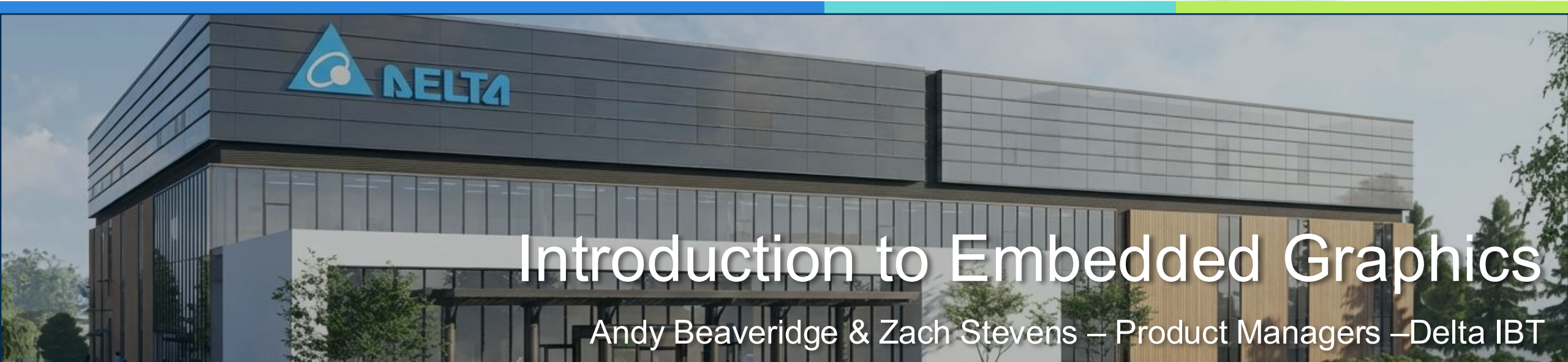




Introduction to Embedded Graphics

Andy Beaveridge & Zach Stevens – Product Managers –Delta IBT

A Management Software and HVAC Joint Venture



Introduction to Embedded Graphics Agenda

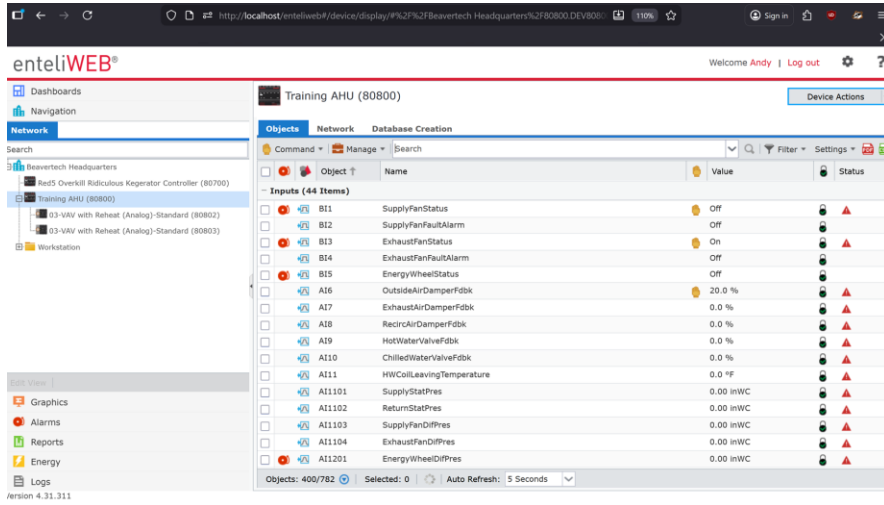


- What are Embedded Graphics
- Embedded Graphics Workflow
- Documentation & Performance Guidance
- Current and Future Functionality
- Q&A



"What Are Embedded Graphics?"

“Bring intuitive, equipment visualization directly to the controller.”



Facility Manager:

- Needs access anywhere onsite
- Benefits from mobile-friendly, real-time graphics
- Gains independence from IT / workstation bottlenecks

BMS Operator :

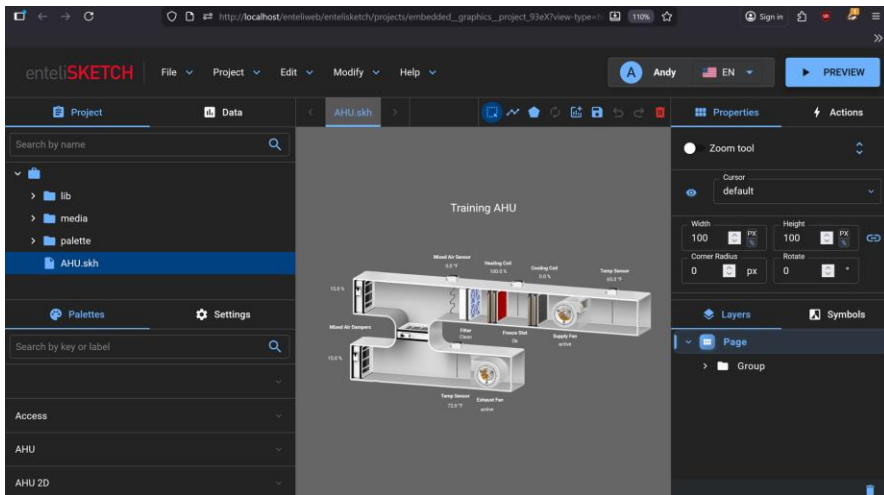
- Needs quick overrides and fault diagnosis
- Saves time with local graphics and built-in commands

OEM System Programmer:

- Needs OEM specific data access and multi-graphic support
- Support for equipment configuration without eWEB Access

End Users / Occupants:

- Need simple read-only or limited-control views
- Benefit from friendly, intuitive interface





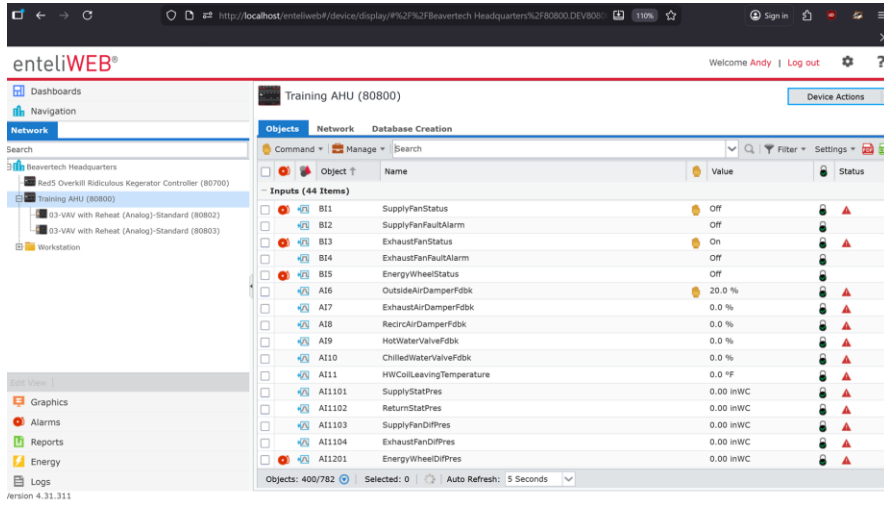
Localized Visualization

Controller-level graphics, without the front end

- Enables a fast, local, graphical interface
- Deliver real-time equipment representation at the EDGE level
- Improve troubleshooting efficiency and reduce downtime
- Provide a consistent experience across all V4 IP devices



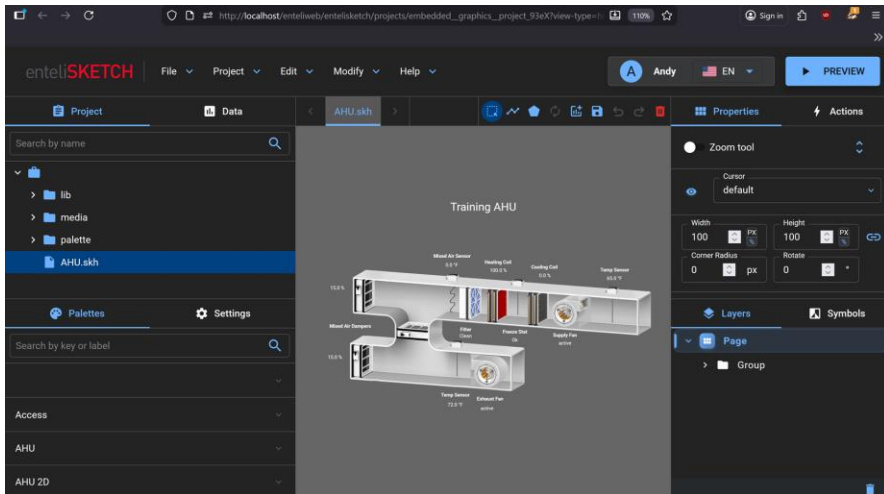
“Bring intuitive, equipment visualization directly to the controller.”



Embedded Graphics

Are Not:

- A replacement for enteliWEB or enteliCLOUD
- A multi-building supervisory interface
- A full graphical editor



Red5 EDGE VAV



Graphics where the control happens

Powered By enteliSKETCH and V4 Firmware

- Controller Resident HTML5 graphics engine
- Provides basic operator commands and visualization
- Accessible from any device that has a browser
- Kiosk and Administrator Modes



Embedded Graphics Workflow

Embedded Graphics Workflow

enteliSKETCH Export & Upload to Device



Create Graphics in enteliSKETCH & 'Export for Device'



Create FIL Object on Device and name it 'enteliSKETCH Project'



Upload Project .zip to FIL Object



Log into Embedded Web of Device and Enable Graphics User



Configure Permissions and view graphics as required

The screenshot displays the enteliSKETCH web application interface. The top navigation bar includes 'File', 'Project', 'Edit', 'Modify', and 'Help' menus. The 'Project' menu is open, showing options like 'New Project', 'Open Project', 'Favorite', 'Rename Project', 'Delete Project', 'Export / Import', 'Export Current Project', 'Export for Device', and 'Import Project'. The 'Export for Device' option is selected, leading to a 'VAV Graphic' view. This view features a 3D model of a VAV damper with various data points and controls. The left sidebar shows a 'Project' section with a search bar and a list of assets including 'My Project', 'assets', 'media', 'palette', and 'Embedded VAV.skh'. The bottom section shows a 'Palettes' section with a search bar and a list of project items. The right sidebar contains 'Properties' and 'Layers' panels. The 'Properties' panel shows settings for 'Corner Radius' and 'Rotation'. The 'Layers' panel shows a 'Page' section with a 'Title' group containing several 'Analog Edit Box Vertical' and 'Data_Analog_Read' elements.



Embedded Graphics Documentation



Graphics Deployment Planning Guide

Graphics Deployment Guide

Available on enteliSKETCH Product Page

<https://support.deltacontrols.com/products/entelisketch/>

This guide outlines best practices for designing, deploying, optimizing, and maintaining graphics in enteliWEB, enteliCLOUD, and Embedded Web Servers.

It is primarily intended for system designer, graphics developers, integrators, application engineers, and facility managers

Topics Covered

- + Graphics Platform Selection
- + Performance Optimization
- + Browser Compatibility
- + Embedded Graphics Limitations



Graphics Deployment Planning Guide

Intelligent. Efficient. Innovative. Sustainable.

Graphics Platform Selection

Graphics Editors

Editor	Status	Recommended Usage
enteliSKETCH	Active Development	New Projects
enteliVIZ	Supported Maintenance Mode	Existing Deployments

Embedded Graphics (BETA)

Project	Editor	Comments
Embedded Graphics	enteliSKETCH	Use eWEB 4.33+



Graphics Deployment Planning Guide

Performance Optimization

Prioritize Graphics Performance during development to:

- + Minimize Memory Usage on Client Side (Browser Viewing Graphics)
- + Improve Load Times

Topics covered include

- + Use Native HTML5 Elements
 - Colorized HTML Group elements vs. LED icons for alarms
- + Reduce heavy bitmap images
- + Data Point Count Considerations



Embedded Graphic Functionality



Graphics Deployment Planning Guide

Intelligent. Efficient. Innovative. Sustainable.

Scope & Capabilities

What is supported today, and what is in our To-Do list.

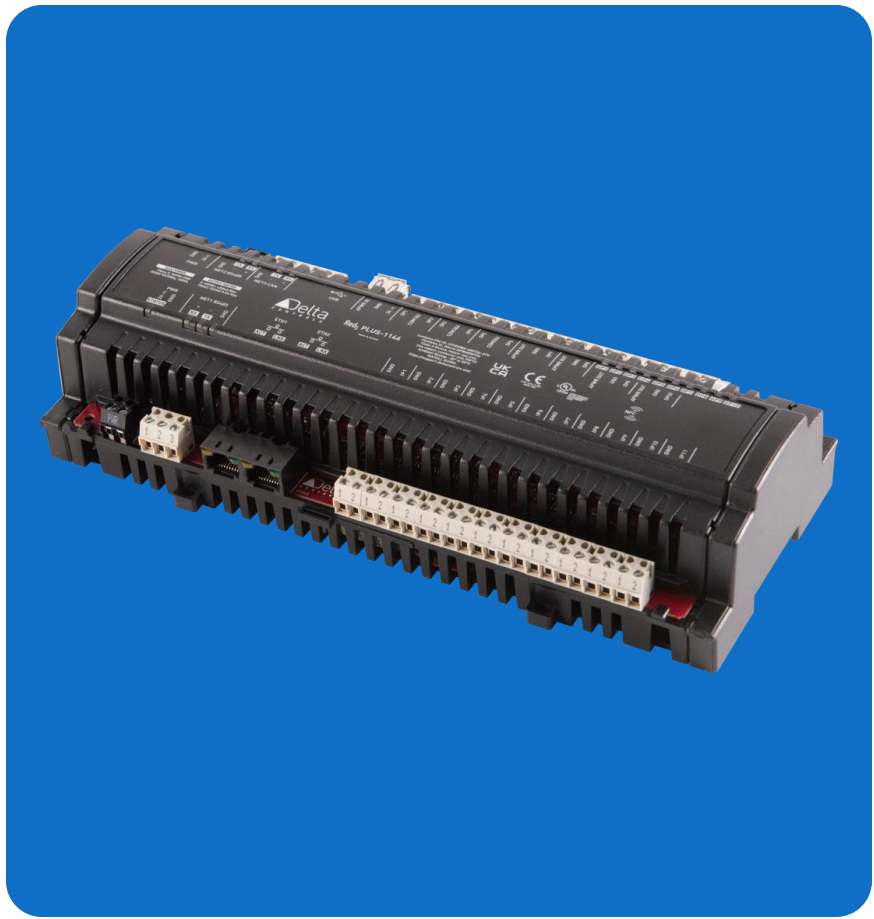
Supported Today

- Multi-graphic navigation
- Adjustable datapoints such as setpoint etc.
- Multi-controller deployment via save/load database
- 3 concurrent users
- Local datapoints

Future Phases

- Object / TL / SCH pages
- Controller graphical export
- Remote datapoints
- Event handling
- Improved Workflow

Use Embedded Graphics for local controller visualization. Use enteliWEB for site-level supervision.



Embedded Graphics (Beta) Limits

Embedded Graphics Support Local Device Points Only

Device Type	Datapoint Limit*	Project Size Limit**
RED5-PLUS-11xx/6xx	150	20 MB
RED5-EDGE-Vxxx	100	10 MB
eBMGR-2 / eBCON-2	100	10MB
RED5-EDGE-11xx/6xx	100	10MB
RED5-PLUS-ROOM	50	5MB
RED5-EDGE-ROOM	50	5MB
O3	Not Available Yet	Not Available Yet

* These are not hard datapoint limits, but tested limits that result in acceptable initiation load times. Load times may vary depending on factors such as images, project, and database size

** These are tested limits to ensure that adequate space remains for other device applications

Red5 EDGE VAV



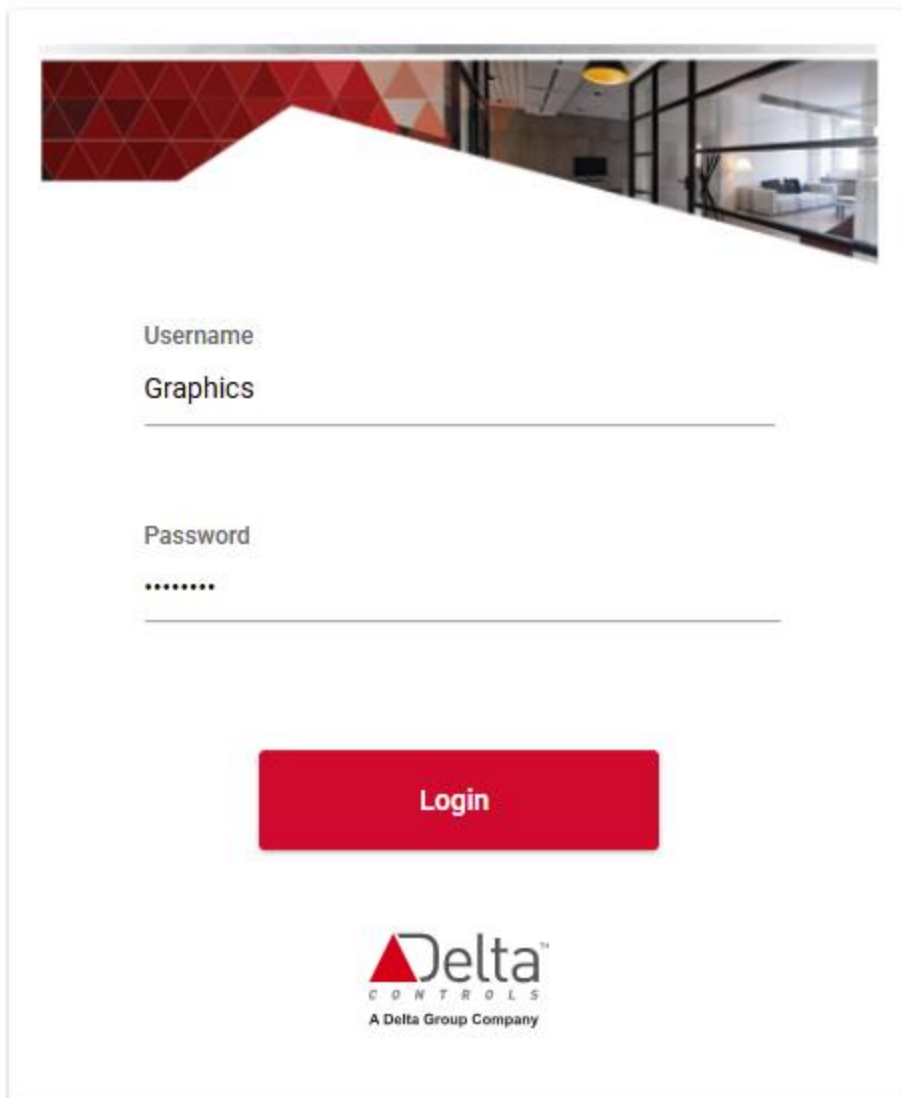
Graphics where the control happens

Powered By enteliSKETCH and V4 Firmware

- Controller Resident HTML5 graphics engine
- Provides basic operator commands and visualization
- Access from any device that has a browser
- Kiosk and Administrator Modes

Current Limitations

- 3 concurrent users
- No Object / TL / SCH pages yet (Phase 2)



The image shows a login interface for Delta Controls. At the top, there is a banner image with a red geometric pattern on the left and a modern office interior on the right. Below the banner, there are two input fields: 'Username' with the text 'Graphics' entered, and 'Password' with a masked password '.....'. A red 'Login' button is positioned below the password field. At the bottom, the Delta Controls logo is displayed, featuring a red triangle and the text 'Delta CONTROLS A Delta Group Company'.

Username
Graphics

Password
.....

Login


Delta
CONTROLS
A Delta Group Company

Embedded Graphic Users

- 2 separate users
- "Graphics" user cannot access admin page of embedded webserver
- Admin can access everything
- Non-authenticated Kiosk Mode
- Graphics can be set to read-only
- Graphics can be disabled

Network						«
Name	Object	Routing		Network Number	Status	Enable
NET1 - LINKnet	NP1			20807		☒
NET3 - CANbus	NP3					☒
▼ Ethernet1 - Physical	NP4					
Ethernet1 - BACnet	NP5	On		19999		☒
Ethernet1 - BACnet UDP/IPv4 - 1	NP6	On		49999		☐
Ethernet1 - BACnet UDP/IPv4 - 2	NP7	On		39999		☐
Ethernet1 - HTTPS	NP8					☒
Secure Connect 1	NP9			9999	Not Connecte...	☐
NFC	NP11					☒

Ethernet1 - HTTPS	
Protocol	https
IPv4 Address	10.0.0.113
IPv6 Address	2604:3d08:2d7c:7b00::fec1
Hostname	Red5-EDGE-V-T1L-19-EE-90.local



← Graphics Setting

▼ Application Settings

Linknet (NET1 - LINKnet)
Enabled

BACnet Ethernet
Enabled

BACnet UDP/IP
Disabled

Web Server Settings
Enabled

BACnet Secure Connect - Regular No
Disabled

Graphics
Enabled

Username : Graphics

User Enabled



Access Type

Read Only



Read & Write

Security

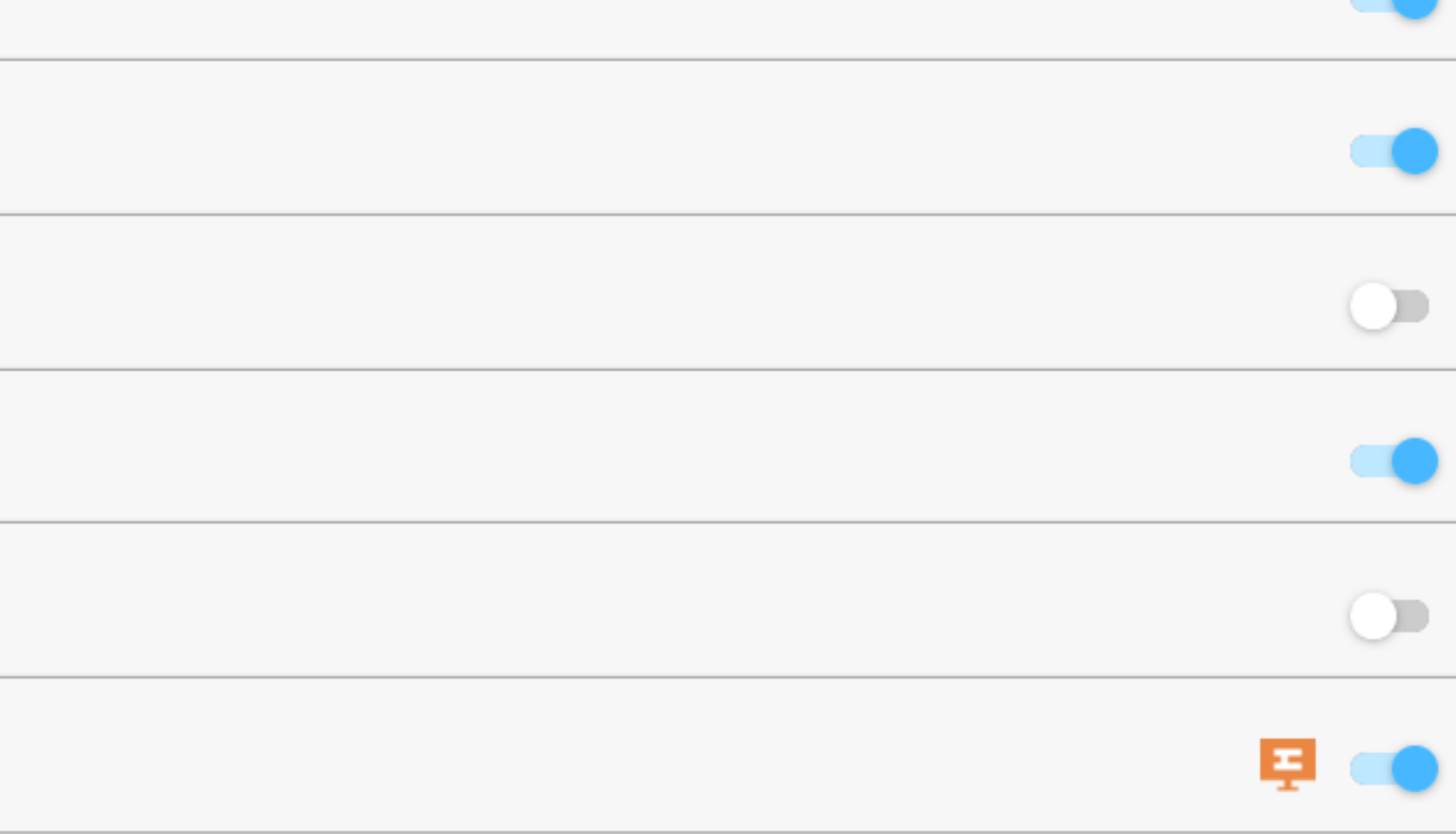
Kiosk Mode



Graphics User

Change Password







VAV Graphic

Office 102 RT	RTU1 SAT
21.0 °C	15.0 °C

Office 102 Occ SP
23 °C ✓
SET TO AUTO

Airflow Setpoint
100 CFM

AF Setpoint Clg Max Limit
500 CFM ✓
SET TO AUTO

AF Setpoint Htg Max Limit
400 CFM ✓
SET TO AUTO

Airflow Setpoint Min
100 CFM ✓
SET TO AUTO

Kfactor Specified
896 ✓
SET TO AUTO

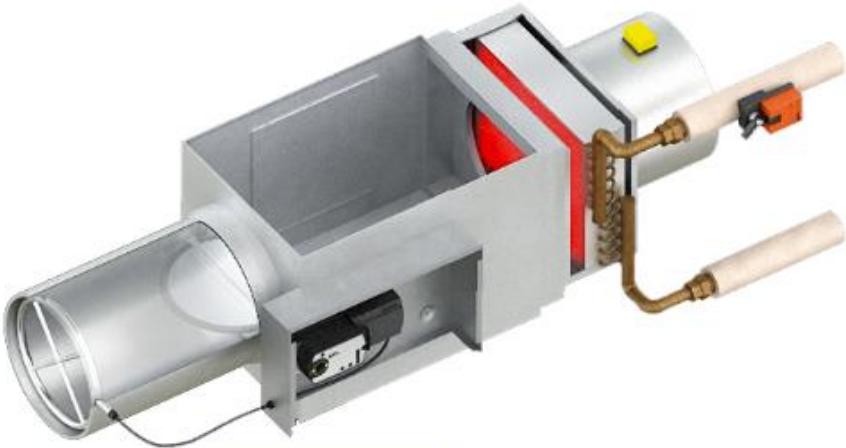
Airflow
145 CFM

Inlet Duct Diameter
8 in

Room 102 DAT
16.0 °C

Reheat Valve Output
100 % ✓
SET TO AUTO

Damper Output
100 % ✓
SET TO AUTO





Q and A

Thank you!