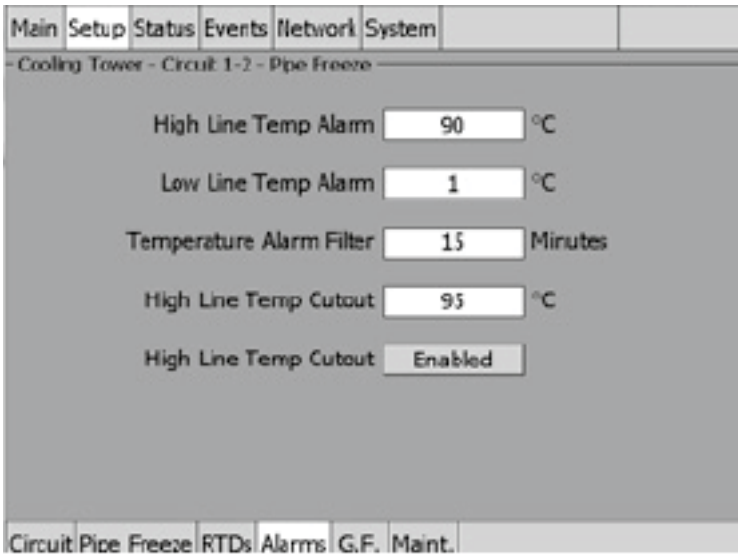


Fig. 3.56 Setup|Alarms window (Pipe Freeze PASC Control)

Note: Temperature alarms can only be associated to line monitoring RTDs.

High Line Temp Alarm: If any RTDs assigned to a circuit measures a temperature above this threshold, the ACS-30-EU-UIT2 generates an alarm. The limit can be set for any temperature value you desire for your application within the range allowed.

Range: 35°C to 90°C

Default: 90°C

Low Line Temp Alarm: If any RTDs assigned to a circuit measures a temperature below this threshold, the ACS-30-EU-UIT2 generates an alarm.

Range: 1ºC to maintain temperature

Default: 1ºC

Temperature Alarm Filter: This minimizes nuisance alarms by forcing the ACS-30-EU-UIT2 to verify that the alarm condition continually exists over the selected period of time before alarming.

Range: 0 to 999 minutes

Default: 15 minutes

Note: Setting the Alarm Filter to 0 minutes is mainly for testing and demonstration purposes. Choosing this option for normal use may cause nuisance alarming since this option may not allow the ACS-30-EU-UIT2 time to verify that the alarm conditions exist.

High Line Temp Cut-Out: If any RTDs assigned to a circuit measures a temperature above this threshold, the ACS-30-EU-UIT2 generates an alarm and the relay output is turned off. If the high line temperature drops below this threshold minus the hysteresis, the output is turned on and normal control is resumed.

Range: 40°C to 95ºC

Default: 95ºC

High Line Temp Cut-Out Enable/Disable: Enables or disables the high line temp cut-out capability. When enabled, the ACS-30-EU-UIT2 alarms and the output relay turns OFF if any RTDs exceeds the cut-out value for the alarm filter time period. If the high line temp cut-out is disabled, the relay output will continue to function normally without the high temperature cut-out feature.

Options: Enable or Disable

Default: Enable

Assigning Ground-Fault Alarm and Trip Levels

The Setup|G.F. window allows you to set the alarm and trip levels.

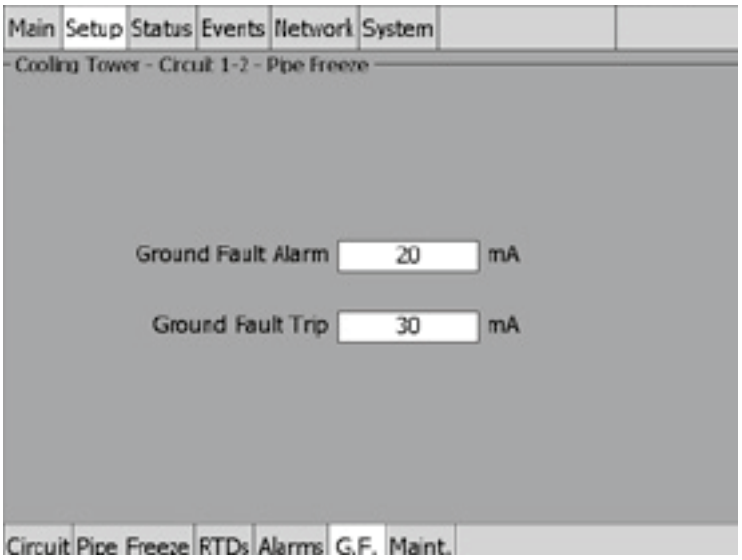


Fig. 3.57 Setup|G.F. window (Pipe Freeze PASC Control)

Input the Ground-Fault Alarm and Ground-Fault Trip:

Ground-Fault Alarm: When the ground-fault current exceeds this level the ACS-30-EU-UIT2 goes in alarm.

Range: 10 to 200 mA Default: 20 mA

Ground-Fault Trip: When the ground-fault current exceeds this level the ACS-30-EU-PCM2 turns off the circuit relay.

Range: 10 to 200 mA Default: 30 mA

Assigning Power Cycle Test

The Setup|Maint. window allows you to enable the Power Cycle test start time and frequency. After the start time and frequency are entered the time of the next test will be displayed on this screen.

Note: If the circuit is disabled, forced on, or forced off, the power cycle test will be disabled until the circuit is enabled.

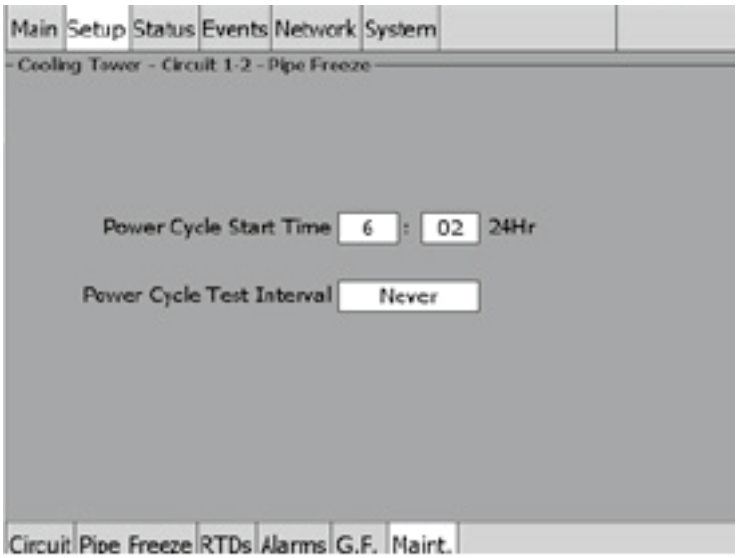


Fig. 3.58 Setup|Maint. window (Pipe Freeze PASC Control)

Input the start time and frequency for the Power Cycle test:

Power Cycle Start Time: The time of day to start the Power Cycle test

Range: 00:00 to 23:59

Default: Each circuit is assigned a unique default start time calculated from the device address and relay number.

Power Cycle Test Interval: The frequency to run the Power Cycle Test

Range: Never, Daily, Weekly and Monthly

Default: Never

3.6 Fuel Oil Mode

The Fuel Oil control mode prompts you to enter the control parameters for a Fuel Oil Protection application. In this mode, you will be given three different control method options: Ambient, Line and PASC.

3.6.1 TEMP CONTROL – AMBIENT CONTROL

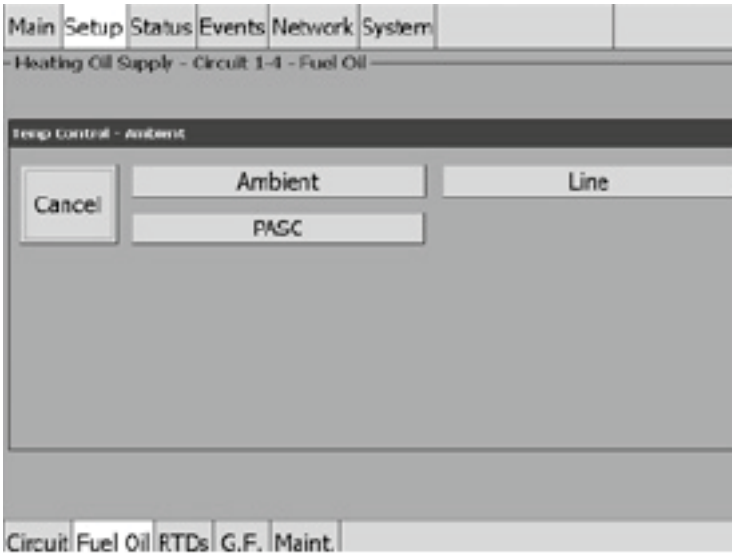


Fig. 3.59 Fuel Oil Temperature Ambient Control window

The Temp Control window allows you to select the temperature control mode to Ambient Control, Line Control or PASC. This option depends on where the controlling RTD inputs are situated and utilized: either measuring the temperature of the environment surrounding the pipe (ambient), or directly on the pipe itself (line). Tap: Ambient.

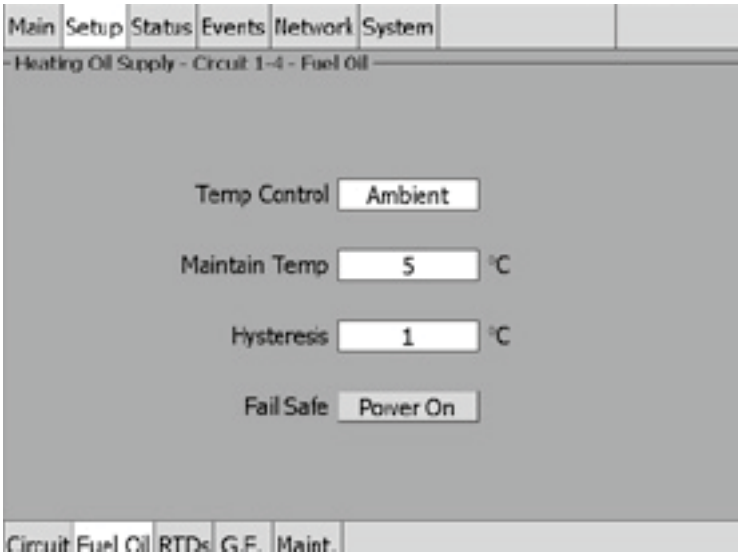


Fig. 3.60 Setup|Fuel Oil Ambient Control window

Setpoint Temperature: The setpoint temperature is the desired maintain temperature for the water pipe. Based on the measured control temperature, the ACS-30-EU-PCM2 will switch the relay output to maintain the system at the desired setpoint.

Range: 0ºC to 10ºC

Default: 5°C

Hysteresis: If the control temperature is above the setpoint temperature plus hysteresis, the relay output is turned off. If the control temperature is below the setpoint temperature, the output is turned on.

Range: 1°C to 6°C

Default: 3°C

Fail Safe: The Fail Safe control button turns the power on or off to the heating cable if the circuit loses all valid RTDs.

When the last remaining sensor for control fails (or communication with the sensor is lost), the ACS-30-EU-UIT2:

- Signals an alarm for the failure of the sensor
- Changes control of the circuit to the fail safe control selected
- Changes the control status display to indicate that control of the circuit is in the fail safe state
- Records the events

When the sensor for control is returned to service, the ACS-30 controller signals the alarm has been cleared, returns the circuit to its normal control mode, and records both of these events.

Range: Power On or Power Off

Default: Power On

External Override: The dry contacts from a BMS system or external device may be assigned to the circuit to de-energize the circuit to save power when it is not needed. See Appendix 5.4 for detailed information about the connections. All temperature and system alarms are still active.

Assigning RTDs

When in Ambient Control mode you must have one RTD assigned as ambient control. The remaining three RTDs may be assigned to ambient control or line monitor. For detailed information on the Setup|RTD window refer to 2.2.3 Assigning and Sharing RTD Control and Monitoring on page 28. Input from an external dry contact may also be assigned to override the system. See Appendix 5.4 for detailed information about the connections.

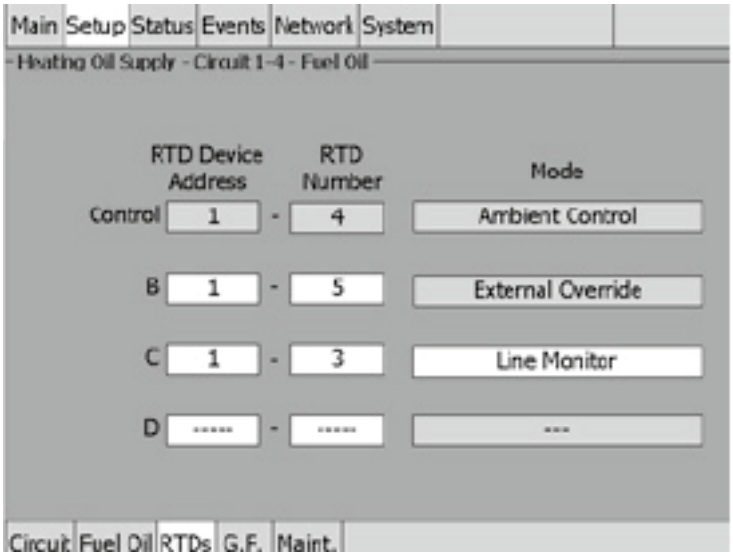


Fig. 3.61 Setup|RTDs window (Fuel Oil Ambient Control)

Assigning Temperature Alarms

Once RTDs have been assigned to the circuit high and low temperature alarms may be set.

Note: Temperature alarms can only be associated to line monitoring RTDs.

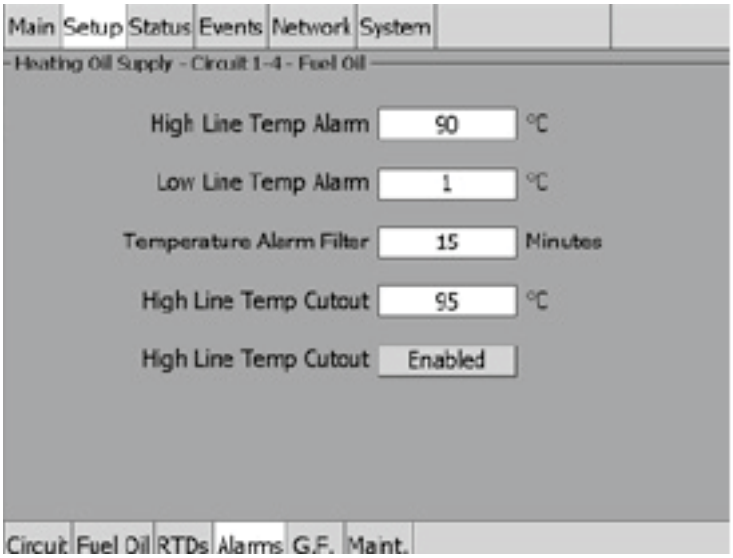


Fig. 3.62 Setup|Alarms window (Fuel Oil Ambient Control)

High Line Temp Alarm: If any RTDs assigned to a circuit measures a temperature above this threshold, the ACS-30-EU-UIT2 generates an alarm. The limit can be set for any temperature value you desire for your application within the range allowed.

Range: 35°C to 90°C

Default: 90°C

Low Line Temp Alarm: If any RTDs assigned to a circuit measures a temperature below this threshold, the ACS-30-EU-UIT2 generates an alarm.

Range: 1°C to maintain setpoint

Default: 1°C

Temperature Alarm Filter: This minimizes nuisance alarms by forcing the ACS-30-EU-UIT2 to verify that the alarm condition continually exists over the selected period of time before alarming.

Range: 0 to 999 minutes

Default: 15 minutes

Note: Setting the Alarm Filter to 0 minutes is mainly for testing and demonstration purposes. Choosing this option for normal use may cause nuisance alarming since this option may not allow the ACS-30-EU-UIT2 time to verify that the alarm conditions exist.
High Line Temp Cut-Out: If any RTDs assigned to a circuit measures a temperature above this threshold, the ACS-30-EU-UIT2 generates an alarm and the relay output is turned off. If the high line temperature drops below this threshold minus the hysteresis, the output is turned on and normal control is resumed.
Range: 40°C to 95°C

Default: 95°C

High Line Temp Cut-Out Enable/Disable: Enables or disables the high line temp cut-out capability. When enabled, the ACS-30-EU-UIT2 alarms and the output relay turns OFF if any RTDs exceeds the cut-out value for the alarm filter time period. If the high line temp cut-out is disabled, the relay output will continue to function normally without the high temperature cut-out feature.

Options: Enable or Disable

Default: Enable

Assigning Ground-Fault Alarm and Trip Levels

The Setup|G.F. window allows you to set the alarm and trip levels.

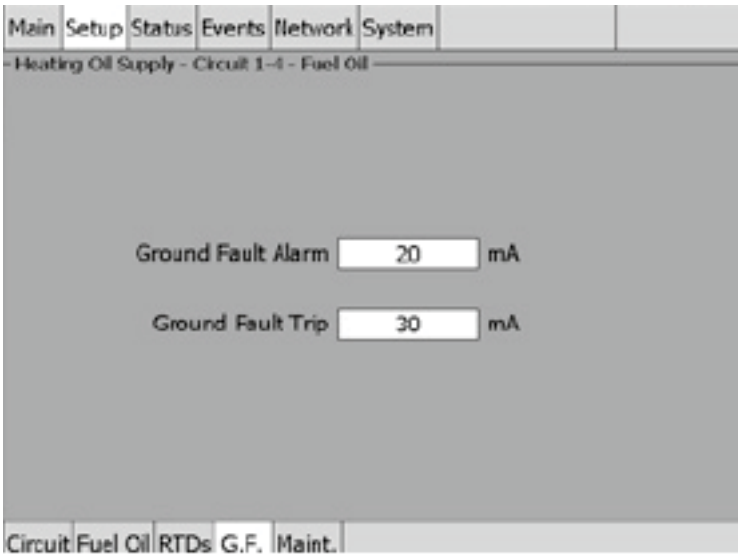


Fig. 3.63 Setup|G.F. window (Fuel Oil Ambient Control)

Input the Ground-Fault Alarm and Ground-Fault Trip:

Ground-Fault Alarm: When the ground-fault current exceeds this level the ACS-30-EU-UIT2 goes in alarm.

Range: 10 to 200 mA

Default: 20 mA

Ground-Fault Trip: When the ground-fault current exceeds this level the ACS-30-EU-PCM2 turns off the circuit relay.

Range: 10 to 200 mA

Default: 30 mA

Assigning Power Cycle Test

The Setup|Maint. window allows you to enable the Power Cycle test start time and frequency. After the start time and frequency are entered the time of the next test will be displayed on this screen.

Note: If the circuit is disabled, forced on, or forced off, the power cycle test will be disabled until the circuit is enabled.

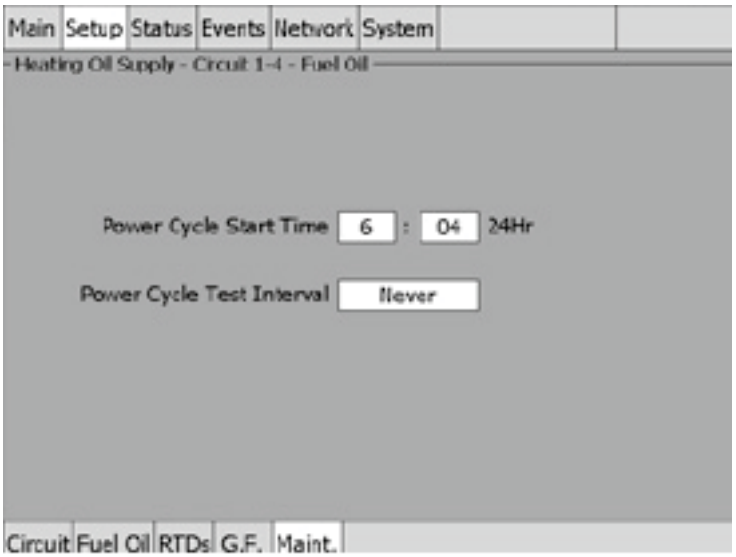


Fig. 3.64 Setup|Maint. window (Fuel Oil Ambient Control)

Input the start time and frequency for the Power Cycle test:

Power Cycle Start Time: The time of day to start the Power Cycle test

Range: 00:00 to 23:59

Default: Each circuit is assigned a unique default start time calculated from the device address and relay number.

Power Cycle Test Interval: The frequency to run the Power Cycle Test

Range: Never, Daily, Weekly and Monthly

Default: Never

3.6.2 TEMP CONTROL – LINE CONTROL

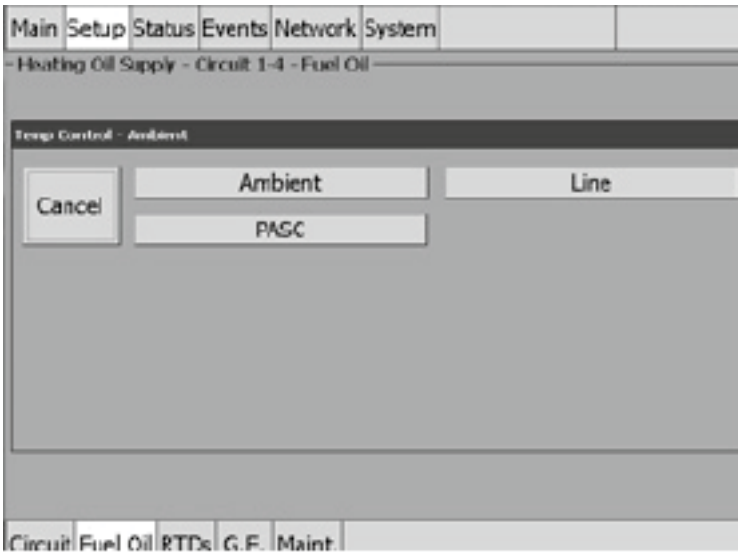


Fig. 3.65 Fuel Oil Temperature Line Control window

The Temp Control window allows you to select the temperature control mode to Ambient Control, Line Control or PASC. This option depends on where the controlling RTD inputs are situated and utilized: either measuring the temperature of the environment surrounding the pipe (ambient), or directly on the pipe itself (line). Tap: Line.

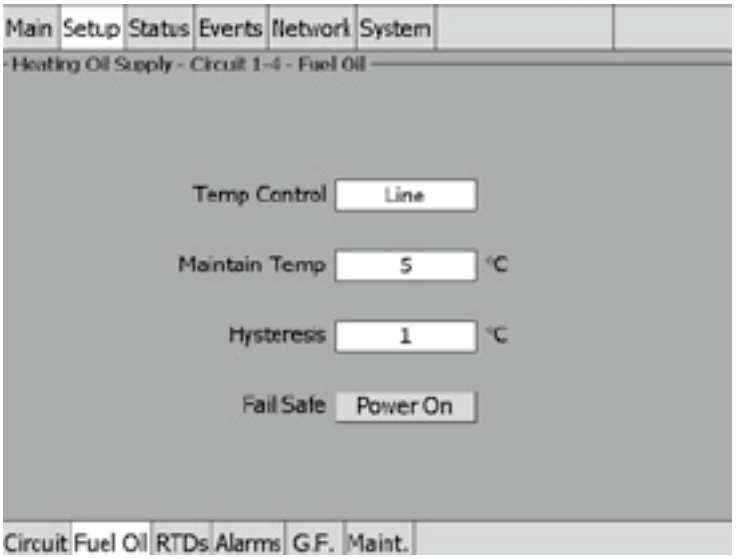


Fig. 3.66 Setup|Fule Oil Line Control window

Setpoint Temperature: The setpoint temperature is the desired maintain temperature for the water pipe. Based on the measured control temperature, the ACS-30-EU-PCM2 will switch the relay output to maintain the system at the desired setpoint.

Range: 0°C to 10°C

Default: 5°C

Hysteresis: If the control temperature is above the setpoint temperature plus hysteresis, the relay output is turned off. If the control temperature is below the setpoint temperature, the output is turned on.

Range: 1°C to 6°C

Default: 3°C

Fail Safe: The Fail Safe control button turns the power on or off to the heating cable if the circuit loses all valid RTDs. When the last remaining sensor for control fails (or communication with the sensor is lost), the ACS-30-EU-UIT2:

- Signals an alarm for the failure of the sensor
- Changes control of the circuit to the fail safe control selected
- Changes the control status display to indicate that control of the circuit is in the fail safe state
- Records the events

When the sensor for control is returned to service, the ACS-30 controller signals the alarm has been cleared, returns the circuit to its normal control mode, and records both of these events.

Range: Power On or Power Off

Default: Power On

External Override: The dry contacts from a BMS system or external device may be assigned to the circuit to de-energize the circuit to save power when it is not needed. See Appendix 5.4 for detailed information about the connections. All temperature and system alarms are still active.

Assigning RTDs

After the control mode and parameters have been set tap Setup|RTDs window to assign RTDs to the circuit. When in line control mode you have the option of setting up to four RTDs for pipe line sensing. For detailed information on the Setup|RTD window refer to 2.2.3 Assigning and Sharing RTD Control and Monitoring on page 28. Input from an external dry contact may also be assigned to override the system. See Appendix 5.4 for detailed information about the connections.

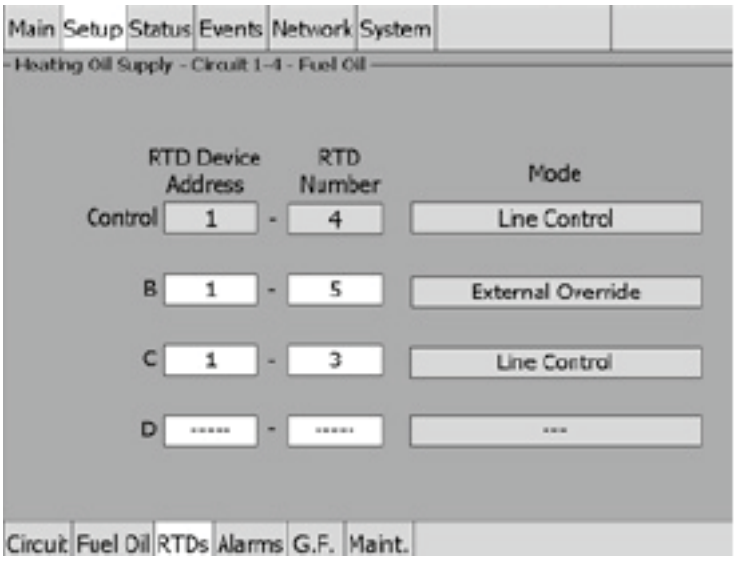


Fig. 3.67 Setup|RTDs window (Fuel Oil Line Control)

Assigning Temperature Alarms

Once RTDs have been assigned to the circuit high and low temperature alarms may be set.

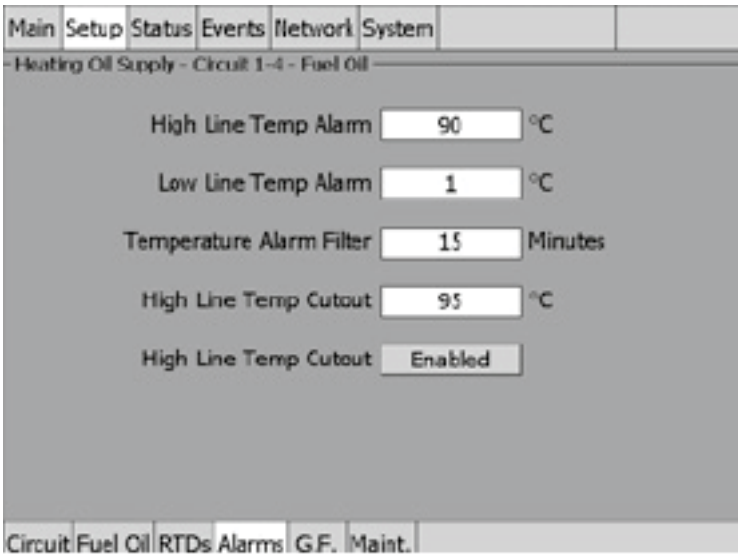


Fig. 3.68 Setup|Alarms window (Fuel Oil Line Control)

High Line Temp Alarm: If any RTDs assigned to a circuit measures a temperature above this threshold, the ACS-30-EU-UIT2 generates an alarm. The limit can be set for any temperature value you desire for your application within the range allowed.

Range: 35°C to 90ºC

Default: 90°C

Low Line Temp Alarm: If any RTDs assigned to a circuit measures a temperature below this threshold, the ACS-30-EU-UIT2 generates an alarm.

Range: 1ºC to maintain setpoint

Default: 1°C

Temperature Alarm Filter: This minimizes nuisance alarms by forcing the ACS-30-EU-UIT2 to verify that the alarm condition continually exists over the selected period of time before alarming.

Range: 0 to 999 minutes

Default: 15 minutes

Note: Setting the Alarm Filter to 0 minutes is mainly for testing and demonstration purposes. Choosing this option for normal use may cause nuisance alarming since this option may not allow the ACS-30-EU-UIT2 time to verify that the alarm conditions exist.
High Line Temp Cut-Out: If any RTDs assigned to a circuit measures a temperature above this threshold, the ACS-30-EU-UIT2 generates an alarm and the relay output is turned off. If the high line temperature drops below this threshold minus the hysteresis, the output is turned on and normal duty cycle control is resumed.

Range: 40°C to 95ºC

Default: 95ºC

High Line Temp Cut-Out Enable/Disable: Enables or disables the high line temp cut-out capability. When enabled, the ACS-30-EU-UIT2 alarms and the output relay turns OFF if any RTDs exceeds the cut-out value for the alarm filter time period. If the high line temp cut-out is disabled, the relay output will continue to function normally without the high temperature cut-out feature.

Options: Enable or Disable

Default: Enable

Assigning Ground-Fault Alarm and Trip Levels

The Setup|G.F. window allows you to set the alarm and trip levels.

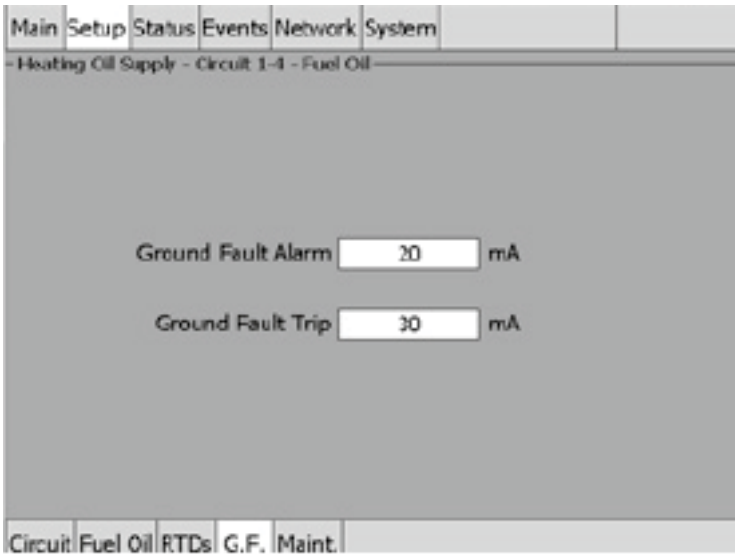


Fig. 3.69 Setup|G.F. window (Fuel Oil Line Control)

Input the Ground-Fault Alarm and Ground-Fault Trip:

Ground-Fault Alarm: When the ground-fault current exceeds this level the ACS-30-EU-UIT2 goes in alarm.

Range: 10 to 200 mA

Default: 20 mA

Ground-Fault Trip: When the ground-fault current exceeds this level the ACS-30-EU-PCM2 turns off the circuit relay.

Range: 10 to 200 mA

Default: 30 mA

Assigning Power Cycle Test

The Setup|Maint. window allows you to enable the Power Cycle test start time and frequency. After the start time and frequency are entered the time of the next test will be displayed on this screen.

Note: If the circuit is disabled, forced on, or forced off, the power cycle test will be disabled until the circuit is enabled.

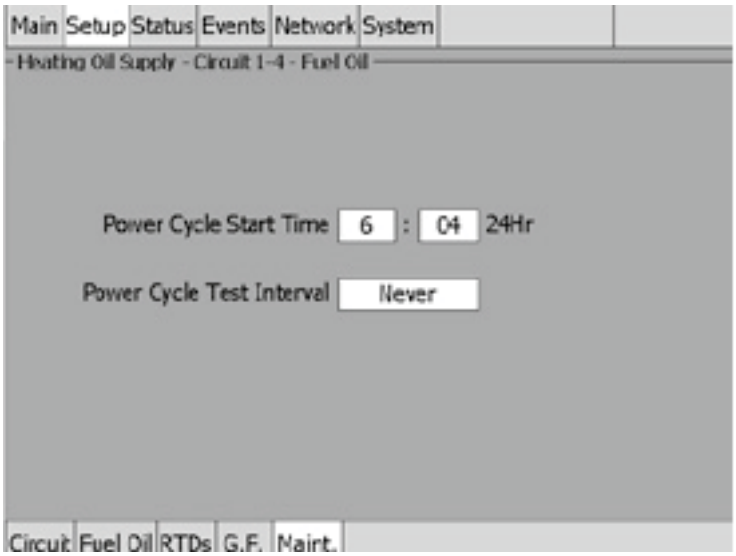


Fig. 3.70 Setup|Maint. (Fuel Oil Line Control)

Input the start time and frequency for the Power Cycle test:

Power Cycle Start Time: The time of day to start the Power Cycle test

Range: 00:00 to 23:59

Default: Each circuit is assigned a unique default start time calculated from the device address and relay number.

Power Cycle Test Interval: The frequency to run the Power Cycle Test

Range: Never, Daily, Weekly and Monthly

Default: Never

3.6.3 TEMP CONTROL – PASC CONTROL

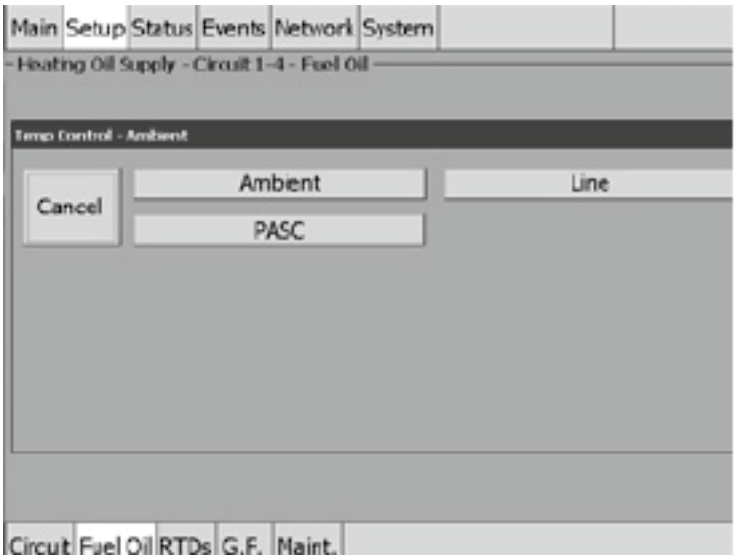


Fig. 3.71 Fuel Oil Temperature PASC Control window

The Temp Control window allows you to select the temperature control mode to Ambient Control, Line Control or PASC. This option depends on where the controlling RTD inputs are situated and utilized: either measuring the temperature of the environment surrounding the pipe (ambient), or directly on the pipe itself (line). Tap PASC.

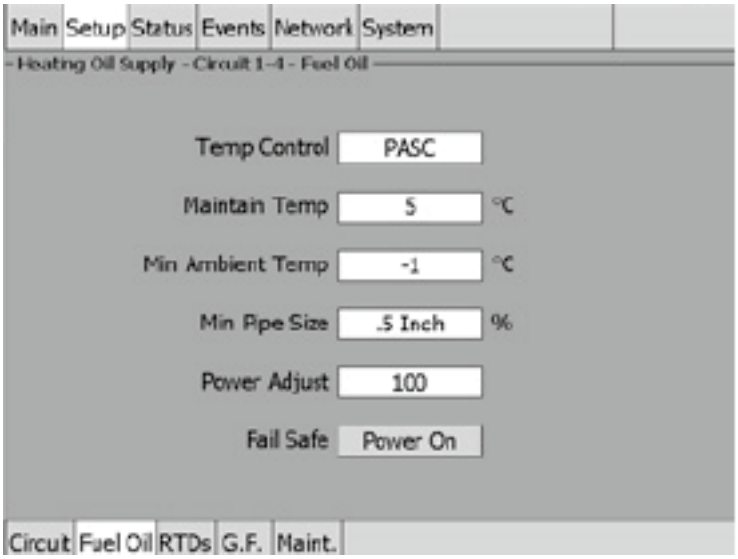


Fig. 3.72 Setup|Fuel Oil PASC Control window

PASC (Proportional Ambient Sensing Control): PASC takes advantage of the fact that the heat loss from a pipe is proportional to the temperature difference between the pipe and the ambient air. This is true regardless of heater type, insulation type, or pipe size. Once the heat tracing and insulation on a pipe has been designed to balance heat input with heat loss for maintaining at the maintain temperature the pipe, the main variable in controlling the pipe temperature becomes the ambient air temperature.

The ACS-30 system has a control algorithm that uses the measured ambient temperature, the desired maintain temperature, minimum ambient temperature assumption used during design, and size of the smallest pipe diameter to calculate how long the heater should be on or off to maintain a near-constant pipe temperature.

Maintain temperature setpoint:: enter the maintain temperature for your installation:

Range: 0°C to 10°C

Default: 5°C

Minimum Ambient: Enter the minimum ambient temperature for your installation

Range: – 40°C to Maintain temperature

Default: – 1°C

Min Pipe Size: Min. Pipe Size is the diameter of the smallest heat-traced pipe in the group controlled by this circuit. Small diameter pipes heat up and cool down more rapidly than larger diameter pipe. Therefore, the PASC duty cycle is calculated over a shorter time base. Larger diameter pipes heat and cool less rapidly, so the on/off periods for the heater system can be stretched over a longer period. If electromechanical contactors are being used to control the heater circuit, the longer time base reduces the number of contactor on/off cycles and extends the contactor life.

Select: 0.5, 1, ⩾ 2 inches

Default: 0.5 inches

Power Adjust: This allows the PASC control to be adjusted when the heating cable output is greater than the design assumption, or if the pipe insulation proves to be more efficient than assumed. Pipe temperature may run higher or lower than desired if the heating cable has a different output than required to offset the heat loss. The Power Adjust parameter enables a reduction or an increase in the heating effective power by entering a value less or greater than 100%

Range: 10 to 200%

Default: 100%

IMPORTANT: If improperly used, the Power Adjust parameter can cause the piping to get too cold or too hot. If unsure, leave at 100%. Do not change this value unless an engineer calculates the temperature impact on the system and determines that it is safe to do so. Be particularly cautious if the circuit has more than one diameter of pipe or type of heat tracing. Contact a Pentair Thermal Management representative for assistance with this factor.

Fail Safe: The Fail Safe control button turns the power on or off to the heating cable if the circuit loses all valid RTDs.

When the last remaining sensor for control fails (or communication with the sensor is lost), the ACS-30-EU-UIT2:

- Signals an alarm for the failure of the sensor
- Changes control of the circuit to the fail safe control selected
- Changes the control status display to indicate that control of the circuit is in the fail safe state
- Records the events

When the sensor for control is returned to service, the ACS-30 controller signals the alarm has been cleared, returns the circuit to its normal control mode, and records both of these events.

Range: Power On or Power Off

Default: Power On

External Override: The dry contacts from a BMS system or external device may be assigned to the circuit to de-energize the circuit to save power when it is not needed. See Appendix 5.4 for detailed information about the connections. All temperature and system alarms are still active.

Assigning RTDs

After the control mode and parameters have been set tap Setup|RTDs window to assign RTDs to the circuit. When in PASC control mode you have the option of setting up to four RTDs for ambient sensing PASC control. In this mode you can have up to three of the four RTDs set to monitor the pipe. For detailed information on the RTD window refer to 2.2.3 Assigning and Sharing RTD Control and Monitoring on page 28. Input from an external dry contact may also be assigned to override the system. See Appendix 5.4 for detailed information about the connections.

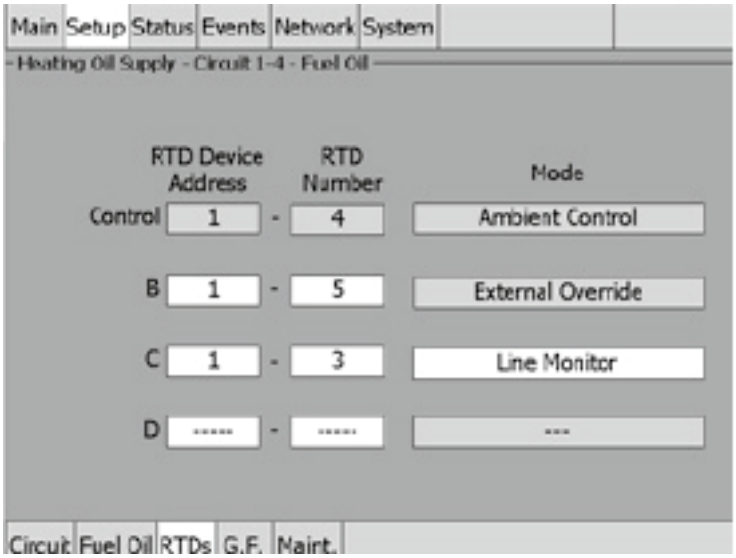


Fig. 3.73 Setup|RTDs window (Fuel Oil PASC Control)

Assigning Temperature Alarms

Once RTDs have been assigned to the circuit high and low temperature alarms may be set.

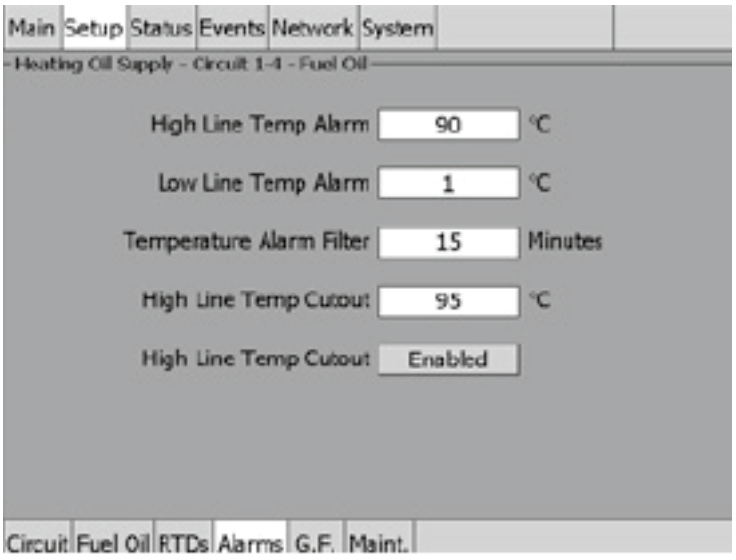


Fig. 3.74 Setup|Alarms window (Fuel Oil PASC Control)

Note: Temperature alarms can only be associated to line monitoring RTDs.

High Line Temp Alarm: If any RTDs assigned to a circuit measures a temperature above this threshold, the ACS-30-EU-UIT2 generates an alarm. The limit can be set for any temperature value you desire for your application within the range allowed.

Range: 35°C to 90°C

Default: 90°C

Low Line Temp Alarm: If any RTDs assigned to a circuit measures a temperature below this threshold, the ACS-30-EU-UIT2 generates an alarm.

Range: 1ºC to maintain temperature

Default: 1ºC

Temperature Alarm Filter: This minimizes nuisance alarms by forcing the ACS-30-EU-UIT2 to verify that the alarm condition continually exists over the selected period of time before alarming.

Range: 0 to 999 minutes

Default: 15 minutes

Note: Setting the Alarm Filter to 0 minutes is mainly for testing and demonstration purposes. Choosing this option for normal use may cause nuisance alarming since this option may not allow the ACS-30-EU-UIT2 time to verify that the alarm conditions exist.

High Line Temp Cut-Out: If any RTDs assigned to a circuit measures a temperature above this threshold, the ACS-30-EU-UIT2 generates an alarm and the relay output is turned off. If the high line temperature drops below this threshold minus the hysteresis, the output is turned on and normal control is resumed.

Range: 40°C to 95ºC

Default: 95ºC

High Line Temp Cut-Out Enable/Disable: Enables or disables the high line temp cut-out capability. When enabled, the ACS-30-EU-UIT2 alarms and the output relay turns OFF if any RTDs exceeds the cut-out value for the alarm filter time period. If the high line temp cut-out is disabled, the relay output will continue to function normally without the high temperature cut-out feature.

Options: Enable or Disable

Default: Enable

Assigning Ground-Fault Alarm and Trip Levels

The Setup|G.F. window allows you to set the alarm and trip levels.

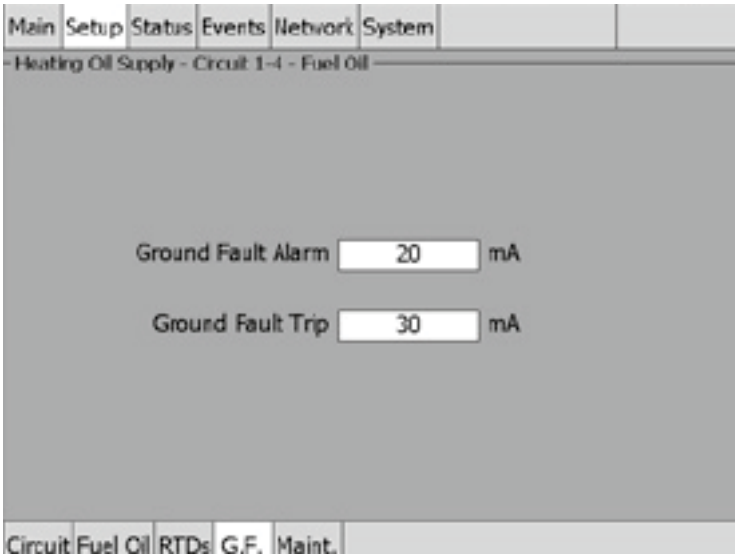


Fig. 3.75 Setup|G.F. window (Fuel Oil PASC Control)

Input the Ground-Fault Alarm and Ground-Fault Trip:

Ground-Fault Alarm: When the ground-fault current exceeds this level the ACS-30-EU-UIT2 goes in alarm.

Range: 10 to 200 mA

Default: 20 mA

Ground-Fault Trip: When the ground-fault current exceeds this level the ACS-30-EU-PCM2 turns off the circuit relay.

Range: 10 to 200 mA

Default: 30 mA

Assigning Power Cycle Test

The Setup|Maint. window allows you to enable the Power Cycle test start time and frequency. After the start time and frequency are entered the time of the next test will be displayed on this screen.

Note: If the circuit is disabled, forced on, or forced off, the power cycle test will be disabled until the circuit is enabled.

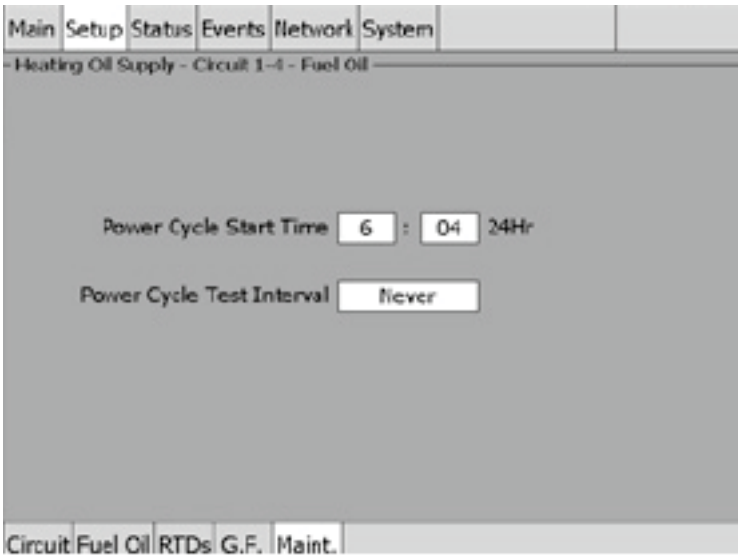


Fig. 3.76 Setup|Maint. window (Fuel Oil PASC Control)

Input the start time and frequency for the Power Cycle test:

Power Cycle Start Time: The time of day to start the Power Cycle test

Range: 00:00 to 23:59

Default: Each circuit is assigned a unique default start time calculated from the device address and relay number

Power Cycle Test Interval: The frequency to run the Power Cycle Test

Range: Never, Daily, Weekly and Monthly

Default: Never

3.7 Greasy Waste and Temperature Maintenance Mode

The Greasy Waste control mode prompts you to enter the control parameters for a Greasy Waste application and other flow maintenance applications with a maintain temperature greater than 20°C.

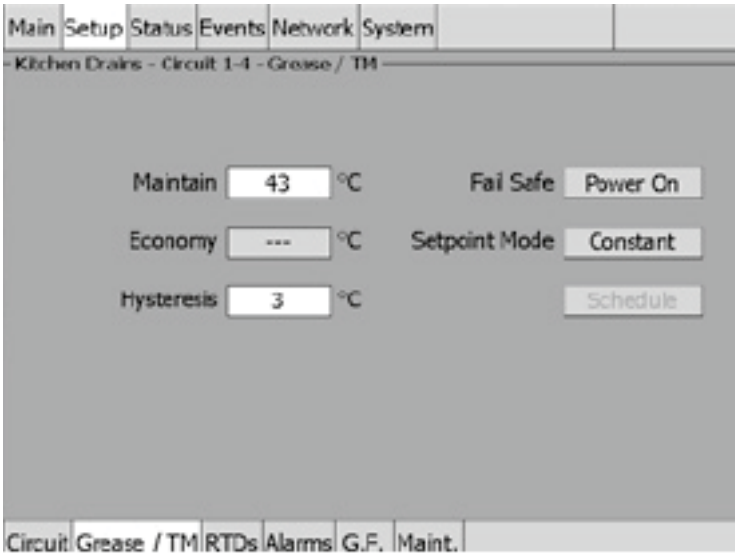


Fig. 3.77 Setup|Greasy Waste/TM window

Temperature Setpoint: The pipe temperature setpoint is the desired maintain temperature. Based on the measured control temperature, the ACS-30-EU-UIT2 will switch the relay output to maintain the system at the desired setpoint.

Range: 20°C to 70°C

Default: 43°C

Economy Temperature (optional): This value represents the temperature that you want the pipe to maintain when in economy mode. This input is only accessible if the Setpoint Mode is set to Variable which applies the temperature setpoint 24/7 scheduler function described in Appendix 5.2 24/7 Scheduler on page 138.

Enter the Economy temperature

Range: 20°C to Maintain temperature

Default: 20°C

Hysteresis: If the control temperature is above the setpoint temperature plus hysteresis, the relay output is turned off. If the control temperature is below the setpoint temperature, the output is turned on.

Range: 1°C to 6°C

Default: 3°C

Fail Safe: The Fail Safe control button turns the power on or off to the heating cable if the circuit loses all valid RTDs. When the last remaining sensor for control fails (or communication with the sensor is lost), the ACS-30-EU-UIT2:

- Signals an alarm for the failure of the sensor
- Changes control of the circuit to the fail safe control selected
- Changes the control status display to indicate that control of the circuit is in the fail safe state
- Records the events

When the sensor for control is returned to service, the ACS-30 controller signals the alarm has been cleared, returns the circuit to its normal control mode, and records both of these events.

Options: Power On or Power Off

Default: Power On

Schedule: Tapping on this button will bring up the Scheduler.
See Appendix 5.2 24/7 cheduler on page 138 for more information.

Assigning RTDs

Tap Setup|RTDs window to assign RTDs after the control mode and parameters have been set. In this mode you have the option of setting up to four RTDs for pipe temperature sensing. For detailed information on the RTD window refer to 2.2.3 Assigning and Sharing RTD Control and Monitoring on page 28.

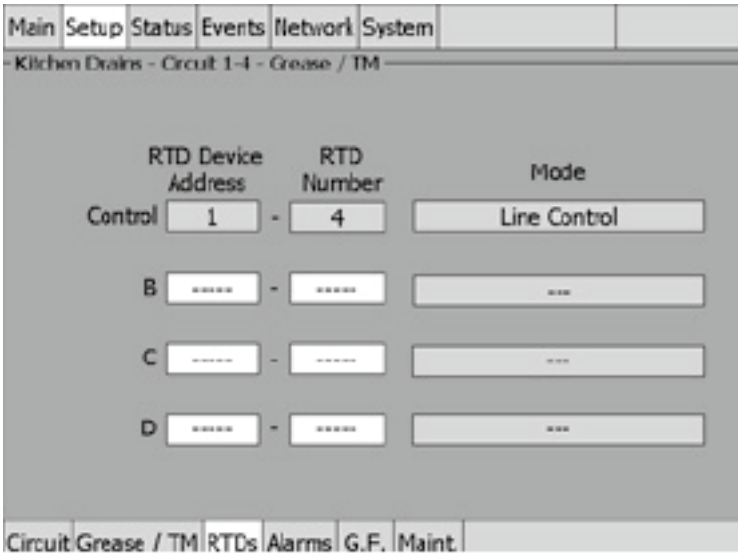


Fig. 3.78 Setup|RTDs window (Grease Waste/TM)

Assigning Temperature Alarms

Once RTDs have been assigned to the circuit the alarm button appears then high and low temperature alarms may be set. Tap the Alarms button.

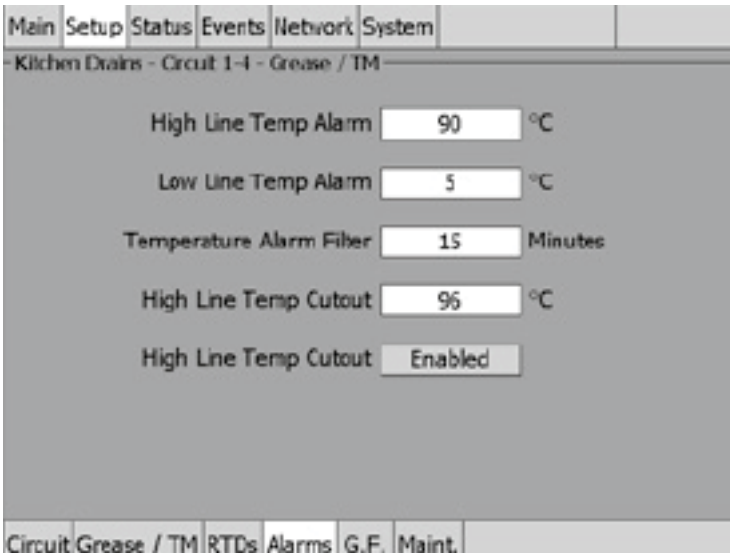


Fig. 3.79 Setup|Alarm window (Grease Waste/TM)

High Line Temp Alarm: If any RTDs assigned to a circuit measures a temperature above this threshold, the ACS-30-EU-UIT2 generates an alarm. The limit can be set for any temperature value you desire for your application within the range allowed.

Range: Maintain temperature plus 6°C to 90°C

Default: 90°C

Low Line Temp Alarm: If any RTDs assigned to a circuit measures a temperature below this threshold, the ACS-30-EU-UIT2 generates an alarm.

Range: 5°C to maintain/economy temperature

Default: 5°C

Temperature Alarm Filter: This minimizes nuisance alarms by forcing the ACS-30-EU-UIT2 to verify that the alarm condition continually exists over the selected period of time before alarming.

Range: 0 to 999 minutes

Default: 15 minutes

Note: Setting the Alarm Filter to 0 minutes is mainly for testing and demonstration purposes. Choosing this option for normal use may cause nuisance alarming since this option may not allow the ACS-30-EU-UIT2 time to verify that the alarm conditions exist.
High Line Temp Cut-Out: If any RTDs assigned to a circuit measures a temperature above this threshold, the ACS-30-EU-UIT2 generates an alarm and the relay output is turned off. If the high line temperature drops below this threshold minus the hysteresis, the output is turned on and normal control is resumed.

Range: High Line Temp Alarm plus 6°C to 96 °C

Default: 96°C

High Line Temp Cut-Out Enable/Disable: Enables or disables the high line temp cut-out capability. When enabled, the ACS-30-EU-UIT2 alarms and the output relay turns OFF if any RTDs exceeds the cut-out value for the alarm filter time period. If the high line temp cut-out is disabled, the relay output will con- tinue to function normally without the high temperature cut-out feature.

Options: Enable or Disable

Default: Enable

Assigning Ground-Fault Alarm and Trip Levels

The Ground-fault window allows you to set the alarm and trip levels. Tap the G.F. button to access the ground-fault window.

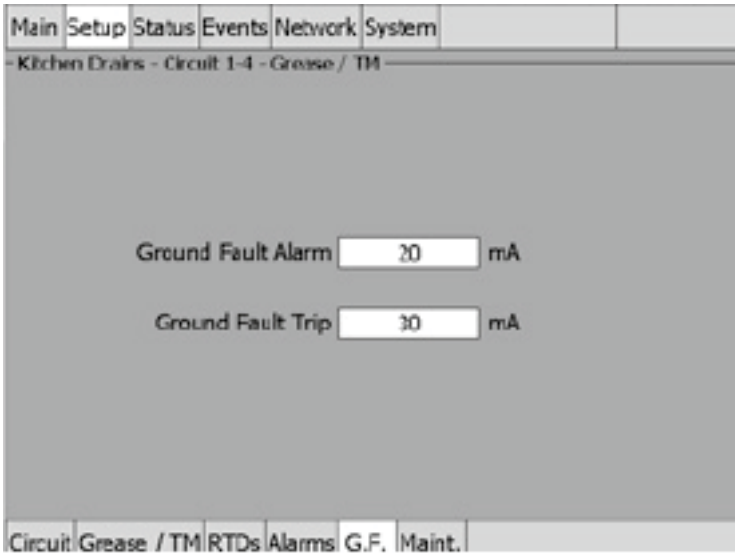


Fig. 3.80 Setup|G.F. window (Grease Waste/TM)

Input the Ground-Fault Alarm and Ground-Fault Trip:

Ground-Fault Alarm: When the ground-fault current exceeds this level the ACS-30-EU-UIT2 goes in alarm.

Range: 10 to 200 mA

Default: 20 mA

Ground-Fault Trip: When the ground-fault current exceeds this level the ACS-30-EU-PCM2 turns off the circuit relay.

Range: 10 to 200 mA

Default: 30 mA

Assigning Power Cycle Test

The Setup|Maint. window allows you to enable the Power Cycle test start time and frequency. After the start time and frequency are entered the time of the next test will be displayed on this screen.

Note: If the circuit is disabled, forced on, or forced off, the power cycle test will be disabled until the circuit is enabled.

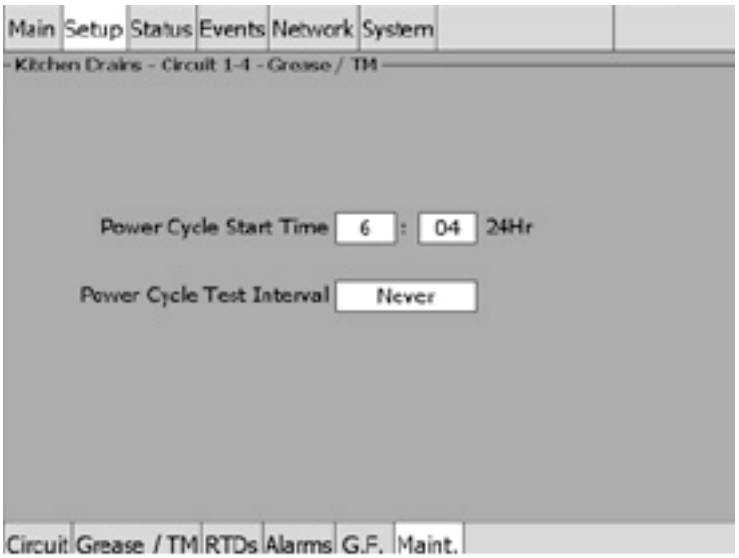


Fig. 3.81 Setup|Maint. window (Grease Waste/TM)

Input the start time and frequency for the Power Cycle test:

Power Cycle Start Time: The time of day to start the Power Cycle test

Range: 00:00 to 23:59

Default: Each circuit is assigned a unique default start time calculated from the device address and relay number.

Power Cycle Test Interval: The frequency to run the Power Cycle Test

Range: Never, Daily, Weekly and Monthly

Default: Never

3.8 Roof and Gutter De-icing Mode

The Roof & Gutter De-icing control mode prompts you to enter the control parameters for a Roof and Gutter De-icing application. In this mode, you will be given three different control method options: External Device, Ambient Temp, Bracketed Ambient Temp and Surface Temp.

3.8.1 TEMP CONTROL – EXTERNAL DEVICE CONTROL

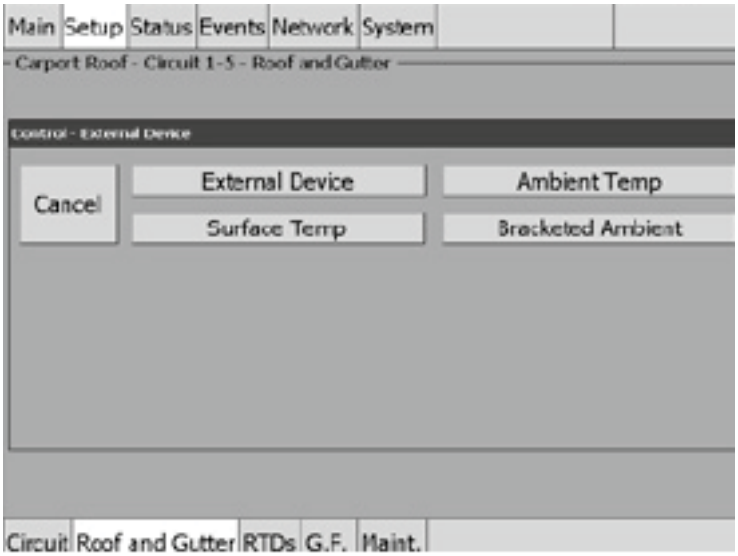


Fig. 3.82 Roof & Gutter External Device Control window

The External Device window allows you to control your Roof & Gutter De-icing application using an external input from the ACS-30-EU-EMDR-10-MOD module. Refer to Appendix 5.4 Connecting External Control Devices on page 149 for connection details. Tap External Device.

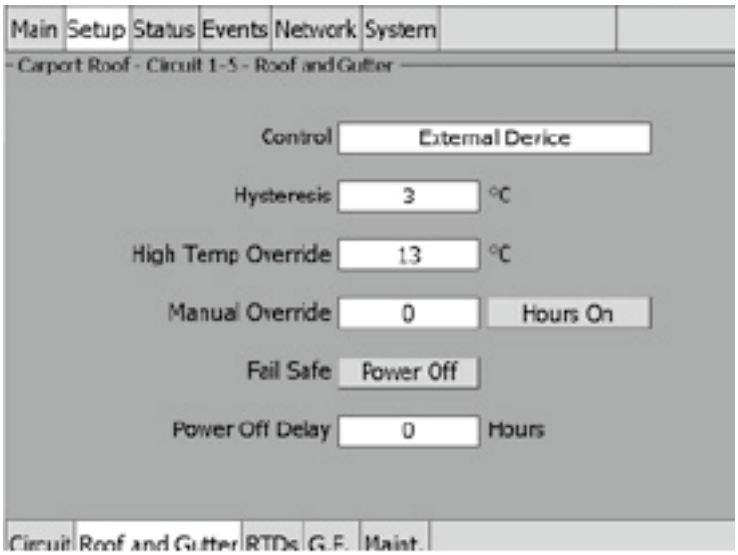


Fig. 3.83 Setup|Roof and Gutter External Device Control window

Control: In the external device mode the output from a roof and gutter de-icing controller (ACS-30-EU-EMDR-10-MOD) is connected to a RTD input terminal. The heating circuit is energized or de-energized based on the resistance value provided by the external input.
Hysteresis: If a RTD is used on the system and the measured temperature is above the high temperature override setpoint temperature plus hysteresis, the relay output is turned off. If the control temperature is below the setpoint temperature, the output is turned on. This parameter is modifiable only if there is at least one RTD used as High Temp Override.

Range: 1°C to 6°C

Default: 3C

High Temperature Override: The high temperature override is the setpoint that will override the external device input. This parameter is active only if there is at least one RTD used as High Temp Override.

Range: 4°C to 32°C

Default: 13°C

Override Manual: This feature provides a manual override to force the circuit on or off for a specified period of time for the circuit.

Range: 0 to 10 hours

Default: 0 hours

Hrs: On or off

Power Off Delay: Continue to power the circuit when the external control devices contacts open.

Range: 0 to10 hours

Default: 0 hours

Fail Safe: The Fail Safe control button turns the power on or off to the heating cable if the circuit loses all valid RTDs. When the last remaining sensor for control fails (or communication with the sensor is lost), the ACS-30-EU-UIT2:

- Signals an alarm for the failure of the sensor
- Changes control of the circuit to the fail safe control selected
- Changes the control status display to indicate that control of the circuit is in the fail safe state
- Records the events

When the sensor for control is returned to service, the ACS-30 controller signals the alarm has been cleared, returns the circuit to its normal control mode, and records both of these events.

Range: Power On or Power Off

Default: Power Off

Assigning RTDs

After the control mode and parameters are set, tap Setup|RTDs window to assign RTDs to thecircuit.

When in external device control mode you have the option of setting up to four inputs through any RTD inputs in your system. You must have a least one External Control device, and for High Temperature Override at least one RTD must be assigned. For detailed information on the RTD window refer to Section 2.2.3 Assigning and Sharing RTD Control and Monitoring on page 28.

Note: If a RTD is connected to the ACS-30-EU-PCM2 relay the heating cable is assigned in this mode it must be assigned to high temperature override.

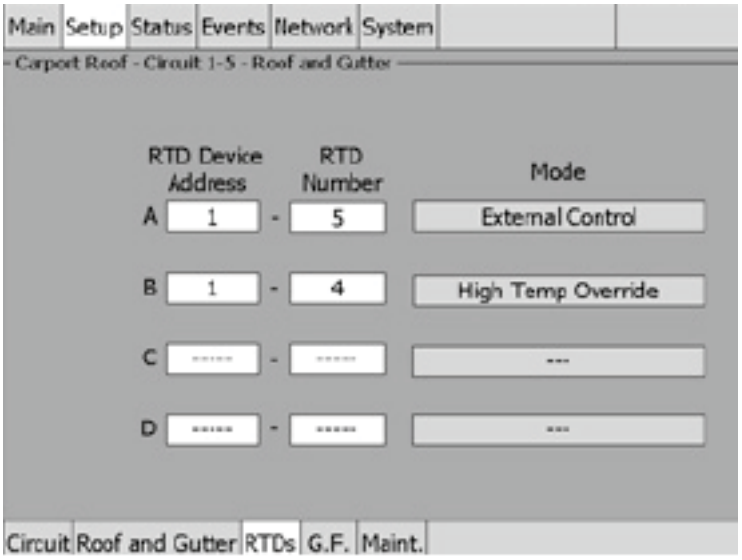


Fig. 3.84 Setup|RTDs window (Roof & Gutter External Control)

In this example a RTD was connected to the ACS-30-EU-PCM2 relay and the External Control input was assigned from a different input.

Assigning Ground-Fault Alarm and Trip Levels

The Setup|G.F. window allows you to set the alarm and trip levels. Tap the G.F. button to access the Setup|G.F. window.

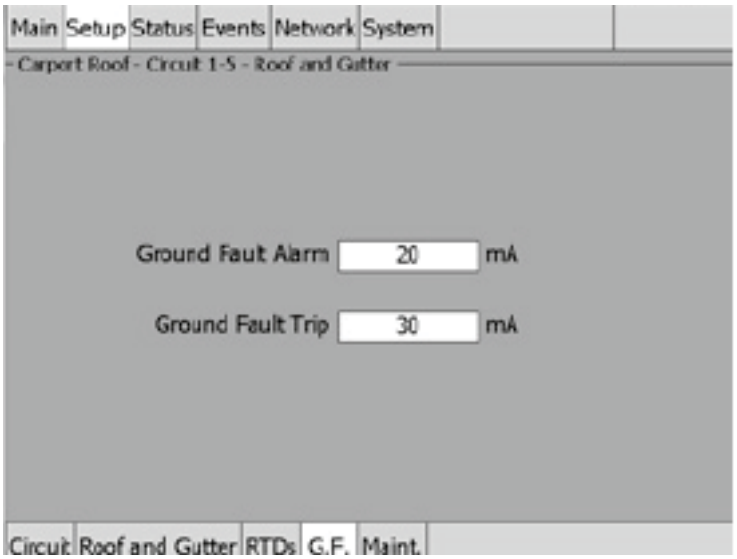


Fig. 3.85 Setup|G.F. Window (Roof & Gutter External Device)

Input the Ground-Fault Alarm and Ground-Fault Trip:

Ground-Fault Alarm: When the ground-fault current exceeds this level the ACS-30-EU-UIT2 goes in alarm.

Range: 10 to 200 mA

Default: 20 mA

Ground-Fault Trip: When the ground-fault current exceeds this level the ACS-30-EU-PCM2 turns off the circuit relay.

Range: 10 to 200 mA

Default: 30 mA

Assigning Power Cycle Test

The Setup|Maint. window allows you to enable the Power Cycle test start time and frequency. Once the start time and test frequency are entered, the time of the next test will be displayed on this screen.

Note: If the circuit is disabled, forced on, or forced off, the power cycle test will be disabled until the circuit is enabled.

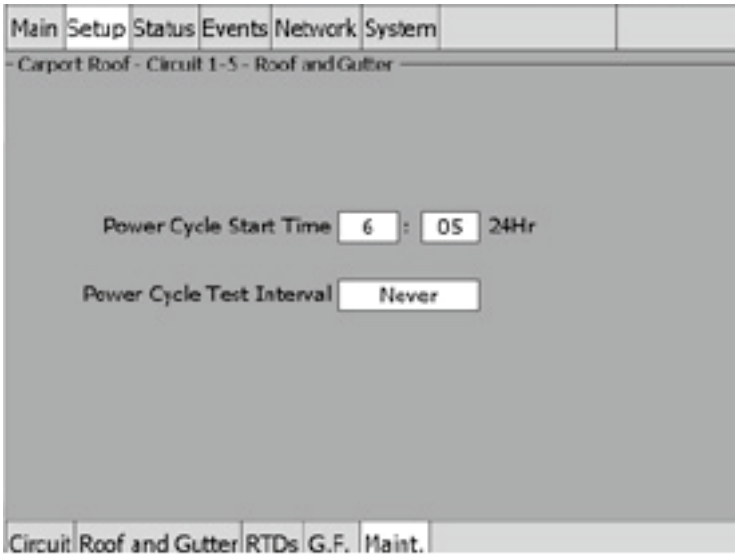


Fig. 3.86 Setup|Maint. Window (Roof & Gutter External Device)

Input the start time and frequency for the Power Cycle test:

Power Cycle Start Time: The time of day to start the Power Cycle test

Range: 00:00 to 23:59

Default: Each circuit is assigned a unique default start time calculated from the device address and relay number.

Power Cycle Test Interval: The frequency to run the Power Cycle Test

Range: Never, Daily, Weekly and Monthly

Default: Never

3.8.2 TEMP CONTROL – AMBIENT TEMPERATURE CONTROL

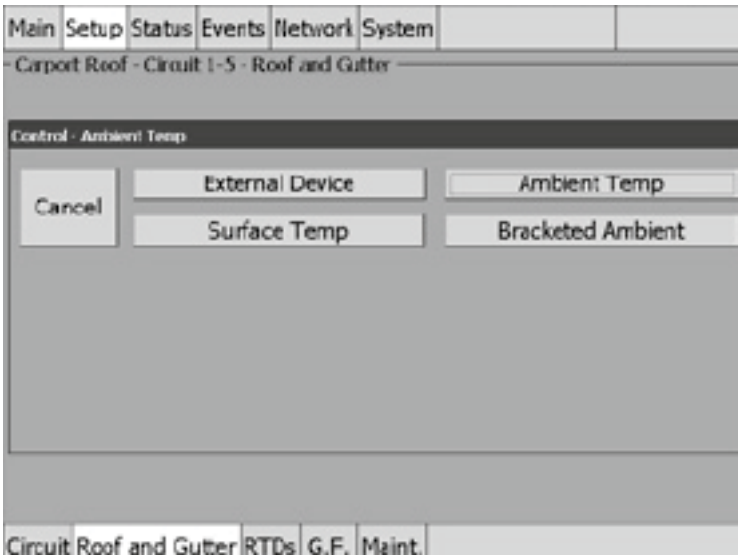


Fig. 3.87 Roof & Gutter - Ambient Temperature Control Window

The Ambient Temperature window allows you to control your Roof & Gutter application using ambient temperature. Tap Ambient Temp.

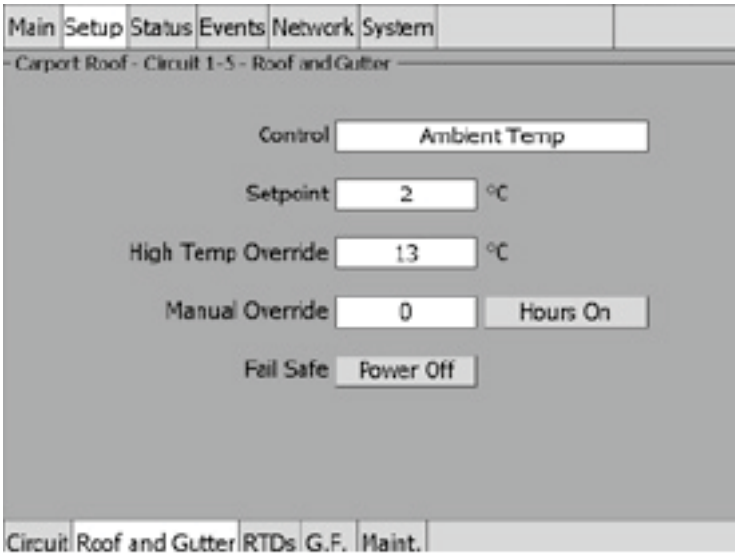


Fig. 3.88 Setup|Roof & Gutter - Ambient Temp Control Window

Setpoint: Enter the temperature setpoint for ambient control

Range: – 1°C to 10°C

Default: 2°C

High Temperature Override: The high temperature override is the setpoint that will override the ambient control temperature. This is typically used as a gutter sensor.

Range: 4°C to 32°C

Default: 13°C

Override Manual: This feature provides an additional override capability for the circuit.

Range: 0 to 10 hours

Default: 0 hours

Hrs: On or off

Fail Safe: The Fail Safe control button turns the power on or off to the heating cable if the circuit loses all valid RTDs. When the last remaining sensor for control fails (or communication with the sensor is lost), the ACS-30-EU-UIT2:

- Signals an alarm for the failure of the sensor
- Changes control of the circuit to the fail safe control selected
- Changes the control status display to indicate that control of the circuit is in the fail safe state
- Records the events

When the sensor for control is returned to service, the ACS-30 controller signals the alarm has been cleared, returns the circuit to its normal control mode, and records both of these events.

Range: Power On or Power Off

Default: Power Off

Assigning RTDs

After the control mode and parameters are set, tap Setup|RTDs window to assign RTDs to the circuit.

When in ambient control mode you have the option of setting up to four inputs through any RTD inputs in your system. You must have a least one RTD assigned for Ambient Control, the remaining RTD positions are optional and may be used for either ambient control or High Temperature Override. For detailed information on the RTD window refer 2.2.3 Assigning and Sharing RTD Control and Monitoring on page 28.

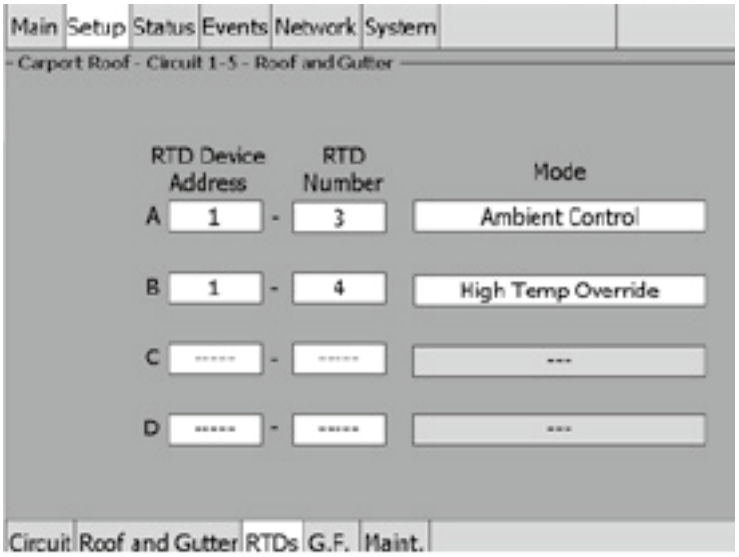


Fig. 3.89 Setup|RTDs window (Roof & Gutter - Ambient Temp Control)

Assigning Ground-Fault Alarm and Trip Levels

The Setup|G.F. window allows you to set the alarm and trip levels. Tap the G.F. button to access the Setup|G.F. window.

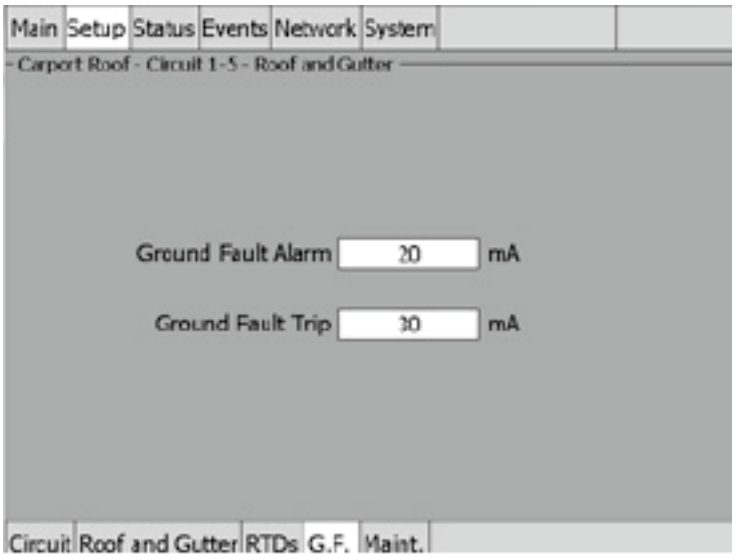


Fig. 3.90 Setup|G.F. Window (Roof & Gutter - Ambient Temp Control)

Input the Ground-Fault Alarm and Ground-Fault Trip:

Ground-Fault Alarm: When the ground-fault current exceeds this level the ACS-30-EU-UIT2 goes in alarm.

Range: 10 to 200 mA

Default: 20 mA

Ground-Fault Trip: When the ground-fault current exceeds this level the ACS-30-EU-PCM2 turns off the circuit relay.

Range: 10 to 200 mA

Default: 30 mA

Assigning Power Cycle Test

The Setup|Maint. window allows you to enable the Power Cycle test start time and frequency. Once the start time and test frequency are entered, the time of the next test will be displayed on this screen.

Note: If the circuit is disabled, forced on, or forced off, the power cycle test will be disabled until the circuit is enabled.

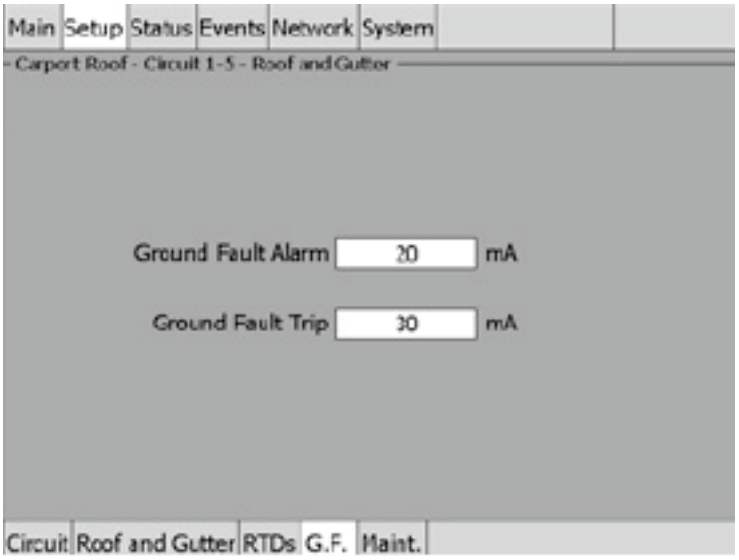


Fig. 3.91 Setup|Maint. Window (Roof & Gutter - Ambient Temp Control)

Power Cycle Start Time: The time of day to start the Power Cycle test

Range: 00:00 to 23:59

Default: Each circuit is assigned a unique default start time calculated from the device address and relay number.

Power Cycle Test Interval: The frequency to run the Power Cycle Test

Range: Never, Daily, Weekly and Monthly

Default: Never

3.8.3 TEMP CONTROL – BRACKETED AMBIENT TEMPERATURE CONTROL

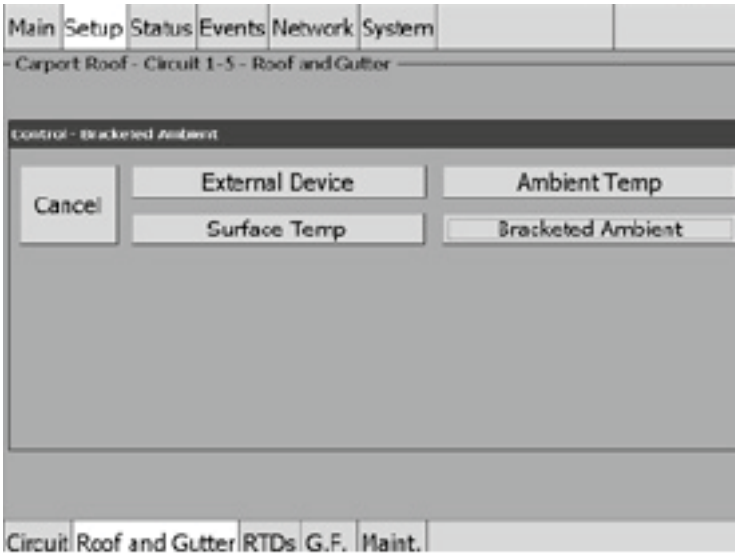


Fig. 3.92 Roof & Gutter - Bracketed Ambient Temperature Control Window

The Bracketed Ambient Temperature window allows you to control your Roof & Gutter application using ambient temperature. This mode saves energy by only powering the cable when potential ice dam formation conditions exist. Tap Bracketed Ambient.

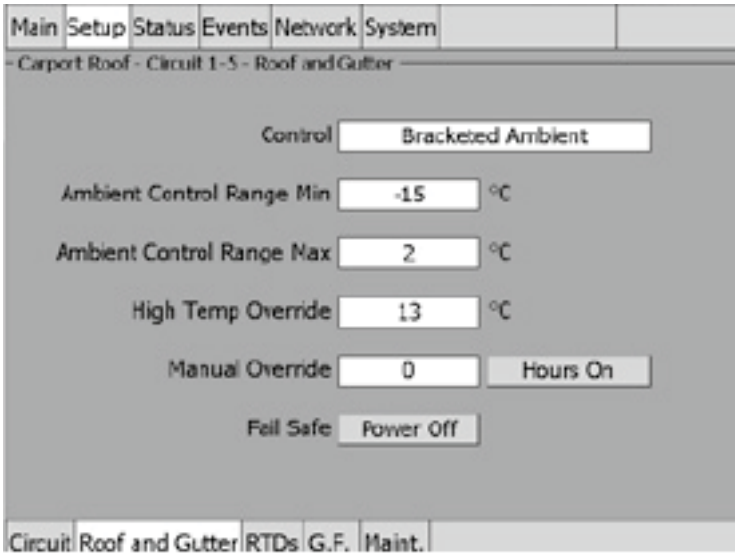


Fig. 3.93 Setup|Roof & Gutter - Bracketed Ambient Temp Control Window

Ambient Control Range: Enter the minimum and maximum ambient control range Min Ambient

Range: – 40°C to – 1°C

Default: – 15°C

Max Ambient

Range: – 1°C to 10°C

Default: 2°C

High Temperature Override: The high temperature override is the setpoint that will override the ambient control temperature. This is typically used as a gutter sensor.

Range: 4°C to 32°C

Default: 13°C

Override Manual: This feature provides an additional override capability for the circuit. This parameter is active only if no RTDs are configured as High temp Override.

Range: 0 to 10 hours

Default: 0 hours

Hrs: On or off

Fail Safe: The Fail Safe control button turns the power on or off to the heating cable if the circuit loses all valid RTDs. When the last remaining sensor for control fails (or communication with the sensor is lost), the ACS-30-EU-UIT2:

- Signals an alarm for the failure of the sensor
- Changes control of the circuit to the fail safe control selected
- Changes the control status display to indicate that control of the circuit is in the fail safe state
- Records the events

When the sensor for control is returned to service, the ACS-30 controller signals the alarm has been cleared, returns the circuit to its normal control mode, and records both of these events.

Range: Power On or Power Off

Default: Power Off

Assigning RTDs

After the control mode and parameters are set, tap Setup|RTDs window to assign RTDs to the circuit.

When in ambient control mode you have the option of setting up to four inputs through any RTD inputs in your system. You must have a least one RTD assigned for Ambient Control, the remaining RTD positions are optional and may be used for either ambient control or High Temperature Override. For detailed information on the RTD window refer 2.2.3 Assigning and Sharing RTD Control and Monitoring on page 28.

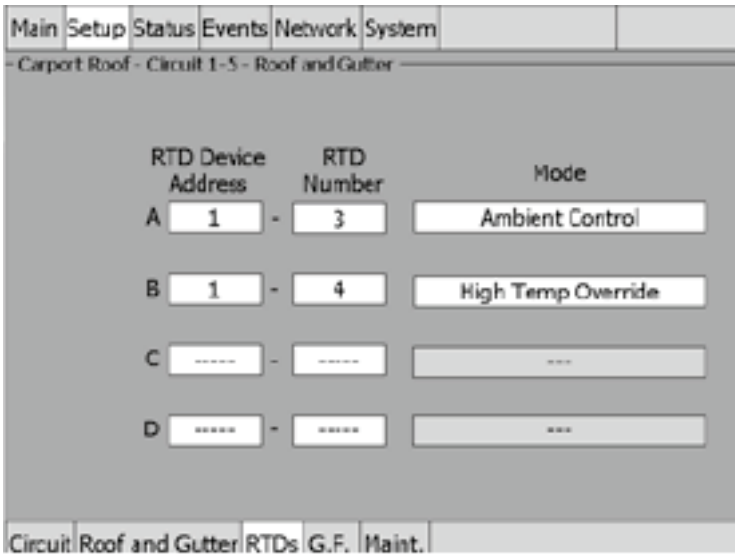


Fig. 3.94 Setup|RTDs window (Roof & Gutter - Bracketed Ambient Temp Control)

Assigning Ground-Fault Alarm and Trip Levels

The Setup|G.F. window allows you to set the alarm and trip levels. Tap the G.F. button to access the Setup|G.F. window.

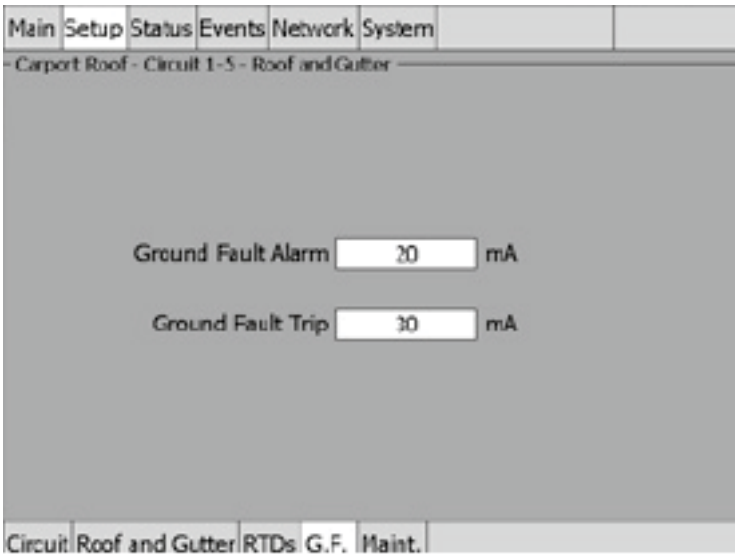


Fig. 3.95 Setup|G.F. Window (Roof & Gutter - Bracketed Ambient Temp Control)

Input the Ground-Fault Alarm and Ground-Fault Trip:

Ground-Fault Alarm: When the ground-fault current exceeds this level the ACS-30-EU-UIT2 goes in alarm.

Range: 10 to 200 mA

Default: 20 mA

Ground-Fault Trip: When the ground-fault current exceeds this level the ACS-30-EU-PCM2 turns off the circuit relay.

Range: 10 to 200 mA

Default: 30 mA

Assigning Power Cycle Test

The Setup|Maint. window allows you to enable the Power Cycle test start time and frequency. Once the start time and test frequency are entered, the time of the next test will be displayed on this screen.

Note: If the circuit is disabled, forced on, or forced off, the power cycle test will be disabled until the circuit is enabled.

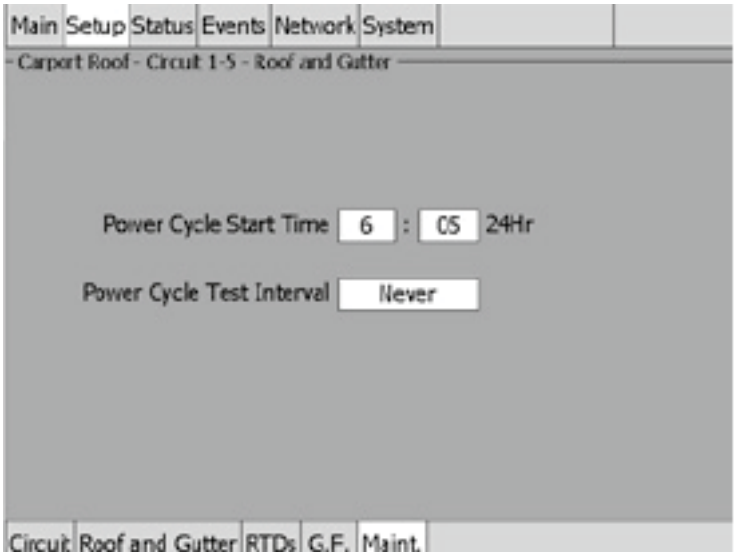


Fig. 3.96 Setup|Maint. Window (Roof & Gutter - Bracketed Ambient Temp Control)

Power Cycle Start Time: The time of day to start the Power Cycle test

Range: 00:00 to 23:59

Default: Each circuit is assigned a unique default start time calculated from the device address and relay number.

Power Cycle Test Interval: The frequency to run the Power Cycle Test

Range: Never, Daily, Weekly and Monthly

Default: Never

3.8.4 TEMP CONTROL – SURFACE TEMPERATURE CONTROL

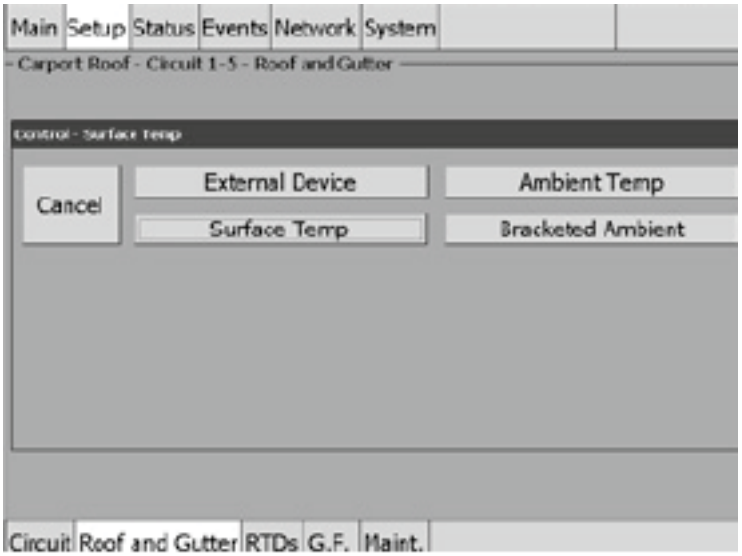


Fig. 3.97 Roof & Gutter - Surface Temp Control Window

The Ambient Temperature window allows you to control your Roof & Gutter application using ambient temperature. Tap Surface Temp.

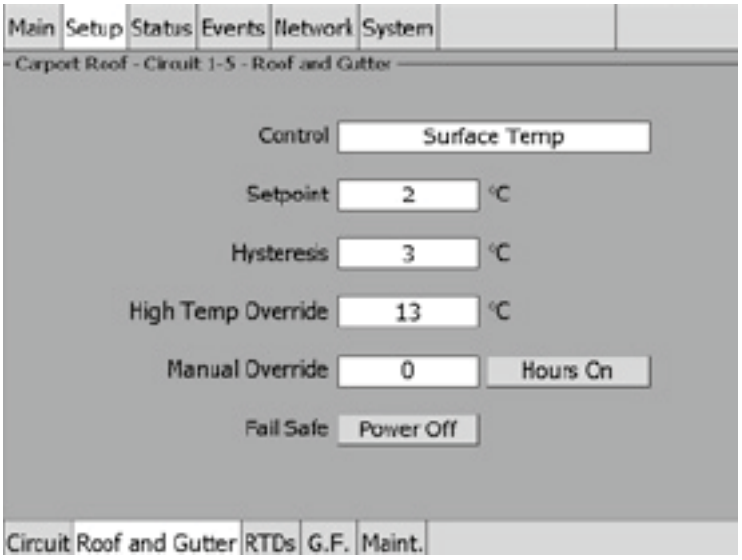


Fig. 3.98 Setup|Roof and Gutter - Surface Temp Control Window

Setpoint: Enter the setpoint temperature for surface temperature control

Range: – 1°C to 10°C

Default: 2°C

Hysteresis: If the measured temperature is above the setpoint temperature plus hysteresis, the relay output is turned off. If the control temperature is below the setpoint temperature, the output is turned on.

Range: 1°C to 5°C

Default: 3°C

High Temperature Override: The high temperature override will override the control temperature when multiple RTD inputs are assigned to a circuit.

Range: 4°C to 32°C

Default: 13°C

Override Manual: This feature provides an additional override capability for the circuit.

Range: 0 to 10 hours

Default: 0 hours

Hrs: On or off

Fail Safe: The Fail Safe control button turns the power on or off to the heating cable if the circuit loses all valid RTDs. When the last remaining sensor for control fails (or communication with the sensor is lost), the ACS-30-EU-UIT2:

- Signals an alarm for the failure of the sensor
- Changes control of the circuit to the fail safe control selected
- Changes the control status display to indicate that control of the circuit is in the fail safe state
- Records the events

When the sensor for control is returned to service, the ACS-30 controller signals that the alarm has been cleared, returns the circuit to its normal control mode, and records both of these events.

Range: Power On or Power Off

Default: Power Off

Assigning RTDs

After the control mode and parameters are set, tap Setup|RTDs window to assign RTDs to the circuit.

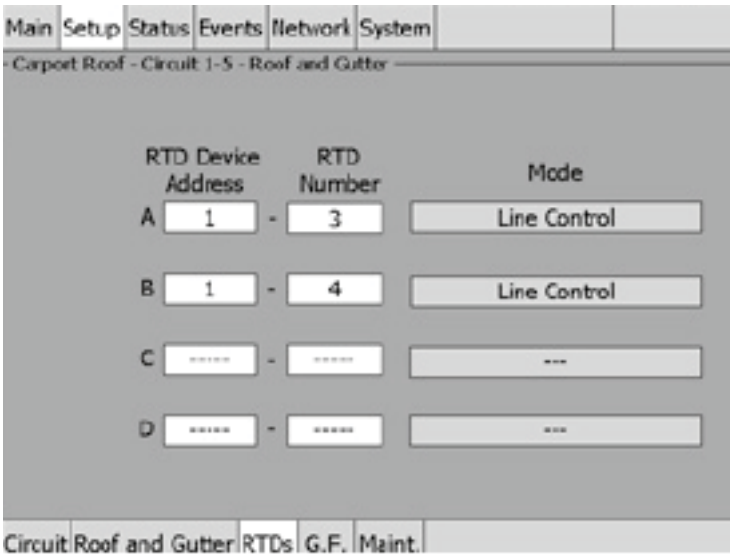


Fig. 3.99 Setup|RTDs Window (Roof & Gutter - Surface Temp Control)

When in Surface temperature control mode you have the option of setting up to four inputs through any RTD inputs in your system. For detailed information on the RTD window refer to section 2.2.3 Assigning and Sharing RTD Control and Monitoring on page 28

Assigning Ground-Fault Alarm and Trip Level

The G.F. window allows you to set the alarm and trip levels.

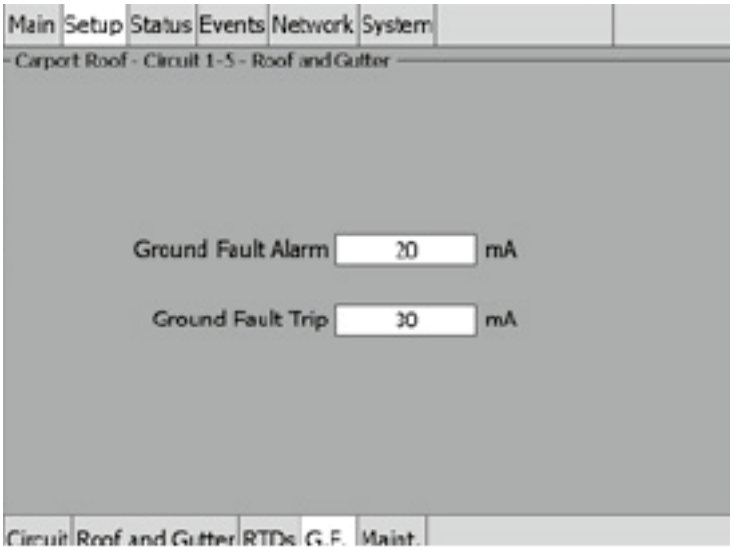


Fig. 3.100 Setup|G.F. Window (Roof & Gutter - Surface Temp Control)

Input the Ground-Fault Alarm and Ground-Fault Trip:

Ground-Fault Alarm: When the ground-fault current exceeds this level the ACS-30-EU-UIT2 goes into alarm.

Range: 10 to 200 mA

Default: 20 mA

Ground-Fault Trip: When the ground-fault current exceeds this level the ACS-30-EU-PCM2 turns off the circuit relay.

Range: 10 to 200 mA

Default: 30 mA

Assigning Power Cycle Test

The Setup|Maint. window allows you to enable the Power Cycle test start time and frequency. Once the start time and test frequency are entered, the time of the next test will be displayed on this screen.

Note: If the circuit is disabled, forced on, or forced off, the power cycle test will be disabled until the circuit is enabled.

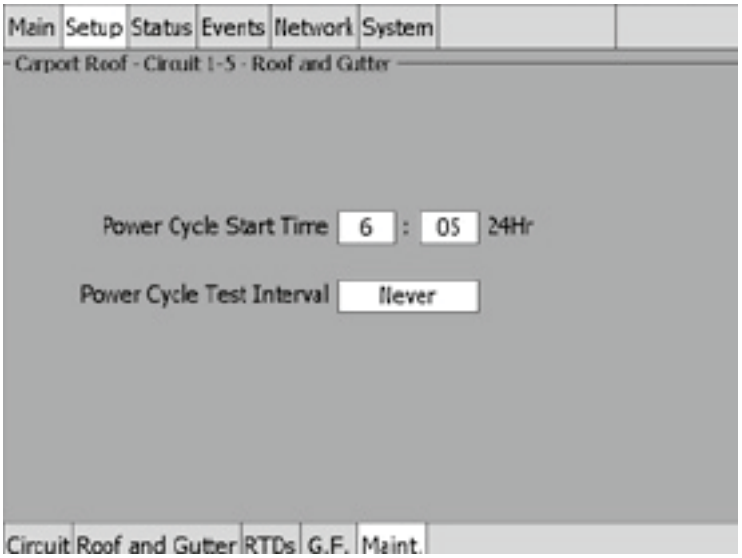


Fig. 3.101 Setup|Maint. Window (Roof & Gutter - Surface Temp Control)

Input the start time and frequency for the Power Cycle test:

Power Cycle Start Time: The time of day to start the Power Cycle test

Range: 00:00 to 23:59

Default: Each circuit is assigned a unique default start time calculated from the device address and relay number.

Power Cycle Test Interval: The frequency to run the Power Cycle Test

Range: Never, Daily, Weekly and Monthly

Default: Never

3.9 Snow Melting Mode

The Snow Melting control mode prompts you to enter the control parameters for a Surface Snow Melting application. In this mode, you will be given three different control method options: External Device, Ambient Temperature and Surface Temperature.

3.9.1 TEMP CONTROL – EXTERNAL DEVICE CONTROL

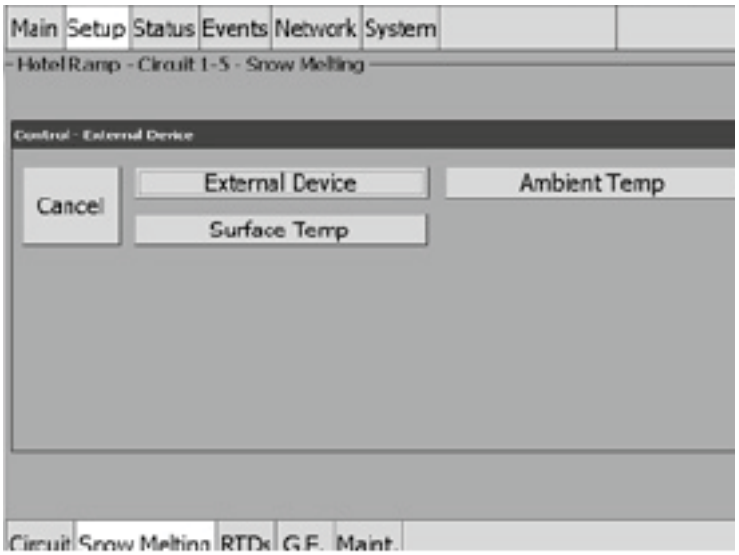


Fig. 3.102 Snow Melting External Device Control window

The External Device window allows you to control your Snow Melting application using an external input from the ACS-30-EU-VIA-DU-20-MOD module. Refer to Appendix 5.4 Connecting External Control Devices on page 149 for connection details. Tap External Device.

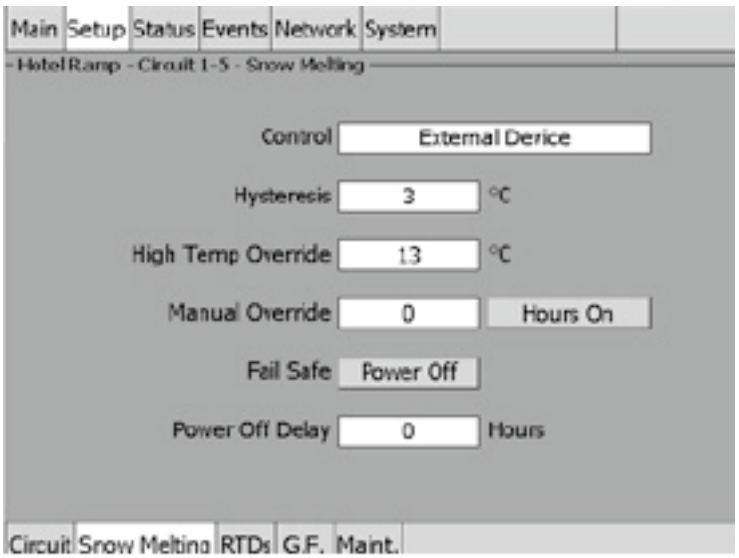


Fig. 3.103 Setup| Snow Melting External Device Control window

Control: In the external device mode the input from a snow controller (ACS-30-EU-VIA-DU-20-MOD) is connected to a RTD input terminal. The heating circuit is energized or de-energized based on the resistance value provided by the external input.

Hysteresis: If a RTD is used on the system and the measured temperature is above the high temperature override setpoint temperature plus hysteresis, the relay output is turned off. If the control temperature is below the setpoint temperature, the output is turned on. This parameter is modifiable only if there is at least one RTD used as High Temp Override.

Range: 1°C to 6°C

Default: 3C

High Temperature Override: The high temperature override is the setpoint that will override the external device input. This parameter is active only if there is at least one RTD used as High Temp Override.

Range: 4°C to 32°C

Default: 13°C

Override Manual: This feature provides an additional override capability for the circuit.

Range: 0 to 10 hours

Default: 0 hours

Hrs: On or off

Power Off Delay: Continue to power the circuit when the external control devices contacts open.

Range: 0 to10 hours

Default: 0 hours

Fail Safe: The Fail Safe control button turns the power on or off to the heating cable if the circuit loses all valid RTDs. When the last remaining sensor for control fails (or communication with the sensor is lost), the ACS-30-EU-UIT2:

- Signals an alarm for the failure of the sensor
- Changes control of the circuit to the fail safe control selected
- Changes the control status display to indicate that control of the circuit is in the fail safe state
- Records the events

When the sensor for control is returned to service, the ACS-30 controller signals the alarm has been cleared, returns the circuit to its normal control mode, and records both of these events.

Range: Power On or Power Off

Default: Power Off

Assigning RTDs

After the control mode and parameters are set, tap Setup|RTDs window to assign RTDs to the circuit.
When in external device control mode you have the option of setting up to four inputs through any RTD inputs in your system. You must have a least one External Control device, and for High Temperature Override at least one RTD must be assigned. For detailed information on the RTD window refer to 2.2.3 Assigning and Sharing RTD Control and Monitoring on page 28.

Note: If a RTD is connected to the ACS-30-EU-PCM2 relay the heating cable is assigned in this mode it must be assigned to high temperature override.

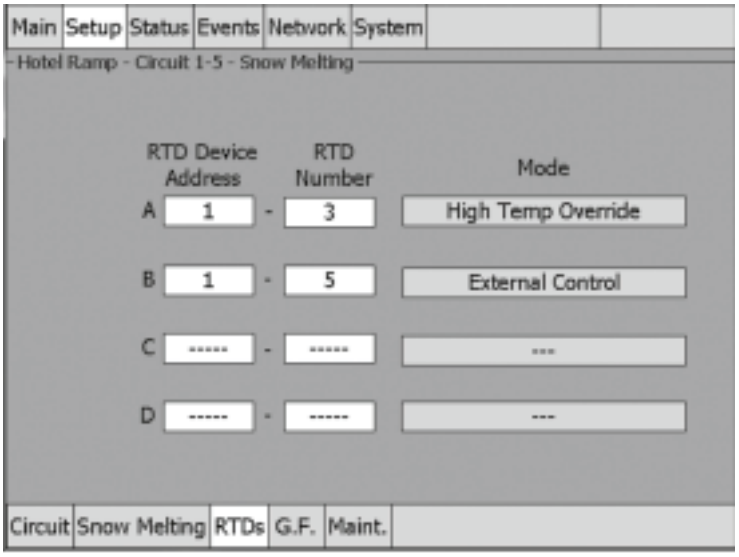


Fig. 3.104 Setup|RTDs Window (Snow Melting External Control)

In this example a RTD was connected to the ACS-30-EU-PCM2 relay and the External Control input was assigned from a different input.

Assigning Ground-Fault Alarm and Trip Levels

The Setup|G.F. window allows you to set the alarm and trip levels. Tap the G.F. button to access the Setup|G.F. window.

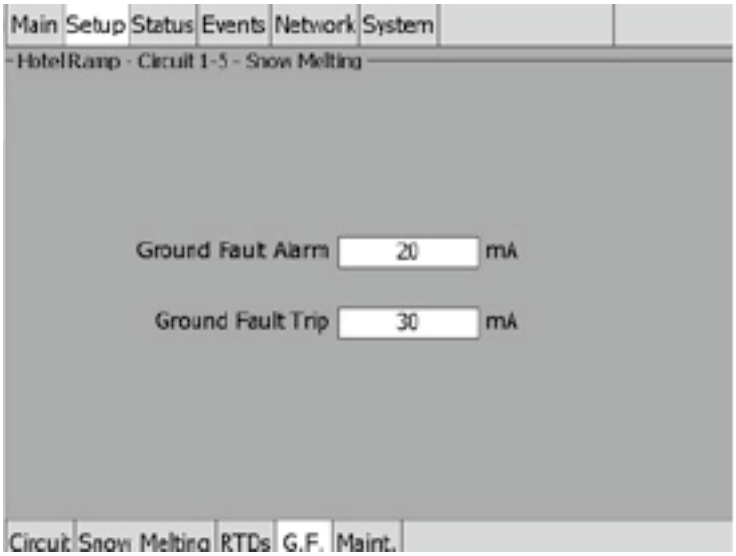


Fig. 3.105 Setup|G.F. Window (Snow Melting External Control)

Input the Ground-Fault Alarm and Ground-Fault Trip:

Ground-Fault Alarm: When the ground-fault current exceeds this level the ACS-30-EU-UIT2 goes in alarm.

Range: 10 to 200 mA

Default: 20 mA

Ground-Fault Trip: When the ground-fault current exceeds this level the ACS-30-EU-PCM2 turns off the circuit relay.

Range: 10 to 200 mA

Default: 30 mA

Assigning Power Cycle Test

The Setup|Maint. window allows you to enable the Power Cycle test start time and frequency. Once the start time and test frequency are entered, the time of the next test will be displayed on this screen.

Note: If the circuit is disabled, forced on, or forced off, the power cycle test will be disabled until the circuit is enabled.

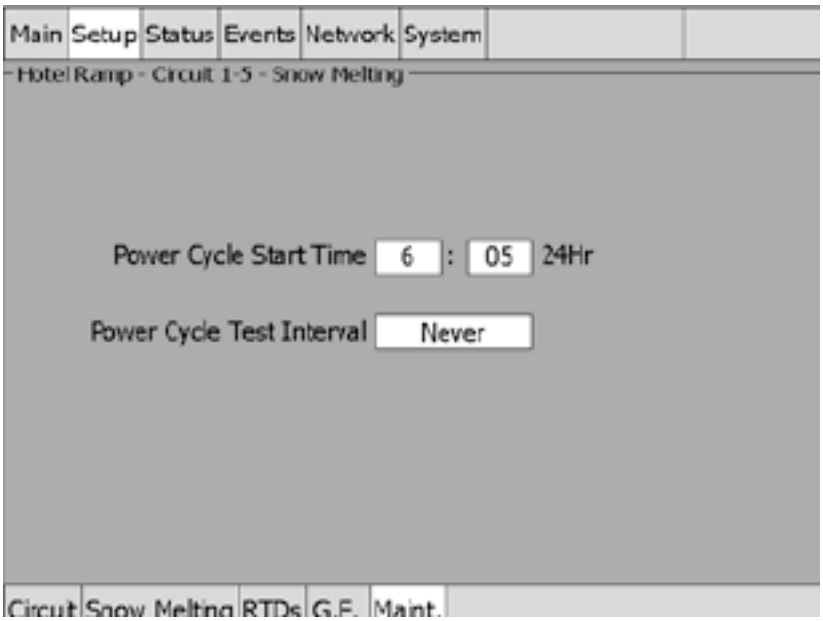


Fig. 3.106 Setup|Maint Window (Snow Melting External Control)

Input the start time and frequency for the Power Cycle test:

Power Cycle Start Time: The time of day to start the Power Cycle test

Range: 00:00 to 23:59

Default: Each circuit is assigned a unique default start time calculated from the device address and relay number.

Power Cycle Test Interval: The frequency to run the Power Cycle Test

Range: Never, Daily, Weekly and Monthly

Default: Never

3.9.2 TEMP CONTROL – AMBIENT TEMPERATURE CONTROL

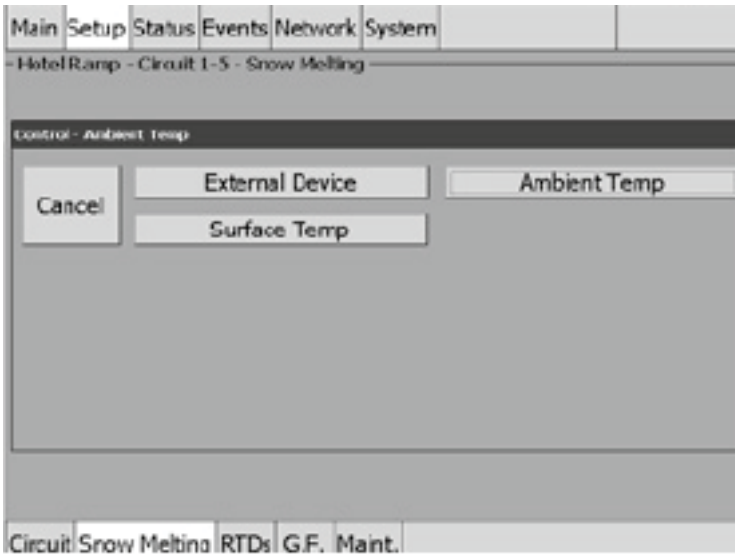


Fig. 3.107 Snow Melting - Ambient Temperature Control

The Ambient Temperature window allows you to control your Snow Melting application using ambient temperature. Tap Ambient Temp.

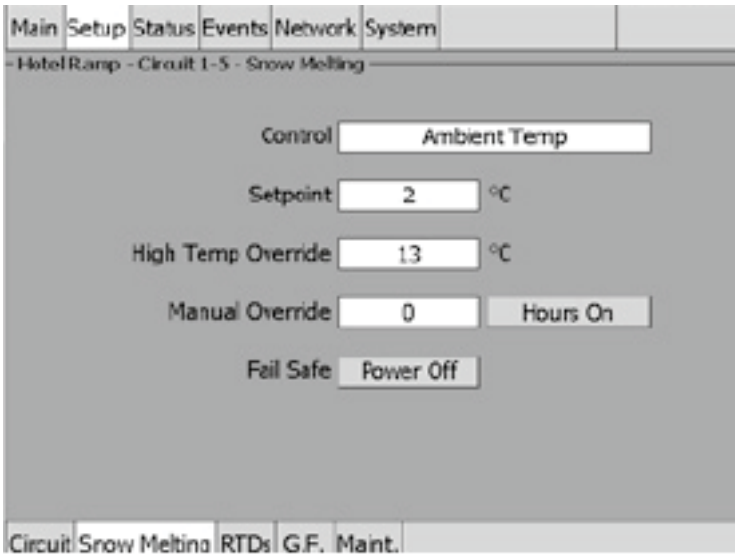


Fig. 3.108 Setup|Snow Melting - Ambient Temp Control Window

Setpoint: Enter the temperature setpoint for ambient control

Range: – 1°C to 10°C

Default: 2°C

High Temperature Override: The high temperature override is the setpoint that will override the ambient control temperature. This is typically used as a gutter sensor.

Range: 3°C to 32°C

Default: 13°C

Override Manual: This feature provides an additional override capability for the circuit.

Range: 0 to 10 hours

Default: 0 hours

Hrs: On or off

Fail Safe: The Fail Safe control button turns the power on or off to the heating cable if the circuit loses all valid RTDs. When the last remaining sensor for control fails (or communication with the sensor is lost), the ACS-30-EU-UIT2:

- Signals an alarm for the failure of the sensor
- Changes control of the circuit to the fail safe control selected
- Changes the control status display to indicate that control of the circuit is in the fail safe state
- Records the events

When the sensor for control is returned to service, the ACS-30 controller signals the alarm has been cleared, returns the circuit to its normal control mode, and records both of these events.

Range: Power On or Power Off

Default: Power Off

Assigning RTDs

After the control mode and parameters are set, tap Setup|RTDs window to assign RTDs to the circuit.

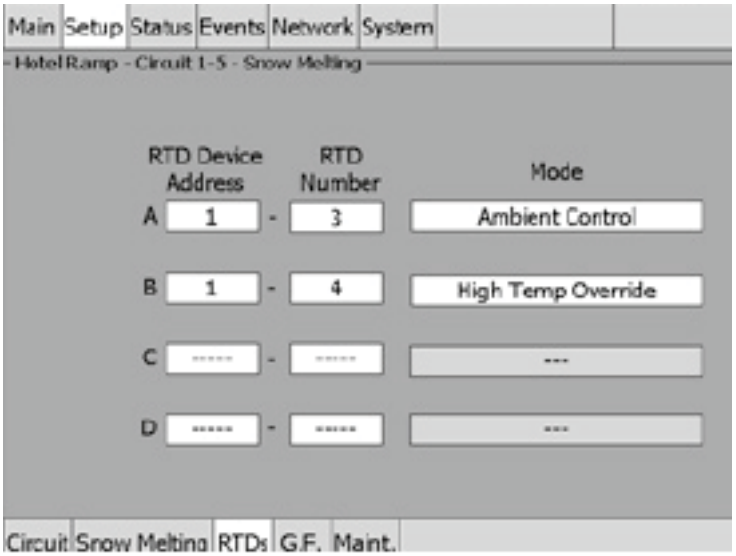


Fig. 3.109 Setup|RTD window (Snow Melting Ambient Temp Control)

When in ambient control mode you have the option of setting up to four inputs through any RTD inputs in your system. You must have a least one RTD assigned for Ambient Control, the remaining RTD positions are optional and may be used for either ambient control or High Temperature Override. For detailed information on the RTD window refer to 2.2.3 Assigning and Sharing RTD Control and Monitoring on page 28.
Assigning Ground-Fault Alarm and Trip Levels
The Setup|G.F. window allows you to set the alarm and trip levels. Tap the G.F. button to access the Setup|G.F. window.

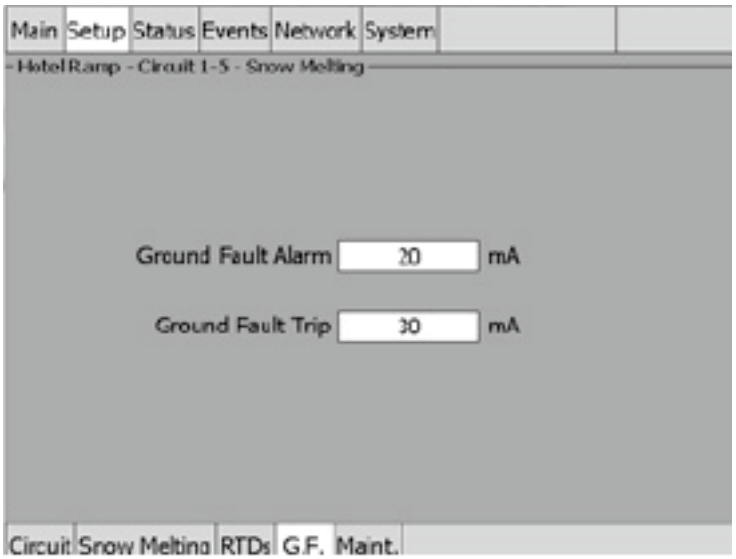


Fig. 3.110 Setup|G.F. window (Snow Melting Ambient Control)

Input the Ground-Fault Alarm and Ground-Fault Trip:

Ground-Fault Alarm: When the ground-fault current exceeds this level the ACS-30-EU-UIT2 goes in alarm.

Range: 10 to 200 mA

Default: 20 mA

Ground-Fault Trip: When the ground-fault current exceeds this level the ACS-30-EU-PCM2 turns off the circuit relay.

Range: 10 to 200 mA

Default: 30 mA

Assigning Power Cycle Test

The Setup|Maint. window allows you to enable the Power Cycle test start time and frequency. Once the start time and test frequency are entered, the time of the next test will be displayed on this screen.

Note: If the circuit is disabled, forced on, or forced off, the power cycle test will be disabled until the circuit is enabled.

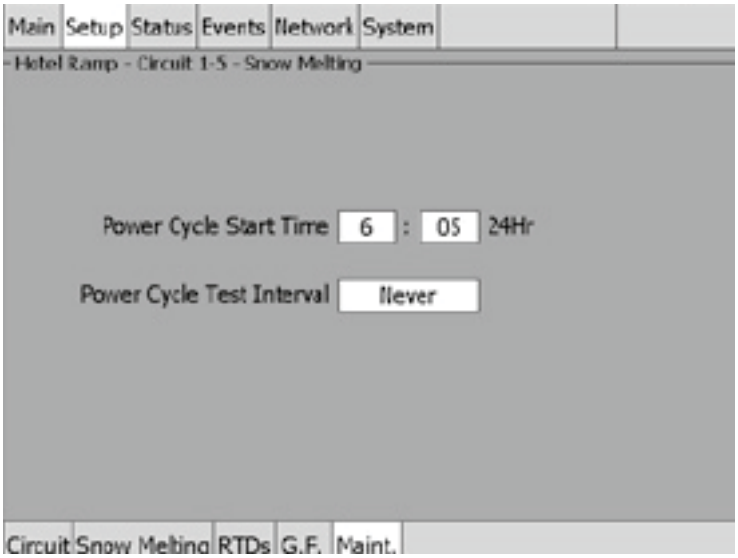


Fig. 3.111 Setup|Maint. Window (Snow Melting Ambient Control)

Input the start time and frequency for the Power Cycle test:

Power Cycle Start Time: The time of day to start the Power Cycle test

Range: 00:00 to 23:59

Default: Each circuit is assigned a unique default start time calculated from the device address and relay number.

Power Cycle Test Interval: The frequency to run the Power Cycle Test

Range: Never, Daily, Weekly and Monthly

Default: Never

3.9.3 TEMP CONTROL – SURFACE TEMPERATURE CONTROL

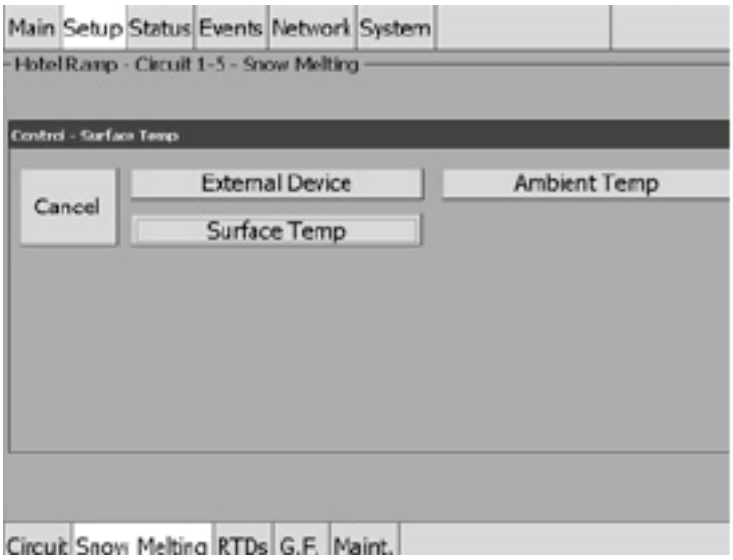


Fig. 3.112 Roof & Gutter Surface Temperature Control Window

The Surface Temperature window allows you to control your Snow Melting application using surface temperature. Tap Surface Temp.

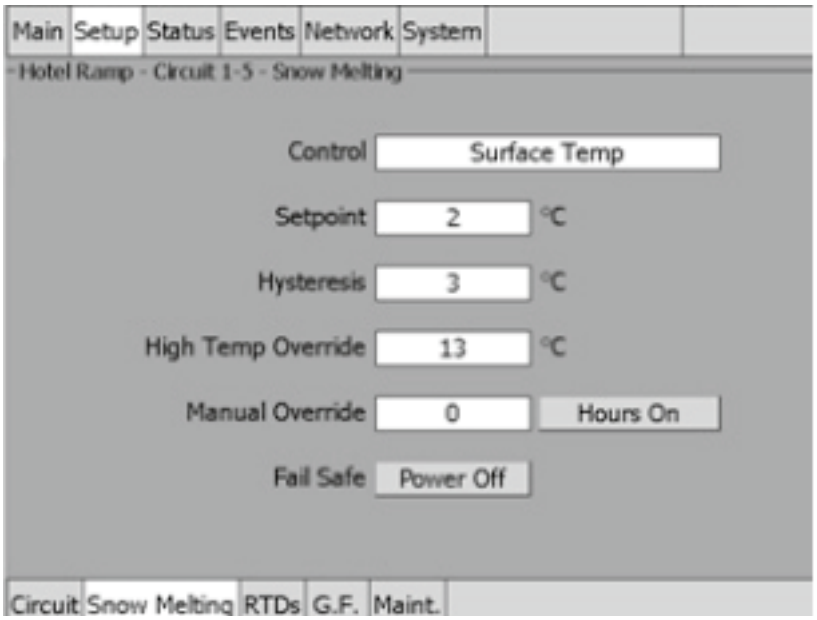


Fig. 3.113 Setup|Snow Melting - Surface Temp Control Window

Setpoint: Enter the setpoint temperature for surface temperature control

Range: – 1°C to 10°C

Default: 2°C

Hysteresis: If the measured temperature is above the setpoint temperature plus hysteresis, the relay output is turned off. If the control temperature is below the setpoint temperature, the output is turned on.

Range: 1°C to 6°C

Default: 3°C

High Temperature Override: The high temperature override will override the control temperature when multiple RTD inputs are assigned to a circuit.

Range: 4°C to 32°C

Default: 13°C

Override Manual: This feature provides an additional override capability for the circuit.

Range: 0 to10 hours

Default: 0 hours

Hrs: On or off

Fail Safe: The Fail Safe control button turns the power on or off to the heating cable if the circuit loses all valid RTDs. When the last remaining sensor for control fails (or communication with the sensor is lost), the ACS-30-EU-UIT2:

- Signals an alarm for the failure of the sensor
- Changes control of the circuit to the fail safe control selected
- Changes the control status display to indicate that control of the circuit is in the fail safe state
- Records the events

When the sensor for control is returned to service, the ACS-30 controller signals that the alarm has been cleared, returns the circuit to its normal control mode, and records both of these events.

Range: Power On or Power Off

Default: Power Off

Assigning RTDs

After the control mode and parameters are set, tap Setup|RTDs window to assign RTDs to the circuit.

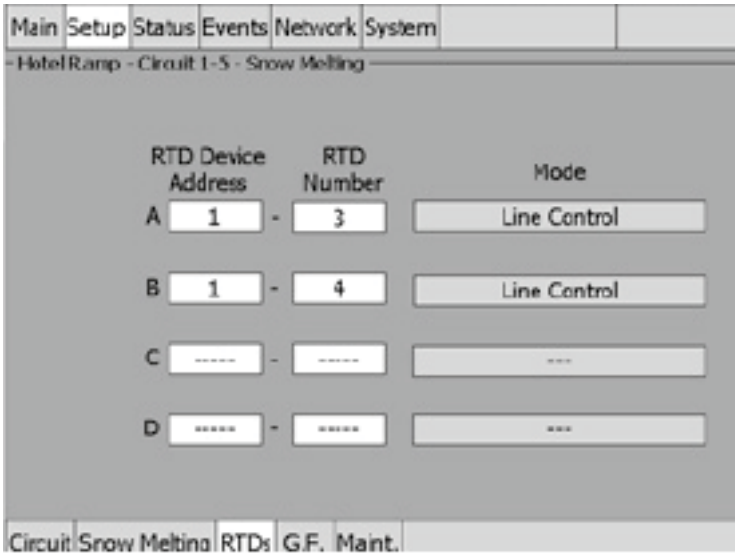


Fig. 3.114 Setup|RTDs Window (Snow Melting Surface Temp Control)

When in Surface temperature control mode you have the option of setting up to four inputs through any RTD inputs in your system. For detailed information on the RTD window refer to 2.2.3 Assigning and Sharing RTD Control and Monitoring on page 28.

Assigning Ground-Fault Alarm and Trip Level

The Ground-fault window allows you to set the alarm and trip levels.

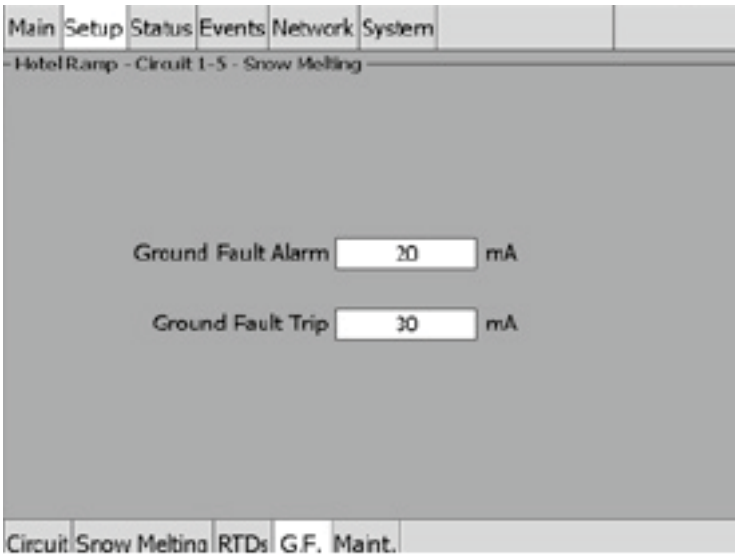


Fig. 3.115 Setup|G.F. Window (Snow Melting Surface Temp Control)

Input the Ground-Fault Alarm and Ground-Fault Trip:

Ground-Fault Alarm: When the ground-fault current exceeds this level the ACS-30-EU-UIT2 goes into alarm.

Range: 10 to 200 mA

Default: 20 mA

Ground-Fault Trip: When the ground-fault current exceeds this level the ACS-30-EU-PCM2 turns off the circuit relay.

Range: 10 to 200 mA

Default: 30 mA

Assigning Power Cycle Test

The Setup|Maint. window allows you to enable the Power Cycle test start time and frequency. Once the start time and test frequency are entered, the time of the next test will be displayed on this screen.

Note: If the circuit is disabled, forced on, or forced off, the power cycle test will be disabled until the circuit is enabled.

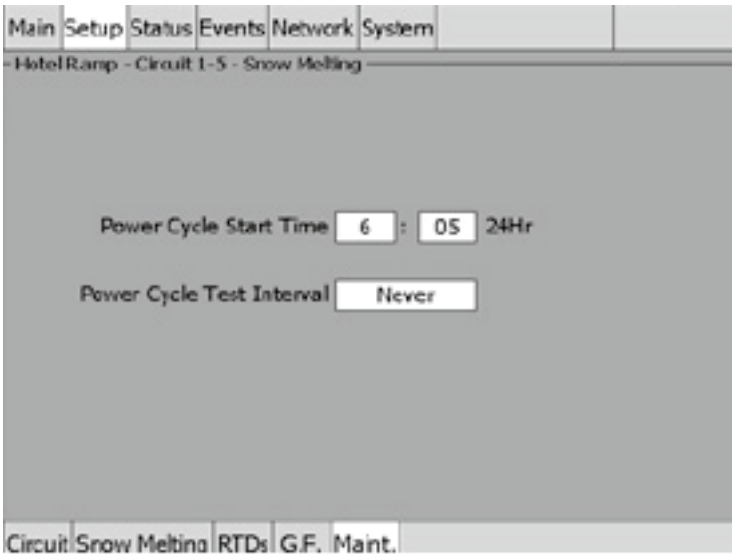


Fig. 3.116 Setup|Maint. Window (Snow Melting Surface Temp Control)

Input the start time and frequency for the Power Cycle test:

Power Cycle Start Time: The time of day to start the Power Cycle test

Range: 00:00 to 23:59

Default: Each circuit is assigned a unique default start time calculated from the device address and relay number.

Power Cycle Test Interval: The frequency to run the Power Cycle Test

Range: Never, Daily, Weekly and Monthly

Default: Never

SECTION 4 TEMPERATURE MONITOR ONLY CIRCUITS

Five circuits are available for temperature monitoring only. These circuits are not connected to any relays on the ACS-30-EU-PCM2 but can monitor up to four RTDs from your system. These monitoring circuits may be used to watch critical system components.

4.1 Assigning a Temp Monitor Circuit

4.1.1 SELECTING THE TEMPERATURE MONITORING CIRCUIT

The Monitor Only circuits are labeled TM-A through TM-E and can be accessed from the main screen or from the set-up window. From the main screen tap anywhere on the line of the circuit you wish to program. From the Set-up screen select Temp Monitor on the radial button and tap field entry box.(TM-A)

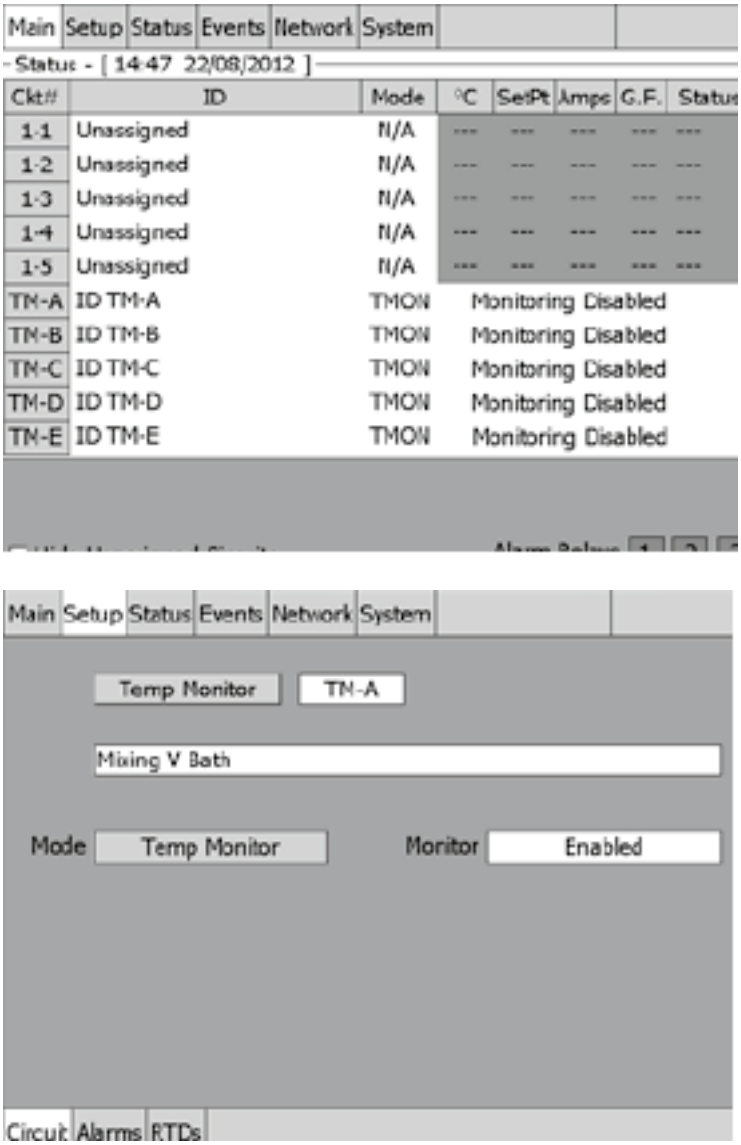


Fig. 4.1 Temperature Monitor - Circuits on Main screen and Setup Window

Select the monitor only circuit from the Temp Monitor screen.

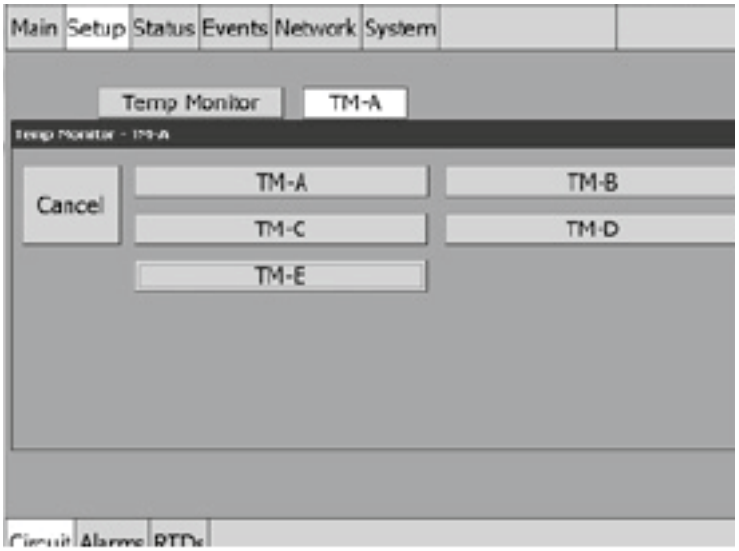


Fig. 4.2 Temp Monitor - Assign Circuit Window

4.1.2 NAMING THE TEMPERATURE MONITORING CIRCUITS

Tap on the ID field and you can enter user defined identification with the text-messaging style keypad.

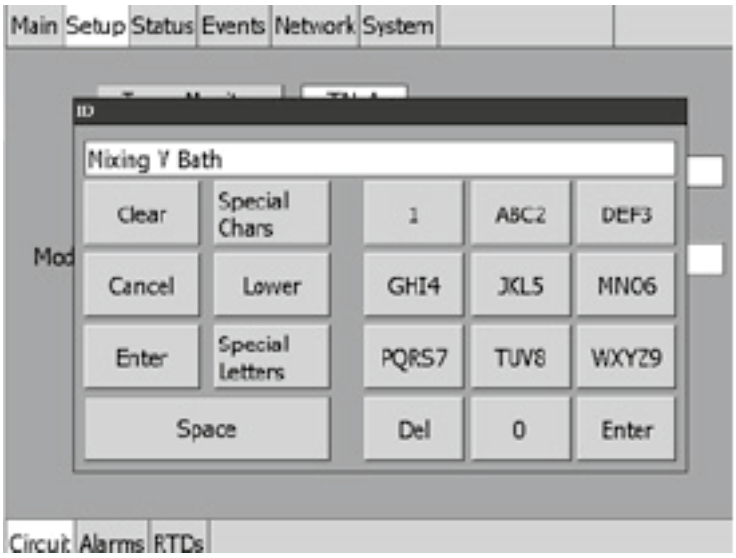


Fig. 4.3 Temperature Monitor - Circuit Identification keypad

Assigning RTDs

Once the Temperature Monitoring circuit has been selected and identified tap Setup|RTD tab to assign RTDs from the system you wish to monitor.

In this mode you may assign up to four RTDs from any location in your system. Enter the Device address and relay number.

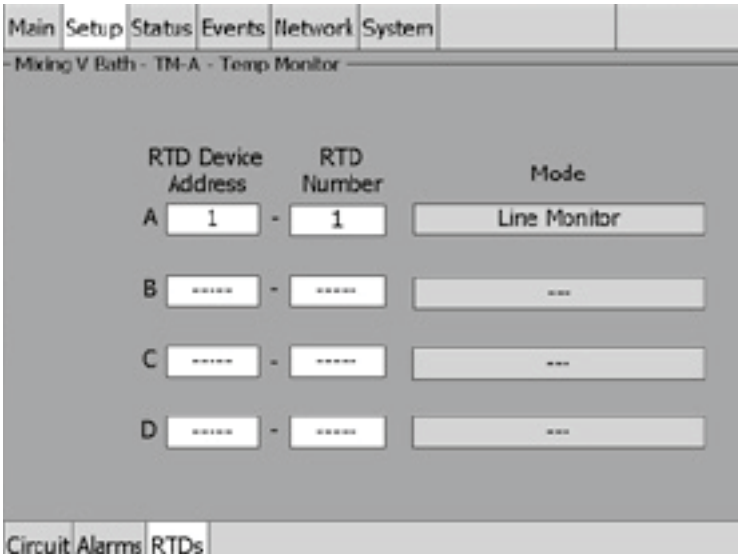


Fig. 4.4 Temperature Monitor - Assigning RTDs

Assigning Temperature Alarms

Once RTDs have been assigned to the monitoring circuit high and low temperature alarms may be set. Tap the Alarm tab

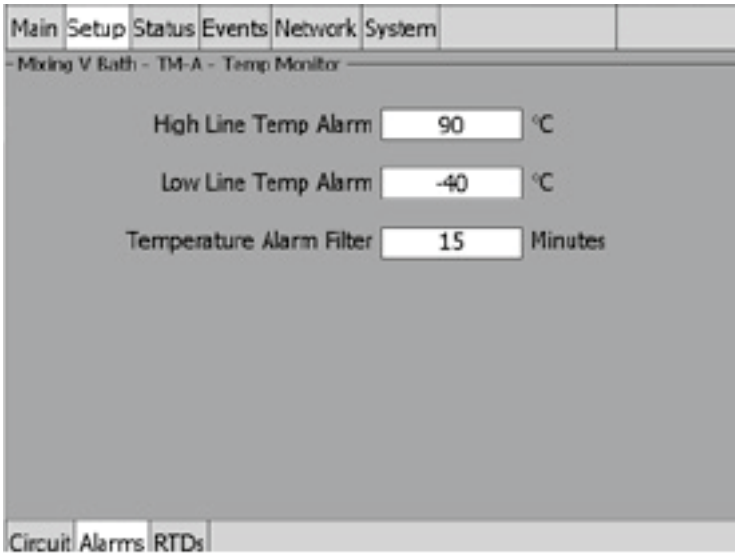


Fig. 4.5 Temperature Monitor - Setup|Alarms

High Temperature Alarm: If any RTD assigned to the temperature monitor circuit measures a temperature above this threshold, the ACS-30-EU-UIT2 generates an alarm. The limit can be set for any temperature values you desire for your application within the range allowed.

Range: Low Temp to 205ºC

Default: 90ºC

Low Temp Alarm: If any RTD assigned to the temperature monitor circuit measures a temperature below this threshold, the ACS-30-EU-UIT2 generates an alarm.

Range: – 73ºC to High temp alarm

Default: – 40ºC

Temperature Alarm Filter: This minimizes nuisance alarms by forcing the ACS-30-EU-UIT2 to verify that the alarm condition continually exists for over the selected period of time before alarming.

Range: 0 to 999 minutes

Default: 15 minutes

Note: Setting the Alarm Filter to 0 minutes is mainly for testing and demonstration purposes. Selecting this option for normal use may cause nuisance alarming since this option may not allow the ACS-30-EU-UIT2 time to verify that the alarm condition exists.

SECTION 5 APPENDICES

5.1 Proportional Ambient Sensing Control (PASC) Control Mode

PASC takes advantage of the fact that the heat loss from a pipe is proportional to the temperature difference between the pipe and the ambient air. This is true regardless of heater type, insulation type, or pipe size. Once the heat tracing and insulation on a pipe has been designed to balance heat input with heat loss and maintain a particular temperature, the main variable in controlling the pipe temperature becomes the ambient air temperature.

The ACS-30 system has a control algorithm that uses the measured ambient temperature, desired maintain temperature, minimum ambient temperature assumption used during design, and size of the smallest pipe diameter to calculate how long the heater should be on or off to maintain a near-constant pipe temperature.

The power to the heat tracing is proportioned based upon on the ambient temperature. If the ambient temperature is at or below the "minimum design ambient plus 1.7°C" the heaters will be on 100%. If the measured ambient is at or above the "maintain temperature –1.7°C" the heaters will be on 0%. For any measured ambient between "minimum design ambient" and "maintain temperature," the heaters will be on a percentage of the time equal to (maintain temperature – measured ambient) / (maintain temperature – minimum design temperature).

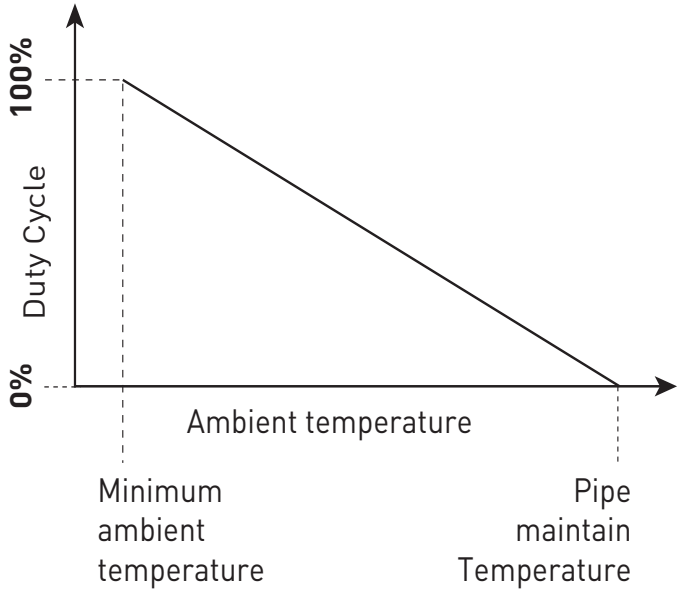


Fig. 5.1 Proportional Ambient Sensing Control (PASC)

Appendix 5.2 24/7 Scheduler

SCHEDULER FOR HWAT, FREEZER FROST HEAVE PREVENTION, FLOOR HEATING AND GREASY WASTE

The 24/7 scheduler enables the user to adjust the control setpoint of the commercial heating application depending on the time of day. A prime example would be to change the maintain temperature of an HWAT, freezer frost heave prevention, floor heating and greasy waste system to its economy temperature at night to reduce power consumption.

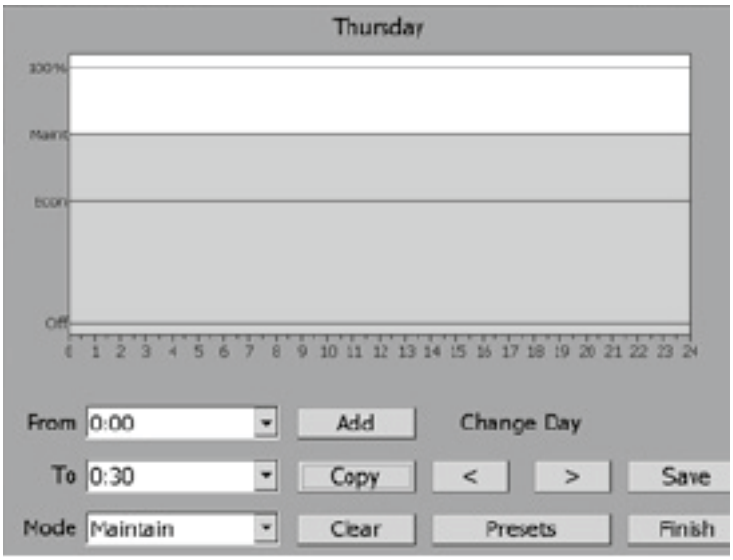


Fig. 5.2 24/7 Scheduler window

This is the main window of the Scheduler displaying all of the tools needed to create a schedule. All of the functions will be described below.

Scheduler Graph: The schedule is represented by a colored bar graph. The X- Axis is labeled by the time of day in 24 hour format starting at 12:00am and ending at 12:00pm. Each intermediate tick mark represents a half-hour in time. On the Y-Axis, each mode is labeled. Each mode is represented by both the height of the bar and the color of the bar. The mode colors are described below.

Scheduler Dropdown Boxes: The dropdown boxes labeled "From", "To", and "Mode" are used to configure the schedule. A more detailed procedure on how to do this is described in the section called Configuring a Schedule.

Add Button: The add button deciphers what is configured in the Scheduler dropdown boxes and places it into the schedule. See Configuring a Schedule below for more information.

Copy Button: This button brings you to the Copy window allowing you to copy a day's schedule to one or more other days. See Copying a Day for more information.

Clear Button: Tapping on this button will clear the entire schedule. This will set every day of the week to act in Maintain mode. This would be synonymous to setting the Setpoint Mode to Constant.

Change Day Buttons: Pressing the "<" button will navigate you to the day prior to the one that is currently being displayed. Conversely, pressing the ">" Button will advance you to the next day.

Presets Button: This button is only available in HWAT mode. It is not available in Floor Heating mode or Greasy Waste modes. Tapping on this button will bring you to the Presets configuration window where a list of scheduled presets can be selected and used. See Presets for more information.

Save Button: Saves the changes on the current schedule.

Finish Button: Exits the Scheduler. If the schedule changed and was not saved, the scheduler will prompt you asking if you want to save the changes that were made before exiting.

CONFIGURING A SCHEDULE

A schedule can be configured into 48 discrete 30-minute intervals per a 7-day week where each day can be unique.
Circuits can be set to one of four modes at any given 30 minute interval:
Off: The circuit is completely turned off.

Economy: The circuit is set to maintain its temperature at the configured Economy temperature.

Maintain: The circuit is set to maintain its temperature at the configured Maintain temperature.

Heat Cycle 100%: This mode is only available for HWAT circuits utilizing the HWAT-R heating cable. The circuit is set to be on 100%, and is used to increase the pipe temperature above the typical maintain setpoint for a desired period of time.

To schedule a block of time to a specific mode:

1. Select the start time from the "From" drop-down menu.
2. Select the end time from the "To" drop-down menu.
3. Select the mode from the "Mode" drop-down menu.
4. Tap on the "Add" button.
5. Repeat as necessary.

COPYING A DAY

Since many times heating is needed at similar times of day, a function was included to allow you to copy a day to one or more other days. This can be accessed by tapping on the "Copy" button on the main window of the scheduler.

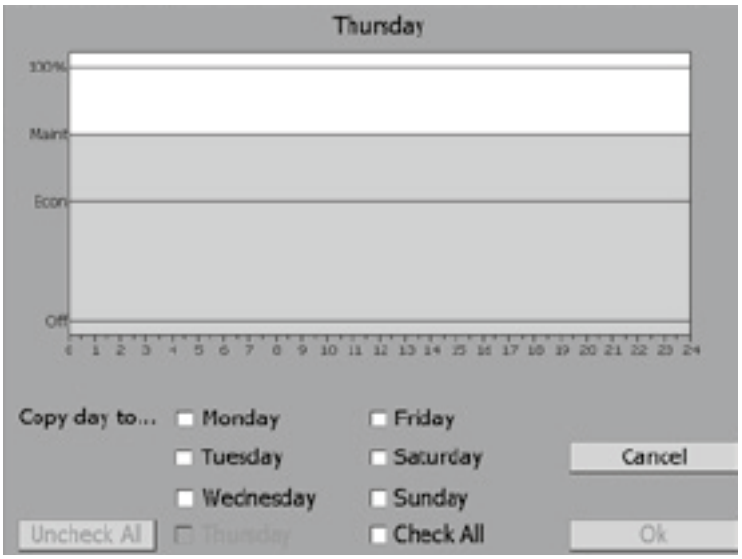


Fig. 5.3 Scheduler - copying a day

To copy a day, navigate to the day that you have already set up and press the "Copy" button on the main window. The bottom portion of the window will change to something similar shown above. Place a check mark next to each day that you the schedule to be copied to. Press OK to finish.

PRESETS

When using the scheduler for an HWAT circuit, the presets option will appear on the main window. Tapping on this button will bring you to the presets configuration window where you

can choose out of a list of common presets (Apartments, Prison, Hospital, Nursing Home, Hotel, Sport Center, Swimming Pool, Office, Convalescence Home, School, Family Home). After choosing a preset, they can be modified to fit your specific needs.

Fig. 5.4 Scheduler - presets

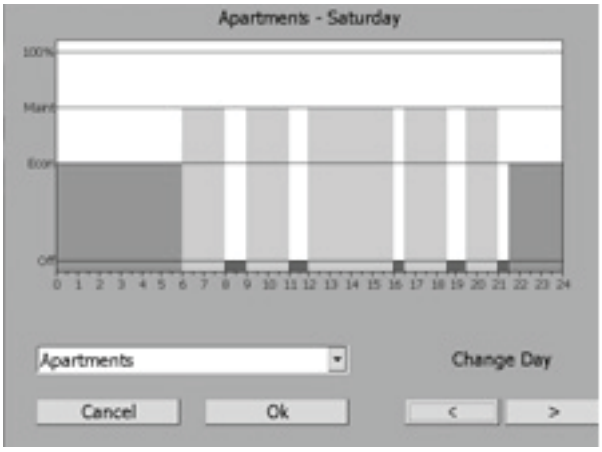
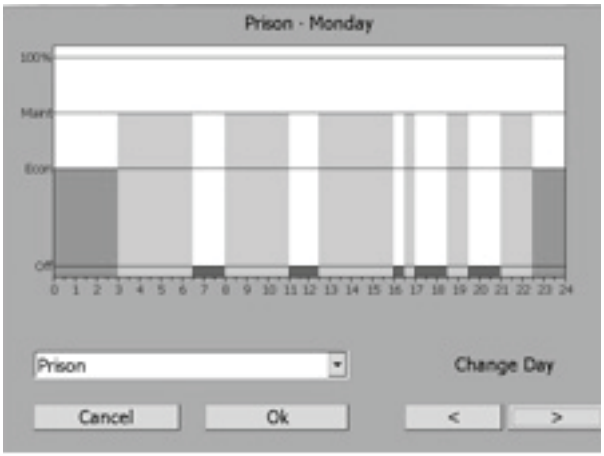
Presets Dropdown Box Tap on the drop down box to view the list of presets available. Selecting a preset will temporarily display it on the Scheduler Graph.

Cancel Button Tapping this button will return you to the main window with the original schedule prior to entering the Presets Configuration.

OK Button Tapping on the OK button will prompt you asking if you would like to overwrite the original schedule with the new preset schedule. After a decision is made, you will be brought back to the main Scheduler window.

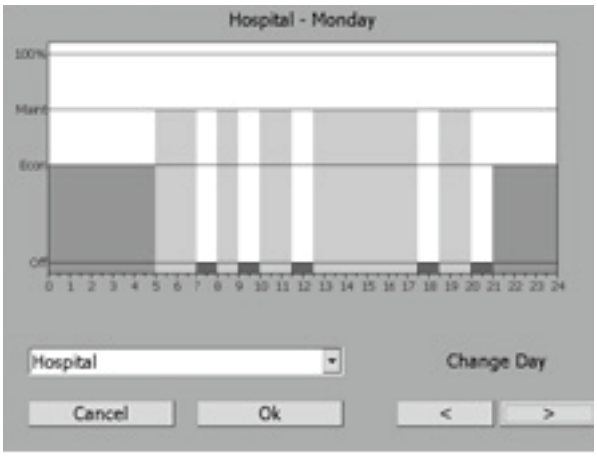
Change Day Buttons As with the main window, tapping on these buttons will navigate you throughout.

The preset programs schedules are below shown.

Program	Schedule
Apartment	
Mon-Fri	
Sat-Sun	
Prison	
Mon-Sun	

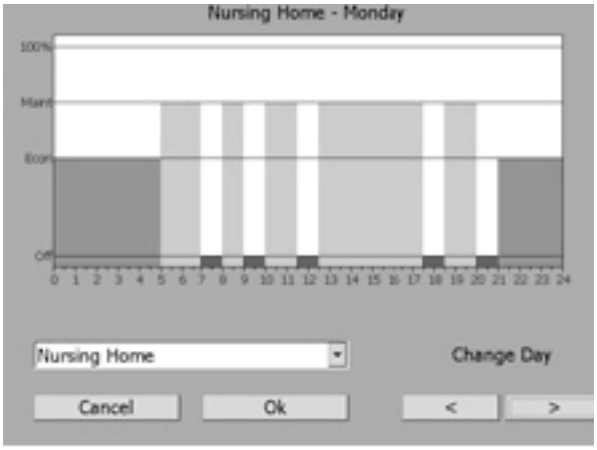
Hospital

Mon-Sun



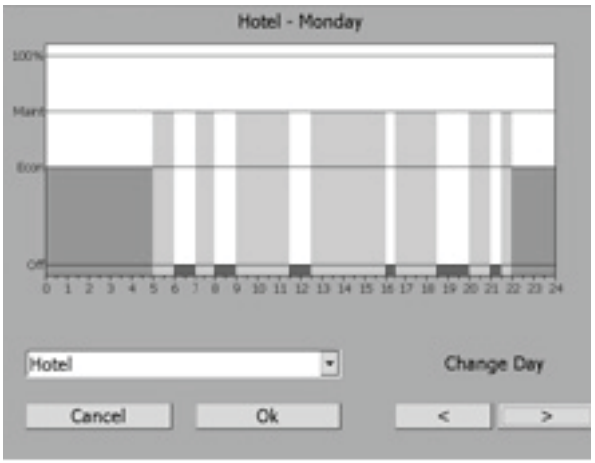
Nursing Home

Mon-Sun



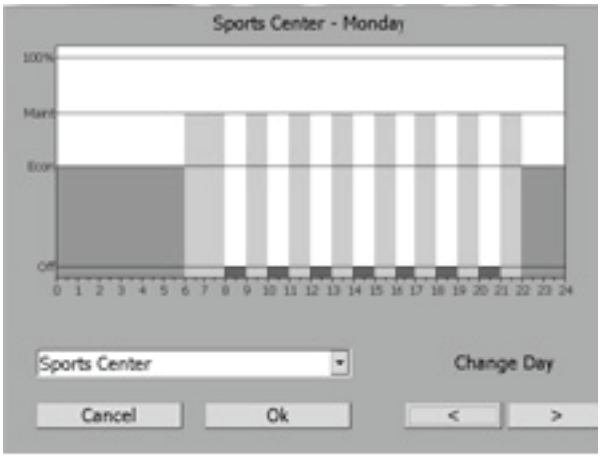
Hotel

Mon-Sun



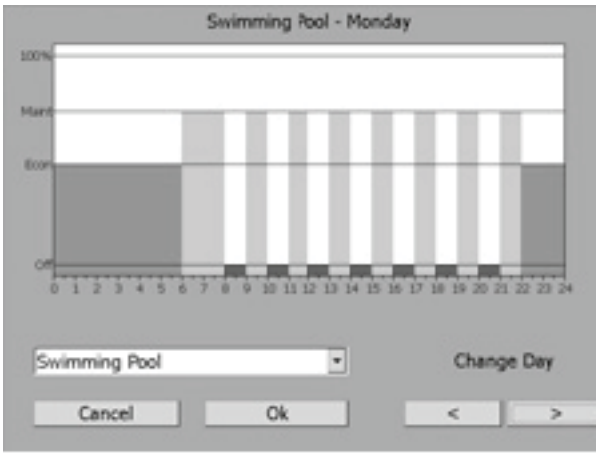
Sport Center

Mon-Sun



Swimming Pool

Mon-Sun



Office

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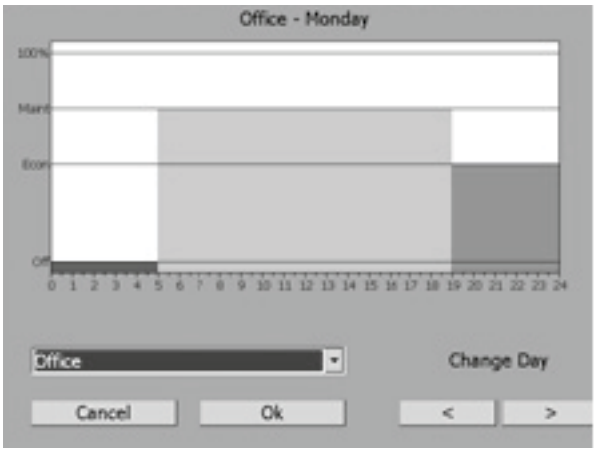
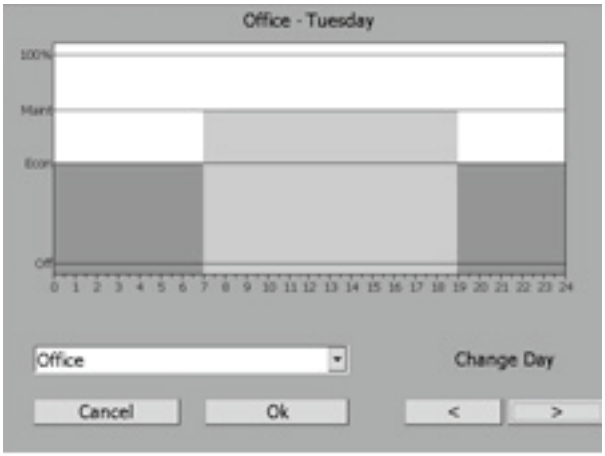
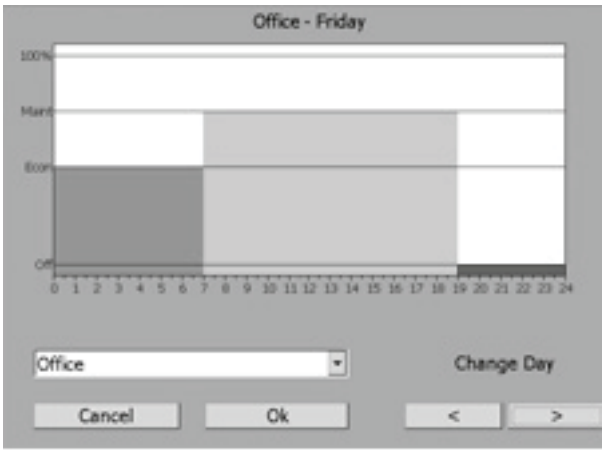


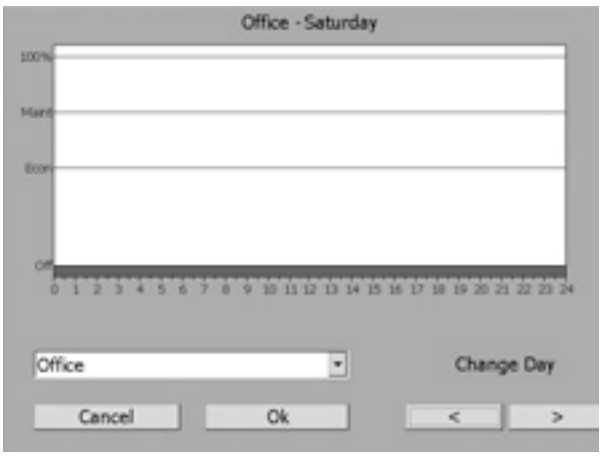
Tue-Thu



Fri

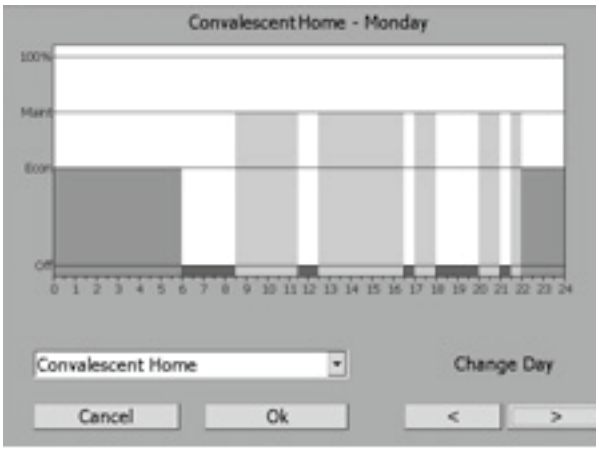


Sat-Sun



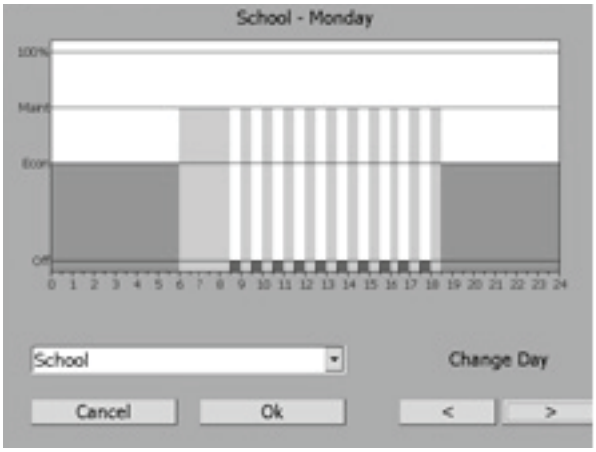
Convalescent Home

Mon-Sun



School

Mon-Fri



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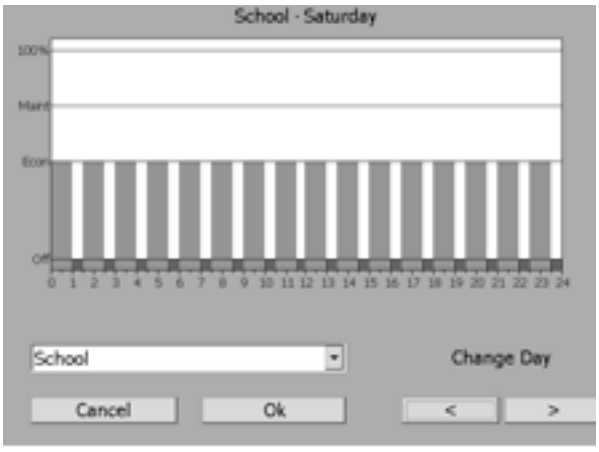


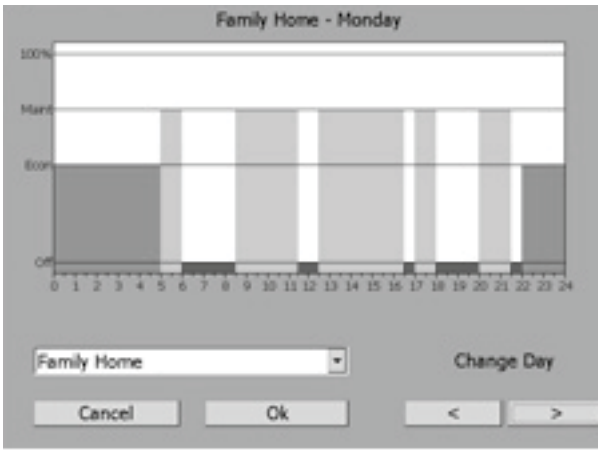
Family Home	
Mon-Sun	

Fig. 5.5 HWAT preset Programs

Appendix 5.3 Legionella prevention

The growth of legionella pneumophila is dependent on temperature: HWAT-R and ACS-30 offer the possibility of increasing the water temperature by fully powering the HWAT-R. The increased water temperature enables decontamination (measures anti-scalding are essential). Most legionella pneumophila bacteria are killed at 60°C over a period of 30 minutes.

Warning: The selected pipework material should be able to resist the decontamination temperature.

The graphs below (Fig. 5.6, 5.7, 5.8) indicate the time needed for the heat-up of the warm water to a desired decontamination temperature with HWAT-R heater.

Notes:

- The graphs are theoretically calculated. A safety margin should be taken into account based on the condition of the pipework, e.g. lime.
- The heat-up times are valid after ageing of the HWAT-R heater.

The HWAT-R heater achieves specified power after ±1 month of full operation.

Calculation steps of heat-up time for legionella prevention:

1. Select the appropriate graph based on average pipe diameter and used insulation thickness
2. Read the required heat-up time between maintain temperature and 60°C = ΔT
3. Increase heat-up time by 30 minutes for legionella destruction
4. Ensure that the previous block is at maintain temperature of minimum 50°C (otherwise heat-up time will be too long)

Total heat-up time for programming = ΔT + 30 minutes

Note: the cool-down time till maintain temperature takes ± equal time.
Take necessary measures to prevent scalding. Legionella prevention during night is recommended.

Example:

1. Select graph for 1" pipe Stainless Steel (SS), 30 mm Rock Wool (RW) insulation
2. ΔT from 55°C to 60°C = 45 min.
3. Total = 45 min. + 30 min. = 75 min. heat-up cycle

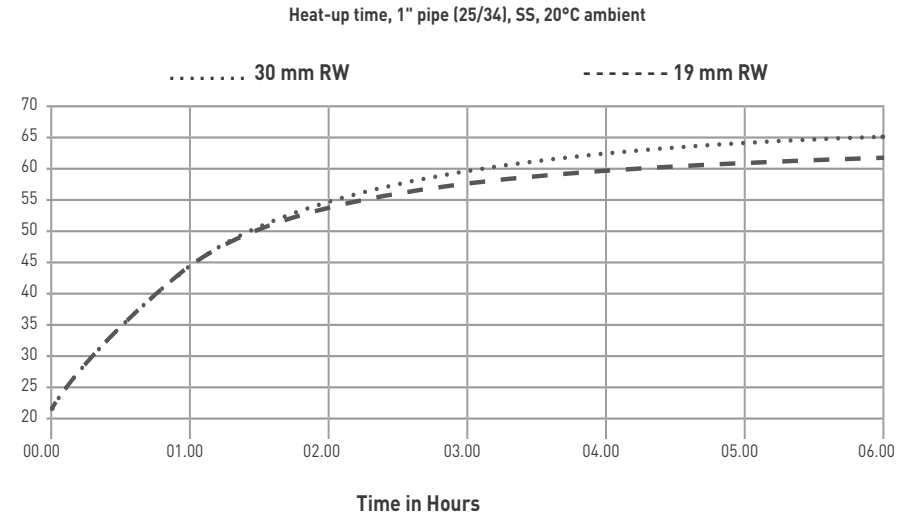


Fig. 5.6 Heat Up Time, 1" pipe, 20°C ambient

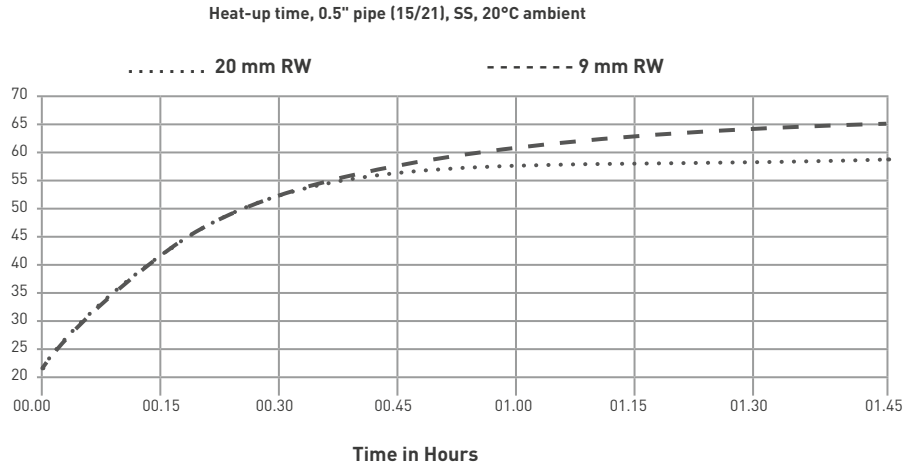


Fig. 5.7 Heat Up Time, 0.5" pipe, 20°C ambient

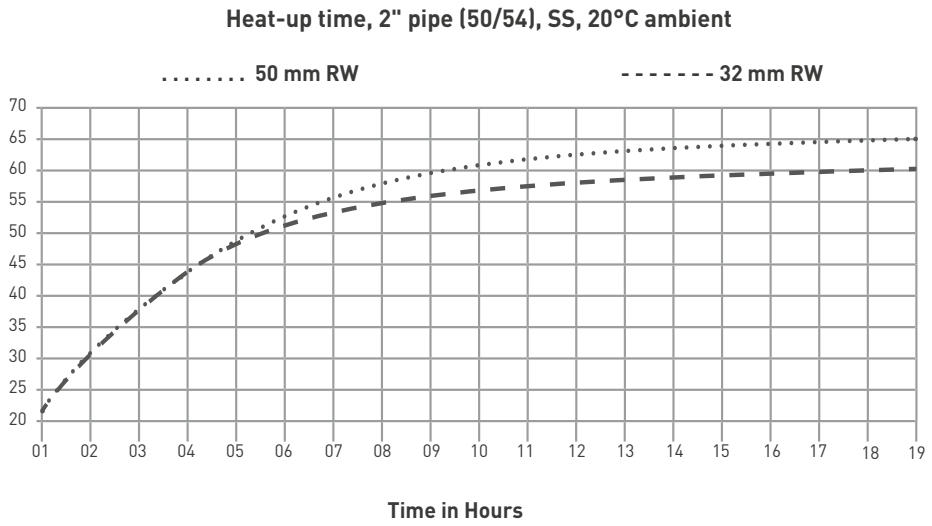


Fig. 5.8 Heat Up Time, 2" pipe, 20°C ambient

Appendix 5.4 Connecting External Control Devices

The ACS-30 system allows the user to connect the contact outputs of BMS systems or external devices to control the heating cable circuits. In this manual they consist of two categories: circuit control and circuit override.

External device control modes use the logic of an RTD energizing or de-energizing the circuit based on the temperature read, as described in the table below.

The input is provided applying a resistor to the RTD input terminals of the PCM module accordingly to a standard PT100 Resistance Table.

Pentair Thermal Management recommends the following resistors to switch on and off the heating circuit.

Temperature Input [°C]	Recommended R [ohm]	Status
238 - 350	200 ohm, 0.1% precision	Circuit energized
379 - 500	251,1 ohm, 0.1% precision	Circuit de-energized
Other values	-	Alarm

External override modes use a similar logic than the external device control modes de-energizing the circuit whenever the input provided is within the range shown below.

Note: When scanning the network the override input must be active, otherwise the input will not be recognized by the ACS-30.

Temperature Input [°C]	Recommended R [ohm]	Status
238 - 350	200 ohm, 0.1% precision	Override Active. Circuit de-energized.
Other values	Open contact	No override.

The Roof & Gutter De-icing and Surface Snow Melting control modes include an External Device control option. This option allows a Moisture sensing controller to be integrated in to the ACS-30 system (see ACS-30-EU-VIA-DU-20-MOD and ACS-30-EU-EMDR-10-MOD modules).

In the pipe freeze protection, fuel oil flow maintenance and floor heating application modes, external outputs may be connected to the RTD inputs in the ACS-30-EU-PCM2 module to provide auxiliary override to the temperature input.

The general approach is that each of the external controllers provides the signal to the RTD input terminals of the ACCS-PCM2-xx-yyA power module which can interpret the temperature read as commands to turn on or off the heating cable circuits. Up to four different external controllers may be mapped to a single circuit or may be shared to many different circuits.

Connecting External Device Input (ACS-30-EU-VIA-DU-20-MOD for snow melting and ACS-30-EU-EMDR-10-MOD for roof & gutters de-icing)

Connect 3-wires shielded cable from the external control device to the RTD input terminals on the ACCS-CRM board located within the ACS-30-EU-PCM2 power control module. Refer to ACS-30-EU-PCM2 <EN-RaychemACS30PCM220A-DS-EU0015, EN-RaychemACS30PCM232A-DS-EU0013> for further information.

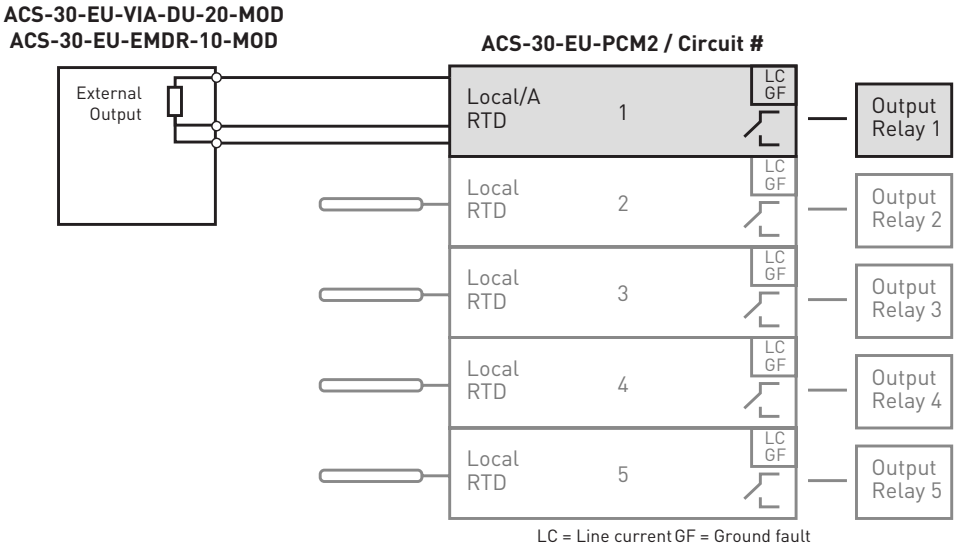


Fig. 5.9 External Control Device (5 circuits)

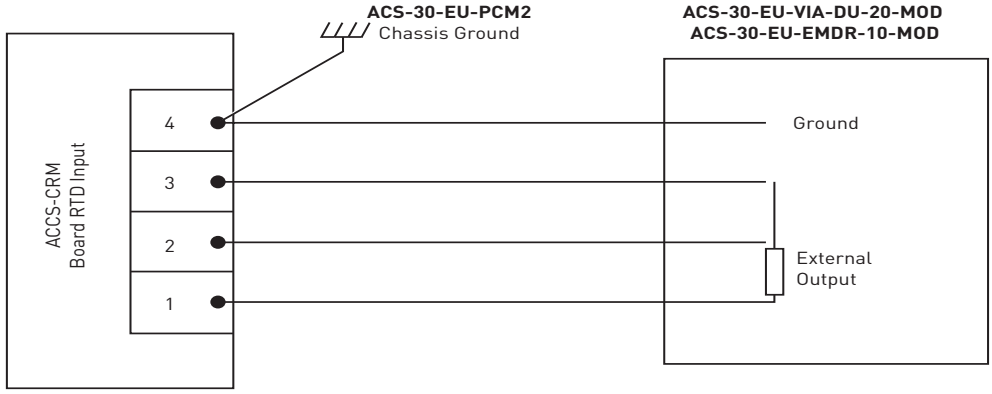


Fig. 5.10 External Control Device Connection

Connecting External Device Input (Override Device)

1. Connect 2-wire shielded cable from the normally open position of the external device dry contacts to the RTD input terminals on the ACCS-CRM board located within the ACS-30-EU-PCM2 power control module adding a proper resistor in between. Refer to ACS-30-EU-PCM2 <EN-RaychemACS30PCM220A-DS-EU0015, EN-RaychemACS30PCM232A-DS-EU0013> for further information.

2. Connect the cable to terminals 1 and 3 with a jumper between position 2 and 3 as shown below.

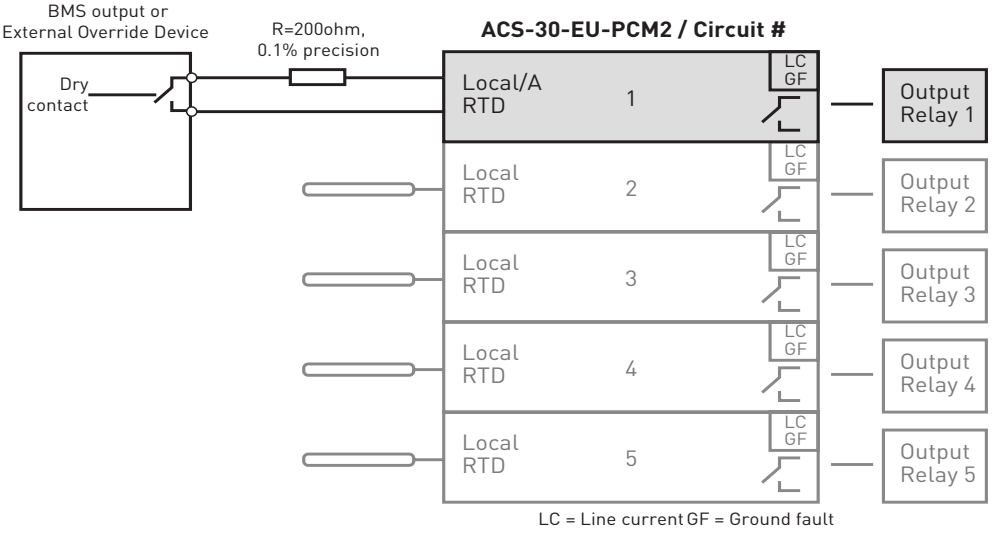


Fig. 5.11 External Override Device (5 circuits)

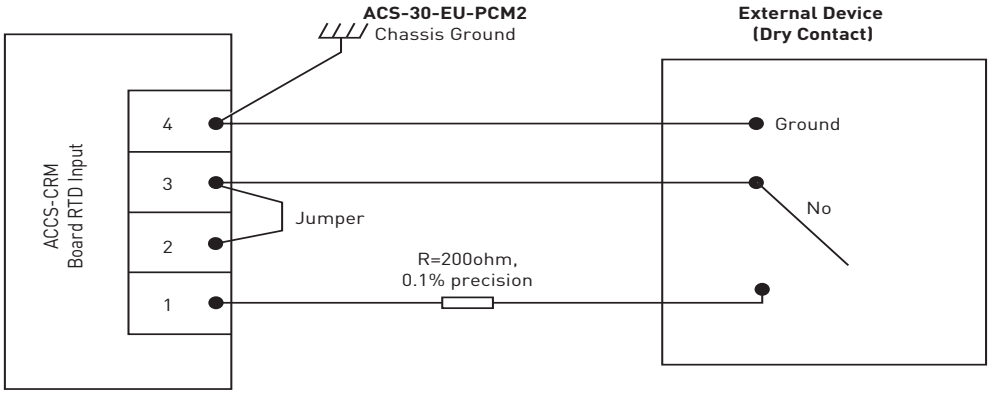


Fig. 5.12 External Override Device Connection

Appendix 5.5 Energy Consumption Database Download

All the energy data stored in the ASC-30 can be easily downloaded. A USB stick has to be plugged into the UIT2 (see ACS-30-EU-UIT2 manual for more information) and the destination path chosen.
Once the USB stick is plugged a service panel pops-up, select 'Export Energy to XML'. Don't wait too long otherwise the system goes automatically back to main screen.

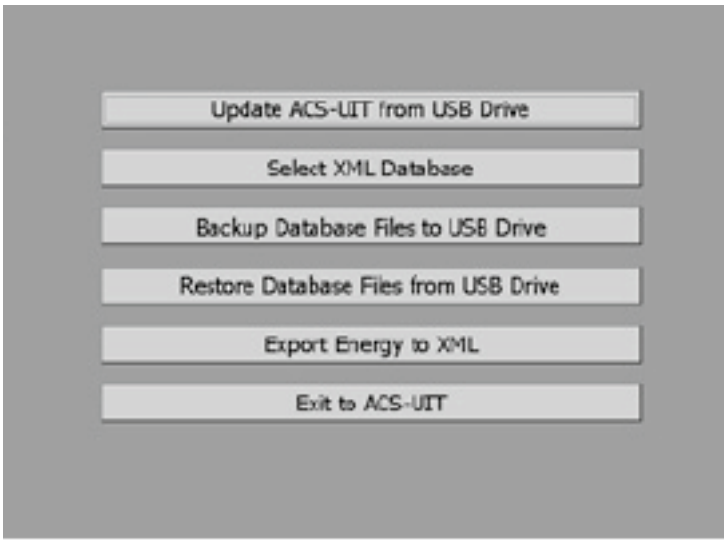


Fig. 5.13 Export Energy Database to XML

Select the directory where to download the files, if it does not exist you will be asked to create it.

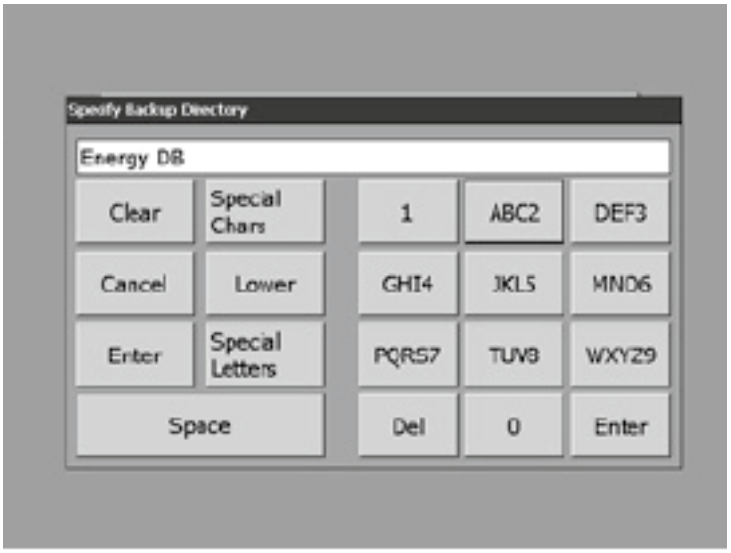


Fig. 5.14 Export Energy Database to XML – Select Backup Directory

Two files are stored in the path \ACCS_UIT\Specified Directory:

- EnergyDaily.xml

  It contains the daily energy consumption on for all months/years stoired for all circuits.

- EnergyHourly.xml

  It contains the hourly energy consumption for the actual day plus the previous 7 days for all circuits.

Appendix5.6 Terms and Definitions

Amps	Heater current amperes
Line Temperature	The lowest temperature from the RTDs assigned to a circuit
°C or °F	The control temperature
Hysteresis	Hysteresis
Device Address	Network address for specific hardware devices attached to the ACS-30-EU-UIT2
EMR	Electrical Mechanical Relay
G.F.	Heater ground-fault current
ID	Identification 'tag' for the circuit
Circuit	Short for 'Control Circuit', the basic organizing structure of the ACS-30
RTD	Resistance temperature detectors
RTD Number	This is the number of the RTD determined by the physical point of connection to a networked device
Set Pt	Setpoint is the desired maintain temperature
Status	Relay (heater on, off or trip) and communication status

BELGIË / BELGIQUE
Tel. +32 16 21 35 02
Fax +32 16 21 36 04
salesbelux@pentair.com

BULGARIA
Tel./fax +359 56 86 68 86
fax +359 56 86 68 86
salesee@pentair.com

ČESKÁ REPUBLIKA
Tel. +420 241 009 215
Fax +420 241 009 219
czechinfo@pentair.com

DANMARK
Tel. +45 70 11 04 00
Fax +45 70 11 04 01
salesdk@pentair.com

DEUTSCHLAND
Tel. 0800 1818205
Fax 0800 1818204
salesde@pentair.com

ESPAÑA
Tel. +34 902 125 307
Fax +34 91 640 29 90
ptm-sales-es@pentair.com

FRANCE
Tél. 0800 906045
Fax 0800 906003
salesfr@pentair.com

HRVATSKA
Tel. +385 1 605 01 88
Fax +385 1 605 01 88
salesee@pentair.com

ITALIA
Tel. +39 02 577 61 51
Fax +39 02 577 61 55 28
salesit@pentair.com

LIETUVA/LATVIJA/EESTI
Tel. +370 5 2136633
Fax +370 5 2330084
info.baltic@pentair.com

MAGYARORSZÁG
Tel. +36 1 253 7617
Fax +36 1 253 7618
saleshu@pentair.com

NEDERLAND
Tel. 0800 0224978
Fax 0800 0224993
salesnl@pentair.com

NORGE
Tel. +47 66 81 79 90
Fax +47 66 80 83 92
salesno@pentair.com

ÖSTERREICH
Tel. 0800 297410
Fax 0800 297409
info-ptm-at@pentair.com

POLSKA
Tel. +48 22 331 29 50
Fax +48 22 331 29 51
salespl@pentair.com

REPUBLIC OF KAZAKHSTAN
Tel. +7 495 926 18 85
Fax +7 495 926 18 86
saleskz@pentair.com

РОССИЯ
Тел. +7 495 926 18 85
Факс +7 495 926 18 86
salesru@pentair.com

SERBIA AND MONTENEGRO
Tel. +381 230 401 770
Fax +381 230 401 770
salesee@pentair.com

SCHWEIZ / SUISSE
Tel. 0800 551308
Fax 0800 551309
info-ptm-ch@pentair.com

SUOMI
Puh. 0800 11 67 99
Telekopio 0800 11 86 74
salesfi@pentair.com

SVERIGE
Tel. +46 31 335 58 00
Fax +46 31 335 58 99
salesse@pentair.com

TÜRKIYE
Tel. +90 530 977 64 67
Fax +32 16 21 36 04
ptm-sales-tr@pentair.com

UNITED KINGDOM
Tel. 0800 969013
Fax 0800 968624
salesthermaluk@pentair.com

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