MANUAL – INSTALLATION

Advantage With Disio Display

Digital VAV Diffusers

v200 – Issue Date: 24/06/25

acutherm by price

ADVANTAGE WITH DISIO DISPLAY

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PRODUCT OVERVIEW & INSTALLATION INSTRUCTIONS

General Description

Advantage Disio diffusers are digital VAV diffusers with a built-in electric motor and controller providing VAV cooling and VAV heating. The damper modulates open and close to vary the air flow (warm or cool) into the room in response to room temperature. Master models have onboard controls, while the drone model imitates the master.

The Advantage with Disio uses the Disio Display wall mounted thermostat to accurately sense room temperature in both cooling and heating modes. Disio features capacitive touch buttons on an anti-fingerprint glass with a sleek wedge design. The Advantage is factory wired with a 25ft plenum rated cable for easy connection to the Disio Display.

Disio Display is available in White and Black colors.

Installation into Ceiling

Advantage with Disio is available in four different geometries: square, round, swirl, and linear slot. Round inlets for connection to supply ductwork are standard on all models. Various border styles are available to suit most ceiling types. Please refer to individual model submittals for more details.

When installing units, make sure construction debris does not enter units or duct system.

1. Inspect the carton for damage before opening. Notify carrier if external damage exists. Submit all claims for shipping damage to the carrier.
2. Move the diffusers (in cartons) to installation area. Note any unit identification.
3. Remove cardboard box and insert. Recycle packaging material.
4. Install diffuser in ceiling (**Figure 3-4**) If installed in ceiling grid, install T-bar support wire close to each corner of unit. Make sure that only wire suspended T-bars are used to support unit weight. Limit screw and drill holes to inlet neck collar area.
5. Connect and secure the supply duct to the collar. Flexible duct should NOT be formed in a centerline radius of less than 1½ times the duct diameter.

FIGURE 1 - DISIO THERMOSTAT ▼

FIGURE 2 ▼

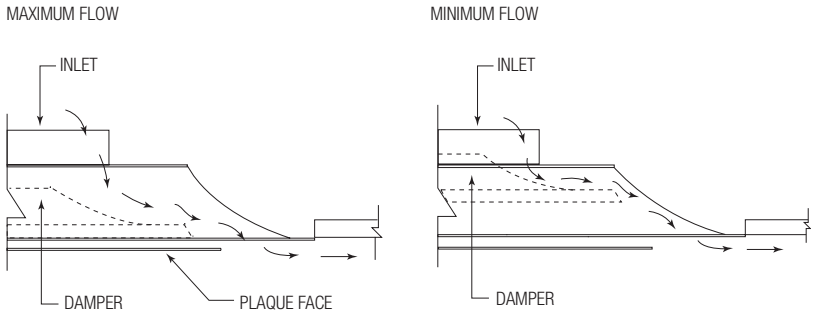


FIGURE 3 - TYPE 1 SURFACE MOUNT ▼

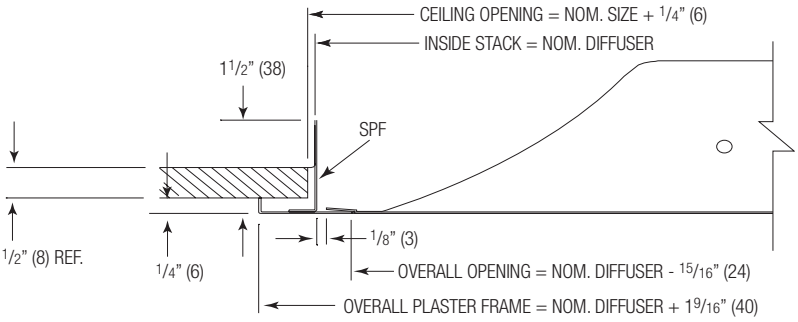
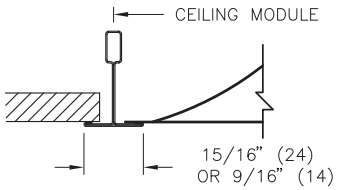


FIGURE 4 - TYPE 3 T-BAR ▼



MORE BORDER TYPES AVAILABLE. PLEASE SEE INDIVIDUAL MODEL SUBMITTALS FOR MORE DETAILS

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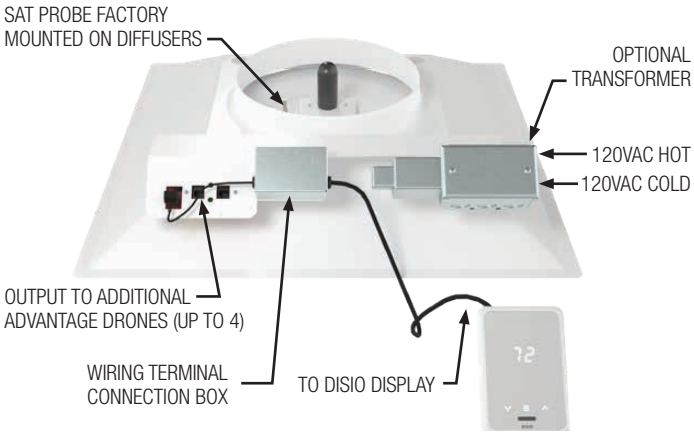
6. After diffuser has been installed in ceiling, uncoil supplied cable and pull down wall to location of Disio thermostat. (**Figure 5-7**) For Disio thermostat installation.
7. Connect any optional drone diffuser(s) to the Advantage with Disio using the cable supplied with the Drone (see **Page 6**).
8. Lastly, connect supply power (see supply power options on **Page 3-4**).
9. Balance the system (see **Page 3**).

FIGURE 5 - ADVANTAGE WITH DISIO JUNCTION PANEL ▼



Thermostat Installation

The Disio Display thermostat can be installed to any standard single gang electrical box in the vertical orientation to be mounted to drywall or other surface using appropriate mounting hardware. The Disio Display thermostat comes as an assembly with two parts; the backing plate which is mounted to the electrical box or to the wall, and the front plate with screen that snaps onto the backing plate by aligning with the pins and the tabs.

Step 1

Separate front screen from backplate by carefully using a small flat screwdriver to pry the bottom of the backplate from the front screen in the pry slot provided. Next, pry the top in the same way until separated, then pull apart.

NOTE: The first time the screen and backplate are separated, they will be very tight.

Step 2

Mount the backplate to an electrical junction box or to the wall by running screws through the slots in the backplate. Plug the purple NetC25 cable into the plug on the back of the Disio labeled “Main” and the optional BACnet cable into the plug labelled “BACnet” **NOTE:** If mounting directly to drywall, drywall anchors must be used to secure the backplate.

Step 3

Once the wiring is complete, carefully line up the front face to the backplate and snap back together.

FIGURE 6 ▼

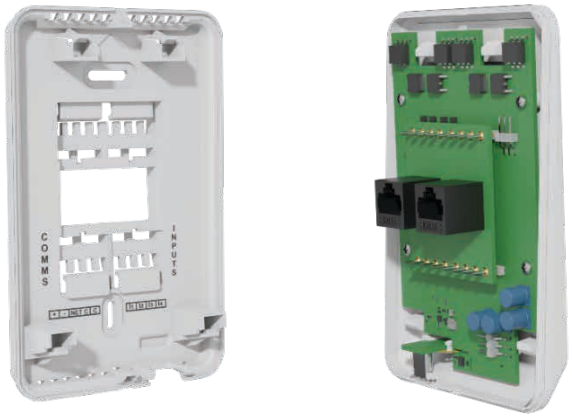
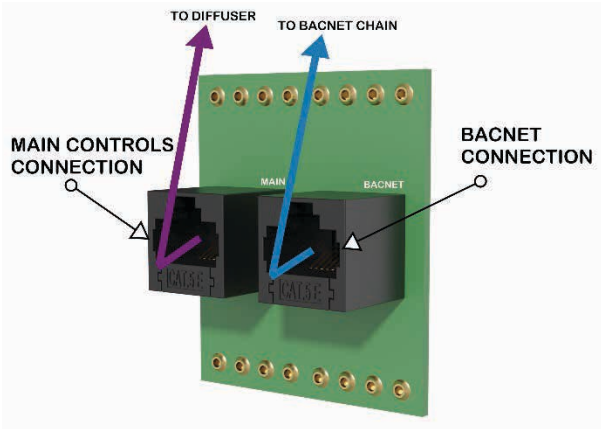


FIGURE 7 ▼



ADVANTAGE WITH DISIO DISPLAY

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Disio Display Thermostat

The Advantage with Disio uses the Disio Display wall mounted thermostat to accurately sense room temperature in both cooling and heating modes. Disio features capacitive touch buttons on an anti-fingerprint glass with a sleek wedge design.
The Advantage is factory wired with a 25ft plenum rated cable for easy connection to the Disio Display.

Disio Display is available in White and Black colors.

Balancing

VAV diffuser systems are balanced like any other system (e.g. proportional balance) except the VAV diffuser must be in a full open position during balancing. To open the Advantage with Disio, press and simultaneously hold both the UP arrow and DOWN arrow buttons and release when "– –" is displayed. Then press DOWN, UP, UP, DOWN and the display will show "UU" and then "bR" for balancing mode. The damper will then move to the AV28 Damper Max V (full open) position (default full open). Once balancing has been completed, press either the UP or DOWN arrow and the override will be released.

Setpoint Adjustment

Setpoint adjustment with the Disio Display thermostat is easy! Just use the UP arrow button to increase your setpoint and the DOWN arrow button to decrease your setpoint. The display lights will flash to indicate there is a setpoint adjustment, and then fully illuminate once accepted. Pressing the Menu button will display basic information about the configuration (**see Page 15**).

Power Supply to Advantage with Disio

All Advantage with Disio diffusers require a 24 VAC power supply and each draws 3.0 VA. There are three options for power:

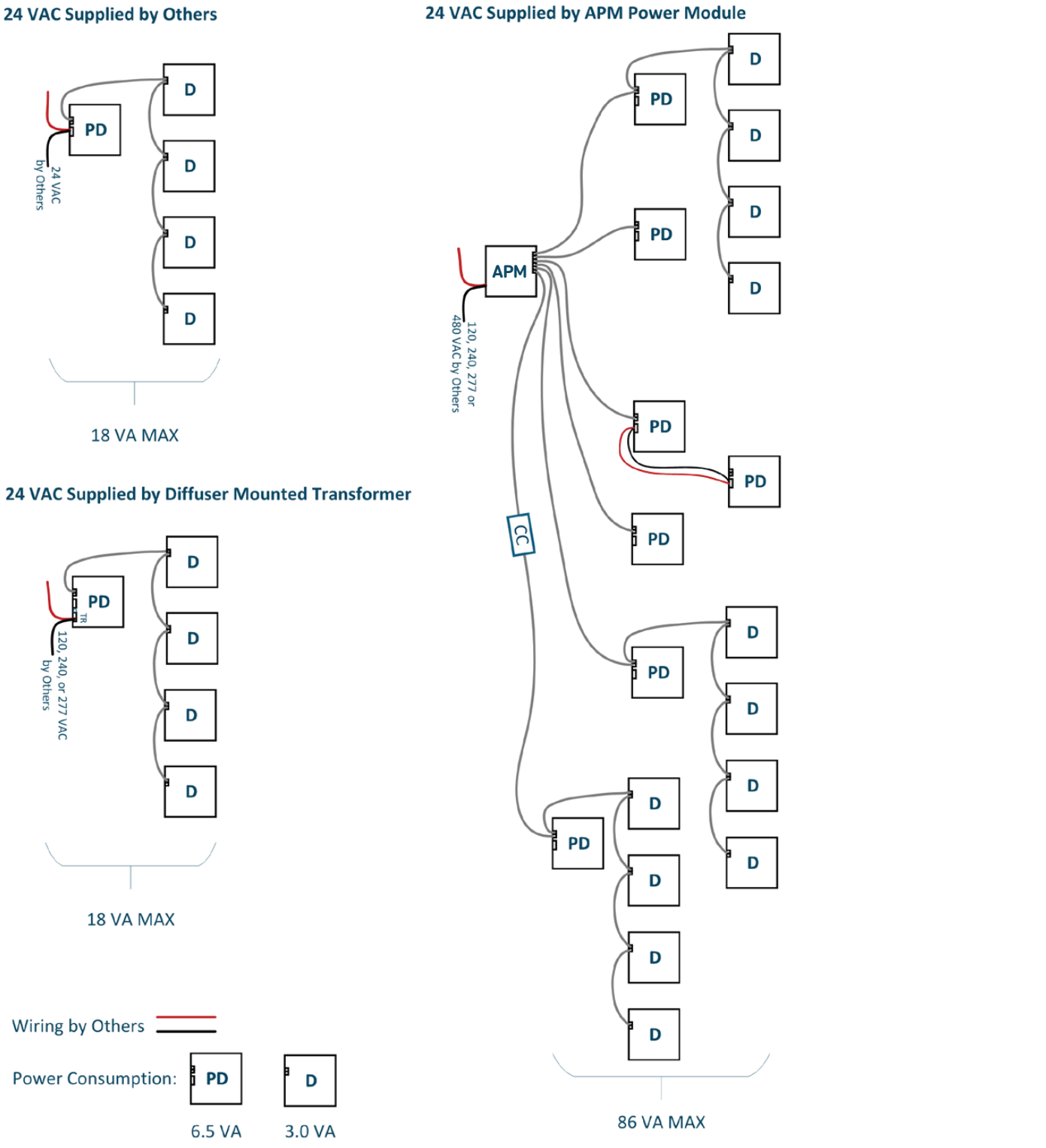
1. **Field Supplied 24 VAC**
   Connect 24 VAC and common lines to the HOT and COM screw terminals shown in **Figure 9**.
2. **TR115 / TR240 / TR277 20 VA Transformer**
   Advantage with Disio diffusers supplied with transformer mounted to Advantage Diffuser require field connection of primary power supply and grounding. Secondary power supply will be factory connected to the HOT and COM screw terminals shown in **Figure 9**. See Mounting/Installation instructions on **Page 9** if transformer is shipped separately.
3. **Advantage Power Module (APM)**
   (See Mounting/Installation Instructions on **Page 8**)
   Use a C35 (35' Plenum rated snap-in cable) to connect power output to one of the two RJ12 ports on the Advantage with Disio.

NOTE: HOT and COMMON 24 VAC polarity is critical and must be consistent. 24 VAC COMMON must be EARTH ground in field to ensure proper BACnet network communication.

ADVANTAGE WITH DISIO DISPLAY

PRODUCT OVERVIEW & INSTALLATION INSTRUCTIONS

FIGURE 8 - EXAMPLE SUPPLY POWER LAYOUTS ▼



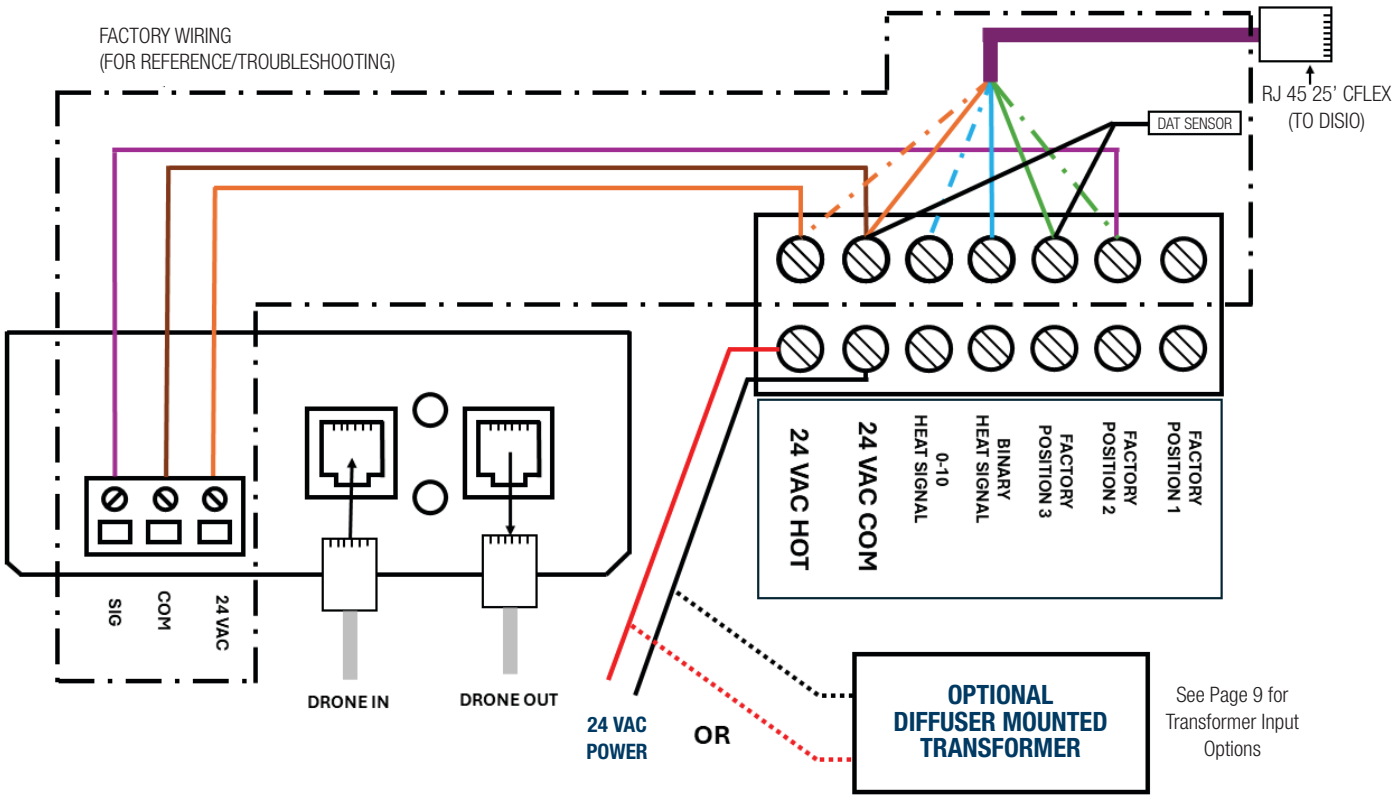
PD = Advantage with Disio, D = Drone, TR = Transformer, CC = Cable Coupler

ADVANTAGE WITH DISIO DISPLAY

PRODUCT OVERVIEW & INSTALLATION INSTRUCTIONS

Diffuser Wiring

FIGURE 9 - ADVANTAGE WITH DISIO TERMINAL BOX WIRING ▼



Factory Wiring (For Reference Only)			
ITEM	**WIRE COLOUR**	**TERMINAL POSTION**	**WIRE DESCRIPTION**
RJ45 25' CFLEX CABLE	ORANGE STRIPED	24VAC HOT	24VAC HOT
	ORANGE	24VAC COM	24VAC COM
	BLUE STRIPED	0-10V HEAT SIGNAL	0-10V HEAT SIGNAL
	BLUE	BINARY HEAT SIGNAL	BINARY HEAT SIGNAL
	N/A	FACTORY 1	N/A
	GREEN STRIPED	FACTORY 2	2-10V DAMPER SIGNAL
	GREEN	FACTORY 3	DAT SENSOR
DAT SENSOR	BLACK	24VAC COM	DAT SENSOR
	BLACK	FACTORY 3	DAT SENSOR
3 POSITION PLUGABLE CONNECTOR	ORANGE	24VAC HOT	24VAC HOT
	BROWN	24VAC COM	24VAC COM
	PURPLE	FACTORY 2	2-10V DAMPER SIGNAL

ADVANTAGE WITH DISIO DISPLAY

OPTIONS & ACCESSORIES

Optional Advantage Series Drone Diffusers

Drone diffusers contain actuators and control circuitry to respond to signals from the Advantage with Disio diffuser. The Drone damper movement is synchronous to the Advantage with Disio diffuser and up to five drone diffusers are supported.

The four geometries (square, round, swirl, and linear slot) of Advantage diffusers use the same digital controls and can be mixed between Disio and Drone.

Drone Power Supply Connection (Figure 11)

- The ADV Drone diffuser has two RJ12 Jacks to make daisy chain connections for 24 VAC and 2-10 VDC control signal from Advantage with Disio.
- C35 (35' plenum rated cable) supplied with RJ12 modular plugs at both ends. Use cable to connect unit with DRONE OUT on Advantage with Disio or previously connected ADV using a free Drone output Drone Jack. Cable length may be extended by using a CC (cable connector) for longer runs.
- A maximum of four ADV drones can be supported by one PPD with Disio Diffuser. Each PPD drone draws 3.0 VA.

FIGURE 10 - ADVANTAGE DRONE DIFFUSERS ▼

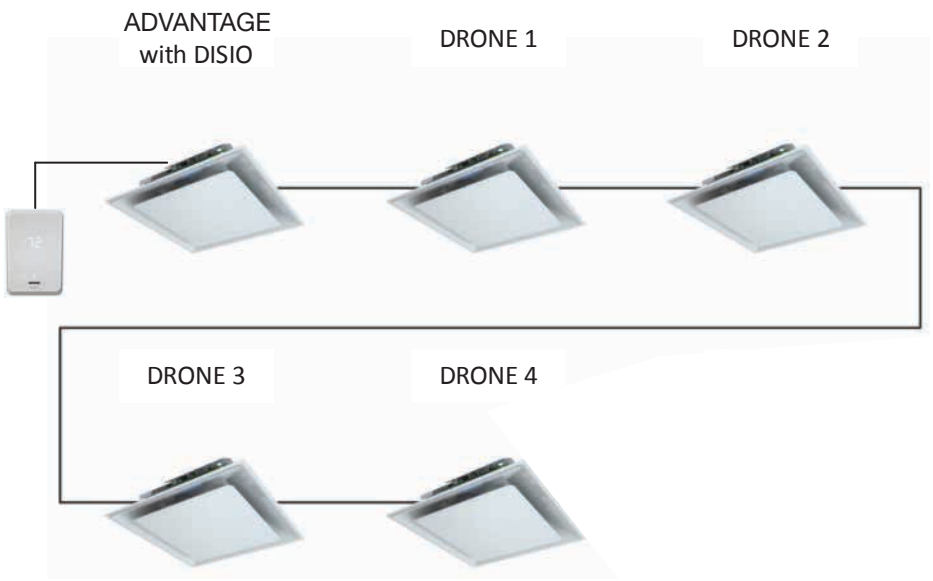
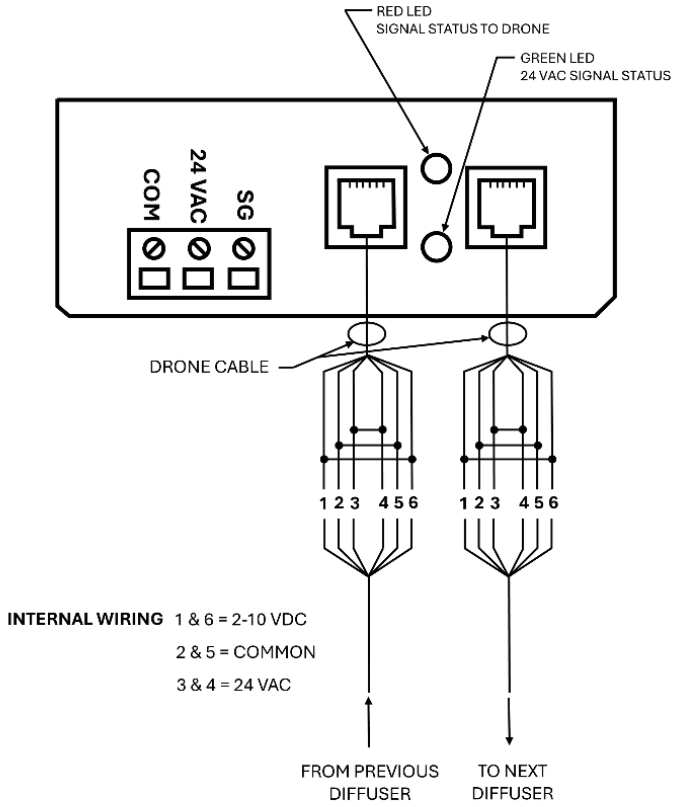


FIGURE 11 - DRONE WIRING DIAGRAM ▼



ADVANTAGE WITH DISIO DISPLAY

OPTIONS & ACCESSORIES

Optional APM Power Module

The Power Module (APM) provides the most economical and convenient method of powering multiple Advantage diffusers because electrician time is minimized. Designed to be ceiling mounted, the enclosed 96 VA Class 2 transformer is offered for 120V, 240V, 277V and 480V primary voltage supply. Final power connections to the Advantage diffusers are completed via plenum cables with RJ (Snap-In) plugs. Since the cables are all low voltage, commissioning or relocation of Advantage diffusers is simple.

CAUTION: See **Page 11** if using Aux heat option.

Features

- 96 VA Class 2 Transformer (120 / 240/277/480 to 24 VAC) with breaker resettable overload protection.
- 6 parallel power jacks each of which support up to 18 VA. Overload indicator LEDs on each line light up if too many Advantage diffusers are connected or if there is a short in the cable.
- Max 86 VA total per APM
  (May not be able to populate all 6 jacks)
- C35 (35ft/10.5m plenum rated cable) with RJ plugs provides flexible and convenient power connection. One required for each Advantage with Disio unit. Multiple cables can be connected by using a CC (Cable Connector) for longer runs. 210ft/63m maximum.
- Power switch with indicator LED.

Specification and Limitations

1. Total connected load not to exceed 86 VA
   - Each Prodigy Drone draws 3.0 VA
   - Each Prodigy with Disio Master draws 6.5 VA
   - See CAUTION on **Page 11** if using Aux heat option
2. Specification for each of the 6 output jacks:
   - 20 VA auto-reset thermal fuse with fault indicator LED.
   - See CAUTION ON Page 11 if using Aux heat option

FIGURE 12 - APM POWER MODULE ▼

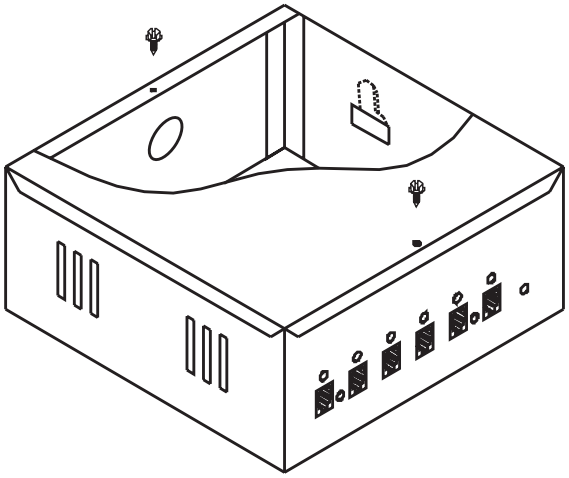
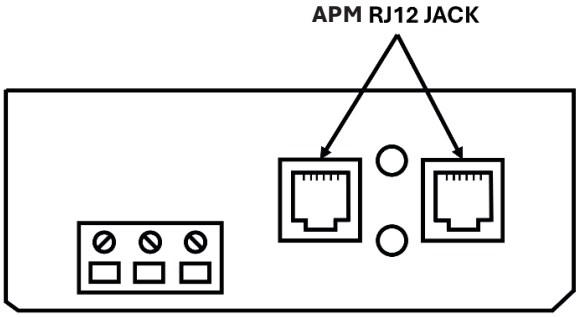


FIGURE 13 - APM DIFFUSER INPUT ▼



ADVANTAGE WITH DISIO DISPLAY

OPTIONS & ACCESSORIES

Installation Instructions

1. Turn off power switch. Remove cover.
2. Secure box to surface in plenum using 3 mounting holes. Orientation irrelevant.
3. Supply power and ground to terminal per wiring diagram.
4. Replace cover.
5. Turn on power switch. Green LED indicates power

Connecting Advantage with Disio to the APM

1. Plug C35 power cable into an output jack on power module.
2. Plug other end of cable into one of the “Drone/Power” sockets on the control board. (Multiple C35 cables can be connected with CC - Cable Connectors for longer runs.) (Max two 35ft/10.5m cables)
3. Green Power LED and Red Drone Signal LED on Advantage with Disio indicate proper connection.

FIGURE 14 - APM CONNECTIONS ▼

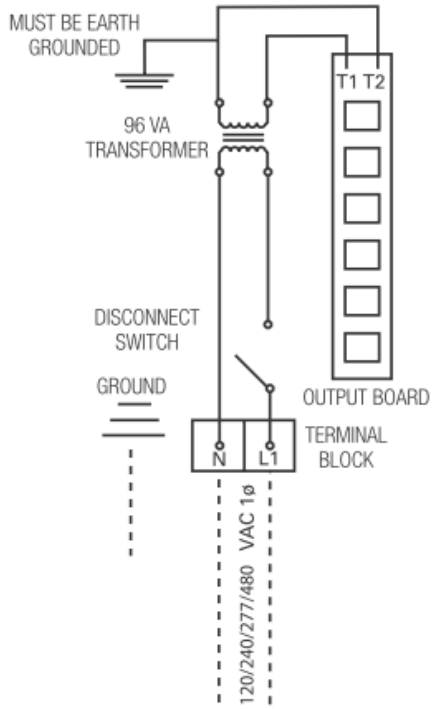
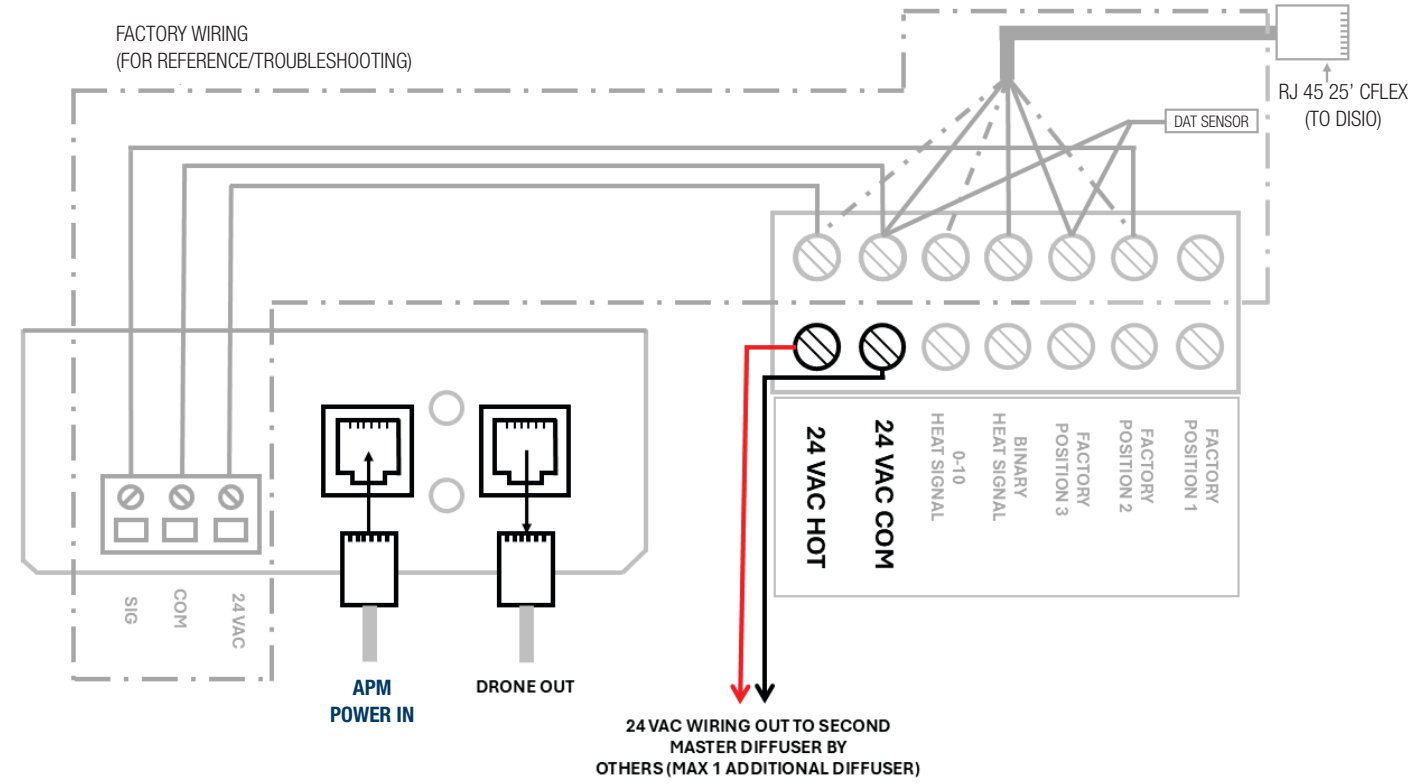


FIGURE 15 - APM WIRING ▼



ADVANTAGE WITH DISIO DISPLAY

OPTIONS & ACCESSORIES

Optional TR115 / TR240 / TR277 Transformer

Optional 20 VA transformer mounts to the junction bracket of Advantage with Disio Diffuser. Support up to 5 Advantage units (Includes Drones).

Installation Instructions

1. Remove lid from junction box.
2. Fasten to Advantage junction bracket using two #8 screws provided.
3. Connect primary power supply and grounding.
4. Replace cover.
5. Connect secondary transformer leads to power jack of Advantage (TP - Terminal Plug provided).

Optional Baffle – ADV Square Only

An optional baffle is available to provide 3-way, 2-way, and 1-way air blow patterns.

FIGURE 16 - OPTIONAL 20 VA TRANSFORMER ▼

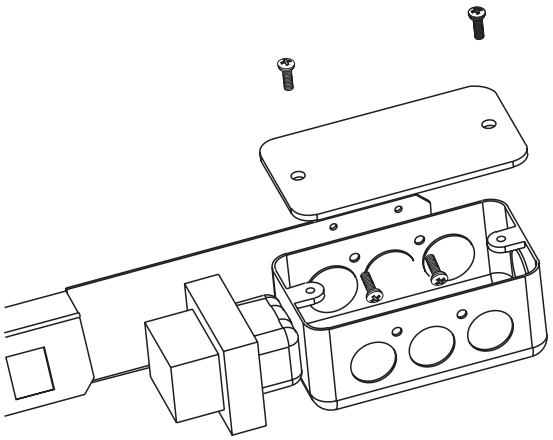
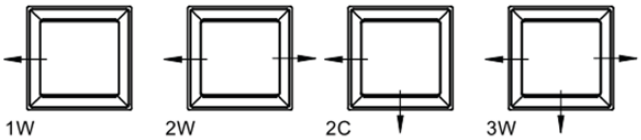


FIGURE 17 - DIRECTIONAL BAFFLES ▼



ADVANTAGE WITH DISIO DISPLAY

OPTIONS & ACCESSORIES

Optional ARC Pressure Relief Collar (Not Available for the ADVL Advantage Linear Diffuser)

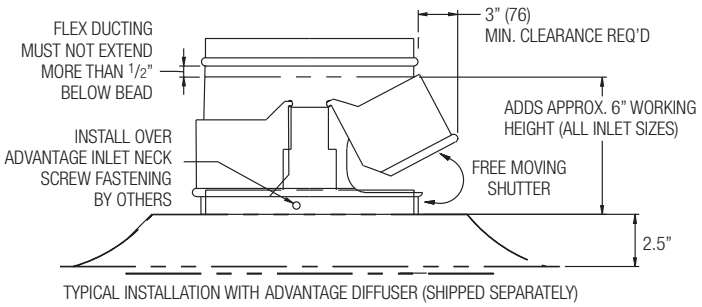
The Acutherm Pressure Relief Collar (ARC) slips over the Advantage inlet to provide a simple and inexpensive method to control duct static pressure. The ARC's dual shutters are designed to gradually open in response to pressure in excess of approximately 0.25"wg/62Pa and allow some of the supply air to escape into the return air plenum.

Installation Instructions

1. The ARC is intended for use only in systems that have a non-ducted return air plenum.
2. Mount ARC directly over Advantage inlet, with shutters hanging down. Two mounting holes are provided for fastening with #8 sheet metal screws.
3. Mount ducting to top of ARC. A bead is provided on the top of the ARC as a stop for hard ducting. Flex duct may be banded below the bead providing it does not extend more than ½in/13mm below the stop bead as it will obstruct the proper operation of the shutters.
4. The ARC is shipped with shutters taped shut. DO NOT REMOVE the tape until the system is completely balanced. This will ensure that the balancer can provide maximum design air volume without excess air being relieved into the plenum. Premature removal of the tape may impair proper air system balancing.

NOTE: ARC is not compatible with model ADVL.

FIGURE 18 - INSTALLATION DIAGRAM ▼



TYPICAL INSTALLATION WITH ADVANTAGE DIFFUSER (SHIPPED SEPARATELY)

FIGURE 19 - PRESSURE RELIEF COLLAR ▼

ADVANTAGE WITH DISIO DISPLAY

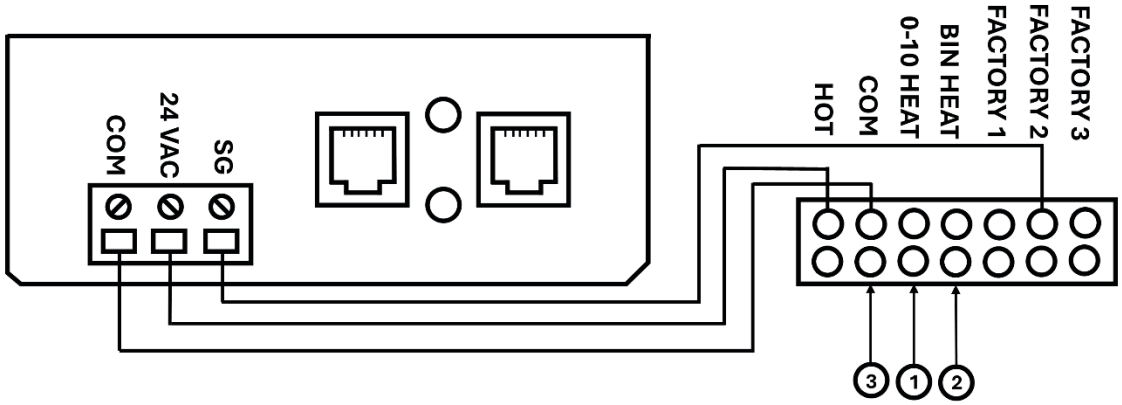
OPTIONS & ACCESSORIES

Optional Heater Control

The Disio Display thermostat comes pre-programmed to operate any form of heater in a commercial building, whether it is a baseboard heater, electric duct heater, hot water coil, unit space heater or even a radiant panel.

The default control is for either 24VAC Binary On/Off or 0-10VDC proportional. Configuration of the outputs can be done using the Disio Setup Software (**Page 16**).

FIGURE 20 - REHEAT APPLICATION 0-10 VDC OR 24VAC BINARY ▼



1. **Aux Heat 0-10 Output**
2. **Aux Heat Binary Output**
3. **Common**

The internal reheat relay is limited to 12 VA and should not be used to directly drive valves or radiant panels. It is intended to switch power to the primary coil of an intermediate relay.

CAUTION: The number of Drones supported by the Master must be reduced for each 3VA used to power the Aux Heat.

CAUTION: The number of diffusers (Master and Drone) supplied by the APM must be reduced for each 3VA used to power the Aux Heat.

Two options of reheat algorithms are available:

1. **0-10 V Analog Signal** – Proportional heating signal that increases with heating demand.
2. **On/Off Binary Heating** – Acts more like a traditional thermostat and cycles the least of both options. Suitable for mechanical relay interface (24VAC, 12VA max).

ADVANTAGE WITH DISIO DISPLAY

OPTIONS & ACCESSORIES

Optional BACnet Networking

BACnet Wiring

The Advantage with Disio can be used as a stand-alone diffuser or can be integrated into a BACnet MS/TP network using the provided NETC35 cables and BACnet T-connector. (See **Figure 21**) Acutherm follows the T568B wiring standard for three wire (NET+,NET-, NET COM) for BACnet communication.

NOTE: for three wire BACnet NET COM must be wired.

BACnet networks must be run in a daisy chain configuration, meaning there is only one main cable, and each network device is connected directly along its path, with no more than 30 devices per segment, and MS/TP segment lengths must not exceed 1050ft/315m.

NOTE: Advantage with Disio BACnet connection must be wired using a 3 wire BACnet system.

Termination

BACnet MS/TP networks must be terminated to ensure proper operation. A network should be terminated twice, once at the beginning and once at the end. Termination helps reduce reflections and noise. The termination can be done with a 100 ohm resistor across the + and - lines.

TECH TIP: The Acutherm BACnet MS/TP to IP Router has built in termination and it is enabled by default (since the router is typically the beginning of the entire MS/TP network). Now you only have to go and find/terminate that last device.

Electrical Noise

Electrical noise can affect both analog signal and digital communications such as BACnet. **Therefore, do not route high voltage lines next to the BACnet network**. Avoid noisy electrical sources such as:

- Variable Frequency Drives
- High current power lines (main panel feeds)
- Fluorescent light fixtures

If you must pass near noisy electrical lines cross at right angles. This will help reduce the amount of noise coupled to the network wires.

FIGURE 21 - ELECTRICAL NOISE EXAMPLE ▼

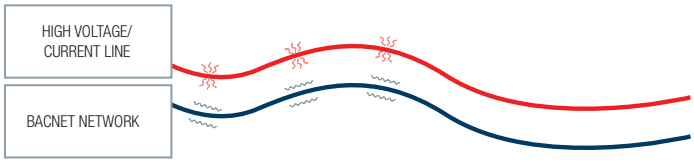
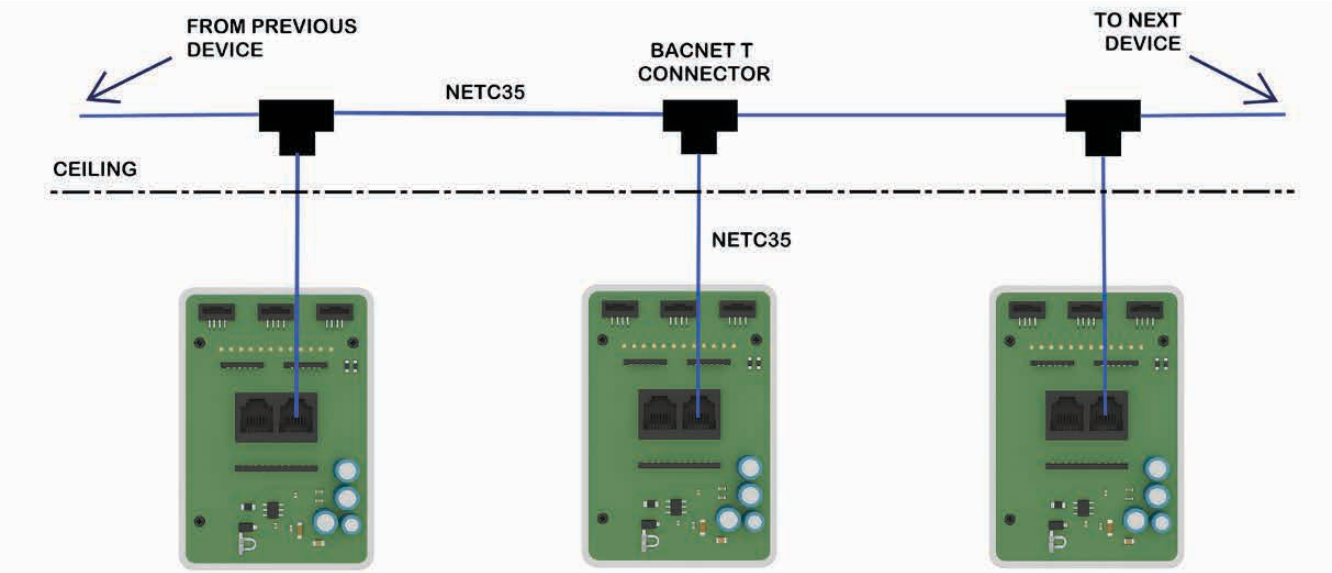


FIGURE 22 - BACNET DAISYCHAIN EXAMPLE ▼



Network Wire Specifications

For the BACnet MS/TP network specific wire is required. Do not use standard power or “thermostat” wire. This wire does not have the necessary requirements for digital communications. While it’s possible it may work (temporarily) the network will be unreliable and not operating optimally.

BACnet MS/TP Wire type recommendations

- Use one balanced twisted pair
- Low capacitance (17pF or less)
- Plenum rated (FT6, CMP ratings)
- 100-120 ohm, balanced
- (CAT5, CAT5E, CAT6 network cable has excellent specifications and will work in almost any BACnet MS/TP application.)
- **Acutherm recommends using the Orange Complement for (+), the Orange for (-), and the Brown and Brown Complement for the (NETCOM) connections. These are paired in a standard CAT5E cable.**

NOTE: NETCOM MUST BE WIRED (3 WIRE BACNET)

Sequence of Operation

Supply Air Temperature measured to determine mode

All Advantage with Disio diffusers have a temperature sensor located near the inlet for automatic heating / cooling changeover. For automatic changeover the Advantage with Disio uses a dynamic neutral mode for optimal use of the supply air. Basically if the supply air can help the Advantage meet the room set point it is used as such. For example if the supply air is 70F and the room temperature is 80F with a set point of 72F, the Advantage will consider the supply air as cold and modulate appropriately. Please note, however, it is typically difficult to cool a room with supply air temperatures above 60F. Changeover and dynamic neutral mode is as follows:

1. Heating Mode - Supply air temperature warmer than room temperature by 2°F (1°C)
2. Neutral Mode - Supply air within 2°F (1°C) of room air
3. Cooling Mode - Supply air temperature 2°F (1°C) below room temperature

If Dynamic neutral mode is not required, user can force HOT and COLD switch points in the Disio Setup Software. This method is not recommended but is available for unique circumstances (**Page 16**).

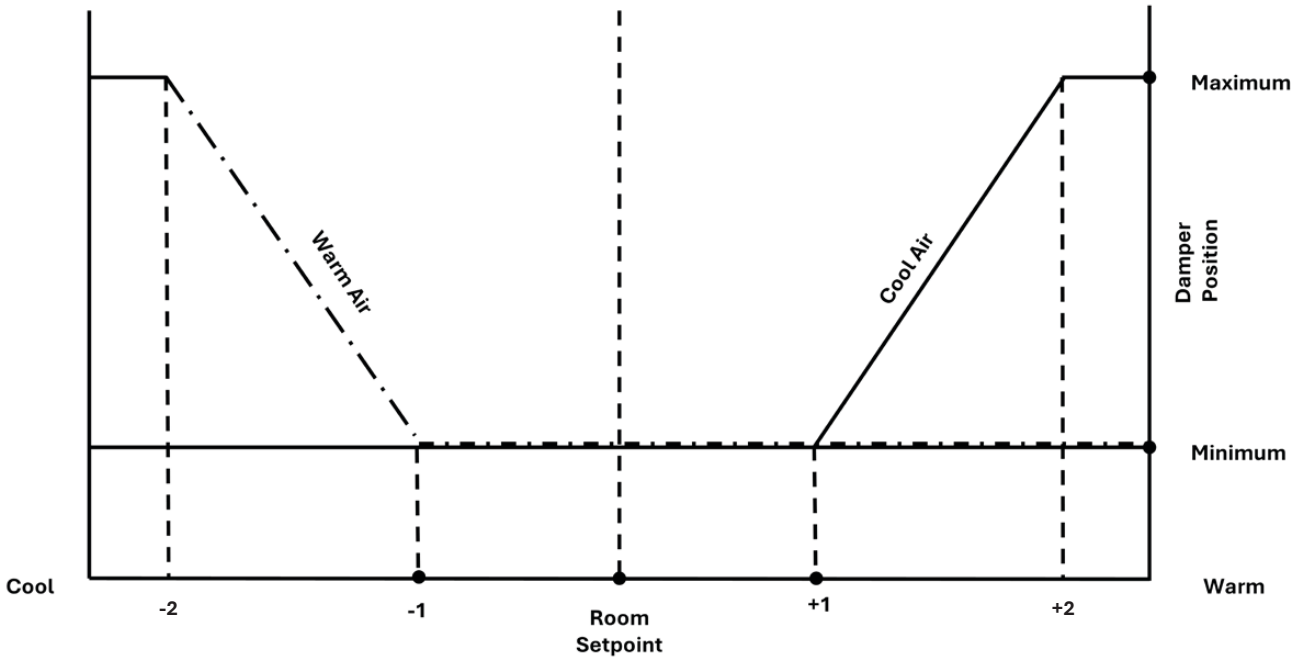
Cool supply air

On an increase in space temperature the T-Stat and Advantage regulate the diffuser's air damper open to increase the flow of cool air. On an increase of space temperature greater than the cooling proportional band, the damper position (%) is maintained at its pre-selected maximum setting. On a decrease in space temperature the T-Stat and Advantage regulate the diffuser's air damper closed to reduce the flow of cool air. If the space temperature decreases to less than the cooling proportional band, the damper position (%) is maintained at the pre-selected minimum setting.

Warm supply air

On a decrease in space temperature the T-Stat and Advantage regulate the diffuser's air damper open to increase the flow of warm air. On a decrease of space temperature greater than the heating proportional band, the damper position (%) is maintained at its pre-selected maximum setting. On an increase in space temperature the T-Stat and Advantage regulate the diffuser's air damper to reduce the flow of warm air. If the space temperature increases above the heating proportional band, the damper position (%) is maintained at the pre-selected minimum setting.

FIGURE 23 - CONTROL GRAPH ▼



ADVANTAGE WITH DISIO DISPLAY

PRODUCT CONFIGURATION & NAVIGATION

Disio Navigation

The Menu ☰ button displays basic information of the controller regarding application, room temperature, room load, etc. Values cannot be changed from the menu, just viewed for information only. Press and hold Menu ☰ button for 2 seconds to enter the Info Menu. Scroll through using the **up** and **down** buttons.

AP	Application: Advantage VAV Diffuser with Disio Display UU
tu	Temperature Units: F Fahrenheit or C Celsius
rt	Room Temperature
CL or HL or n	Controller Load: CL cooling -1 - -99, HL heating 1 - 99, n neutral
dP	Damper target Position 2-10 (0-100%)
SA	Supply Air Temperature

ADVANTAGE WITH DISIO DISPLAY

PRODUCT OVERVIEW & INSTALLATION INSTRUCTIONS

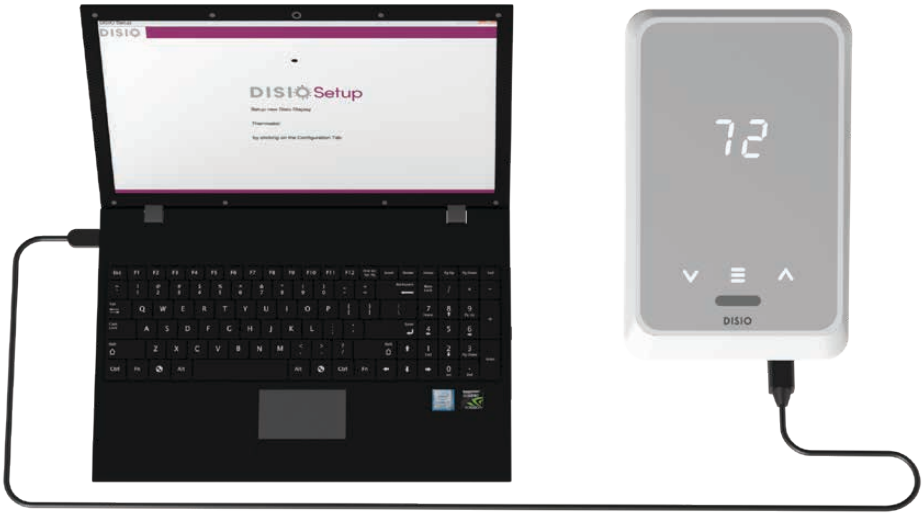
General

Disio Setup is a FREE Windows based software used to setup and calibrate the Disio Display Thermostat in the field or warehouse. This cutting-edge software connects through a USB to USB-C cable from your Windows computer to the Disio Display Thermostat. Once connected the Disio Setup can scan a device and determine the sequence of operation and display all the parameters that are available inside the controller making setup and troubleshooting quick and easy.

Downloading Disio Setup Software

To use the Disio Setup software, you must first install the Disio Setup software for Windows computers from the **disio.io** website: **disio.io/setup**.

DISIO SETUP CONNECTION TO COMPUTER ▼



Running Disio Setup Software

After connecting the USB cable to your computer, click the Disio Setup icon to run the software you previously downloaded from the **disio.io** website.

Connection

This column shows the port the controller is connected to, the current firmware, and sequence of operation in the controller. Order information is also available in this column if the controller was calibrated at the factory.

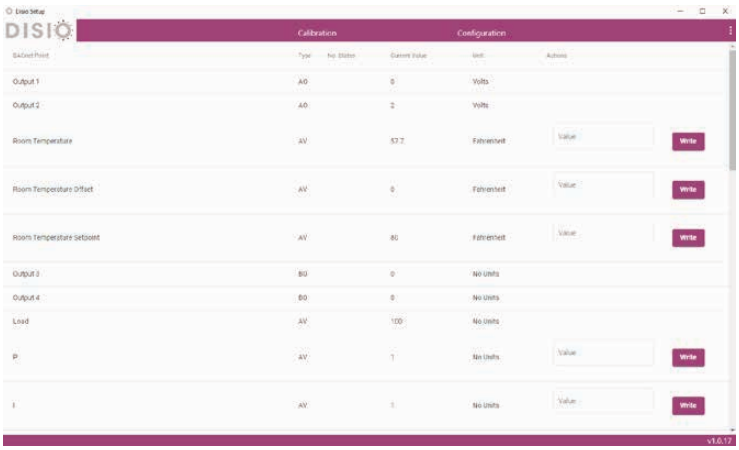
Calibration

This tab shows all pre-built sequences of operation available to load into the connected controller. A user can also select their temperature units and update their controller's firmware from this tab.

Configuration

This tab shows all the parameters that are available throughout the controller. Some of the variables that can be adjusted in this tab include setpoint limits, (optional) BACnet configurations, etc.

DISIO SETUP CONFIGURATION PAGE ▼

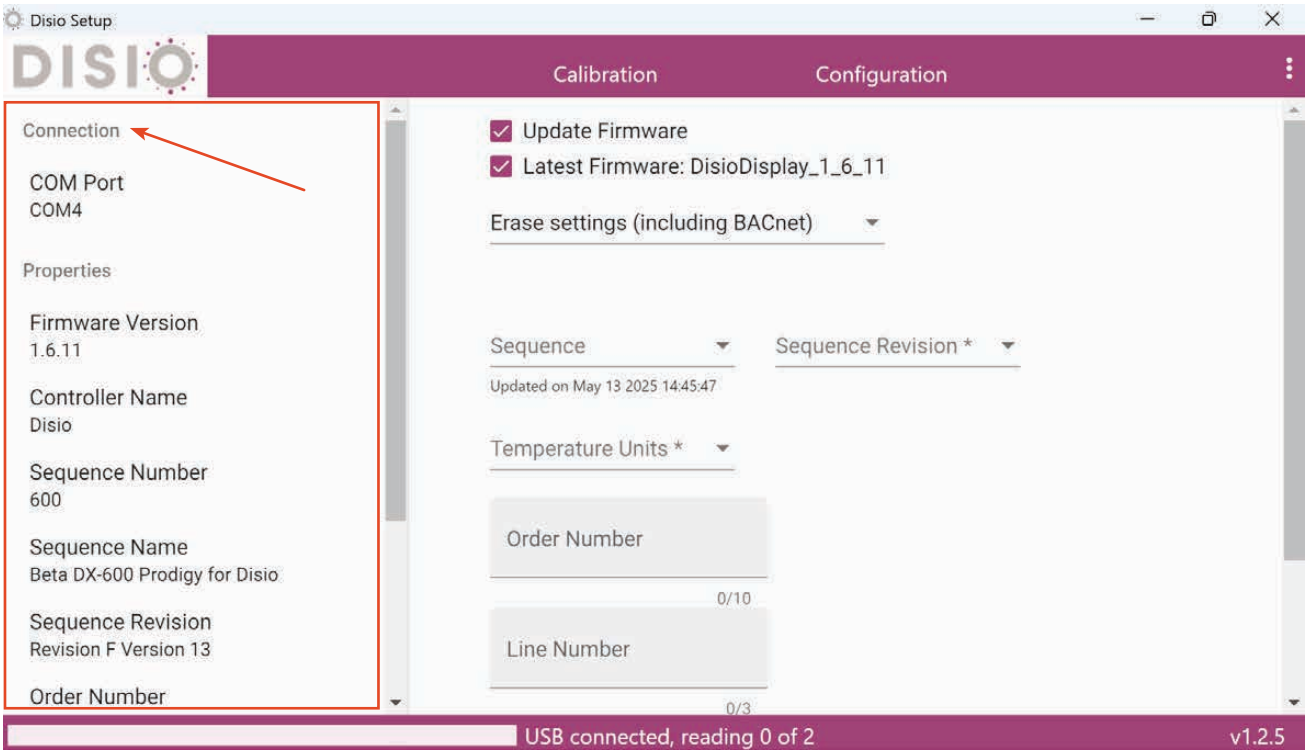


ADVANTAGE WITH DISIO DISPLAY

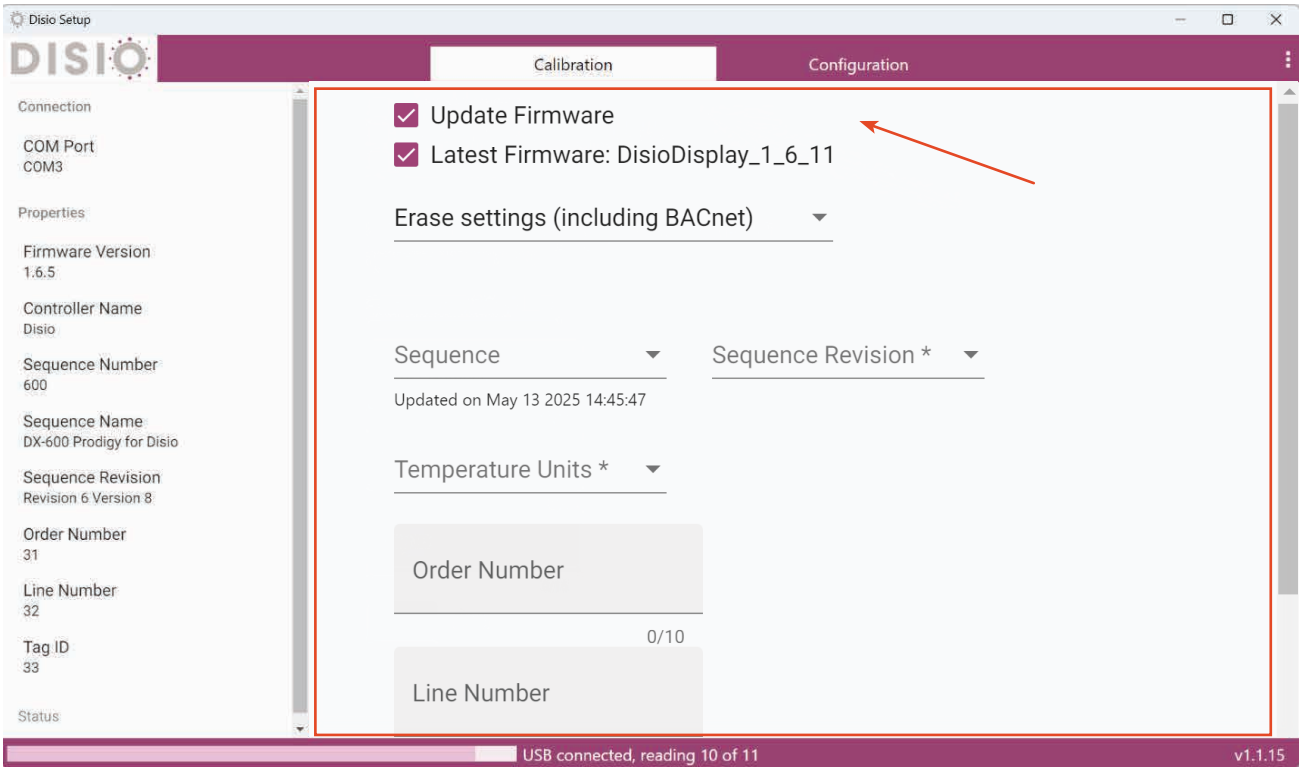
PRODUCT CONFIGURATION & NAVIGATION

The Calibration tab displays the Connection and Calibration windows.

The Connection window shows the current firmware configuration of the Disio thermostat.



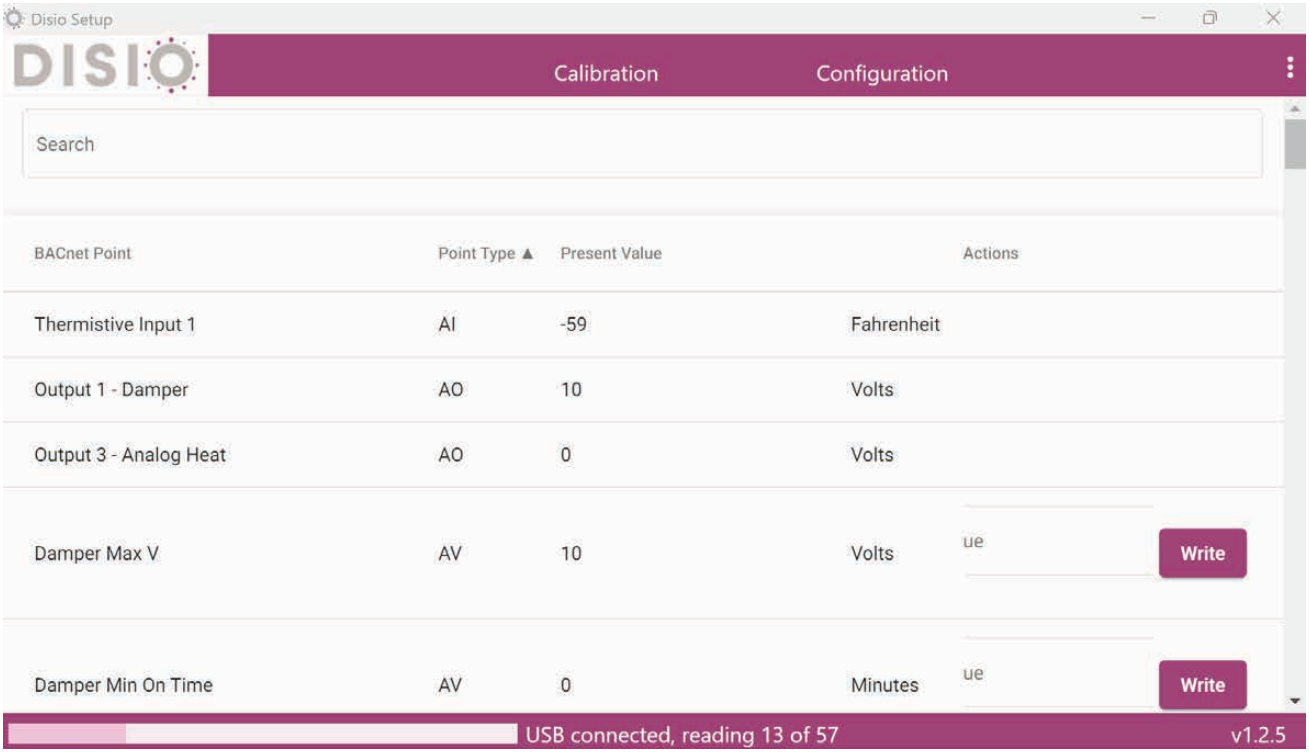
The Calibration window is used to update the Disio firmware.



ADVANTAGE WITH DISIO DISPLAY

PRODUCT CONFIGURATION & NAVIGATION

The Configuration tab is used to adjust the settings of the Disio.



ADVANTAGE WITH DISIO DISPLAY

PRODUCT CONFIGURATION & NAVIGATION

BACnet Objects

Measurements
AI1 Thermistive Input1
AV11 Room Temperature
AV13 SAT

Set Points
AV6 Room Temperature Setpoint
AV7 Room Temperature Setpoint Min
AV8 Room Temperature Setpoint Max

Damper Position
AO1 Output1 Damper

Balancing
MV11 Device Mode

Heat/Cool Changeover
AV28 Inlet Temperature Delta (changeover)
MV2 Inlet HCCO

Optional Output to Control Local Heater
BO1 Output 2 Binary Heat
AV33 Binary Heat Min On Time
AV34 Binary Heat Min Off Time
AO2 Analog Heat
AV35 Analog Heat Min V
AV36 Analog Heat Max V
AV37 Analog Heat Min On Time
AV38 Analog Heat Min Off Time

Optional Occupancy Control
MV7 Occupancy
MV8 Occupancy Source
MV9 Support Unoccupied Mode
AV39 Occupancy Time out

BACnet Settings
AV1 MAC Address
MV6 Baud Rate

Deadband Target
AV9 Deadband Damper

Sensor Calibration
AV10 Room Temperature Offset
AV12 SAT Offset

Units of Measure
MV3 Temperature Units
MV4 Airflow Units
MV5 Pressure Units

Disio Display Settings
AV5 LED Brightness
AV40 Proximity Screen Timeout
MV10 Proximity Screen Mode

Software Revision
AV2 Sequence Version
AV3 Sequence Number
AV4 Hardware Version
MV1 Sequence Revision

Factory Settings – Do not adjust without consulting Factory

Output Configuration
AV29 Damper Min V
AV30 Damper Max V

Diagnostics
AV41 Diagnostic Mode

Control Loop Settings
AV14 Cooling Loop Kp
AV15 Cooling Loop Ki
AV16 Cooling Loop Pro Band
AV17 Cooling Loop Dead Band
AV18 Cooling Loop Unoccupied Dead Band
AV19 Cooling Loop Service Time
AV20 Cooling Loop Load
AV21 Heating Loop Kp
AV22 Heating Loop Ki
AV23 Heating Loop Pro Band
AV24 Heating Loop Dead Band
AV25 Heating Loop Unoccupied Dead Band
AV26 Heating Loop Service Time
AV27 Heating Loop Load

ADVANTAGE WITH DISIO DISPLAY

PRODUCT CONFIGURATION & NAVIGATION

Object	Name	Units	Default	Range	Description	R/W	Retained on Powewr Failure
AI1	Supply Air Temperature	°F/°C	N/A	-59 - 300°F	Current Supply Air Temperature	R/W	N
AO1	Damper	Volts DC	N/A	2 - 10V	Current Damper Control Voltage	R/W	N
AO2	Analog Heat	Volts DC	N/A	0 - 10V	Current 0-10 Heater Output Signal	R/W	N
AV1	MAC Address	N/A	2	0 - 127	BACnet MAC Address	R/W	Y
AV2	Sequence Version	N/A	N/A	N/A	The Version of the Sequence	R	Y
AV3	Sequence Number	N/A	600	N/A	The Number of the Sequence	R	Y
AV4	Hardware Version	N/A	N/A	N/A	Disio Hardware Version Number	R	N
AV5	LED Brightness	Percent	40%	0-100%	Brightness of the Disio Display	R/W	Y
AV6	Room Temperature Setpoint	°F/°C	72°F	65 - 80°F	Current Room Temperature Setpoint	R/W	Y
AV7	Room Temperature Setpoint Min	°F/°C	65°F	32 - 80°F	Minimum user-adjustable setpoint	R/W	Y
AV8	Room Temperature Setpoint Max	°F/°C	80°F	65 - 300°F	Maximum user-adjustable setpoint	R/W	Y
AV9	Deadband Damper	Percent	0%	0 - 100%	Deadband Damper Target	R/W	Y
AV10	Room Temperature Offset	°F/°C	0°F	-20 - 20°F	Delta Applied to Temperature Reading	R/W	Y
AV11	Room Temperature	°F/°C	N/A	-59 - 300°F	Current Room Temperature	R/W	N
AV12	SAT Offset	°F/°C	0 °F	-20 °F - 20 °F	Delta Applied to SAT Reading	R/W	Y
AV13	SAT	°F/°C	N/A	-59 - 300°F	Current Supply Air Temperature	R/W	N
AV14	Cooling Loop Kp	N/A	1	0 - 300	Proportional for Cooling Loop offset which is the difference between the input signal and the setpoint.	R/W	Y
AV15	Cooling Loop Ki	N/A	1	0 - 300	Integral for Cooling Loop is a time-based correction factor to improve the accuracy of the output signal	R/W	Y
AV16	Cooling Loop Pro Band	°F/°C	2°F	0 - 300°F	Pro Band for Cooling Loop that is the time for the control signal to go from 0 - 100 load/demand	R/W	Y
AV17	Cooling Loop Dead Band	°F/°C	1°F	0 - 300°F	Dead Band for Cooling Loop that is the range set within the controller where no action is taken	R/W	Y
AV18	Cooling Loop Unoccupied Dead Band	°F/°C	10°F	0 - 300°F	Unoccupied Dead Band for Cooling Loop that is the range set within the controller where no action is taken when controller is in unoccupied	R/W	Y
AV19	Cooling Loop Service Time	Seconds	60s	0 - 600s	Time in which the Heating Loop runs in seconds when there is a demand for heating	R/W	Y
AV21	Heating Loop Kp	N/A	1	0 - 300	Proportional for Heating Loop offset which is the difference between the input signal and the setpoint.	R/W	Y
AV22	Heating Loop Ki	N/A	1	0 - 300	Integral for Heating Loop is a time-based correction factor to improve the accuracy of the output signal	R/W	Y
AV23	Heating Loop Pro Band	°F/°C	2°F	0 - 300°F	Delta from setpoint for the control signal to go from 0 - 100 load/demand	R/W	Y
AV24	Heating Loop Dead Band	°F/°C	1°F	0 - 300°F	Maximum delta from setpoint where no action is taken	R/W	Y

ADVANTAGE WITH DISIO DISPLAY

PRODUCT CONFIGURATION & NAVIGATION

Object	Name	Units	Default	Range	Description	R/W	Retained on Powewr Failure
AV25	Heating Loop Unoccupied Dead Band	°F/°C	10°F	0 - 300°F	Unoccupied Delta from setpoint where no action is taken	R/W	Y
AV26	Heating Loop Service Time	Seconds	60s	0 - 600s	Time in which the Heating Loop runs in seconds when there is a demand for heating	R/W	Y
AV27	Heating Loop Load	Percent	N/A	0 - 100%	Range of the heating loop load in percent	R/W	N
AV28	Inlet Temperature Delta	°F/°C	2°F	1 - 20°F	Controls what is considered hot/cold air. So if air coming in is lower than room setpoint by delta, its considered cold air. If air is coming in is hotter than room setpoint by this delta its considered hot enough	R/W	Y
AV29	Damper Min V	Volts DC	2V	0 - 10V	Minimum Damper Output Voltage	R/W	Y
AV30	Damper Max V	Volts DC	10V	2 - 10V	Maximum Damper Output Voltage	R/W	Y
AV31	Damper Min On Time	Minutes	0min	0 - 360min	Minimum time that the damper will be forced to stay open and will not be allowed to close until specified time is reached	R/W	Y
AV32	Damper Min Off Time	Minutes	0min	0 - 360min	Minimum time that the damper will be forced to stay closed and will not be allowed to open until specified time is reached	R/W	Y
AV33	Binary Heat Min On Time	Minutes	0min	0 - 360min	Minimum time binary heat will be forced to stay on once activated	R/W	Y
AV34	Binary Heat Min Off Time	Minutes	0min	0 - 360min	Minimum time binary heat will be forced to stay off once deactivated	R/W	Y
AV35	Analog Heat Min V	Volts DC	0V	0 - 10V	Minimum output voltage for Output 3	R/W	Y
AV36	Analog Heat Max V	Volts DC	10V	0 - 10V	Maximum output voltage for Output 3	R/W	Y
AV37	Analog Heat Min On Time	Minutes	0min	0 - 360min	Minimum time analog heat will be forced to stay on and will not be allowed to turn off until specified time is reached	R/W	Y
AV38	Analog Heat Min Off Time	Minutes	0min	0 - 360min	Minimum time analog heat will be forced to stay off and will not be allowed to turn on until specified time is reached	R/W	Y
AV39	Occupancy Timeout	Minutes	240min	0 - 600min	Sets how long it takes the Disio Display Thermostat to go from occupied to unoccupied when the source is not BACnet	R/W	Y
AV40	Proximity Screen Timeout	Seconds	10sec	5-86400 sec	Time required without proximity detection for display timeout	R/W	Y
AV41	Diagnostic Mode	N/A	N/A	0 - 8388607	For internal use only	R/W	N
BO1	Binary Heat	N/A	N/A	0 - 1	Current Binary Heater Output Signal	R/W	N
MV1	Sequence Revision	N/A	6	26 States	1-A, 2-B, 3-C, 4-D, 5-E, 6-F, 7-G, 8-H, 9-I, 10-J, 11-K, 12-L, 13-M, 14-N, 15-O, 16-P, 17-Q, 18-R, 19-S, 20-T, 21-U, 22-V, 23-W, 24-X, 25-Y, 26-Z	R	Y
MV2	Inlet HCCO State	N/A	N/A	3 States	1- Neutral 2- Hot 3- Cold	R/W	N

ADVANTAGE WITH DISIO DISPLAY

PRODUCT CONFIGURATION & NAVIGATION

Object	Name	Units	Default	Range	Description	R/W	Retained on Powewr Failure
MV3	Temperature Units	N/A	2	2 States	1- Celsius 2- Fahrenheit	R/W	Y
MV4	Airflow Units	N/A	1	3 States	1- CFM 2- L/S, 3- CMH	R/W	Y
MV5	Pressure Units	N/A	1	2 States	1- Inches H20 2- Pascals	R/W	Y
MV6	Baud Rate	N/A	4	4 States	1- 9600 2- 19200 3- 38400 4- 76800	R/W	Y
MV7	Occupancy	N/A	N/A	2 States	1- Unoccupied 2- Occupied	R/W	N
MV8	Occupancy Source	N/A	N/A	4 States	1- Default 2- BACnet 3- Button 4- Motion	R	N
MV9	Support Unoccupied Mode	N/A	1	2 States	1- No 2- Yes	R/W	Y
MV10	Proximity Screen Mode	N/A	N/A	3 States	0-Dim 1-Blank 2-Always On	R/W	Y
MV11	(Balancing) Device Mode	N/A	N/A	2 States	1- Standard Operation 2- Balancing (Damper Max Open)	R/W	N

BACnet Addressing

The **MAC Address** must be unique per device on each segment of the network. Unlike the Instance Number, the MAC Address does not need to be unique over the whole network. The same MAC Address may be used on different segments of the network.

- To set the MAC Address in the Disio Setup software, enter a desired number into the MAC Address AV input.
- To set the MAC Address over BACnet, discover the diffuser using BACnet software and change the value of Object AV1 to a desired number.
- The MAC Adress must be a number between 0 and 127

The Instance Number must be unique per device across the whole network. Instance Numbers may not be repeated anywhere in the network.

- To set the **Instance Number** in the Disio Setup software, use the Device Instance AV input and enter the desired Instance number.
- To set the Instance Number over BACnet, discover the diffuser using BACnet software and use the object identifier object in the Device Properties of the diffuser (See Device Properties on next page).
- The Instance must be a number between 0 and 4194303.

ADVANTAGE WITH DISIO DISPLAY

PRODUCT CONFIGURATION & NAVIGATION

Device Properties

Adpu Timeout	6000
Application Software Version	15.00
Database Revision	1
Description	Disio
Device Address Binding	
Firmware Revision	1.6.12
Location	
Max Apdu Length Accepted	480
Max Info Frames	1
Max Master	127
Model Name	Disio
Number of Apdu Retries	0
Object Identifier	OBJECT_DEVICE:4000102 <---------- Instance Number
Object List	Object[] Array
Property List	Object[] Array
Object Name	Disio
Object Type	8 : Object Device
Protocol Object Types Supported	11111
Protocol Revision	15
Protocol Services Supported	00000
Protocol Version	1
Segmentation Supported	3 : None
System Status	0 : Operational
Vendor Identifier	158
Vendor Name	Acutherm

ADVANTAGE WITH DISIO DISPLAY

MAINTENANCE

Maintenance

Advantage with Disio is designed for long life and no lubrication or other maintenance is required other than occasional cleaning of visible surfaces to maintain a good appearance. There are no recommended spare parts.

Troubleshooting

Please note that the maximum damper opening position is specific to the Advantage model and inlet size. The full open position is different by model and inlet size to ensure discharge velocity is maintained. When comparing the full open position between diffusers check the diffuser model and inlet size as diffusers that may at first appear to be the same may have different full open positions.

The Disio upon power on will display the Menu button, then the Up/Down button and lastly the room set point followed by the Menu and Up/Down buttons turning off.

Status LEDs are provided on the Junction Panel of all Advantage Diffusers to aid in field diagnostics.

Green LED – Indicates presence of 24 VAC power supply.

Red LED – Indicates presence of 2-10 VDC control signals. The Red LED will flash the following:

- Solid = Calibration
- 1 Flash = Control voltage below 2VDC – check wiring
- 2 Flash = Normal Operation - Damper full close
- 6 Flash = Normal Operation - Damper between close and open
- 4 Flash = Normal Operation - Damper full open
- 5 Flash = Calibration error – contact factory for support

The following information is provided in the event that a Advantage with Disio diffuser does not appear to function properly after installation. Since all Advantage with Disio diffusers are auto-changeover controllers, response will be dependent on the supply air temperature. Connected Drone diffusers will synchronize damper position with Advantage with Disio diffuser.

If the Advantage diffuser damper appears to be about 1/2 open and does not move from this position, check the Red LED status. If the red LED is flashing 5 times, cycle power off and then on again, the diffuser should move to a full closed position, and then reopen as needed by the temperature conditions. Issue a full open command (**Page 3**). If the diffuser does not move to the full open position, then please contact the Acutherm Support for further instructions. (**NOTE:** An Advantage with this issue will not affect other Advantage diffusers connected to it.)

Damper	VDC
0%	2
10%	2.8
20%	3.6
30%	4.4
40%	5.2
50%	6.0
60%	6.8
70%	7.6
80%	8.4
90%	9.2
100%	10.0

ADVANTAGE WITH DISIO DISPLAY

MAINTENANCE

Advantage Specifications

Specifications	Advantage with Disio
Power Supply	24 VAC (+-10%) 60Hz; Class 2
Power Consumption	3 VA for diffuser + Disio (+ Drones and any reheat load)
Electrical Connection	Terminal box wired connection or RJ12 jack from power module
Certification	ETL listed
Outputs	1 Binary Triac zero crossing output at 24 VAC (thermally protected) 12VA maximum
	2x RJ12 jacks for Advantage Drone units (maximum 4 total per master)
Proportional Band	Adjustable via Disio Thermostat or USB connection
Temperature Sensors	10k NTC supply air temperature thermistor, 10k NTC Thermostat thermistor
Temperature Sensor Range	-40°F - +175°F (-40.0°C - + 79.4°C)

Disio Specifications

Power Requirements	24 VAC Hot (50/60 Hz, 6 VA plus external loads)
Power Supply	24 VAC (+-10%) 50/60Hz; Class 2
Power Consumptions	3.5 VA + Diffuser (+Drones and reheat)
Electrical Connection	RJ45 jack from Diffuser
Universal/Configurable Outputs (4)	Configurable For: • 24VAC On/Off (0.50 Amps Max per output) Switched Hot (default) • 24 VAC Floating Point Modulation (Damper / Water Valve) • 0-10 VDC Modulation, 10mA max per output (Damper / Water Valve / SCR Electric Heat)
Unversal/Configurable Inputs (4)	Configurable For • Binary Input - Contact Closure • Thermistor Input (10k Type J), 70º F to 82º F (+/- 1-2º F typical accuracy) • Voltage Input (0-10 VDC)
Communication ports	BACnet MS/TP Connection (optional) • Communication speeds: 9,600, 19,200, 38,400, 76,800 (default) • Maximum recommended devices per MS/TP segment: 30 devices USB-C Connection: • For local setup using Windows based Disio Setup software
Size	3.31" x 1.25" x 5.18"
Weight	.2 lb. (100g)

This document contains the most current product information as of this printing. For the most up-to-date product information please go to acutherm.com, where you can also access digital brochures, CAD files, performance data and more.

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