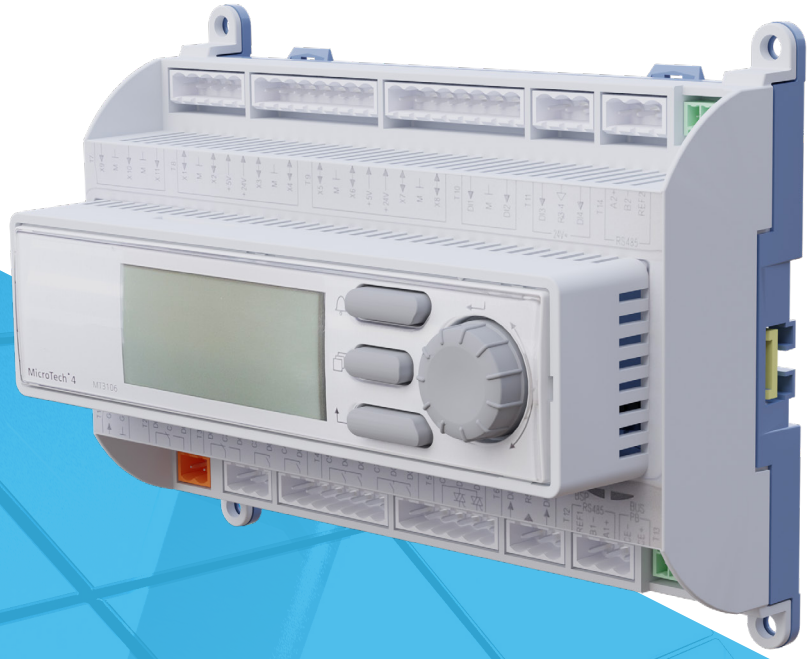
OPERATION MANUAL

OM 1329-2

APRIL 2026

# VISION® / SKYLINE®

## EC FAN CONTROLLER



MODELS: CAH, CAC, OAH, OAC



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# Safety Information

## Hazard Identification

**⚠ DANGER**

Danger indicates a hazardous situation, which will result in death or serious injury if not avoided.

**⚠ WARNING**

Warning indicates a potentially hazardous situations, which can result in property damage, personal injury, or death if not avoided.

**⚠ CAUTION**

Caution indicates a potentially hazardous situations, which can result in minor injury or equipment damage if not avoided.

***NOTICE***

Notice indicates practices not related to physical injury.

**NOTE:** Indicates important details or clarifying statements for information presented in Figures or Tables.

## General Information

This manual provides operating information about the Vision/ Skyline Daikin Applied EC Fan array with premium controls. This document includes controller operation sequences and start-up procedures. For overall array installation and/or maintenance procedures, refer to the following documents:

***Table 1: Vision / Skyline Literature***

| Title | Literature Part Number |
|---|---|
| **Vision CAC/CAH** | IM 672 |
| **Vision Extended Sizes CAC/CAH** | IM 915 |
| **Vision and Skyline Gas Heat** | IM 1300 |
| **Skyline OAC/OAH** | IM 777 |

***Figure 1: Example Delta Motor Label***

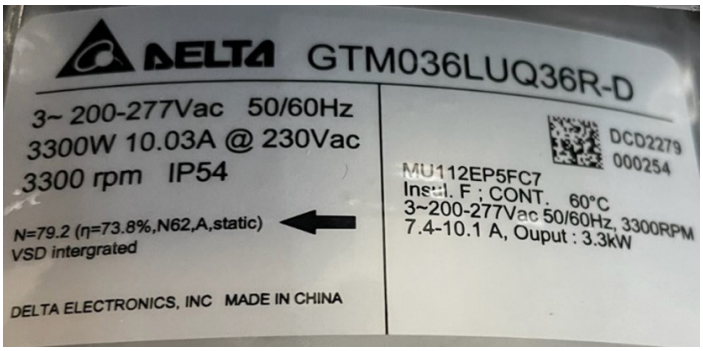



***Figure 2: Example EBM Motor Label***

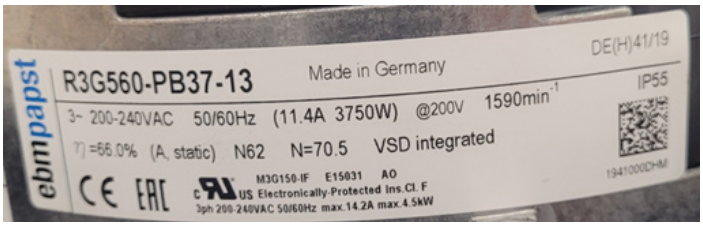
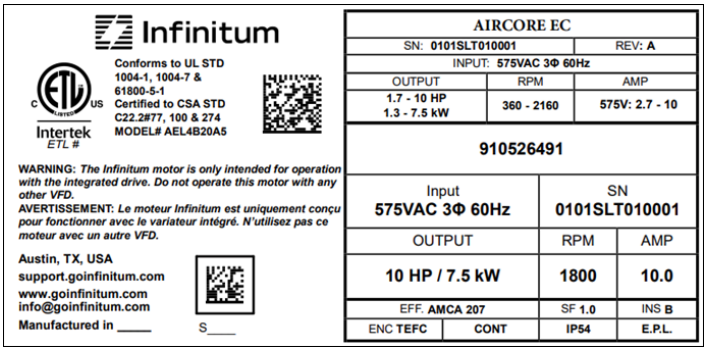



***Figure 3: Example Infinitum Motor Label***



# Control Panel Locations

Figure 4 shows control and power panel locations on a typical section. Figure 5 and Figure 6 show the layout of the components within the power box and low voltage control box, respectively.

***Figure 4: Panel Locations (Example)***

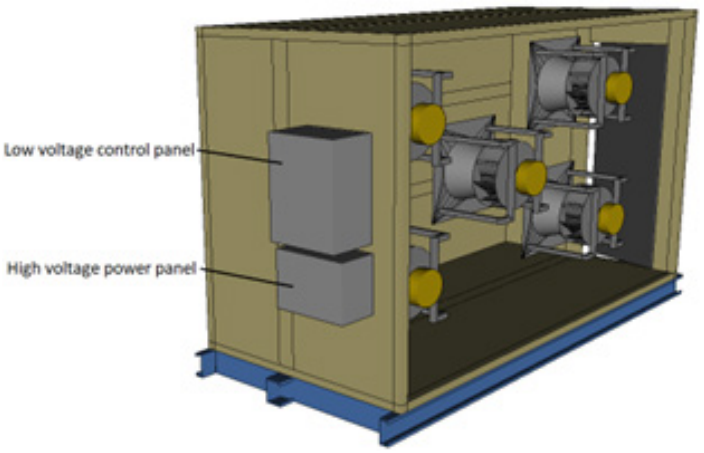



***Figure 5: Power Box Control Panel (Example)***

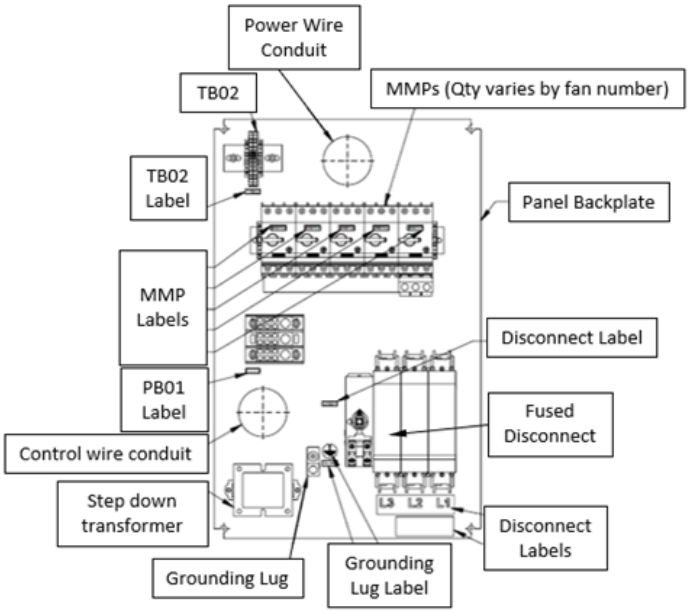
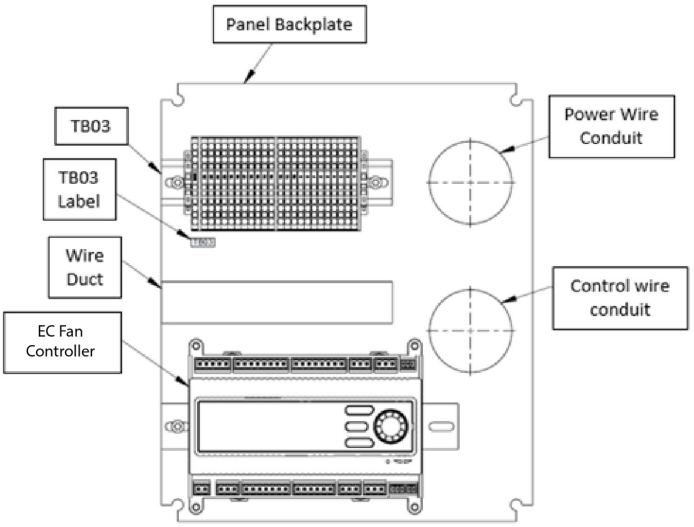



***Figure 6: Low Voltage Control Panel (Example)***



# Controller Fundamentals

## Getting Started

This manual contains information designed to assist the field technician with the Daikin Applied EC fan array setup when premium controls are provided. The technician will need to be familiar with the following topics at a minimum to successfully set up the Daikin Applied EC fan array operation.

- Keypad navigation/editing/passwords
- Control Mode
- Demand Source

The keypad/display consists of a 5-line-by-22-character display, three keys and a “push and roll” navigation wheel. There is an Alarm Button, Menu (Home) Button, and a Back Button. The wheel is used to navigate between lines on a screen (page) and to increase and decrease changeable values when editing. Pushing the wheel acts as an Enter Button.

The first line on each page includes the page title and the line number to which the cursor is currently “pointing”. The line numbers are X/Y to indicate line number X of a total of Y lines for that page . The left most position of the title line includes an “up” arrow to indicate there are pages “above” the currently displayed items, a “down” arrow to indicate there are pages “below” the currently displayed items or an “up/down” arrow to indicate there are pages “above and below” the currently displayed page .

Each line on a page can contain status only information or include changeable data fields. When a line contains status only information and the cursor is on that line all but the value field of that line is highlighted meaning the text is white with a black box around it . When the line contains a changeable value and the cursor is at that line, the entire line is highlighted . Each line on a page may also be defined as a “jump” line, meaning pushing the navigation wheel will cause a “jump” to a new page . An arrow is displayed to the far right of the line to indicate it is a “jump” line.

The keypad/display Information is organized into Menu groups; Main Menu, Quick Menu, View Status, Commission Array, Manual Control, Service Menus, BMS Communications, Alarm List, and About This Array.

**NOTE:** Only menus and items that are applicable to the specific array configuration are displayed.

The Main Menu allows the user to enter a password, access the Quick Menu pages, view the current array state, access the Alarm List Menu as well as access information about the fan array. The Quick Menu provides access to status information indicating the current operating condition of the fan array . The View Status Menus include basic fan array operating status menus and information about current operation . The Commission Array menu includes commissioning/configuration menus to set up the fan array for operation. The Manual Control Menu allows service personnel to test fan array operation directly from the HMI. The Service Menus allow service personnel to review Modbus status and current fan operation hours. The BMS Communications menus allow service personnel to view and set building management system parameters such as the IP address. The Alarm List Menu includes active alarm and alarm log information. The About This Array menu allows service personnel to view information about the fan array including SO Number and Software Build Version.

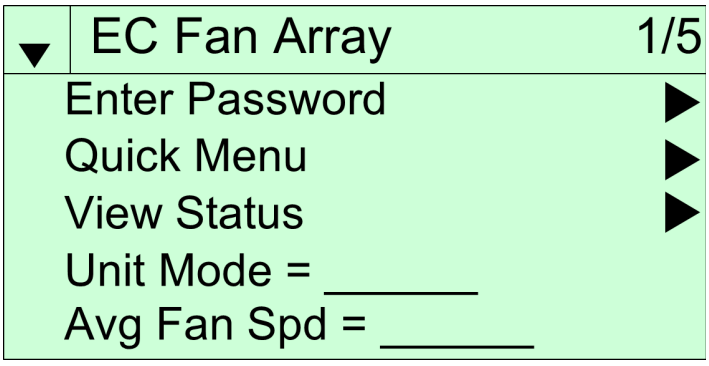
## Passwords

Various menu functions are accessible or inaccessible, depending on the access level of the user, and the password they enter, if any . There are four access levels, including no password, Level 2, Level 4, and Level 6, with Level 2 having the highest level of access . Without entering a password, the user has access only to basic status menu items and the About this Array menu group. Entering the Level 6 password (5321) adds access to the Alarm List, Quick Menu, and the View Status menu groups to the “no password” level. Entering the Level 4 password (2526) adds access to the Service Menu and Manual Control menu groups to the Level 6 access level. Entering the Level 2 password (6363) adds access to the Commission Array and BMS Communications menu groups to the level 4 access level.

**NOTE:** Alarms can be acknowledged without entering a password.

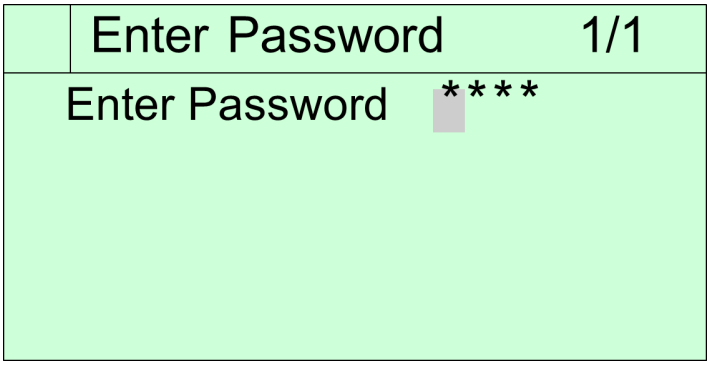
The main menu is displayed when the keypad/display is first accessed, the Home Key is pressed, the Back Key is pressed multiple times, or if the keypad/display has been idle longer than the Password Timeout (default 10 minutes) . The main menu provides access to enter a password, access the Quick Menu, view the current Array State, access the alarm lists or view information about the array.

***Figure 7: Example Password Main Menu***



The password field initially has a value **** where each * represents an adjustable field. These values can be changed by selecting the Enter Password menu item.

***Figure 8: Password Entry Page***




Entering an invalid password has the same effect as continuing without entering a password. Once a valid password has been entered, the controller allows further changes and access without requiring the user to enter a password until either the password timer expires or a different password is entered. The default value for this password timer is 10 minutes .

## Navigation Mode

In the Navigation Mode, when a line on a page contains no editable fields, all but the value field of that line is highlighted, meaning the text is white with a black box around it. When the line contains an editable value field the entire line is inverted when the cursor is pointing to that line .

When the navigation wheel is turned clockwise, the cursor moves to the next line (down) on the page. When the wheel is turned counterclockwise the cursor moves to the previous line (up) on the page. The faster the wheel is turned the faster the cursor moves .

When the Back Button is pressed the display reverts to the previously displayed page. If the Back button is repeated pressed the display continues to revert one page back along the current navigation path until the “main menu” is reached.

When the Menu (Home) Button is pressed the display reverts to the “main page.”

When the Alarm Button is pressed, the most recent active alarm displays.

## Edit Mode

The Editing Mode is entered by pressing the navigation wheel while the cursor is pointing to a line containing an editable field. Turning the wheel clockwise while the editable field is highlighted causes the value to be increased. Turning the wheel counterclockwise while the editable field is highlighted causes the value to be decreased. The faster the wheel is turned the faster the value is increased or decreased. Pressing the wheel again causes the new value to be saved and the keypad/display to leave the edit mode and return to the navigation mode.

## View Status

The “View Status” menu provides a series of read-only menus to observe the status of individual fans, IO status, and the current date and time settings.

# Field Wired Inputs

## Field Control Wiring

After the array has been installed, EC Fan Arrays may require low voltage field wiring to connect the BMS to the EC fan controller, along with any additional sensors that may be required. Use the schematic provided on the door of the control panel to determine where field control connections required for the application are located. Figure 9 is a graphical representation of TB03, and Table 2 shows the possible field connections that can be made.

***Figure 9: TB03 Sample Diagram***

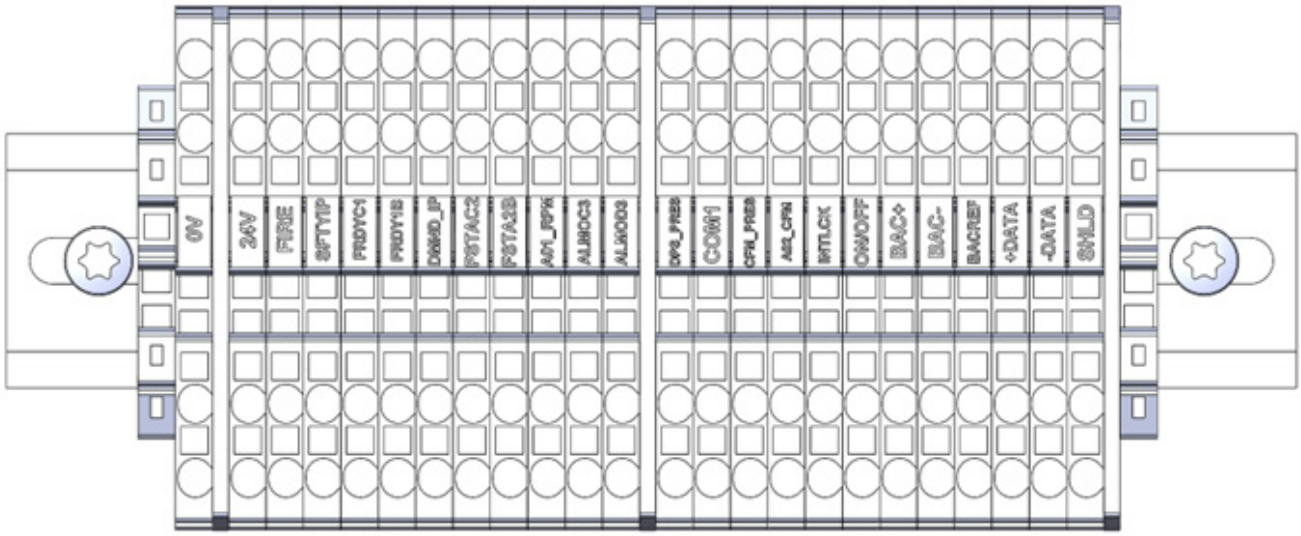



***Table 2: Potential Field Connections and Locations on TB03 (Terminal Block Label 1 is Rightmost Terminal Block)***

| Terminal Block Label | Terminal Block Name | Description | Signal |
|---|---|---|---|
| 1 | SHLD | MODBUS to Fans | RS485 |
| 2 | -DATA | MODBUS to Fans | RS485 |
| 3 | +DATA | MODBUS to Fans | RS485 |
| 4 | BACREF | BACnet Ground | RS485 |
| 5 | BAC- | BACnet Negative | RS485 |
| 6 | BAC+ | BACnet Positive | RS485 |
| 7 | ON/OFF | Array ON/OFF | Contact Closure |
| 8 | INTLCK | Interlock Input | Contact Closure |
| 9 | A02_CFM | CFM Output | 0–10V DC |
| 10 | CFM_PRES | CFM Pressure Sensor | Configurable (4–20mA/0-10V) |
| 11 | COM1 | DC Ground | GND |
| 12 | DPS_PRES | DSP Pressure Sensor | Configurable (4–20mA/0-10V) |
| 13 | ALMOD3 | Alarm | Contact Closure |
| 14 | 24VC3 | Alarm | Contact Closure |
| 15 | A01_RPM | RPM Output | 0–10V DC |
| 16 | 24VC2 | Fan Status | Contact Closure |
| 17 | FSTAC2 | Fan Status | Contact Closure |
| 18 | DMND_IP | Demand Input | Configurable (4–20mA/0–10V) |
| 19 | FRDY1B | Fan Ready | Contact Closure |
| 20 | 24VC1 | Fan Ready | Contact Closure |
| 21 | SFTYIP | Safety Input | Contact Closure |

| Terminal Block Label | Terminal Block Name | Description | Signal |
|---|---|---|---|
| 22 | FIRE | Fire Mode Input | Contact Closure |
| 23 | 24V | Power Supply | 24V |
| GROUND | 0V | GND | GND |

***Figure 10: System Block Diagram***

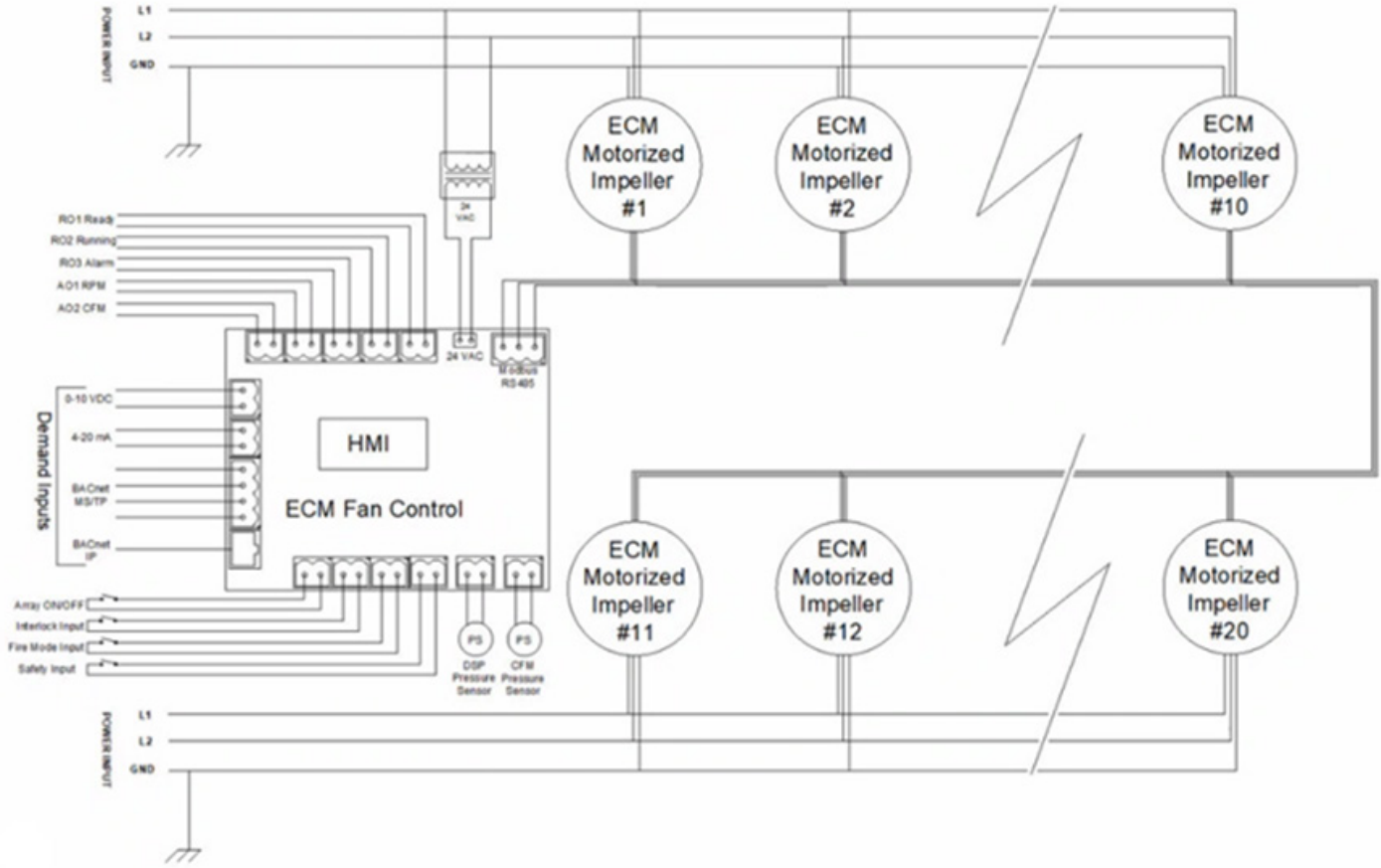
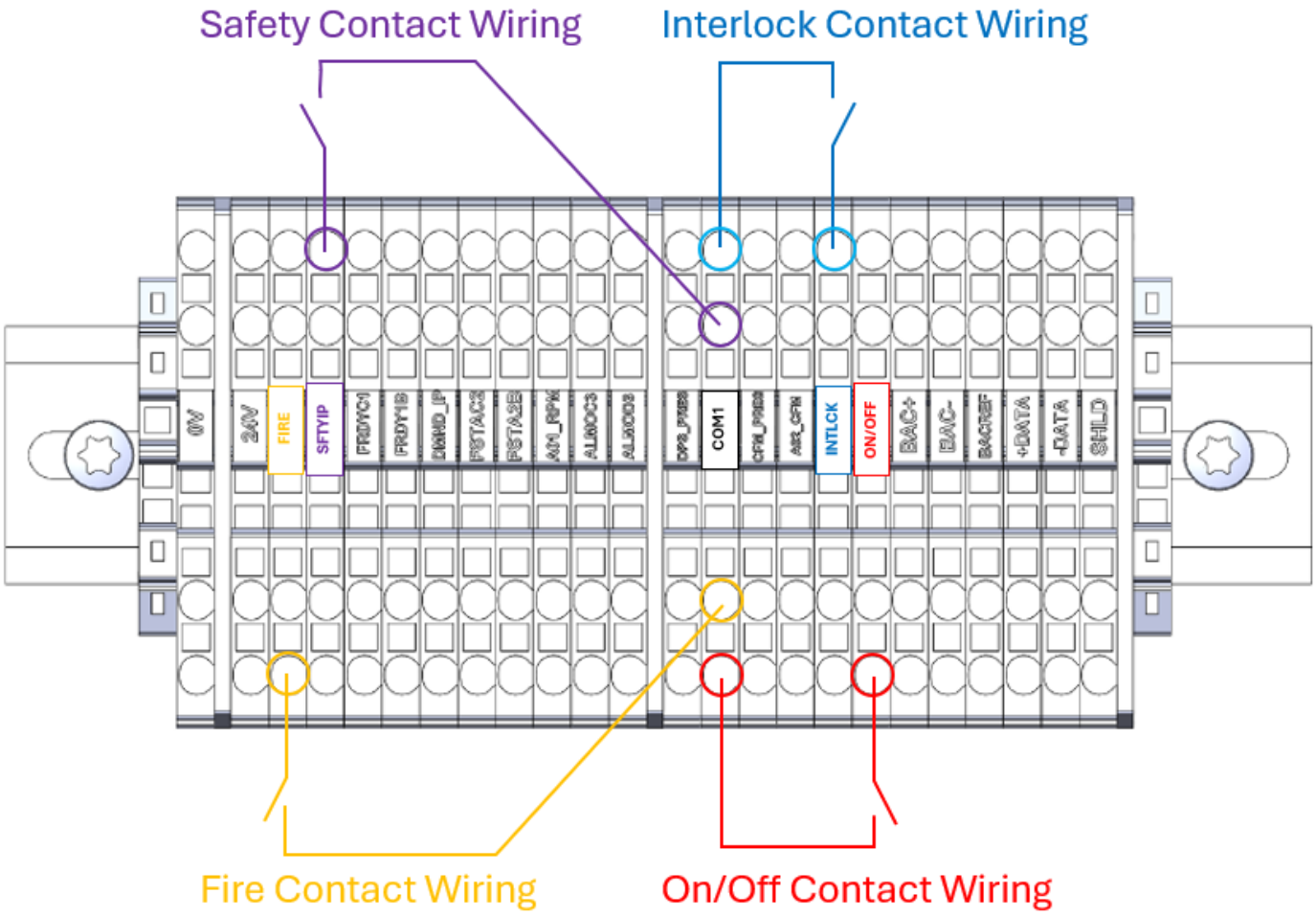
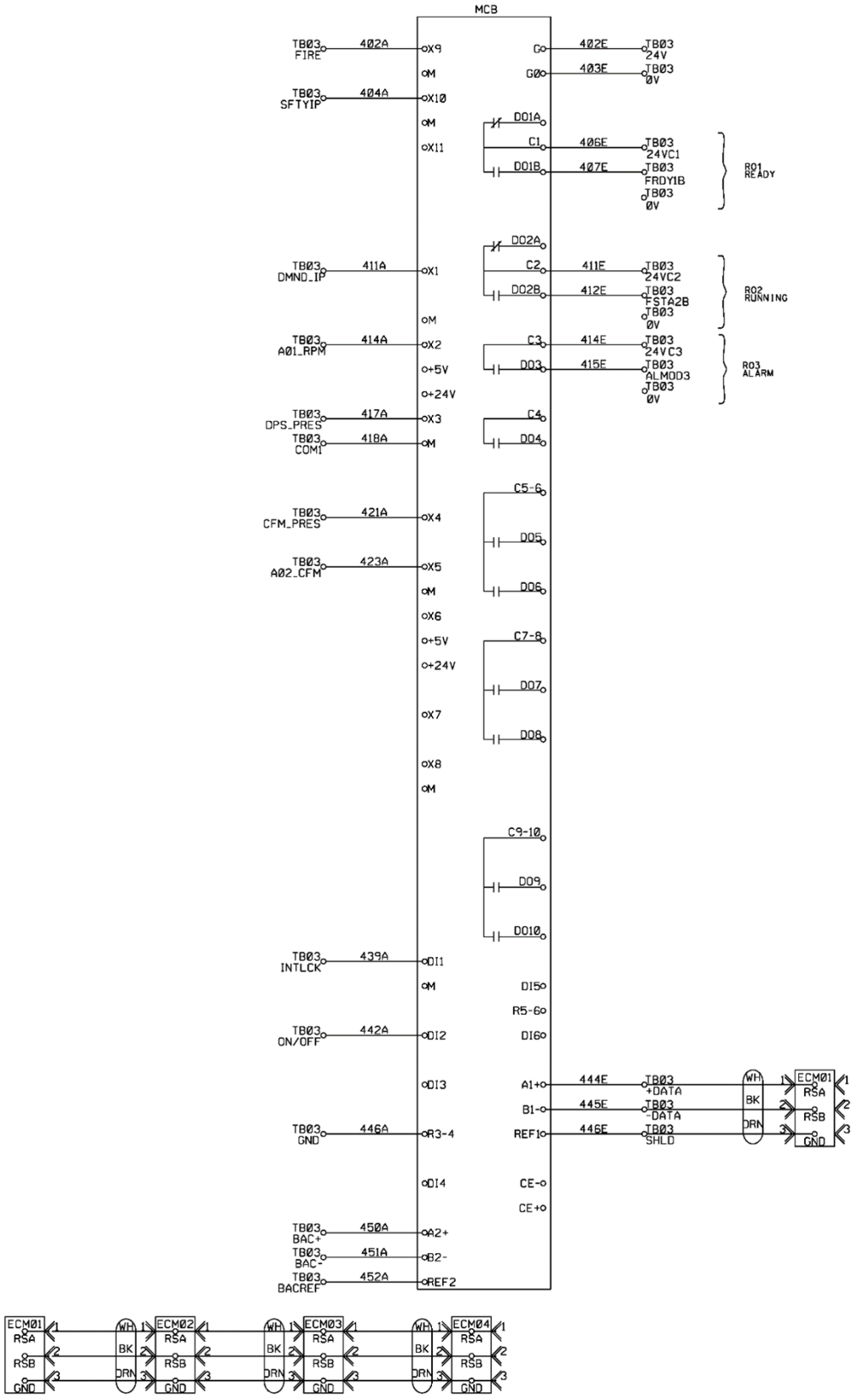


***Figure 11: Field Control Wiring***




**NOTE:** The diagram provided in Figure 11 is an example. Any open port on a terminal block can be utilized.

***Figure 12: Example Control Schematic***



# Fan Array Sensors

The EC fan controller can be wired to the following sensors:

- Duct Pressure Sensor
  - — Field-provided and -installed
- Array CFM Pressure Transducer (see page 16 for CFM sensor setup)
  - — Factory Installed, Daikin Applied PNs: 2061282 -04 through -07
  - — 1 transducer per array

# Duct Pressure Sensor

The Duct Pressure Sensor is used by the EC fan controller to calculate duct static pressure downstream of the fan. The Pressure Range Limit will be selected in the controller through the Main Menu\Commission Array\Configure Array\DSPSenSetup menu. The sensor measurement range can be entered into the controller in the Pressure Sensor Setup menu (up to 10" WC), and the pressure sensor output signal can be either in VDC or mA. The output range of the sensor can also be entered into the controller in the same menu.

***Figure 13: Duct Pressure Sensor Schematic***

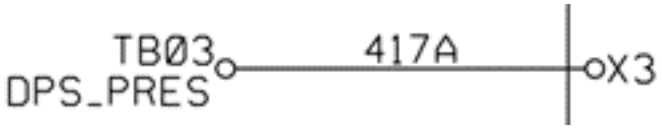



***Table 3: Duct Pressure Sensor Navigation***

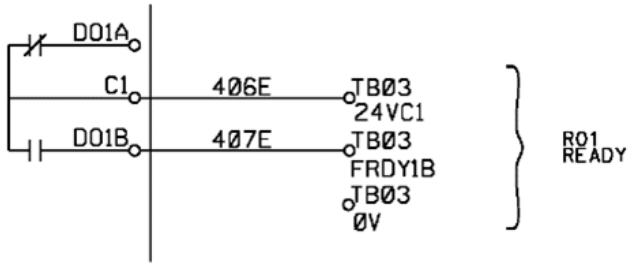
| Main Menu \ Commission Array \ Config Array \ DSPSenSetup | | | |
|---|---|---|---|
| **Menu Display Name** | **Default** | **Range** | **Description** |
| DSPSnsrTyp | mA | None<br>mA<br>VDC | DSPSnsrTyp is an adjustable item that selects the input signal type to the controller from the Duct Static Pressure sensor. |
| V/A@MinDSP | 4(VDC)<br>4(mA) | 0–10(VDC)<br>0–20(mA) | V/A@MinDSP is an adjustable item that informs the controller what the VDC or mA signal magnitude is at the sensor's minimum pressure threshold. |
| MinDSP | 0 | 0–10 | MinDSP is an adjustable item that informs the controller what the sensor's minimum pressure threshold is. |
| V/A@MaxDSP | 10 (VDC)<br>20 (mA) | 0–10(VDC)<br>0–20(mA) | V/A@MaxDSP is an adjustable item that informs the controller what the VDC or mA signal magnitude is at the sensor's maximum pressure threshold. |

| Main Menu \ Commission Array \ Config Array \ DSPSenSetup | | | |
|---|---|---|---|
| **Menu Display Name** | **Default** | **Range** | **Description** |
| MaxDSP | 10 | 0–10 | MaxDSP is an adjustable item that informs the controller what the sensor's maximum pressure threshold is. Units are inches WC. |

## Ready Relay

The controller has a Ready Relay contact that provides a digital output that will close when the fan array is ready to run.

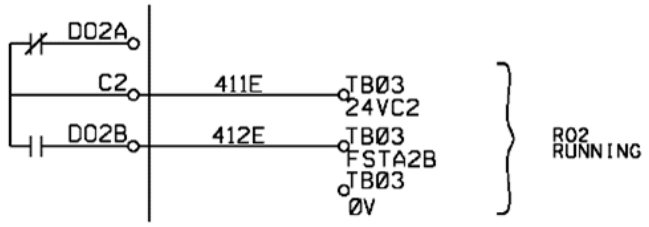
***Figure 14: Ready Relay Schematic***




## Running Relay

The controller has a Running Relay contact that provides a digital output that will close when the fan array receives a request to run from the specified demand input.

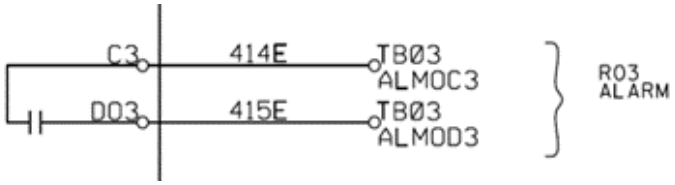
***Figure 15: Running Relay Schematic***




## Alarm Output

The controller has an Alarm Output contact that provides a digital output anytime an alarm is active on the controller. The alarm output will close whenever there are any alarms on the EC fan controller.

***Figure 16: Alarm Output Schematic***



# Commissioning and Operations

## Array Set-Up

General array set-up configurations are used to adjust the controller's units of measure and the array name.

***Table 4: Array Set-Up Menu***

| Main Menu \ Commission Array \ Array Set-Up | | | |
|---|---|---|---|
| **Menu Display Name** | **Default** | **Range** | **Description** |
| Eng Units | US | US<br>SI<br>CA | Unit of Measure is an adjustable item to indicate if the unit is to display US, Metric, or Canadian units of measure. |
| Name | - | - | Array Name is an adjustable item that allows each controller to be given a unique name. This may be useful when multiple arrays are connected to a single remote HMI. The limit for this value is 14 alphanumeric characters. |

## Units

The units of measure can be set to US, Metric, or Canadian units. For all units of measure, the units will be as shown in Table 5.

***Table 5: Units of Measure***

| Unit of Measure | English Units | Metric Units | Canadian Units |
|---|---|---|---|
| Weight | lb | kg | kg |
| Temperature | ˚F | ˚C | ˚C |
| Airflow | $ft^3$/min | $m^3$/hr | $ft^3$/min |
| Pressure | inWc | Pa | Pa |
| Electrical Power | kW | kW | kW |
| Length | ft | m | m |

# Date/Time Settings

The controller uses the date and time to timestamp events. The current time and date will not be lost if the array is turned off for up to forty-eight hours. The time and date can be set from the HMI. The time of day can be set by entering the hour (00–23), minute (00–59), and second (00–59) into the appropriate menu item. The current date can be set by entering the day (01–31), month (01–12) and year (2000–2050) into the appropriate menu item.

***Table 6: Date/Time Menu***

| **Main Menu \ Commission Array \ Array Set-up \ Date/Time Settings** | | | |
|---|---|---|---|
| **Menu Display Name** | **Default** | **Range** | **Description** |
| Date | - | 01.01.2000–<br>12.31.2050 | Date is an adjustable item that details the current date |
| Time | - | 00:00:00–<br>23:59:59 | Time is an adjustable item that details the time |
| UTC Diff | 6h | -12–14 | UTC-difference is an adjustable parameter that can be set to indicate how the local time where the array is situated differs from the Coordinated Universal Time (adjustable in one hour increments). |
| DLSStartMonth | Mar | NA<br>Jan–Dec | DLS Start Month is an adjustable item that sets the month for daylight savings time to begin. |
| DLSStartWeek | 2ndWeek | 1stWeek<br>2ndWeek<br>3rdWeek<br>4thWeek<br>5thWeek | DLS Strt Week is an adjustable item that sets the week of the month for daylight savings time to begin. |
| DLSEndMonth | Nov | NA<br>Jan–Dec | DLS End Month is an adjustable item that sets the month for daylight savings time to end. |
| DLSEndWeek | 1stWeek | 1stWeek<br>2ndWeek<br>3rdWeek<br>4thWeek<br>5thWeek | DLS End Week is an adjustable item that sets the week of the month for daylight savings time to end. |
| DLSEnable | Enable | Disable<br>Enable | DLS Enable is an adjustable item that sets whether daylight savings time is enabled. |

# Enable The Array

## Configure Array Menu

The Configure Array Menu is a commissioning menu that provides adjustable parameters to set the fan operating controls.

***Table 7: Configure Array Menu***

| Main Menu \ Commission Array \ Config Array | | | |
|---|---|---|---|
| **Menu Display Name** | **Default** | **Range** | **Description** |
| Ctrl Method | RPM | DSP<br>RPM<br>CFM<br>Tracking | Ctrl Method is an adjustable item used to select how the fan array is to be controlled. The fan array can normally be controlled by a duct pressure (DSP), constant CFM setpoint (CFM), or RPM which allows the fans to either be set at constant speed or adjusted with a building automation system. |
| DmdSrc | 0–10 | 4–20 mA<br>0–10 VDC<br>BACnet<br>HMI | DmdSrc is an adjustable item that defines the demand input source. The DmdSrc options available to select are contingent on the CtrlMode selected. |
| Fire EN | No | Yes<br>No | Fire EN is an adjustable item that allows the controller to ignore the Fire Mode Input when set to “No.” When enabled, if a contact connected to this input is opened, all alarm contacts are closed and alarm signals are sent out through BACnet and the controller HMI. |
| IntLck EN | No | Yes<br>No | IntLck EN is an adjustable item that allows the controller to ignore the Interlock Input when set to “No.” When enabled, this input delays fan operation until an external contact is closed. |
| Safety EN | No | Yes<br>No | Safety EN is an adjustable item that allows the controller to ignore the Safety Input when set to “No.” When enabled, if a contact connected to this input is opened, the fan will not operate under any circumstances. |
| OnOff EN | No | Yes<br>No | OnOff EN is an adjustable item allows the controller to ignore the Array ON/OFF Input when set to “No.” When enabled, this input allows the fan array operation to be controlled on/off with an external contact closure (closing this contact enables fan operation). |

## Control Mode

Daikin Applied EC fan arrays will be controlled using a factory EC motor for each fan. Each motor is controlled via a Modbus interface when selected with the premium control package.

The fan array will control between an adjustable minimum and maximum fan capacity. EBM fans have a minimum speed of 8% of maximum capacity while Delta fans have a minimum of 200 RPM fan speed. Maximum speed for both fan styles is 100% of fan capacity. The setpoints can be adjusted at the array controller interface or via a network input signal.

- **RPM Control (RPM):** An RPM control type controls the fan array capacity to a fixed speed value.
- **Duct Pressure Control (DSP):** Duct pressure control operates the array to maintain duct conditions. The fan array is modulated to maintain a duct static pressure setpoint, based on an external pressure sensor (field supplied and installed).
- **CFM Control:** The array is equipped with a fan airflow measuring system. When the array is configured to CFM control, the fan array capacity is modulated to maintain an adjustable airflow (CFM) setpoint.

## Digital Inputs

The EC fan controller has several digital inputs: a Start Signal Input, an Interlock Input, a Fire Input, and an Alarm Enable Input. Inputs can be landed on terminal block TB03 inside the low voltage control box as shown in the master wiring diagram shown in “Field Wired Inputs” on page 7.

# CFM Sensor Setup

The CFM Sensor Setup Menu allows the user to set the parameters for the specific sensor installed in the array. The Array CFM Pressure Transducer is used by the EC fan controller to calculate the total CFM delivered by the array. The Pressure Range Limit will be selected in the controller through the Main Menu\Commission Array\Configure Array\CFMSenSetup menu. The sensor measurement range can be entered into the controller in the CFM Sensor Setup menu (up to 40” w.c.), and the pressure sensor output signal can be either in VDC or mA. The output range of the sensor can also be entered into the controller in the same menu.

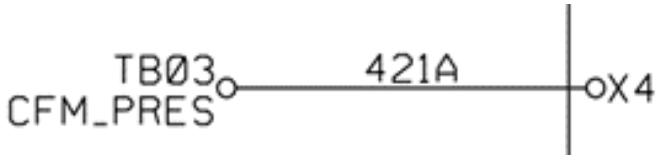
***Table 8: CFM Sensor Setup Menu***

| Main Menu \ Commission Array \ Config Array \ CFMSenSetup | | | |
|---|---|---|---|
| **Menu Display Name** | **Default** | **Range** | **Description** |
| CFMSnsrType | mA | None<br>mA<br>VDC | CFMSnsrType is an adjustable item that selects the input signal type to the controller from the CFM sensor. |
| V/A@MinCFMDP | 4 | 0–20 | V/A@MinCFMDP is an adjustable item that informs the controller what the VDC or mA signal magnitude is at the sensor’s minimum pressure threshold. |
| MinCFM DP | 0 | 0–40 | MinCFM DP is an adjustable item that informs the controller what the sensor’s minimum pressure threshold is. |
| V/A@MaxCFMDP | 20 | 0–20 | V/A@MaxCFMDP is an adjustable item that informs the controller what the VDC or mA signal magnitude is at the sensor’s maximum pressure threshold. |
| MaxCFM DP | 5 | 0–40 | MaxCFM DP is an adjustable item that informs the controller what the sensor’s maximum pressure threshold is. |

***Table 9: Pressure Range Limits for Daikin Applied Pressure Transducers***

| Daikin Applied PN | Pressure Range Limit |
|---|---|
| 206128207 | 0–5" W.C. |
| 206128204 | 0–10" W.C. |
| 206128205 | 0–20" W.C. |
| 206128206 | 0–40" W.C. |

***Figure 17: CFM Sensor Schematic***



# Configure Fans

The Configure Fans Menu allows the user to configure the fan-specific settings for the array.

***Table 10: Configure Fans Menu***

| Main Menu \ Commission Array \ Config Fans | | | |
|---|---|---|---|
| **Menu Display Name** | **Default** | **Range** | **Description** |
| FanNumber | 4 | 1–20 | FanNumber is an adjustable item that informs the controller of the number of fans in the array. |
| Fan Supplier | Delta | EBM<br>Delta<br>Infin (9B)<br>Infin (12B) | Fan Supplier is an adjustable item that informs the controller of the brand of fans installed in the array. |
| FanSize | 355 mm | (EBM and Delta)<br>355 mm–630 mm<br>(Infinitum)<br>11–36 | FanSize is an adjustable item that informs the controller of the nominal diameter of the fan impellers installed in the array. |
| FanVoltage | 460 | 208/230<br>460 | FanVoltage is an adjustable item that informs the controller of the voltage of the fans installed in the fan array. Units are in VDC |
| FanPower | - | 0.0 kW–15.0 kW | FanPower is an adjustable item that informs the controller of the nameplate power rating of the fans installed in the fan array. |
| IncTime | 60 s | 0–120s | IncTime is an adjustable item that controls the time it will take to change the fan speed from minimum RPM to maximum RPM. |
| DecTime | 60 s | 0–120s | DecTime is an adjustable item that controls the time it will take to change the fan speed from maximum RPM to minimum RPM. |
| MaxRPM | (EBM and Delta)<br>355 mm: 3300<br>450 mm: 2600<br>560 mm: 1900<br>630 mm: 1950<br>(Infinitum)<br>11–36: 0–4000 | (EBM and Delta)<br>355mm: 0–3300<br>450mm: 0–2600<br>560mm: 0–1900<br>630mm: 0–1950<br>(Infinitum)<br>11-36: 0–4000 | MaxRPM is an adjustable item that sets the maximum fan speed for the application. The controller adjusts the range of this value based on the fan impeller size selected. Units are in RPM. |
| Min(0%)RPM | 0 RPM | (EBM and Delta)<br>355mm: 0–3300<br>450mm: 0–2600<br>560mm: 0–1900<br>630mm: 0–1950<br>(Infinitum)<br>11-36: 0–4000 | Min(0%)RPM is an adjustable item that sets the minimum fan speed for the application. The controller adjusts the range of this value based on the fan impeller size selected. Units are in RPM. |
| VentOvrdSpd | 0 RPM | (EBM and Delta)<br>355 mm: 0–3300<br>450 mm: 0–2600<br>560 mm: 0–1900<br>630 mm: 0–1950<br>(Infinitum)<br>11–36: 0–4000 | VentOvrdSpd is an adjustable item that sets the fan speed when the vent limit is activated. The controller adjusts the range of this value based on the fan impeller size selected. Note that this value cannot exceed the MaxRPM value. Units are in RPM. |
| RPMFbErr | 300 RPM | 0–3000 RPM | RPMFbErr is an adjustable item that sets the maximum differential between the RPM setpoint and the actual RPM of the fans in the array. If this differential is exceeded, an alarm will be displayed. |
| AdptvSpd | Yes | Yes<br>No | AdptvSpd is an adjustable item that enables or disables adaptive speed. If enabled, when a fan in the array is lost or disabled, the remaining fans will increase their RPM to compensate. |

# Quick Menu

Items in the Quick Menu contain basic array operating status and control set point parameters . The items shown in the Quick Menu are Read Only if a valid password has not been entered . The following are brief descriptions of the Quick Menu items .

***Table 11: Quick Menu***

| Main Menu \ Quick Menu | | | |
|---|---|---|---|
| **Menu Display Name** | **Default** | **Range** | **Description** |
| Ctrl Mode | - | Off<br>Normal<br>Manual<br>Emergency | CtrlMode is a read only item that displays the status of operation in which the array is currently operating. The array mode can be any of the status values shown. |
| Mode Status | - | Off | Mode Status is a read-only item that displays... |
| Unit Alm | No Alarm | No Alarm<br>Fan #1 Alarm<br>Fan #2 Alarm<br>…<br>Fan #19 Alarm<br>Fan #20 Alarm<br>Sensor Error<br>Fire Alarm<br>External Safety Alarm<br>Interlock Alarm<br>Pressure Alarm | Unit Alm is a read only item which displays if, and what, alarm is active. |
| General Alm | Off | Off<br>On | |
| HMI Cmd SP | 0 | 0–100% | HMI Cmd SP is the demand speed setpoint when the demand source is set to “HMI”. |
| HMI Cmd SP | 0 | 0–4000* | HMI Cmd SP is the demand speed setpoint when the demand source is set to “HMI”. Units are in RPM.<br>*The maximum permissable fan speed is determined by the MxPrmFanSpd (see page 21). |
| Dmd SP | 0 | 0–100% | Dmd SP is an adjustable item that sets the demand setpoint. |
| AF SP | 0 | 0–1842249 | AF SP is an adjustable item that sets the CFM setpoint. Units are in CFM. |
| DSP SP | 0 | 0–10 | DSP SP is an adjustable item that sets the duct static pressure setpoint when control mode is DSP. Units are in inches WC. |
| DSP | - | 0–10 | DSP is a read-only item that displays the duct static pressure status from the field installed sensor. Units are in inches WC. |
| DSP Alm SP | 0.25 | 0–2 | DSP Alm SP is an adjustable item that sets the maximum differential between the DSP setpoint and the actual DSP read by the field-installed sensor. If this differential is exceeded, an alarm will be displayed. Units are in inches WC. |
| DmdFanSpdCmd | 0 | 0–100% | DmdFanSpdCmd is a read only item that displays the fan array speed demand setpoint as a percentage of max speed. |
| aDmdFanSpdCmd | 0 | 0–3300 | aDmdFanSpdCmd is a read only item that displays the fan array speed demand setpoint in RPM. |
| AvgFanSpdCmdFb | 0 | 0–100% | AvgDmdFanSpdCmd is a read-only item that displays the average speed of all the fans operating in the fan array as a percentage of max speed. |
| AvgFanSpdFb | 0 | 0–3300 | AvgFanSpdFb is a read-only item that displays the average speed of all the fans operating in the fan array. Units are in RPM. |
| AirFl DP | 0 | 0–40 | AirFl DP is a read-only item that displays the static pressure differential reported by the airflow measurement sensor. |
| AirFl | 0 | 0–1842249 | AirFl is a read-only item that displays the calculated array total airflow as reported by the airflow measurement sensor. Units are in CFM. |
| AFRatioToMax | 0 | 0–100% | AFRatioToMax is a read-only item that displays the calculated array total airflow as a percentage of the estimated maximum allowable airflow. |

| Main Menu \ Quick Menu | | | |
|---|---|---|---|
| **Menu Display Name** | **Default** | **Range** | **Description** |
| Intr Lck In | Off | Off<br>On | Intr Lck In is a read-only item that displays the current state of the Interlock digital input. |
| Fire Alm In | Off | Off<br>On | Fire Alm In is a read-only item that displays the current state of the Fire Alarm digital input. |
| Safety In | Off | Off<br>On | Safety In is a read-only item that displays the current state of the Safety digital input. |
| Array ON/OFF | Off | Off<br>On | Array ON/OFF is a read-only item that displays the current state of the array on/off digital input. |
| Array Power | 0 | 0–75* | Array Power is a read-only item that reports the total power consumption of the fan array. Units are in kW.<br>*Array power limits are variable by configuration. |

# Unit Status

The “Unit Status” menu provides a summary of basic array status and control items. This menu summarizes the current operating state of the array, giving the operating state the array is in, along with the current capacity level of that operating state.

***Table 12: Main Menu \ View Status \ Unit Status***

| **Main Menu \ View Status \ Unit Status** | | | |
|---|---|---|---|
| **Menu Display Name** | **Default** | **Range** | **Description** |
| Ctrl Mode | - | Off<br>Normal<br>Manual<br>Emergency | Ctrl Mode is a read only item that displays the status of operation in which the array is currently operating. The array mode can be any of the status values shown. |
| Mode Status | - | Off<br>Normal<br>Manual<br>Manual Off | Mode Status is a read only item that displays the current fan operating mode. |
| Unit State | - | Off<br>Ready<br>Running<br>Manual<br>Alarm<br>EmergeWRN | Unit State is a read only item that displays the current state of the array. The array state can be any of the values shown |
| Unit Alm | No Alarm | No Alarm<br>Fan #1 Alarm<br>Fan #2 Alarm<br>…<br>Fan #19 Alarm<br>Fan #20 Alarm<br>Sensor Error<br>Fire Alarm<br>External Safety Alarm<br>Interlock Alarm<br>Pressure Alarm | Unit Alm is a read only item which displays if, and what, alarm is active. |
| Array ON/OFF | Off | Off<br>On | Array ON/OFF is a read only item that displays the current state of the array on/off digital input |
| RO1 Ready | Off | Off<br>On | RO1 Ready is a read only item displays the state of the Fan Ready relay |
| RO2 Running | Off | Off<br>On | RO2 Running is a read only item that displays the state of the Fan Running relay |
| RO3 Alarm | Off | Off<br>On | RO3 Alarm is a read only item that displays the state of the Fan Alarm relay |
| DSP | 0 | - | DSP is  a read only item that displays the DSP pressure sensor reading |
| AirFl DP | 0 | 0-40 | AirFl DP is a read-only item that displays the static pressure differential reported by the airflow measurement sensor. |
| AirFl | - | - | Air Fl is a read only item that displays the total airflow of the fan array in CFM |

# Fan Status

The Fan Status Menu displays the fan operation and the relevant current control parameters.

***Table 13: Fan Status Menu***

| Main Menu \ View Status \ Fan Status | | | |
|---|---|---|---|
| **Menu Display Name** | **Default** | **Range** | **Description** |
| Fan Run Cmd | Off | On<br>Off | Fan Run Cmd is a read only item that displays the fan array run command output. |
| DmdFanSpdCmd | - | 0–100% | DmdFanSpdCmd is a read only item that displays the fan array speed command output. |
| aDmdFanSpdCmd | - | 0–4000 | aDmdFanSpdCmd is a read only item that displays the fan array speed. Units are in RPM. |
| AvgFanSpdCmdFb | - | 0–100% | AvgFanSpdFb is a read only item that displays the average speed command of all fans in the fan array. |
| AvgFanSpdFb | - | 0–3300 | AvgFanSpdFb is a read only item that displays the average speed of all fans in the array in RPM. |
| Max RPM | - | 0–4000* | Max RPM is an adjustable setpoint for setting the maximum fan speed. Units are in RPM.<br>*The maximum permissable fan speed is determined by the MxPrmFanSpd. |
| MxPrmFanSpd | - | 0–4000 | MxPrmFanSpd is a read only item that reports the maximum allowable fan speed as determined by the fan motor. |
| AirFl DP | - | 0.0–40.0 | AirFl DP is a read only item that displays the CFM pressure. |
| AirFl | - | 0–200,000 | Air Fl is a read only item that displays the total airflow of the fan array in CFM |
| MxRPMAF | - | 0–200,000 | MxRPMAF is a read only item that reports the calculated theoretical maximum airflow of the entire array at maximum RPM. |
| AFRatioToMax | - | 0–100% | AFRatioToMax is a read only item that displays the ratio of current airflow to the theoretical maximum airflow of the entire array at maximum RPM. |
| # Active Fans | - | 0–20 | # Active Fans is a read only item that displays the number of active fans in the fan array. |
| IntLck | Off | On<br>Off | IntLck is a read only item that reports the status of the interlock. |
| IntLckTm | 180.0 | 0–180.0 | IntLckTm is an adjustable item that sets the maximum time the controller will wait before triggering the IntLckAlm. |
| IntLckAlm | Off | On<br>Off | IntLckAlm is a read only item that reports that the expected time elapsed for the interlock signal to be received by the controller has exceeded the IntLckTm setting. |
| DSP | - | 0–10 | DSP is a read-only item that displays the duct static pressure status from the field installed sensor. Units are in inches WC. |
| DSP Alm | - | OK<br>FLT | DSP Alm is a read-only item that displays the alarm status of the duct static pressure sensor. A fault will trigger if the sensor's reading is above or below the allowable deadband for over 60 seconds. See page 17 for details on the DSP alarm setpoint (DSP Alm SP). |

# Fan Menus

The Fan Menus display each individual fan operation status.

***Table 14: Fan Menus***

| Main Menu \ View Status \ Fan Status \ Fan# (1-20) | | | |
|---|---|---|---|
| **Menu Display Name** | **Default** | **Range** | **Description** |
| Model | - | - | Model is a read only item that displays the motor model number. |
| SN | - | - | SN is a read only item that displays the fan motor serial number. |
| Run Hrs | - | - | Run Hrs is a read only item that displays the runtime of the fan in hours. |
| RPMAlm | - | OK<br>Flt | RPMAlm is a read only item that displays whether there is a RPM alarm present. |
| ComErr | - | OK<br>Flt | ComErr is a read only item that displays whether there is a communication error present. |
| Mtr Sts | - | OK<br>Flt | Mtr Sts is a read-only item that displays whether a fault status exists on the motor. |
| AlmCode | Online | - | AlmCode is a read only item that displays the alarm code active (if any), otherwise will display “Online”. |
| ModIvl | - | 0–100% | ModIvl is a read only item that displays the modulation level. |
| SpdFb | - | 0–4000* | SpdFb is a read only item that displays the RPM feedback from the motor.<br>*The maximum permissable fan speed is determined by the MxPrmFanSpd (see page 21). |
| MaxRPM | - | 0–4000* | MaxRPM is a read only item that displays the maximum RPM of the motor.<br>*The maximum permissable fan speed is determined by the MxPrmFanSpd (see page 21). |
| MaxPermRPM | - | 0–4000* | MaxPermRPM is a read-only item that displays the maximum permissable RPM of the motor.<br>*The maximum permissable fan speed is determined by the MxPrmFanSpd (see page 21). |
| Pwr | - | - | Pwr is a read only item that displays the motor power. |
| MdlT | - | - | MdlT is a read only item that displays the winding temperature within the motor. |
| MtrT | - | - | MtrT is a read only item that displays the motor temperature. |
| ElcT | - | - | ElcT is a read only item that displays the temperature of the internal electronics. |
| Direction | CW | CW<br>CCW | Direction is a read only item that displays the rotational direction setting of the fan wheel. |
| DCLink_VRef | - | - | DCLink_VRef is a read only item that displays the DC Link reference voltage. |
| Voltage | - | - | Voltage is a read only item that displays the motor voltage. |
| DCLink_CRef | - | - | DCLinkCRef is a read only item that displays the DC Link reference current. |
| Current | - | - | Current is a read only item that displays the motor current. |

# Alarm Status

The Alarm Status Menu displays alarm information for individual fans. Damage could occur if any alarms are ignored.

***Table 15: Alarm Status Menu***

| Main Menu \ View Status \ Fan Status \ Fan# (1-20) \ Alarm Status | | | |
|---|---|---|---|
| **Menu Display Name** | **Default** | **Range** | **Description** |
| PHA | Inactive = 0 | Active = 1<br>Inactive = 0 | PHA is the phase failure (3-phase devices) or line undervoltage (single-phase devices) alarm for EBM fans |
| TFE | Inactive = 0 | Active = 1<br>Inactive = 0 | TFE is the output stage overheating alarm for EBM fans |
| SKF | Inactive = 0 | Active = 1<br>Inactive = 0 | SKF is the communication error between master controller and slave controller alarm for EBM fans |
| FB | Inactive = 0 | Active = 1<br>Inactive = 0 | FB is the fan bad alarm, which is a general error for EBM fans |
| TFM | Inactive = 0 | Active = 1<br>Inactive = 0 | TFM is is the motor overheating alarm for EBM fans |
| HLL | Inactive = 0 | Active = 1<br>Inactive = 0 | HLL is the hall sensor error alarm for EBM fans |
| BLK | Inactive = 0 | Active = 1<br>Inactive = 0 | BLK is the motor blocked alarm for EBM fans |
| n_Limit | Inactive = 0 | Active = 1<br>Inactive = 0 | n_Limit is the speed limit exceeded alarm for EBM fans |
| RL_Cal | Inactive = 0 | Active = 1<br>Inactive = 0 | RL_Cal is the rotor position sensor calibration error alarm for EBM fans |
| UzLow | Inactive = 0 | Active = 1<br>Inactive = 0 | UzLow is the DC-link undervoltage alarm for EBM fans |
| OC | Inactive = 0 | Active = 1<br>Inactive = 0 | OC is the DCbus average over protection current alarm for Delta fans |
| OV | Inactive = 0 | Active = 1<br>Inactive = 0 | OV is the DCbus average over protection voltage alarm for Delta fans |
| UV | Inactive = 0 | Active = 1<br>Inactive = 0 | UV is the DCbus average under protection voltage alarm for Delta fans |
| OT | Inactive = 0 | Active = 1<br>Inactive = 0 | OT is the EE over protection temperature alarm for Delta fans |
| Lock | Inactive = 0 | Active = 1<br>Inactive = 0 | Lock is the fan lock alarm for Delta fans |
| PL | Inactive = 0 | Active = 1<br>Inactive = 0 | PL is the 3~ AC lose phase alarm for Delta fans |
| RRW | Inactive = 0 | Active = 1<br>Inactive = 0 | RRW is the fan reverse run alarm for Delta fans |
| Hall | Inactive = 0 | Active = 1<br>Inactive = 0 | Hall is the hall signal abnormal alarm for Delta fans |
| EEPROM | Inactive = 0 | Active = 1<br>Inactive = 0 | EEPROM is the EEPROM read/write fail alarm for Delta fans |
| POC | Inactive = 0 | Active = 1<br>Inactive = 0 | POC is the DCbus peak over current alarm for Delta fans |
| AC_OV | Inactive = 0 | Active = 1<br>Inactive = 0 | AC_OV is the AC bus over protection voltage alarm for Delta fans |
| AC_UV | Inactive = 0 | Active = 1<br>Inactive = 0 | AC_UV is the AC bus under protection voltage alarm for Delta fans |

# Warn Status

The Warn Status Menu displays warning information for individual EBM fans. Damage could occur if any warnings are ignored.

***Table 16: Warn Status Menu***

| Main Menu \ View Status \ Fan Status \ Fan# (1-20) \ Warn Status | | | |
|---|---|---|---|
| **Menu Display Name** | **Default** | **Range** | **Description** |
| I_Limit | Inactive = 0 | Active = 1<br>Inactive = 0 | I_Limit is the current limitation is engaged |
| L_High | Inactive = 0 | Active = 1<br>Inactive = 0 | L_High is the line impedance too high (DC-link voltage unstable) |
| P_Limit | Inactive = 0 | Active = 1<br>Inactive = 0 | P_Limit is the power limiter is currently engaged |
| TE_high | Inactive = 0 | Active = 1<br>Inactive = 0 | TE_high is the output stage temperature is high |
| TM_High | Inactive = 0 | Active = 1<br>Inactive = 0 | TM_High is the motor temperature is high |
| TEI_high | Inactive = 0 | Active = 1<br>Inactive = 0 | TEI_high is the temperature inside electronics is high |
| UzLow | Inactive = 0 | Active = 1<br>Inactive = 0 | UzLow is the DC-link voltage is low |
| LRF | Inactive = 0 | Active = 1<br>Inactive = 0 | LRF is shedding function is active |
| Brake | Inactive = 0 | Active = 1<br>Inactive = 0 | Brake is triggered in instances where an external force causes the fan/motor to run in the wrong direction at high speed for a prolonged period of time, so the motor is unable to start properly |
| UzHigh | Inactive = 0 | Active = 1<br>Inactive = 0 | UzHigh is the DC-link voltage is high |
| UeHigh | Inactive = 0 | Active = 1<br>Inactive = 0 | UeHigh is the line voltage is high |
| RL_Cal | Inactive = 0 | Active = 1<br>Inactive = 0 | RL_Cal is the calibration of the rotor position sensor is in progress |
| Op_circ | Inactive = 0 | Active = 1<br>Inactive = 0 | Op_cir is triggered when the analog input voltage is less than the open circuit limit value |
| n_Low | Inactive = 0 | Active = 1<br>Inactive = 0 | n_Low is the actual speed is less than the speed limit set for speed monitoring |

# IO Status

The IO Status Menu displays the status of all the I/O variables.

***Table 17: IO Status Menu***

| Main Menu \ View Status \ IO Status | | | |
|---|---|---|---|
| **Menu Display Name** | **Default** | **Range** | **Description** |
| Array ON/OFF | Off | On<br>Off | Array ON/OFF is a read only item that displays the current state of the array on/off digital input. |
| Demand Input | 0 | 0–100% | Demand Input is a read only item that displays the fan array speed command input. |
| DSP Press Snsr | 0 | - | DSP Press Snsr is a read only item that displays the DSP pressure sensor reading. |
| AF DPSnsr | 0 | - | AF DPSnsr is a read only item that displays the airflow pressure sensor reading. |
| Interlock Input | Off | On<br>Off | Interlock Input is a read only item that displays the interlock switch status. |
| Safety Input | Off | On<br>Off | Safety Input is a read only item that displays the external safety alarm input status. |
| Fire Mode Input | Off | On<br>Off | Fire Mode Input is a read only item that displays the fire alarm input status. |
| On Off Input | Off | On<br>Off | On Off Input is a read only item that displays the status of the Array On/Off input. |
| RO1 Ready | Off | On<br>Off | RO1 Ready is a read only item displays the state of the Fan Ready relay. |
| RO2 Running | Off | On<br>Off | RO2 Running is a read only item that displays the state of the Fan Running relay. |
| RO3 Alarm | Off | On<br>Off | RO3 Alarm is a read only item that displays the state of the Fan Alarm relay. |
| AO1 RPM | 0% | 0–100% | AO1 RPM is a read only item that reports the RPM value being sent from the controller to the fans in the array. |
| AO2 CFM | 0% | 0–100% | AO2 CFM is a read only item that reports the CFM value being sent from the controller to the fans in the array. |

# Other Configurations

## Damper Control

When the array is equipped with a set of dampers, the damper can be set up with an end switch that is connected to the EC fan controller Interlock Input. This can be used to signal the controller that the damper is in the proper position for fan startup. The RO2 Running can also be used to send a command signal to the damper actuator(s) to adjust the damper(s) between two positions. Reference the Field Control Wiring section of this OM for specific control locations on TB03. Refer to the “Field Wired Inputs” chapter for more information.

## Manual Array Operation

Manual Control can be initiated during start up to control individual features of the fan array independent of the control sequence. Place the array into Manual Control mode through the controller keypad menu Main Menu\Manual Control\Manual Mode = Manual. Once in manual control, fans can be activated manually.

**NOTE:** Manual Operation is not intended for extended operation beyond troubleshooting or initial start-up. After 60 minutes, the controller will automatically revert to normal operation.

***Table 18: Manual Control Menu***

| **Main Menu \ Manual Control** | | | |
|---|---|---|---|
| **Menu Display Name** | **Default** | **Range** | **Description** |
| Manual Mode | Normal | Off<br>Normal<br>Manual | Manual Mode is an adjustable item that allows the array to be placed in normal mode, manual control mode, or turned off completely. |
| Count Down | 0 | 0–60 min | Count Down is a ready only item that reports how many minutes are left before the controller reverts back to normal operation. |
| Manual Speed | 0% | 0–100% | Manual Speed is an adjustable item that manually drives the array to a specified capacity. |
| AvgFanSpd | - | 0–4000* RPM | AvgFanSpd is a read only item that reports the average speed of all fans in the array.<br>*The maximum permissable fan speed is determined by the MxPrmFanSpd (see page 21). |
| Intr Lck In | Off | On<br>Off | Intr Lck In is a read only item that displays the interlock switch status. |
| Safety In | Off | On<br>Off | Safety In is a read only item that displays the external safety alarm input status. |
| Fire Alm In | Off | On<br>Off | Fire Alm In is a read only item that displays the fire alarm input status. |
| Array ON/OFF | Off | On<br>Off | Array ON/OFF is a read only item that displays the status of the Array On/Off input. |
| RO1 Ready | On | Off<br>On | RO1 Ready is an adjustable item that sets the output to the Ready Relay (A value of On here will close the contact). |
| RO2 Running | On | Off<br>On | RO2 Running is an adjustable item that sets the output to the Running Relay (A value of On here will close the contact). |
| RO3 Alarm | Off | Off<br>On | RO3 Alarm is an adjustable item that sets the output to the Alarm Relay (A value of On here will close the contact). |
| AO1 RPM | 0% | 0–100% | AO1 RPM is an adjustable item that sets the RPM value being sent from the controller to the fans in the array. |
| AO2 CFM | 0% | 0–100% | AO2 CFM is an adjustable item that sets the CFM value being sent from the controller to the fans in the array. |
| Clear Alarms | No | Yes<br>No | Clear Alarms is an adjustable item will reset all alarms on the controller when set to Yes. |

# BMS Communications

Reference ED Protocol Document – ED 19122 Vision ECM Fan Controller for additional detail on BMS Communications.

## BACnet IP Setup

***Table 19: BACnet T-IP Menu***

| Main Menu \ BMS Communications \ BACnet T-IP | | | |
|---|---|---|---|
| **Menu Display Name** | **Default** | **Range** | **Description** |
| Name | MT4_DFA_####<br>'####' is the instance ID | - | Up to a 13 Character Device Object Name. This value is read-only. |
| Dev Instance | ####, default is the last 4 digits of the serial number | 0-4294967 | Device Instance of the BACnet communication module |
| UDP Port | 47808 | 0-65535 | UDP Port is the User Datagram Protocol. The UDP Port allows host to host communication via the IP network and is used to identify the application process in the destiniation array. Only change the UDP Port if there are multiple subnets. See a network administrator before modification. |
| DHCP | Off | On<br>Off | DHCP is the Dynamic Host Configuration Protocol. The DHCP is a network protocol that enables a server to automatically assign an IP Address. Set to Off if a static IP address is needed. |
| ActIP | 0.0.0.0 | - | ActIP Is a read-only item that displays the active IP Address of the BACnet Communication module. |
| ActMask | 0.0.0.0 | - | ActMask is a read-only item that displays the active Subnet Base of the BACnet Communication Module. |
| ActGwy | 0.0.0.0 | - | ActGwy is a read-only item that displays the active gateway address. |
| GvnIP | 127.0.0.1 | - | GvnIP is an adjustable item to set the IP Address of the BACnet Communication module. |
| GvnMask | 255.255.255.0 | - | GvnMsk is an adjustable item to set the Subnet Base of the BACnet Communication Module |
| GvnGwy | 127.0.0.1 | - | GvnGwy is an adjustable item to set the gateway address. |
| Unit System | US | SI<br>US<br>CA | Unit System is an adjustable item to indicate if the BACnet communication uses US, Metric, or Canadian units of measure. |
| Save Config | No | No<br>Yes | Save Config saves the configuration changes made in the menu items above |

# BACNet MSTP Setup

***Table 20: BACnet MS/TP Menu***

| Main Menu \ BMS Communications \ BACnet MS/TP | | | |
|---|---|---|---|
| **Menu Display Name** | **Default** | **Range** | **Description** |
| Name | MT4_DFA_####<br>'####' is the instance ID | - | Up to a 13 Character Device Object Name. This value is read-only. |
| Dev Instance | ####, default is the last 4 digits of the serial number | 0–4294967 | Device Instance of the BACnet communication module |
| MSTP Address | 18 | 0–429 | This is the MST/TP address of the BACnet communication module. |
| Baud Rate | 38400 | 9600<br>19200<br>38400<br>57600<br>76800<br>115200 | Baud Rate is an adjustable item that is the Data Transfer speed. |
| Max Master | 127 | 1–127 | Max Master is an adjustble item that specifies the highest possible address for master nodes and shall be less than or equal to 127. |
| Max Info Frm | 10 | 1–127 | Max Info Frm is an adjustible item that specifies the maximum number of information frames the BACnet communmication module may send before it must pass the token. |
| BACNetOverRS485 | Passive | Active<br>Passive | BACnetOverRS485 is an adjustable item that enables BACnet MSTP communication to the controller. This should be set to Passive if BACnet IP is used, Active if BACnet MS/TP is used. |
| Unit System | US | SI<br>US<br>CA | Unit System is an adjustable item to indicate if the BACnet communication uses US, metric, or Canadian units of measure. |
| Save Config | No | No<br>Yes | Save Config saves the configuration changes made in the menu items above |

# Service Menus

The Service Menus section covers several menus that will be useful while maintaining the equipment.

## Fan Service

***Table 21: Fan Service Menu***

| Main Menu \ Service Menus \ Fan Service | | | |
|---|---|---|---|
| **Menu Display Name** | **Default** | **Range** | **Description** |
| ArrayOp Hrs | - | -- | ArrayOp Hrs indicates the number of run hours on the array |
| ArrayCyc Cnt | - | -- | ArrayCyc Cnt indicates the number of operational cycles on the array (number of times the array has been started/stopped) |

## Operating Hours

***Table 22: Operating Hours Menu***

| Main Menu \ Service Menus \ Fan Service \ Fan Op Hours | | | |
|---|---|---|---|
| **Menu Display Name** | **Default** | **Range** | **Description** |
| Fan1 | - | 0-999,999h | Fan Hours is a status only item that displays the number run hours on the Fan |
| Fan2 | - | 0-999,999h | Fan Hours is a status only item that displays the number run hours on the Fan |
| … | - | 0-999,999h | Fan Hours is a status only item that displays the number run hours on the Fan |
| FanXX (max 20 fans) | - | 0-999,999h | Fan Hours is a status only item that displays the number run hours on the Fan |

## Modbus

The Modbus menu is to be used for addressing the fans in the field.

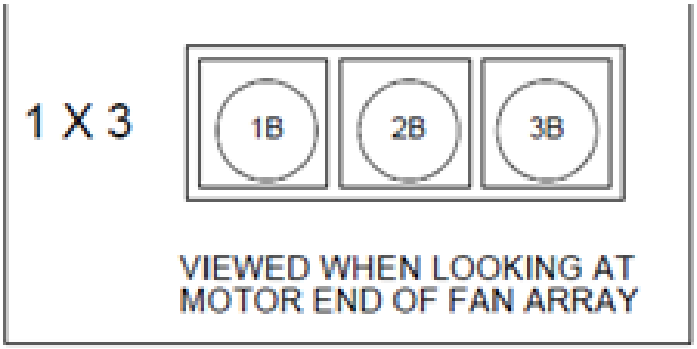
***Figure 18: Modbus Menu***

| Main Menu \ Service Menus \ Modbus | | | |
|---|---|---|---|
| **Menu Display Name** | **Default** | **Range** | **Description** |
| Fan1CommStat | - | Fault<br>OK | Fan1CommStat is a status only item that displays the current communication status for fan 1 |
| Fan2CommStat | - | Fault<br>OK | Fan2CommStat is a status only item that displays the current communication status for fan 2 |
| FanXX (max 20 fans) | - | Fault<br>OK | FanXXCommStat is a status only item that displays the current communication status for fan XX |
| ModbusResistor | - | 0 × 0000 | ModbusResistor indicates the bus pull up/pull down resistor, termination resistor configuration |
| DefaultECMStat | - | No<br>Yes<br>N/A | DefaultECMStat indicates if there is a fan with a default factory address available |
| ChngECMTo | Default | Default<br>1–20 | ChgECMTo is an adjustable item that sets which master fan address will be changed to during the field addressing process |
| ChngECMFrom | Default | Default<br>1–20 | ChgECMFrom is an adjustable item that sets which master fan address will be changed from during the field addressing process |
| Save Config | No | No<br>Yes | Save Config saves the configuration changes made in the menu items above |
| ChndlDly | 25 mSec | 0–1000 mSec | ChndlDly is an adjustable item that sets the Modbus port release timeout delay on inactivity. Units are in milliseconds. |
| ChndlRSPTMO | 250 mSec | 0–1000 mSec | ChndlRSPTMO is an adjustable item that sets the Modbus response timeout delay. Units are in milliseconds. |

To address the fans in the field, follow the procedure below:

1. Ensure the controller has power (requires a 24V power supply if not powered from the transformer in the fan array power box).
2. Ensure the fan(s) have power - the fans can be powered one at a time, or the whole array can be powered simultaneously. If powered individually, the fans need a minimum of 15W @ 110V single phase power in order to to be addressed.
3. Confirm that the array is configured for the correct number of fans in the fan service menu (Main Menu \ Commission Array \ Config Fans)
4. Disconnect the modbus communication harnesses from all of the fans in the array except for one (ideally the fan closest to the control panel), leaving that fan connected to the MT4 controller.
5. Navigate back to the Modbus menu (Main Menu \ Service Menus \ Modbus), and check to see if the fan is ready to be addressed – the DefaultECMStat should show “Yes” and all FanCommStat variables should say “Flt”.
6. Reference the fan arrangement label (example shown below) to determine the fan number being addressed.

***Figure 19: Fan Arrangement Diagram***




7. Set ChgnECMTo to be the number of the fan to be addressed, and set ChngECMFrom to “Default”.
8. Set Save Config to “Yes”. After a short delay, the FanCommStat entry corresponding to the fan being addressed should change from Flt to OK.
9. Cycle power to the fan that was just addressed (or the entire array), then cycle power to the EC Fan Controller.
10. The next fan to be addressed can be connected back into the Modbus control “daisy chain”.
11. Repeat steps 5-10 until all fans have been addressed.

## Air Flow

The Air Flow menu is used to define the constants utilized when the fan array control mode is constant CFM. These values are used with the pressure sensor on the leading fan to calculate the airflow. The fan array total airflow is then calculated by multiplying the calculated airflow by the quantity of running fans. “Altitude” is the only field set item in this menu. The other variables are defined by other parameter inputs – e.g. fan size.

***Table 23: Air Flow Settings Menu***

| Main Menu \ Service Menus \ Air Flow Settings | | | |
|---|---|---|---|
| **Menu Display Name** | **Default** | **Range** | **Description** |
| Altitude SP | 0 | 0–8,000 ft | Altitude SP is an adjustable item that determines the altitude-related parameters of unit operation. The Altitude SP should be set to the altitude of where the unit is intended to operate. |
| AltFactor (AF) | - | 0.70–1.00 | AltFactor (AF) is the altitude factor, dependent on the defined altitude. |
| FreeInlet (C1) | - | N/A | C1 is the coefficient factor for free and ducted inlet, using the standard density method for calculating airflow. The value depends on the impeller size of the fan. |
| Area (A) | - | N/A | Area (A) is the inlet funnel area as determined by the fan impeller size. |
| AirFlCalAdj | 0% | -99%–99% | AirFlCalAdj is an adjustable item that allows for calibration of the calculated airflow from the differential pressure measured by the airflow sensor. |
| AirFl DP | 0 | 0–40 | AirFl DP is a read-only item that displays the static pressure differential reported by the airflow measurement sensor. |
| AirFl | - | 0–200,000 CFM | AirFl is the calculated airflow of the array. |
| MxRPMAF | - | N/A | MxRPMAF is the theoretical maximum airflow at the maximum fan speed with no static pressure. |
| AFRatioToMax | - | 0–100% | AFRatioToMax is the ratio between the calculated airflow of the array divided by the theoretical maximum airflow. |

## DSP Control

***Table 24: DSP PID Settings Menu***

| Main Menu \ Service Menus \ DSP PID Settings | | | |
|---|---|---|---|
| **Menu Display Name** | **Default** | **Range** | **Description** |
| DSP Period | 5.0 s | 0–100.0 s | DSP Period is an adjust able item that sets the “sample time” used in the PI control function to vary the fan capacity when duct static pressure (DSP) control is selected. |
| DSP Gain | 0.2 | 0.0–100.0 | DSP Gain is an adjustable item that sets the “gain” used in the PI control function to vary the fan capacity when duct static pressure (DSP) control is selected. |
| DSP PAT | 0.0 s | 0.0–100.0 s | DSP PAT is an adjustable item that sets the “project ahead time” used in the PI control function to vary the fan speed when DSP Control is selected . |
| DSP MaxChg | 1.0% | 0.0–100.0% | DSP MaxChg is an adjustable item that sets the maximum value of increase or decrease of the fan capacity each period used in the PI control function to vary the fan capacity when duct static pressure (DSP) control is selected . |
| DSPDeadBand | 0.1 in Wa | 0.0–0.5 in Wa | DSPDeadBand is an adjustable item that defines the deadband range for the DSP control setpoint (DSP SP) within which the DSP PID control loop will remain unchanged. |
| DSP Alm SP | 0.25 in Wa | 0.00–2.00 in Wa | DSP Alm SP is an adjustable item that determines the deadband for the duct pressure alarm fault parameter. If the duct pressure sensor returns a pressure reading outside of this deadband, a fault will occur. |

## CFM Control

***Table 25: CFM PID Settings Menu***

| Main Menu \ Service Menus \ CFM PID Settings | | | |
|---|---|---|---|
| **Menu Display Name** | **Default** | **Range** | **Description** |
| CFMPeriod | 20.0 s | 0.0–100.0 s | CFMPeriod is an adjustable item that sets the “sample time” used in the PI control function to vary the supply fan speed when CFM control is selected. |
| CFMGain | 0.1 | 0.0–100.0 | CFMGain is an adjustable item that sets the “gain” used in the PI control function to vary the supply fan speed when CFM control is selected. |
| CFMPAT | 0.0 s | 0.0–100.0 s | CFMPAT is an adjustable item that sets the “project ahead time” used in the PI control function to vary the fan speed when CFMControl is selected . |

| Main Menu \ Service Menus \ CFM PID Settings | | | |
|---|---|---|---|
| **Menu Display Name** | **Default** | **Range** | **Description** |
| CFMMxChg | 2.0% | 0.0–100.0% | CFMMxChg is an adjustable item that sets the maximum value of increase or decrease of the supply fan speed each period used in the PI control function to vary the supply fan speed when CFM control is selected. |
| CFMDeadBand | 3% | 0–100% | CFMDeadBand is an adjustable item that defines the deadband range for the CFM control setpoint (AF SP) within which the CFM PID control loop will remain unchanged. |

# Alarms

Alarms provide the user with information about abnormal conditions that affect array operation. The cause of the alarm should be investigated and eliminated before the array or any disabled equipment in it is placed back into service.

## Viewing Alarms

The Active Alarms menu displays up to 10 active alarms and is located in the menu at Main Menu \ Alarm List \ Active Alarms.

Pushing the scroll wheel in, will show details about the alarm as well as when it occurred. “Alarms” (located in the menu at Main Menu \ Alarm List \ Alarms), shows the same information, but up to 50 of the latest alarms both active and previous alarms.

All active alarms as well as the priority and date and time that they were detected are displayed on the Active Alarm menu. The last fifty alarm “events” detected as well as the date and times that they were detected are displayed on the Alarm Log menu . An alarm “event” is either an alarm becoming active or being cleared . A “+” symbol precedes the active alarm event and a “-” symbol precedes the cleared alarm event. These alarms are displayed in the order that they were detected. The alarm that was detected most recently is displayed first. Multiple occurrences of the same alarm may appear.

***Table 26: Example Active Alarms Menu***

| **Main Menu \ Alarm List \ Active Alarms** | |
|---|---|
| Alm Ct | Displays the number of active alarms. |
| Alarms | Submenu to examine the specific active alarms. |
| Clear Alarms = | Adjustable item to remove all active alarms. Set to “Yes” to reset the alarm count. |

# Other Menu Items

## About this Array

***Table 27: About this Array Menu***

| Main Menu \ About This Array | | | |
|---|---|---|---|
| **Menu Display Name** | **Default** | **Range** | **Description** |
| Array Name | - | - | Array Name is an adjustable field that allows the user to name the fan section |
| SO_Item | - | - | SO_Item displays the array order number and is programmed from the factory |
| Array SN | - | - | Array SN displays the array serial number and is programmed from the factory |
| App Version | - | - | App Version displays the installed version of the controller software code |
| Main BSP | - | - | Main BSP displays the installed version of the controller operating system |
| HMI GUID | - | - | HMI GUID displays the installed version of the controller HMI |
| OBH GUID | - | - | OBH GUID displays the installed version of the controller OBH |

# MicroTech Inputs/Outputs

The complete set of Inputs and Outputs that are possible on a Vision EC Fan Controller are listed below.

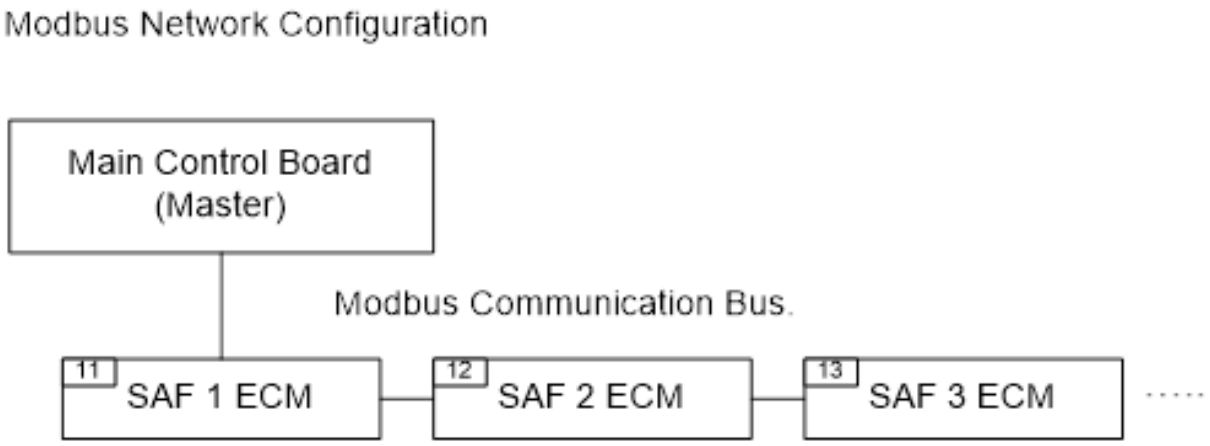
***Table 28: Main Control Board***

| I/O Location | Description | I/O Type | I/O Voltage | Comments |
|---|---|---|---|---|
| D1 | Interlock Input | DI | Dry Contact | Optional, if it's available, ON- Ready, OFF-Not ready; |
| D2 | Array ON/OFF | DI | Dry Contact | Optional, if it's available, ON- Start, OFF-Stop; |
| DU1 | Spare | DI | 24 VAC Active DI | |
| DU2 | Spare | DI | 24 VAC Active DI | |
| DL1 | Spare | DI | 110 VAC Active DI | |
| DL2 | Spare | DI | 110 VAC Active DI | |
| X1 | Demand Input | AI | 0–10 V/4–20 mA | Depending on control method, auto configured based on control method and control source. |
| X2 | AO1 RPM | AO | 0–10 V Output | RPM output, fan speed command sending to the secondary controller. |
| X3 | DSP Pressure Sensor | AI | 0–10 V/4–20 mA | DSP pressure sensor, sensor signal type as well as sensor scaling shall be done in sensor config menu. |
| X4 | CFM Pressure Sensor | AI | 0–10V/4–20mA | CFM pressure sensor signal type as well as sensor scaling shall be done in sensor config menu. |
| X5 | AO2 CFM | AO | 0–10 V Output | CFM output. |
| X6 | Spare | XIO | | |
| X7 | Spare | XIO | | |
| X8 | Spare | XIO | | |
| X9 | Fire Mode Input | XI | Dry Contact | Optional, if it's available, ON- alarm, OFF-OK. |
| X10 | Safety Input | XI | Dry Contact | Optional, if it's available, ON- alarm, OFF-OK. |
| X11 | Spare | XI | | |
| Q1 | RO1 Ready | DO | Relay Output | |
| Q2 | RO2 Running | DO | Relay Output | |
| Q3 | RO3 Alarm | DO | Relay Output | |
| Q4 | Spare | DO | Relay Output | |
| Q5 | Spare | DO | Relay Output | |
| Q6 | Spare | DO | Relay Output | |
| Q7 | Spare | DO | Relay Output | |
| Q8 | Spare | DO | Relay Output | |
| DO1 | Spare | DO | TRAIC | |
| DO2 | Spare | DO | TRAIC | |
| Ethernet Port | BACnet IP | | IP Port | Need to enable/config manually by technician. |
| T6 | BACnet MSTP | | RS485 | Need to enable/config manually by technician. |
| T14 | ECM Fan Modbus Control | | RS485 | Enabled by default. |

# Modbus Inputs/Outputs

The EC fans in the array are controlled via an RS-485 bus built into the array controller using Modbus protocol.

***Figure 20: Modbus Network Configuration Diagram***



# Keypad and Display

The following is a description of the Vision/Skyline Fan-Only Controller menu structure. These menus and items can all be viewed on the keypad/display. Menu items displayed will change based on the array configuration.

***Figure 21: Keypad Key***

| |
|---|
| => Indicates Entry Field |
| Ⓧ = RPM-BN or CFM or DSP |
| Ⓛ = Visible when user logged in |
| Ⓢ = See Config Array Settings |

***Figure 22: Display Menu (1)***

| Main Menu | |
|---|---|
| Enter Password | |
| Ⓛ Quick Menu | |
| Ⓛ View Status | |
| Ⓛ Ctrl Mode => | Off |
| Mode Status = | Off |
| Unit State = | Off |
| Ⓘ Intr Lck In = | Off |
| Ⓕ Fire Alm In = | Off |
| Ⓢ Safety In = | Off |
| Ⓞ Array ON/OFF = | Off |
| Ⓛ HMI Cmd SP = | 0.0 % |
| Ⓧ Dmd SP = | 0 % |
| Ⓓ DSP SP = | 0 inW |
| Ⓒ CFM SP = | 0 cfm |
| Dmd Input SP = | 0 % |
| DmdFanSpdCmd = | 0.0 % |
| aDmdFanSpdCmd = | 0 RPM |
| AvgFanSpdCmdFb= | 0.0 % |
| AvgFanSpdFb= | 0 % |
| Array Power = | 0 kW |
| DSPressure = | 0 inW |
| Air FI = | 0 CFM |
| AFRatioToMax= | 0 % |
| Clear Alarm => | No |
| Ⓛ Commission Array | |
| Ⓛ Manual Control | |
| Ⓛ Service Menus | |
| Ⓛ BMS Communications | |
| Ⓛ Alarm List | |
| About This Unit | |

| About This AHU | |
|---|---|
| Name=> | Vision |
| SO_Item=> | 1234567_12345 |
| Unit SN=> | FBOU123456789 |
| App Version= | 2506990xxx |
| Main BSP= | xx.xx |
| HMI GUID= xxxxxxxx-xxxx-xxxx-xxxx-xxxxxxxxxxxx | |
| OBH GUID= xxxxxxxx-xxxx-xxxx-xxxx-xxxxxxxxxxxx | |

| Enter Password | |
|---|---|
| Login | ****Ⓛ |

| Ⓛ Quick Menu | |
|---|---|
| Ctrl Mode = | Off |
| Mode Status = | Off |
| Unit Alm = | No Alarm |
| General Alm = | Off |
| HMI Cmd SP => | 0.0 % |
| HMI Cmd SP=> | 0RPM |
| Ⓧ Dmd SP => | 0 % |
| Ⓓ DSP SP => | 0 inW |
| Ⓒ CFM SP => | 0 cfm |
| Ⓡ Dmd Input SP = | 0.0 % |
| DmdFanSpdCmd = | 0.0 % |
| aDmdFanSpdCmd = | 0 RPM |
| AvgFanSpdCmdFb= | 0.0 % |
| AvgFanSpdFb = | 0 RPM |
| AirFI DP = | 0.0 inW |
| AirFI = | 0 cfm |
| AFRatioToMax = | 40.3% |
| Ⓘ Intr Lck In = | Off |
| Ⓕ Fire Alm In = | Off |
| Ⓢ Safety In = | Off |
| Ⓞ Array ON/OFF = | Off |
| Array Power = | 0.000kW |
| Ⓓ DSPressure = | 0.00 inW |
| Ⓓ DSP Alm SP => | 0.00 inW |

| Ⓛ Alarm List |
|---|
| Active Alarm |
| Alarm Log |

| Ⓛ Active Alarm |
|---|
| Alm Ct: xx Clr Alms: No |
| Clr Alms: Alarm |
| Alarms |
| Alarms |

| Ⓛ Alarm List |
|---|
| Log Ct: |
| Log Clr: |
| Alarm Log |
| Alarm Log |

***Figure 23: Display Menu (2)***

| Ⓛ View Status |
|---|
| Unit Status ▶ |
| Fan Status ▶ |
| IO Status ▶ |

| Ⓛ Unit Status | |
|---|---|
| Ctrl Mode = | Off |
| Mode Status = | Off |
| Unit State = | Off |
| Unit Alm = | Off |
| Ⓢ Array ON/OFF = | On |
| RO1 Ready = | Off |
| RO2 Running = | Off |
| RO3 Alarm = | Off |
| AirFl = | 0 cfm |

| Ⓛ BMS Communications |
|---|
| BACnet T-IP Setup ▶ |
| BACnet MS/TP Setup ▶ |

| Ⓛ BACnet T-IP Setup | |
|---|---|
| Name = | MT4_DFA_1542 |
| Dev Instance => | 15422 |
| UDP Port => | 47808 |
| DHCP => | Off |
| ActIP | 192.168.1.42 |
| ActMask | 255.255.255.0 |
| ActGwy | 192.168.1.1 |
| Gvn IP => | 192.168.1.42 |
| GvnMask => | 255.255.255.0 |
| GvnGwy => | 192.168.1.1 |
| Enable => | Passive |
| UnitSystem => | US |
| Save Config => | No |

| Ⓛ BACnet MS/TP Setup | |
|---|---|
| Name = | MT4_DFA_1542 |
| Dev Instance => | 15422 |
| MSTP-Address => | 18 |
| Baud Rate => | 38400 |
| MaxMaster => | 127 |
| Max Info Frm => | 10 |
| BACNetOverRS485 => | Active |
| UtilitySystem => | US |
| Save Config => | No |

| Ⓛ Fan Status | |
|---|---|
| Fan Run Cmd = | Off |
| DmdFanSpdCmd = | 0.0 % |
| aDmdFanSpdCmd = | 0 RPM |
| DmdFanSpdCmd = | 0 RPM |
| AvgFanSpdCmdFb= | 0.0 % |
| AvgFanSpdFb | 0 RPM |
| MxPrmFanSpd = | 2600 RPM |
| Air Fl DP = | 0.0 inW |
| AirFl = | 0 cfm |
| MaxAF@MaxRPM= | 0 cfm |
| AFRatioToMax= | 0.0 % |
| # Active Fans = | 4 |
| Ⓘ IntLck = | Off |
| Ⓘ IntLckTm => | 180s |
| Ⓘ IntLckAlm = | Off |
| Ⓓ DSPressure = | 0.00 inW |
| Ⓓ DSPHiAlm = | OK |
| Fan1 ▶ | |
| Fan2 ▶ | |
| Fan3 ▶ | |
| Fan4 ▶ | |

| Fan20 ▶ |
|---|

| Ⓛ Manual Control | |
|---|---|
| Manual Mode => | Normal |
| Count Down = | 0Min |
| Manual Speed => | 0.0% |
| AvgFanSpd = | 0RPM |
| Digital Input Sts: | |
| Ⓘ Intr Lck In = | On |
| Ⓕ Fire Alm In = | On |
| Ⓢ Safety In = | On |
| Ⓞ Array ON/OFF = | On |
| Digital/Analog Outputs: | |
| RO1 Ready => | Off |
| RO2 Running => | Off |
| RO3 Alarm => | Off |
| AO1 RPM => | 0.0% |
| AO2 CFM => | 0.0% |
| Clear Alarms => | No |

| Ⓛ Fan # | |
|---|---|
| PN = | GMTO36PUQ36R D |
| SN = | |
| Run Hrs = | 0 |
| Alarm Status ▶ | |
| Warn Status ▶ | |
| RPMAlm = | OK |
| CommErr = | OK |
| MtrFltSts = | OK |
| Mtr Sts = | OK |
| WarnCode = | |
| AlmCode = | Online |
| ModIvl = | 0.0% |
| SpdFb = | 0 RPM |
| MaxRPM = | 2600RPM |
| MaxPermRPM = | 2600RPM |
| Pwr = | 0 W |
| DC Link (V) = | 0 V |
| DC Link (I) = | 0 A |
| ModuleT = | 0 F |
| ElecT = | 0 F |
| MtrT = | 0 F |

| Ⓛ IO Status | |
|---|---|
| Ⓞ Array ON/OFF = | Off |
| Demand Input = | % |
| Ⓓ DSP Press Snsr = | 0.0 inW |
| AirFlCFM DPSnsr = | 0.0 inW |
| Ⓘ Interlock Input = | Off |
| Ⓕ Fire ModeInput= | Off |
| Ⓐ On Off Input= | Off |
| RO1 Ready = | Off |
| RO2 Running = | Off |
| RO3 Alarm = | Off |
| AO1 RPM = | 0 % |
| AO2 CFM = | 0.0 % |

| Ⓛ Alarm Status |
|---|
| Code = |
| PHA = |
| TFE = |
| SKF = |
| TFM = |
| HLL = |
| BLK = |
| n_Limit = |
| TFEI = |
| RL_Cal = |
| UzHigh = |
| UzLow = |
| UeHigh = |
| UeLow = |
| Code = |
| OC = |
| OV = |
| UV = |
| OT = |
| Lock = |
| PL = |
| RRP/RRW = |
| Hall = |
| EEPROM = |
| POC = |
| AC_OV = |
| AC_UV = |

| Ⓛ Fan1 Warn |
|---|
| Code = |
| I_Limit = |
| L_high = |
| P_Limit = |
| TE_high = |
| TM_High = |
| TEI_high = |
| LRF = |
| Brake = |
| UzHigh = |
| UzLow = |
| UeHigh = |
| UeLow = |
| RL_Cal = |
| Op_circ = |
| n_Low = |

***Figure 24: Figure Display (3)***

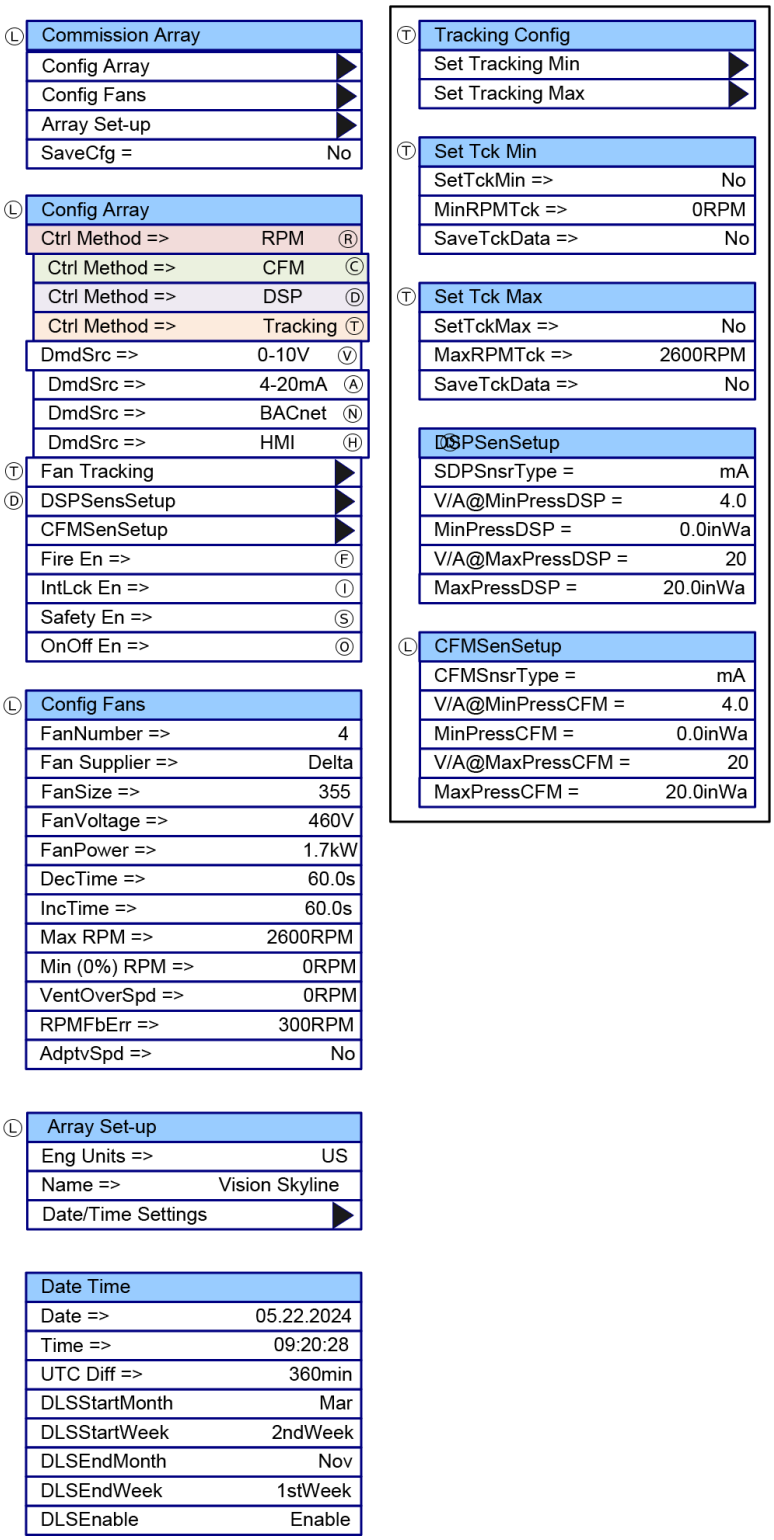


***Figure 25: Keypad Display (4)***

| Service Menu |
|---|
| Fan Service ▶ |
| Operational Settings ▶ |
| Modbus ▶ |
| Air Flow Settings ▶ |
| DSP PID Settings ▶ |
| CFM PID Settings ▶ |

| Fan Service | |
|---|---|
| ArrayOp Hrs = | 0h |
| ArrayCyc Cnt = | 0 |
| Fan Op Hours ▶ | |

| Operating Hours | |
|---|---|
| Fan1 = | 0 |
| Fan2 = | 0 |
| Fan3 = | 0 |
| Fan4 = | 0 |
| Fan5 = | 0 |
| Fan6 = | 0 |
| Fan7 = | 0 |
| Fan8 = | 0 |
| Fan9 = | 0 |
| Fan10 = | 0 |
| Fan11 = | 0 |
| Fan12 = | 0 |
| Fan13 = | 0 |
| Fan14 = | 0 |
| Fan15 = | 0 |
| Fan16 = | 0 |
| Fan17 = | 0 |
| Fan18 = | 0 |
| Fan19 = | 0 |
| Fan20 = | 0 |

| Op Settings | |
|---|---|
| OffDlyWOIntrk => | 30s |
| OffDlyWIIntrk => | 30s |
| AutoStrtDly => | 5s |

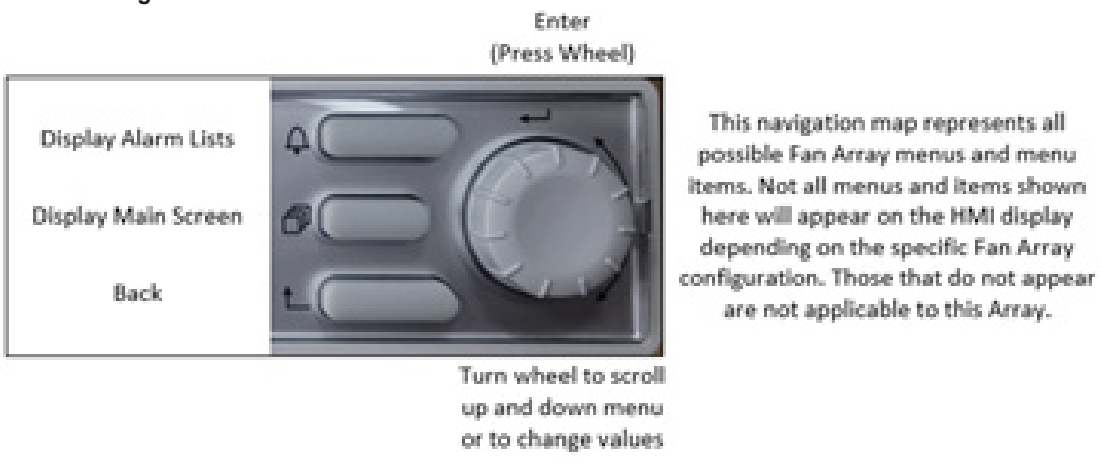
| Modbus | |
|---|---|
| Fan1ComStat = | OK |
| Fan2ComStat = | OK |
| Fan3ComStat = | OK |
| Fan4ComStat = | OK |
| Fan5ComStat = | OK |
| Fan6ComStat = | OK |
| Fan7ComStat = | OK |
| Fan8ComStat = | OK |
| Fan9ComStat = | OK |
| Fan10ComStat = | OK |
| Fan11ComStat = | OK |
| Fan12ComStat = | OK |
| Fan13ComStat = | OK |
| Fan14ComStat = | OK |
| Fan15ComStat = | OK |
| Fan16ComStat = | OK |
| Fan17ComStat = | OK |
| Fan18ComStat = | OK |
| Fan19ComStat = | OK |
| Fan20ComStat = | OK |
| MB Resis => | 0x0000 |
| DfltECMStat = | Flt |
| ChngECMTo => | Default |
| ChngECMFrom => | Default |
| Save Config=> | No |
| ChndlDly => | 25 |
| ChndlRSPTMO => | 250 |

| AirFlwSettings | |
|---|---|
| Altitude SP => | 0ft |
| AltFactor(AF) | 1.000 |
| C1 | 774.47 |
| Area | 0.458sq.ft |
| AirFl | 0cfm |
| AirFlRel | % |

| DSP PID Loop | |
|---|---|
| DSPPeriod | 2.0s |
| DSPGain | 1.0 |
| DSPPAT | 10.0s |
| DSPMaxChg (%) | 2.0 |
| DSPDeadBand | 2.0% |

| CFM PID Loop | |
|---|---|
| CFMPeriod | 2.0s |
| CFMGain | 1.0 |
| CFMPAT | 10.0s |
| CFMMaxChg (%) | 2.0 |
| CFMDeadBand | 2.0% |

***Figure 26: Navigation Wheel***



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