nVent RAYCHEM ACS-30

Multi-application Control & Monitoring

Contents

- **Overview**
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  - Programming
- **Product Features**
- **Case Study**

nVent RAYCHEM ACS-30

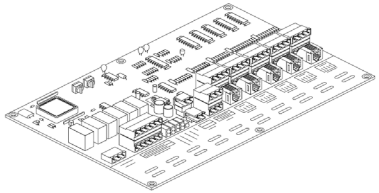
ADVANCED MULTI-CIRCUIT CONTROL, MONITORING AND POWER DISTRIBUTION SYSTEM FOR HEAT-TRACING APPLICATIONS

- Control and monitoring of up to 260 circuits
  - Multi Application (Pipe Freeze, HWAT, Grease line TM, Roof & Gutter DI, Surface snow melting, and UFH.)
- Monitors temperature, ground-fault currents, operating currents.
- Switches by multiple sensor inputs.
- User Interface Terminal with touch screen technology
- Interfaces with Modbus BMS/BAS
- Available with a Modbus to BacNet protocol interface.

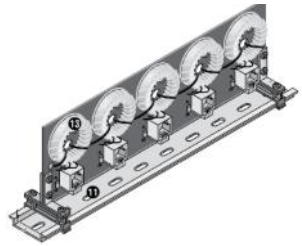
nVent RAYCHEM ACS-30 – System Components

PANEL

- Control Card Module (ACS-CRM)
  - Measures and controls 5 circuits per card
  - Pre-assembled into the ACS-30-EU-PCM2 panel



- Current Transformer Module (CTM)
  - Measures Line and ground fault current
  - Measure actual power consumption



ACS-UIT

- 8.4” Color touchscreen

ADDITIONAL FIELD MONITORING

- Remote Monitoring Module (RMM2)
  - Collects and transmits up to 8 temperatures

nVent RAYCHEM ACS-30 – System Components

➢ ACS-30-EU-VIA-DU-20-MOD

- Multi-sensor input module (External Device) for s
  circuits for surface snow melting
- Switches heater circuits based on surface temper
  and moisture sensing.

➢ ACS-30-EU-EMDR-10-MOD

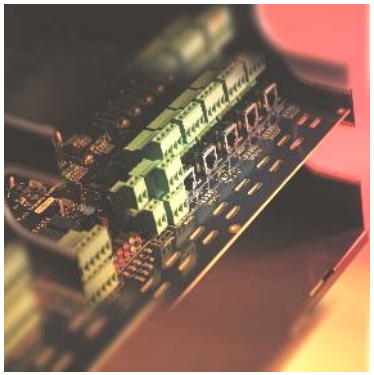
- Multi-sensor input module (External Device) for switching circuits for Roof & Gutter De-icing
- Switches heater circuits based on ambient temperature and moisture sensing.

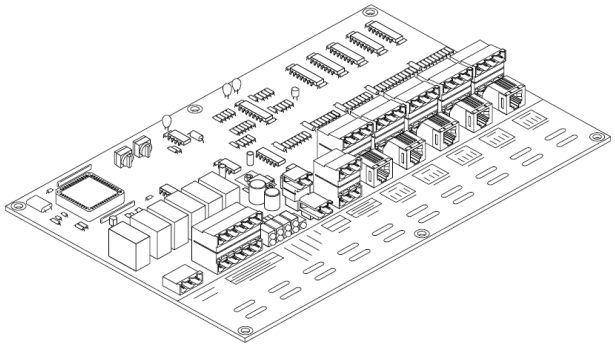
➢ ACS-30 Protonode

- Protocol converter from ModBus to BacNet
- Allows conversion to BacNet protocols of a customer BMS/BAS.

nVent RAYCHEM ACS-30

- 5 control circuits on one board
- ACS-30 CRM board features
  - Mechanical relay control
  - On / Off and PASC control
- Alarm conditions
  - Low / High temperature
  - Low / High current
  - Ground-fault Alarm/Trip
  - RTD failure
  - Communications failure
  - Relay failure

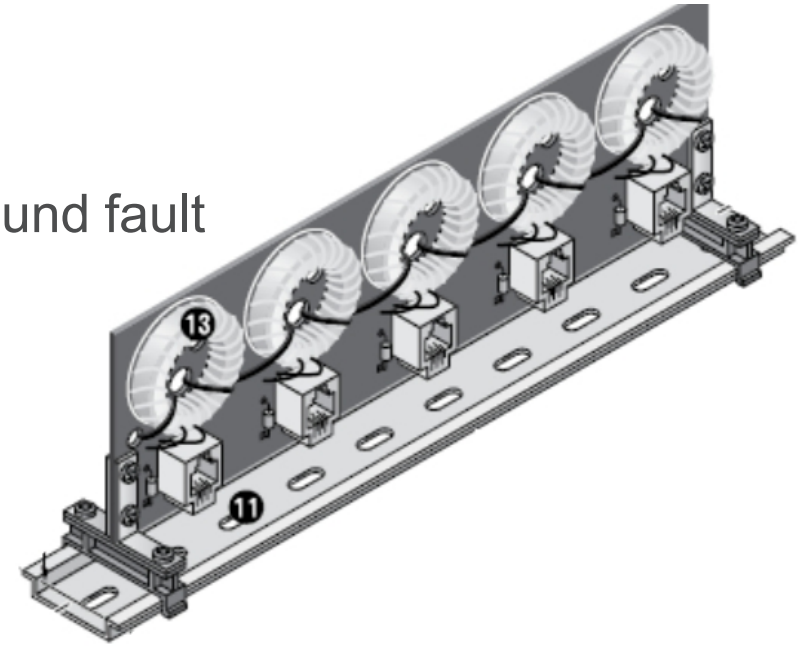




nVent RAYCHEM ACS-30

CURRENT MEASUREMENT

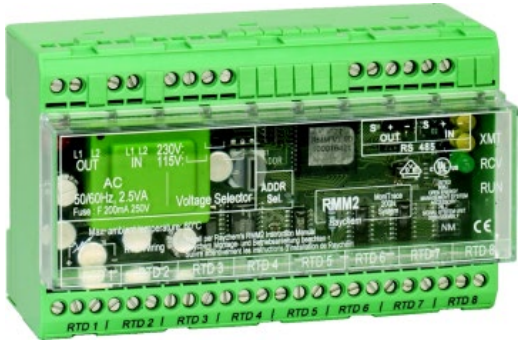
- Via a current transformer the following parameters are measured:
- Total current to field
- Net current loss in EHT system – ground fault



nVent RAYCHEM ACS-30

The RMM2

- The RMM2 converts PT100 temperature data and transmits it to the controller via RS-485
- 8 RTD inputs per module
- Up to 16 RMM2s on a single, twisted RS-485 cable for a total of 128 temperatures

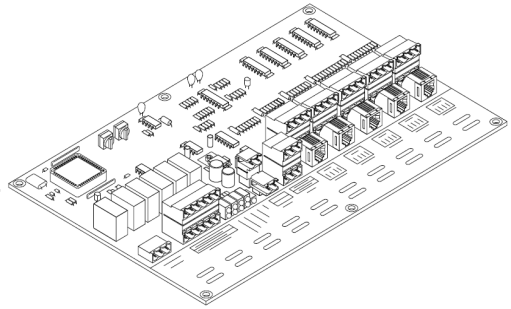


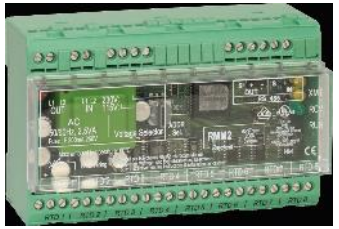
nVent RAYCHEM ACS-30

UIT FOR MONITORING

- The UIT communicates with the control modules
- Control is executed by card rack module (CRM)
- CRM (In the ACS-30-EU-PCM2) and RMM2's are connected via a single, twisted pair RS-485 cable to the user interface terminal (UIT)

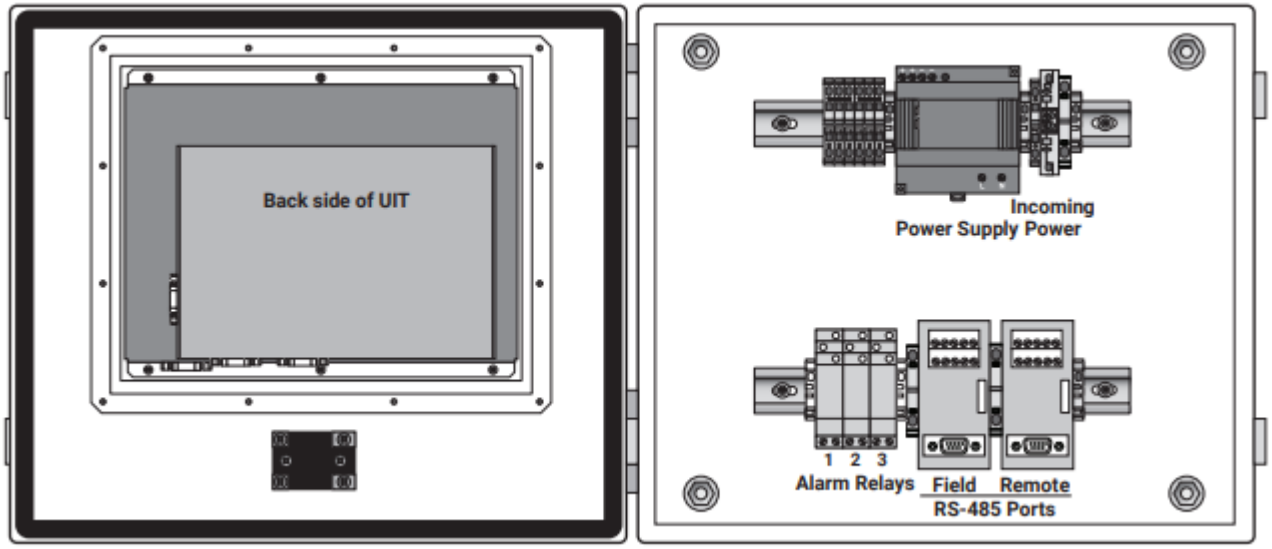
UIT



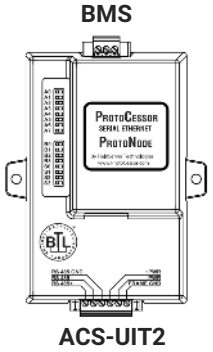


RMM2 - optional

ACS-UIT2



- Field Port – PCM, RMM
- Remote Port – BMS (ProtoNode)
  - Modbus to BACnet Converter



ACS-30-EU-PCM2-x-xxA (Power & Control Module)

5 to 15 circuit outputs per panel. (with 20A or 32A protection per circuit.)

Electrical circuit protection per heating circuit.

Alarm indication on Panel

Control functions built-in, with steering from UIT

- If connection is broken from UIT, the co

1 sensor per circuit built into every panel.

1 panel controls multiple applications

- HWAT
- UFH
- Pipe FP
- Ramp heating
- Frost Heave
- Gutter de-icing
- Grease line temperature maintenance

Up to 52 panels (or 260 circuits) can be linked together and steered from a single UIT.

Bespoke panel design available.

ACS-30-EU-PCM2-x-xxA (Power & Control Module)

The Range:

- ACS-30-EU-PCM2-5-20A — 5 circuit, 20Amp/Circuit.
- ACS-30-EU-PCM2-10-20A — 10 circuit, 20Amp/Circuit.
- ACS-30-EU-PCM2-15-20A — 15 circuit, 20Amp/Circuit.
- ACS-30-EU-PCM2-5-32A — 5 circuit, 32Amp/Circuit.
- ACS-30-EU-PCM2-10-32A — 10 circuit, 32Amp/Circuit.
- ACS-30-EU-PCM2-15-32A — 15 circuit, 32Amp/Circuit

6 Standard PCM configurations means:

- System design time is reduced.
- Lead times are reduced to better serve our customer's needs.
  - (2-4 Weeks)

Note: Bespoke panel design can be provided. Quotation available upon request (Price & Lead time.)

Standardised design, with flexibility

ACS-30 Programming

ACS-30 Programming

Programming Methods

- Program with **UIT**
  - Quick and easy for smaller jobs
  - Can troubleshoot any issues while programming

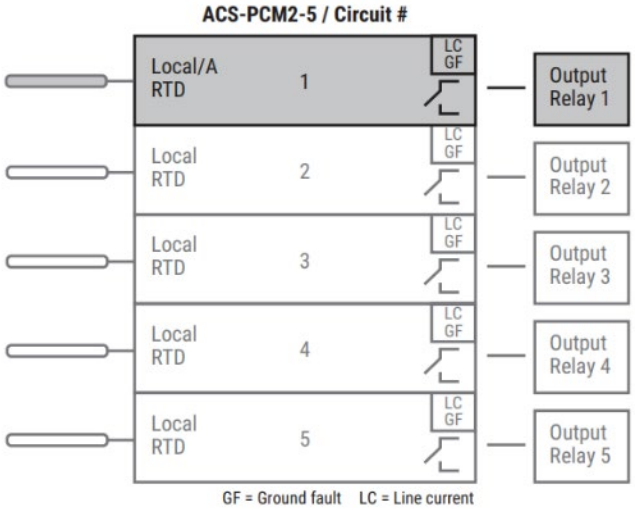
- Program with **Integrator Software**
  - Completed “offline” and programming file exported to UIT format (XML)
  - Useful for large systems with many circuits
  - System needs to be setup exactly as expected (PCM’s, RMM’s, etc)

ACS-30 Programming

Software Organization

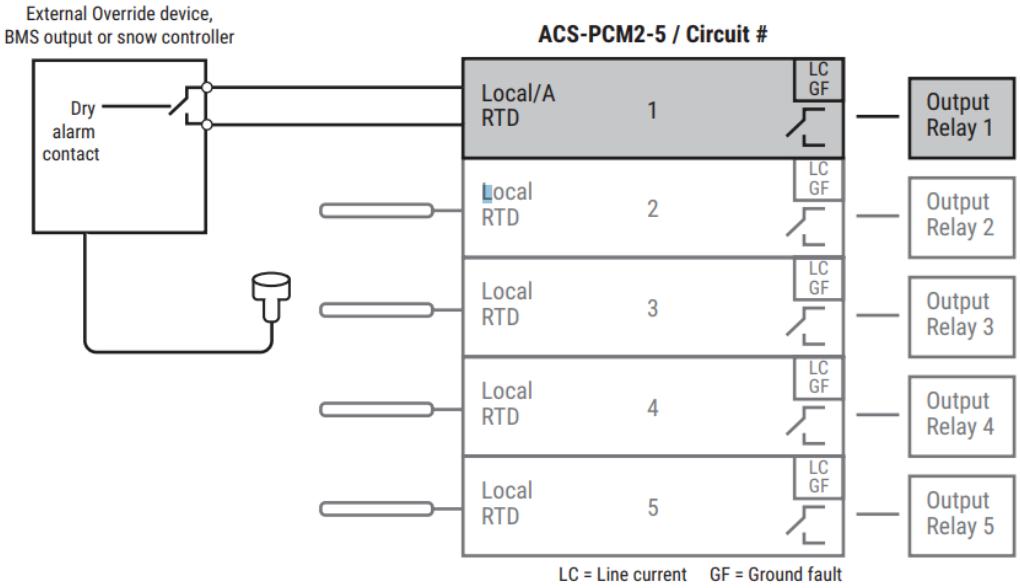
- The ACS-30 is organized around the concept of heating control circuits connected to relay outputs from the ACS-PCM boards within the ACS-30-EU-PCM2 power control panels

- A simple circuit consists of one output relay and one RTD sensor input.



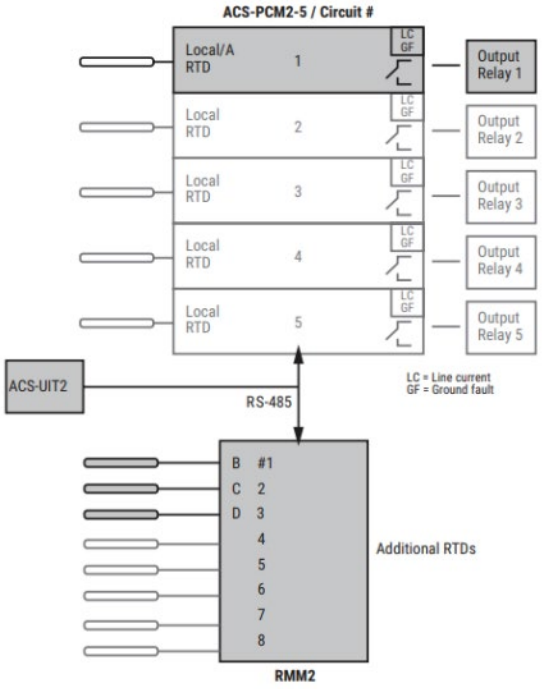
ACS-30 Programming

Heating control circuits can also be connected to the RTD input in the PCM panel from an external device i.e. for roof & gutter and snow melting applications

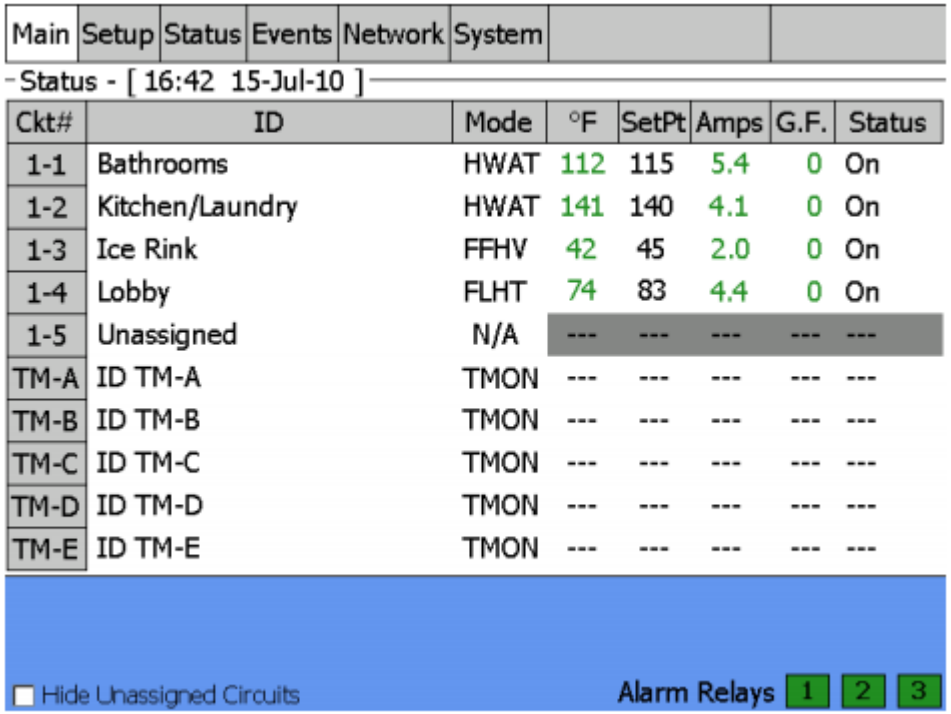


ACS-30 Programming

A circuit may also be controlled by up to four RTD inputs by adding a RMM2 module to the network. Multiple RTDs may be used for control or monitoring of a heating circuit



ACS-30 Programming



Ckt#	ID	Mode	°F	SetPt	Amps	G.F.	Status
1-1	Bathrooms	HWAT	112	115	5.4	0	On
1-2	Kitchen/Laundry	HWAT	141	140	4.1	0	On
1-3	Ice Rink	FFHV	42	45	2.0	0	On
1-4	Lobby	FLHT	74	83	4.4	0	On
1-5	Unassigned	N/A	---	---	---	---	---
TM-A	ID TM-A	TMON	---	---	---	---	---
TM-B	ID TM-B	TMON	---	---	---	---	---
TM-C	ID TM-C	TMON	---	---	---	---	---
TM-D	ID TM-D	TMON	---	---	---	---	---
TM-E	ID TM-E	TMON	---	---	---	---	---

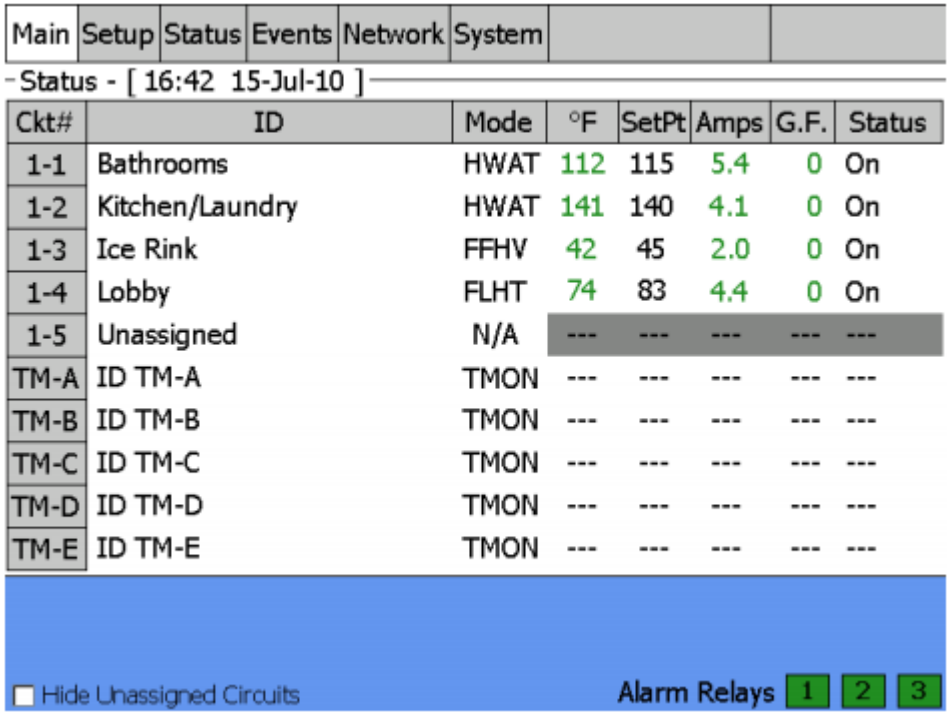
Ckt# Displays the connected ACS-PCM2-5 power panels and the pre-assigned circuit number for each of their five relays (e.g. 1-1, 1-2, 1-3, 1-5) C910-485 controllers will only show a single circuit number

ID Identification tag for the circuit

Mode Displays the application control mode for the circuit. Refer to keep together on one line and the associated nVent 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.
- **Frost heave** Circuit has been set up for a freezer frost heave application.
- **Floor heating** Circuit has been set up for a floor heating application
- **Pipe freeze** Circuit has been set up for a pipe freeze protection application
- **Fuel Oil** Circuit has been set up for a fuel oil flow maintenance application
- **Greasy waste/TM** 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.

ACS-30 Programming



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1-3	Ice Rink	FFHV	42	45	2.0	0	On
1-4	Lobby	FLHT	74	83	4.4	0	On
1-5	Unassigned	N/A	---	---	---	---	---
TM-A	ID TM-A	TMON	---	---	---	---	---
TM-B	ID TM-B	TMON	---	---	---	---	---
TM-C	ID TM-C	TMON	---	---	---	---	---
TM-D	ID TM-D	TMON	---	---	---	---	---
TM-E	ID TM-E	TMON	---	---	---	---	---

°F or °C 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 °F/°C, 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

ACS-30 Programming

MAIN

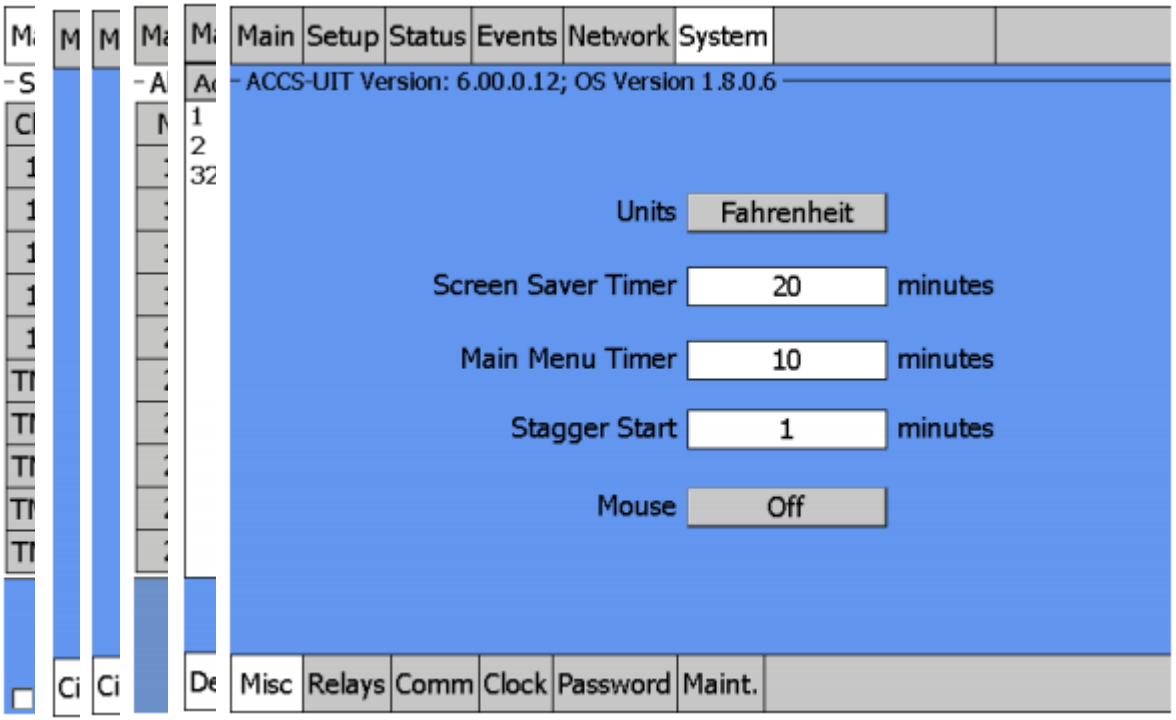
SETUP

STATUS

EVENTS

NETWORK

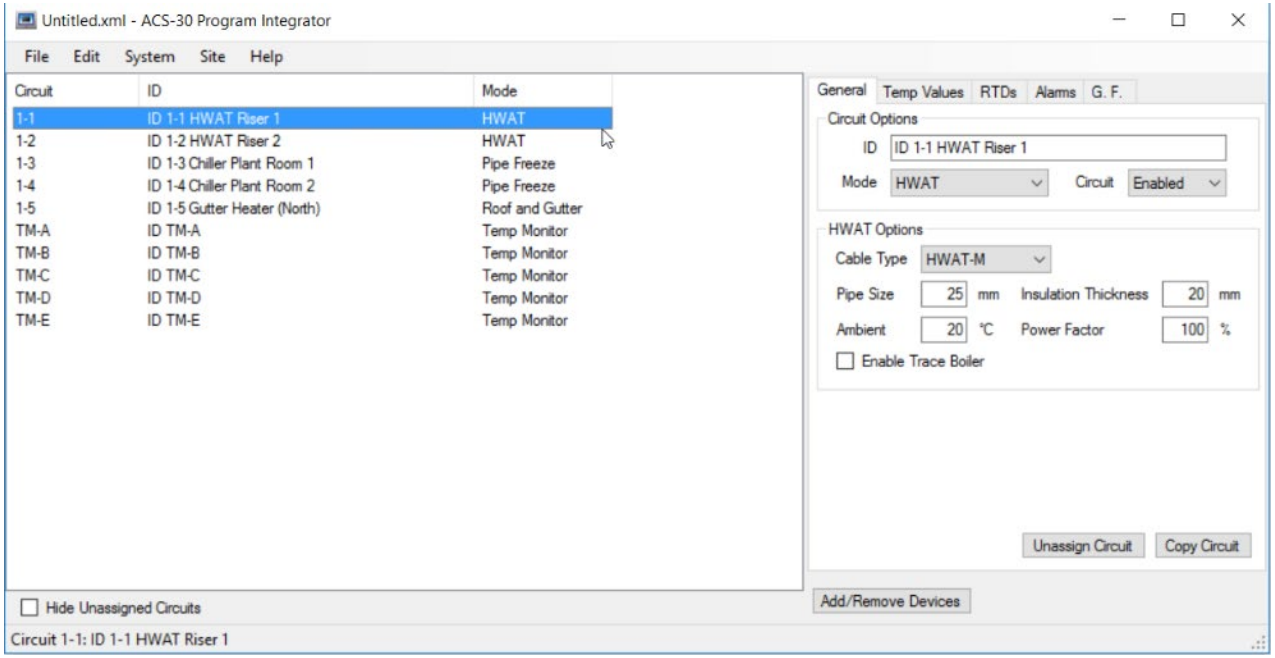
SYSTEM



ACS-30 Programming

Integrator Software

- Similar Menu structure as the “Main and “Menu” tabs
- Allows circuit setup and limited system setup only
  - No Status, Network, Events



nVent

CASE STUDY

Comcast Technology Center (Philadelphia, PA)

BACKGROUND

- Tallest building in Philadelphia and 10th tallest in the US at 1,121 feet, identified potential issues with snow and ice damage

KEY DESIGN CHALLENGE

- Large outdoor area on 45th Floor that required surface snow melting
- Multiple application project on multiple floors

SOLUTION

- nVent RAYCHEM RIM PMPH panels
  - more efficient heat transfer
  - more reliable attachment method
- ACS-30 Control System
  - integral ground fault
  - BMS communication
- Detailed design layout drawings

PROJECT FACTS

- 12,900’ IceStop Cable
- 1,700’ 20QTVR2-CT
- 105 PMPH Panels

Datacenter (Location Confidential)

BACKGROUND

- Large install where system performance and reliability is critically important

KEY DESIGN CHALLENGE

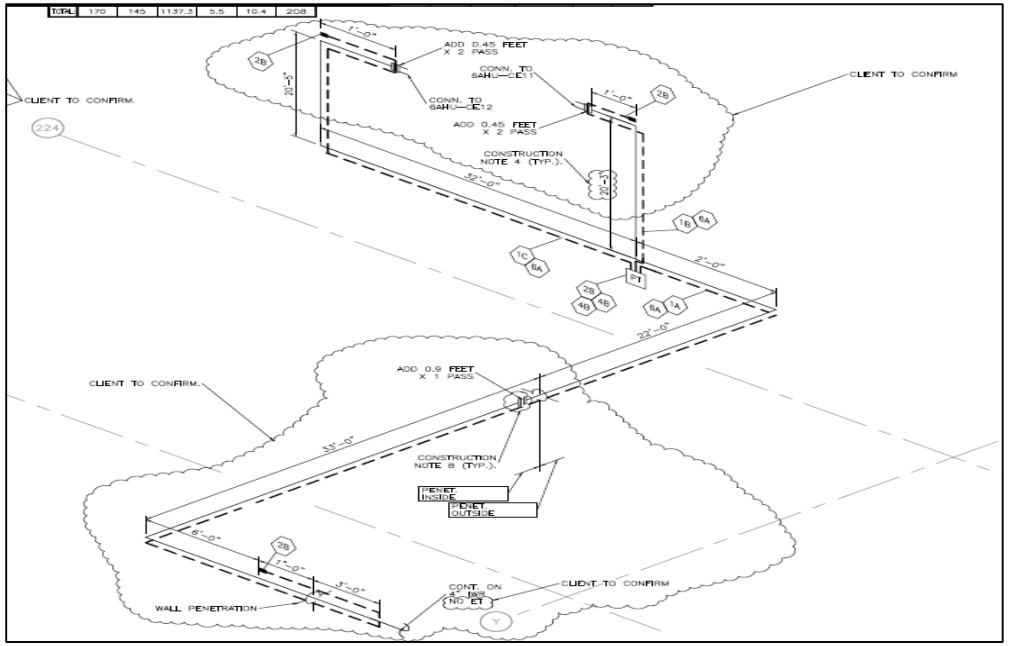
- Large volume of exposed pipes
- Enormous liability if freeze protection fails
- Complete communication required through BMS
- Coordinating between many stakeholders

SOLUTION

- Project Services from quote through completion
- Managing product delivery timelines
- ACS-30

PROJECT FACTS

- 4500’ 8XL2-CR
- 32 electrical circuits
- 7 ACS-PCM
- 1 ACS-UIT



National Music Center (Calgary, AB)

BACKGROUND

- Award winning modern architecture with performance and aesthetics. Identified potential for significant snow and icicle damage

KEY DESIGN CHALLENGE

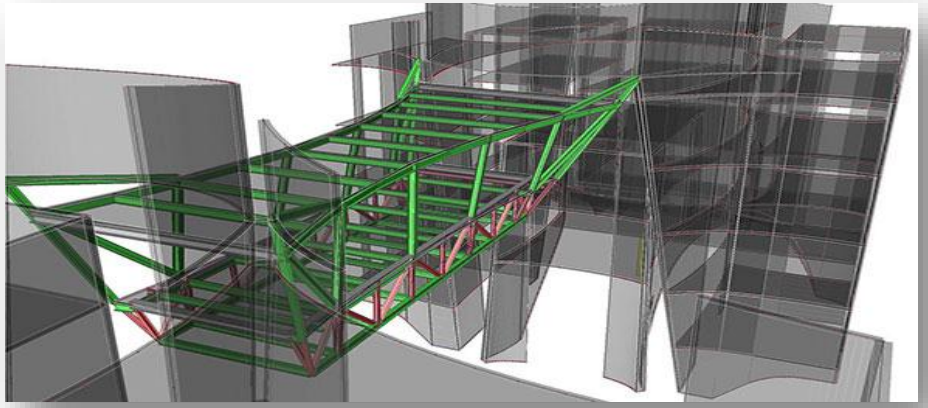
- High volume gutters requiring complete snow-melting,
- High wattage design requirement to melt any possible snow accumulation

SOLUTION

- nVent RAYCHEM RIM Roof Ice Melt panels
  - More efficient heat transfer
  - More reliable attachment method
- ACS-30 Control System
  - Integral ground fault
  - BMS communication
- Detailed design layout drawings

PROJECT FACTS

- 1,300’ RIM heating panels
- 10 electrical circuits, fed from two ACS-PCM Panels



The Bow Center (Calgary, AB)

BACKGROUND

- Landmark building in downtown Calgary, named in tribute to the Bow River that runs through the city

KEY DESIGN CHALLENGE

- Multiple applications including pipe freeze protection and HWAT at various levels of the building from Level B5 to Level 58

SOLUTION

- nVent RAYCHEM ACS-30 control system without the use of any RTD's
  - Integral ground fault
  - Multiple alarm levels
  - BMS communication (used to force on based on BMS temperature data)

PROJECT FACTS

- 9,000' XL-Trace heating cable
- 5,000' HWAT heating cable
- (9) x PCM2-5 panels located at various levels throughout the building

Wanapum Dam Building (Grant County, WA)

BACKGROUND

- New building at PUD electric utility company with various areas requiring heat

KEY DESIGN CHALLENGE

- Original design was to use discrete components per circuit, determined to be too costly and too bulky for wall space

SOLUTION

- nVent RAYCHEM ACS-30 control system without the use of any RTD's
  - integral ground fault
  - multiple alarm levels
  - BMS communication (used to force on based on BMS temperature data)

PROJECT FACTS

- 16,500' Raysol heating cable
- (14) x PCM2-5 panels located at various levels throughout the building

222 Jarvis Street (Toronto, ON)

BACKGROUND

- Renovation of building entrance ramps at five locations in downtown Toronto

KEY DESIGN CHALLENGE

- Original design intent included separate distribution sub panels for each ramp location

SOLUTION

- Custom built nVent RAYCHEM ACS-30 control system combined with distribution panels
  - Centralized control
  - Energy and integrity monitoring
  - One stop for operations and maintenance staff
- No added cost!

PROJECT FACTS

- 30 custom nVent RAYCHEM MI snow melting cables
- (1) x Custom built nVent RAYCHEM ACS-30 panel with 6x ACS-CRM boards and 12x 600V/3P circuit breakers

Thank you