dap4

User Manual

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Notice: The screens displayed in this manual are for illustration purposes only. Most settings are shown at their default value or a setting that allows another screen or setting to appear. These settings are not necessarily the best for your specific application.

Data Aire, Inc. reserves the right to make design changes for the purpose of continuous product improvement or to withdraw any design without notice.

This manual was written when dap4 controllers were shipped with:

Software Version 2.07

Earlier versions may not have some of the features indicated, while later software versions may have additional features that are not listed.

The graphic touch screen contains its own software version which must be equal to or higher than the controller's software version.
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Introduction

The dap4 continues the tradition of advanced electronic devices from Data Aire for monitoring and control of computer room air conditioning units which began in 1977. Each generation has provided more accurate monitoring and application flexibility.

**Control** - The dap4 offers the definite answer for precision environmental control. The dap4 control system not only controls temperature, humidity, airflow and cleanliness; it provides component run times, hourly duty cycles and 24 hour temperature and humidity deviations.

**Efficiency** - Airside and waterside economizers are available to help conserve power usage. Features like “Humidity Anticipation” offsets the humidity set point to reduce excess humidification and dehumidification. Options such as a variable compressor also contribute to energy savings.

**Alarm Management** - The dap4 offers extensive alarm management. An array of alarms conditions may be enabled, and some can be set to stop operations or completely shut down the unit. Up to 200 of the most recent alarms are stored in an alarm log. Each alarm has temperature and humidity readings and the date time it occurred to assist in diagnosing what caused the alarm. There are four alarm relay contacts that can be programed to energize for any multiple of alarm conditions.

**NOTICE... Please don’t let the size of this manual overwhelm you, as it covers many options and features of the dap4 that may not apply to your specific application.**
Optional Equipment & Features

Electronic Expansion Valve: The module communicates to the dap4 to drive a stepper motor inside the expansion valve. The module controls refrigerant superheat and optimizes the efficiency of the refrigerant circuit. It features low superheat, high evaporation pressure (MOP), and low evaporation pressure (LOP) protection.

Power Meter Module: The module communicates to the dap4 to allow monitoring of voltage, amperage, wattage, VA and power consumption (kWh). It also records daily power use trends for the last 30-day span and offers phase loss alarm protection. The ultra-compact module measures only 3.11” tall by 4.25” long and uses only 1.4” of DIN rail space.

Zone Master: A feature that offers multiple dap4 controls a teamwork solution. Up to sixteen dap4 units may be arranged in the Zone Master network. The unit designated as the master has menus with selectable features of:

- Minimum number of units that must always be on
- Automatic lead/lag and standby unit rotation
- Activate a standby unit due to particular alarm conditions
- Activate standby units to assist with controlling temperature or airflow
- Inhibit control functions to prevent units from conflicting operations
- Primary and secondary schedules for economical control
- Unified zone airflow control

Idap Communication Card: A network card with web-based application software installed. It allows a standard PC to communicate with the dap4 controller. It has an intuitive menu system that includes: System Status, Configuration, Data and Graphs, Events and Emails and a Points Table. It can be setup to send trending data for the previous 24-hour period allowing for review and analysis. The idap card can be used on a stand-alone basis, in place of a BMS system. It can also operate in conjunction with a BMS system, using BACnet, Modbus TCP/IP or SNMP protocols.

Rack Sensor Module: Allows up to 32 rack temperature sensors to be connected to the dap4 to control fan speed. Sensors can be set to work independently or arranged in groups. The rack temperature calculation can be set to use the highest of the sensors or an average of the sensors. The DIN rail mountable module is small measuring only 4.5” square and 1.7” tall.

Power Cap: Allows the dap4 to continue operation during short term power interruptions. This feature is valuable where power sources are not reliable or when power may switch to a stand-by generator.
Getting Started

The dap4 consists of two main components: the controller and the display panel. The controller is located inside the electrical panel. The display panel is mounted on the front door of the cabinet and/or mounted in a remote location. They are connected by a special telephone type cable. (Note: If you need a longer cable, please contact the factory, as special cables are used for long distances.)

dap4 Controller (standard size shown)
dap4 Color Touch Display

There are several touch sensitive areas on home screen of the display. Listed below is how each area works when it is touched.

**LED Unit Status**
- White = On
- Blue = Cooling
- Green = E. Saver
- Red = Alarm

Displays the system Information Screen.

Displays the Alarm Log screen.

Display the next screen.

Access service menus shown later in this manual (requires holding 1 sec.)

Touch Temp/Hum readings to display the Set Points screen.

“Key” turns Unit on or off. Color red = unit is off, Green = unit is on.

**Status Loop:**
The first screen in this loop is the Home screen, which displays the basic status of the unit. It contains icons that appear when a specific operation is running as described below:

- **Fan On** - If variable type, speed modulation is also shown.
Compressor On - A number will also appear next to the icon to indicate multiple compressors are running. If variable type, speed modulation is also shown.

Humidifier On - If variable type, humidity demand modulation is also shown.

Dehumidification Mode Running.

Heaters On - A number will also appear next to the icon to indicate multiple heaters are on. If SCR heat type, heat modulation is also shown.

Chilled Water Cooling On – Valve modulation is also shown.

Energy Saver Available – Shown when chilled water is cold enough to provide cooling rather than only running compressors.

CO2 Valve On – This option only available on gPOD model.
Status Loop (continued):

The next screen in the status loop is the Optional screen, which displays the status of optional inputs of the unit. (Note: this screen does not appear if no optional inputs are used).

![Optional Status Screen]

The next screen in the status loop is the Rack Temperature Status screen, which displays the status of all optional rack sensor. (Note: this screen does not appear if rack sense 32 is not used). The highest or average (depending on selection) is shown on the top line, followed by individual sensor readings.

![Rack Temperature Status Screen]

Sensors that are in a Low Temperature alarm have a blue colored bell next to it (like T04). Sensors that are in a High Temperature alarm have a red colored bell next to it (like T09). Sensors T16 to T32 (if used) appear on the next Rack Temperature screen.
Status Loop (continued):
The next screen in the status loop is the Zone Status screen, which displays the status of the zone. (Note: this screen only appears on the Master control when the Zone Master feature is enabled).

![Zone Status Screen](image)

The next screen the Zone Units screen, which displays the status of each units in the zone. (Note: this screen only appears on the Master control when the Zone Master feature is enabled).

![Zone Units Screen](image)

Touch the unit icon to see specific information such as Temperature, Humidity and Airflow. General unit status is indicated by color:

- **Green** = Unit On
- **Blue** = Unit in Standby
- **Red** = Unit in Alarm
- **Gray** = Unit set not to participate
Status Loop (continued):

The next screen in the status loop is the Power Meter Status screen. (Note: this screen only appears when an optional power meter is installed).

![Power Meter Status Screen]

The next screen in the status loop is the Variable Compressor Status screen. Note: this screen only appears when a variable compressor is installed). The operating envelope is indicated by the green colored polygon. The compressor's current status is indicated by a red dot within the envelope.

![Variable Compressor Status Screen]
Status Loop (continued):

The next screen in the status loop is the Trending screen. It displays the historical trends of the return air temperature and humidity. Additional trends of discharge air temperature and chilled water temperature will also appear if installed. To display the legend information, touch the information icon located at the top right corner. The historical time frame screen can be scrolled forward or backwards by pressing and dragging the screen.

![Trending Screen](image1.png)

Alarm Log Screen: (Accesses by touching the Alarm icon on the main status screen). The time and date of past alarms along with readings at the time of the alarm can be viewed. Touch the Up or Down icon to see past alarm logs. There will be a short delay as each log is loaded.

![Alarm Log Screen](image2.png)
Turning the Unit On

Turn the disconnect switch to the ON position. The controller will boot up and conduct a self-test. After approximately 20 seconds the display will become active.

NOTE: Unless otherwise specified, the unit is shipped with the unit to start-up in the OFF mode. This setting can be changed to start-up in the ON mode using the “On/Off” Menu A.

The unit may be turned on (or off) by pressing the Power icon at the bottom left corner of the main screen. The icon is green when unit is on and red when unit is off.

Once turned on there will be a 5 to 600 second start delay indicated by “Time before start: XXs”. If the unit does not turn on, the Unit Status line will indicate the reason, such as an alarm condition, scheduler setting or command from a BMS.

Service Menus

Press the “Tools” key for one second to change mode of display to access the service menus.
Menus

Press the middle key on left side to access the Main Menu. The first screen will ask for a numerical password which determines the three levels of menus that will be displayed: User, Service and Factory.

Note: The User level password is always 0000. The Service level password by default is 0001 and may be changed by the installer. The Factory level password is usually set by the maintenance supervisor to protect from unauthorized use.

After a password is entered, the Main Menu will appear with “Service” or “Factory” level indicated at the top right of the screen. Note: These levels will expire if no key is pressed after 10 minutes. Use the Up or Down key to move the menu of choice to appear in the center black line. Then press Enter key to access that menu.

The USER level displays the following main menu choices:

A. On/Off
B. Setpoint
C. Clock / Scheduler
E. Historical Data
F. Information

The SERVICE level adds the following menu choices to the user level:

D. Input / Output
G. Network Configuration
H. Calibrate Sensors
I. Manual Control
K. Alarms & Limits
M. Zone Master (only shown if feature is enabled)

The FACTORY level adds the following menu choices to the service level:

J. Factory Settings
L. Configure I/O
Changing the Passwords

Important Notice – Service and Factory level passwords should only be given to qualified technicians. Under normal circumstances the Factory menus should not be changed. Please consult with Data Aire engineering or service personnel for help using these menus.

Change the Service level and Factory level passwords following these steps:
1. Press the Menu key.
2. Enter the current Service Level or Factory Level password.
3. The Main Menu will appear. Press the Menu key.
4. The password screen will appear. Press the DOWN key.
5. A Service Security screen will appear. Choose a new service level password. Note: if the Factory level password was entered on step 2; press the DOWN key again to be able to change the Factory level password.

Note: Be sure you write down any changes to these passwords and store in a safe and secure location.

MENU A – ON / OFF

Start-up Delay: This is the amount of time that the control will wait before starting. It is often used to prevent multiple units from starting at the same time, which may cause a surge in power. Selection is from 5 to 600 seconds with a default setting of 5 seconds. A count down timer for this delay is shown on the main status screen.

Startup- Mode: This is the mode that the unit will be in when power is applied. Selection is either On or Off with a default setting of Off. Note: When startup mode is set to Off, the Esc key must be used in order to turn the unit on.

Status: Shows the current unit status as displayed on the main status screen.
MENU B – SETPOINTS

**Temp Setpoint:** This set point is used to control the return or discharge air temperature (whichever is chosen for control mode in the factory settings menu). The range of adjustment depends on the temperature being controlled:

- Return air: range is 65 to 85°F with a default of 72.0°F.
- Discharge air: range is 45 to 85°F with a default of 72.0°F.
  (If model is IRDX or CW only (no DX), maximum range increases to 105°F)

**Temp Deadband:** This is the amount temperature must rise above set point before the first stage of cooling turns on or CW valve begins to open. The range of adjustment depends on the model:

- IRDX: range is 1.1 to 10.0 °F with a default value of 2.0°F.
- All other models: range is 2.0 to 5.0 °F with a default value of 2.0°F.

**Stage-To-Stage:** (Only shown on multiple compressor units). This is the amount of temperature that separates each stage of cooling. The range of adjustment is 0.3 to 3.0 °F with a default of 0.3 °F.

**Latent Deadband:** (IRDX model only when set for discharge latent control mode in factory settings menu). For each increase in humidity of 0.2% above this dead band (range of adjustment is 60 to 80% with a default of 64%) will cause the latent set point to increase by 0.1°F.

**Fan Delta Temp:** (IRDX model only when fan mode is set to delta in the factory settings menu). This is the set point for fan modulation based on the difference between the Return and discharge air temperatures. The range of adjustment is 10.0 to 40.0 °F with a default of 20.0 °F.

**Sync Slave TSP:** (Only shown on master of Zone Master network). When set to Yes (default is No), all units in the zone will use the temperature setpoint and deadband of the master.
Note: This screen is only shown when the airside economizer feature is enabled in the factory settings menu.

**Heating Sp:** This set point is used to control heating of the return air temperature. The range of adjustment is 35.0 – 75.0 °F with a default value of 60.0 °F.

**Heating Dband:** This is the amount return air temperature drop below the set point before the first stage of heating turns on. The range of adjustment is 1.0 to 5.0° with a default value of is 2.0°

**Enthalpy DBand:** (Only shown when economizer SP Mode is set for “Differential Enthalpy” in the factory menu.) This is the amount that the outside air enthalpy must drop below the return air enthalpy before the damper can be allowed to open. The range of adjustment is 0.2 to 1.0 BTU (KJ if temp units set to °C) with a default value of 0.5 BTU.

**Damper Hi OA SP:** (Only shown when economizer SP Mode is set for “Fixed Dry Bulb” in the factory menu.) This is the highest temperature that the outside air can be before the damper is closed. The range of adjustment is 65.0 to 85.0°F, with a default value of 75°F.

**Damper Hi OA DB:** (Only shown when economizer SP Mode is set for “Fixed Dry Bulb” in the factory menu.) This is the how much the outside air must drop below the “Damper Hi OA SP” before the damper may open. The range of adjustment is 1.0 to 5.0° with a default value of 1.0°.
MENU B – SETPOINTS continued

Note: This screen is only shown when the fan is set to modulate to rack temperature in factory settings menu.

**Temp Setpoint:** This fan temperature set point is used to control the fan speed based on the Rack Air Temperature. The range of adjustment is 65 to 85 °F with a default value of 72.0 °F.

**Temp Deadband:** This fan deadband is the amount that temperature must rise above the fan speed setpoint before fan speed will begin to increase. The range of adjustment is 1.0 to 5.0° with a default value of 2.0°.

Note: This screen is only shown when humidity control is set to “Dewpoint” in the factory settings menu or if the Air-side Economizer feature is used.

**Low Dewpoint Sp:** This is the Low Dewpoint Setpoint. It sets the limit for when humidification will begin. The range of adjustment is 30.0 to 55.0 °F with a default value of 45.0 °F.

**Low Dewpoint Db:** This is the Low Dewpoint Deadband. It determines how much above the setpoint that dewpoint must rise to end humidification. The range of adjustment is 0.1 to 3.0 °F with a default value of 1.0 °F.

**High Dewpoint Sp:** This is the High Dewpoint Setpoint. It sets the limit for when dehumidification will begin. The range of adjustment is 50.0 to 65.0 °F with a default value of 59.0 °F.

**High Dewpoint Db:** This is the High Dewpoint Deadband. It is the amount that the dewpoint must drop below setpoint before dehumidification ends. The range of adjustment is 1.0 to 3.0 °F with a default value of 1.0 °F.
MENU B – SETPOINTS continued

Hum Setpoint: This set point is used to control the return air humidity. The range of adjustment is 25 to 70% with a default value of 50%.

Hum Deadband: This is the amount humidity must rise above the set point before dehumidification mode will start. It is also the amount humidity must drop below the set point before the humidifier will start. The range of adjustment is 1 to 15% with a default value of 3%.

Note: This screen is only shown when “Hum Anticipation” is enabled in the factory settings menu.

This screen shows information of what the current humidity setpoint is and how much it is currently being offset by based on the difference between the temperature setpoint and the actual temperature of the return air. In the Humidity Anticipation mode, humidification control uses the “Anticipation SP” value rather than the actual Humidity Setpoint.
Note: This screen is only shown when a Chiller Water Valve is configured as “Engy Svc Cool” or “Aux Chill Wtr” in the factory settings menu.

**Setpoint:** The Energy Saver Setpoint determines the highest temperature that the chilled water can be used for the energy saver mode. The range of adjustment is 40.0 to 60.0 °F with a default value of 50.0 °F.

**Deadband:** The Energy Saver Deadband determines how much the chilled water temperature must drop below the setpoint for the energy saver mode to begin. The range of adjustment is 1.0 to 5.0 °F with a default value of 1.0 °F.

**Change Over:** While in the energy saver mode, this setting determines how much the air temperature can rise above the cooling stage point before changing over to DX cooling. For example, if the Temp Set point is 72° with a Deadband of 2°, DX will normally start at 74°. However when in the energy saver mode and Change Over setting is 3°, then DX will not start until the control temperature rises to 77°. The range of adjustment is 2.0 to 5.0 °F with a default value of 2.0 °F.

Note: This screen is only shown when using the Zone Master and the fan mode is set to “C Airflow” in the factory settings menu. It is also only shown on the unit that is the master controller.

**Zone AF SP:** This is the airflow in cubic feet per minute within a zone that the master controller will modulate the fans of all units running to maintain. The range of adjustment is 100 to 720,000cfm with a default of 32,000cfm.
MENU B – SETPOINTS continued

**Total Flow:** This is the total air flow of all units currently running in the zone.

**Max Flow:** This is the calculated maximum air flow that is capable for the zone.

**Zone AF Demand:** This is the calculated value based on how much of the total airflow makes up the max flow.

*Note: This screen is only shown on the gPOD model.*

**Setpoint:** This is the amount of CO2 in parts per million that the controller will maintain when CO2 regulation is required. Range of adjustment is 100 to 2000ppm with a default value of 1000ppm.

**Deadband:** This is the amount CO2 may drop below the CO2 setpoint before the CO2 valve is modulated. Range of adjustment is 25 to 1000ppm with a default value of 25ppm.

**Min Valve On:** This is the minimum time that the CO2 valve will be turned on when there is demand. Range of adjustment is 0 to 32,767 seconds with a default value of 5 seconds.

**Valve PWM:** This setting meters how fast CO2 is injected into the air by modulating the on/off frequency in a 10 second period. For example, if set to 40%, the valve will be on 4 seconds and off for 6 seconds. Range of adjustment is 10 to 100% with a default value of 10%.
**MENU C – CLOCK/SCHEDULER**

**Day:** The day of the week is for display only and is based on the date setting.

**Date:** Setting for the current date (in Month/Day/Year format).

**Time:** Setting for the current time (in 24 hour format).

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⚠️ Important Notice: Set-Back should only be enabled for non-critical applications where the unit may be turned off or the set points be offset without any damage to sensitive electronic equipment. A typical application for the scheduler is in a comfort cooling application.

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**Set-Back Enable:** Enables the scheduler features. *Note: if the scheduler is set to enabled, you must continue to setup the weekday schedule or the unit will not be able to turn on.*

**Override Schedule:** Temporarily overrides the set-back scheduler (daily, holiday or special day) for a period of the Override Time.

**Override Time:** The time that an override will last. The range of adjustment is 1 to 12 hours with a default value of 4 hours.
MENU C – Clock/Scheduler continued

Note: The following screens will only appear if Set-Back Enable is “Yes”.

**Cooling Setpoint**: Temperature set point for cooling, used when the scheduler is in set-back mode. The range of adjustment depends the temperature being controlled:

- Return air: range is 65 to 85°F with a default value of 77°F.
- Discharge air: range is 45 to 85°F with a default value of 77°F.
  (If model is IRDX or CW only (no DX), maximum range increases to 105°F)

**Heating Setpoint**: Temperature set point for heating, used when the scheduler is in set-back mode. The range of adjustment depends the temperature being controlled:

- Return air: range is 65 to 85°F with a default value of 67°F.
- Discharge air: range is 45 to 85°F with a default value of 67°F.
  (If model is IRDX or CW only (no DX), maximum range increases to 105°F)

**Humidify Setpoint**: The humidifier setpoint, used when the scheduler is in set-back mode. The range of adjustment is 25 to 70% with a default value of 45%.

**Dehumidify Setpoint**: The dehumidification setpoint, used when the scheduler is in set-back mode. The range of adjustment is 25 to 70% with a default value of 55%.

*Note: A notice will appear on this screen if the setpoints that you chose may cause cooling and heating or humidification and dehumidification to overlap.*
### Day
The day of the week that you want to set in the scheduler. The range of adjustment is Monday to Sunday with a default value of Monday.

### Copy to
The weekday that you want the settings of this day to be copied to. The range of adjustment is Monday to Sunday with a default value of Monday. Select “Yes”, to initiate the copy process.

### 1: to 4:
The selection of times (in 24hr format) that an action will take place. You can set up to four timed actions. The range of adjustment is 00:00 (midnight) to 23:59.

### Setting
This is the action that should occur at the selected time. This action will remain until the next timed action for this day. If it is the last timed action for this day, it will remain effective until the next timed action of the following day. The default value is to take No Action. There are four possible action settings:

- **No Action (--------):** The scheduler will continue running the last action taken either this day or the previous day.
- **Normal SP:** Use the normal temperature and humidity settings. This action will also turn the unit on if it was currently off.
- **Set-Back:** Apply the setback offsets to the normal temperature and humidity settings. This action will also turn the unit on if it was currently off.
- **Turn Off:** The unit will be turned off until the timed action of Normal SP or Set-Back is executed. When the unit is off due to the scheduler, the main status screen will indicate the unit status as OFFbySCH. **Caution:** The Turn Off action must be followed by the Normal SP or Set-Back action in order for the unit to turn back on.
Note: The Special Day scheduler will override the Weekday scheduler on the date that the Special Day scheduler is active.

**Setting:** This is the action that should occur at the selected start date. This action will remain in effect until the next start date that is set to have an action. The default value is to take No Action. There are four possible action settings:

- **No Action** (--------): The scheduler will continue running the last action taken either this day or the previous day.

- **Normal SP**: Use the normal temperature and humidity settings. This action will also turn the unit on if it was currently off.

- **Set-Back**: Apply the setback offsets to the normal temperature and humidity settings. This action will also turn the unit on if it was currently off.

- **Turn Off**: The unit will be turned off until the timed action of Normal SP or Set-Back is executed. When the unit is off due to the scheduler, the main status screen will indicate the unit status as OFFbySCH. Caution: The Turn Off action must be followed by the Normal SP or a Set-Back action for the unit to turn back on.
Note: The Holiday scheduler will override the Special Day and Weekday schedulers for the dates that the Holiday scheduler is active.

Date Start: The selection of the date (month/day format) that an action will take place. You can set up to three actions. Once the date is reached, the action will be in effect until the Date Stop is reached. The range of adjustment is 01/01 to 12/31. The default is that no dates are set.

Date Stop: The selection of the date (month/day format) that an action that began on the Date Start will end. The range of adjustment is 01/01 to 12/31. The default is no dates are set.

Setting: This is the action that should occur at the selected date. This action will remain until the next start date that is set to have an action. The default value is to take No Action. There are four possible action settings:

- **No Action** (-------): The scheduler will continue running the last action taken either this day or the previous day.
- **Normal SP**: Use the normal temperature and humidity settings. This action will also turn the unit on if it was currently off.
- **Set-Back**: Apply the setback offsets to the normal temperature and humidity settings. This action will also turn the unit on if it was currently off.
- **Turn Off**: The unit will be turned off until the timed action of Normal SP or Set-Back is executed. When the unit is off due to the scheduler, the main status screen will indicate the unit status as OFFbySCH. **Caution:** A “Turn Off” action must be followed by the “Normal SP” or “Set-Back” action in order for the unit to turn back on.
The Input / Output menu indicates the current status of all inputs and outputs. This menu is helpful for trouble shooting purposes. Screens that will appear in this menu include:

**Digital Inputs** - The status of the 18 inputs (only 8 inputs on minidap4) are indicated on one screen. Inputs in the on state are indicated by a black box.

**Digital Outputs** - (shown) The status of the 18 relay outputs (only 7 outputs on minidap4) are indicated on one screen. Relay outputs in the on state are indicated by a black box.

**Analog Inputs** - The status of the analog inputs is indicated on individual screens. Only analog inputs that are enabled in the Configure I/O menu (which requires factory level password) are displayed.

**Analog Outputs** - The status of the analog outputs is indicated on individual screens. Only analog outputs that are enabled in the Configure I/O menu (which requires factory level password) are displayed.
The historical data menu contains information such as alarm logs and device run hours. The first screen in the menu is the Alarm Log which may contain up to 200 of the most recent alarms. Once the maximum is reached, the oldest alarm is pushed out to make room for the newest one. Information shown on this screen:

**Time / Date** - The time (in 24hr format) and Date (month/day/year format) when this alarm occurred.

-> Scroll Up/Down? - Use the UP key to view an older alarm (if any) or use the DOWN key to view a newer alarm.

# - The sequential number of the displayed alarm, from 1 up to 200.

**Alarm Name**: (Smoke Detector is example shown). The name of the alarm that occurred at this time and date.

**Humidity**: The return air humidity at the time when the alarm occurred.

**Return Air**: The temperature of the return air at the time when the alarm occurred.

**Additional Data** - (if enabled) such as Chilled Water and Discharge Temperatures may be shown. For units using a variable speed compressor, the Evaporator and Condenser temperatures are shown.
There are up to three screens that indicate accumulated run hours for any device that can be installed. Devices that are not installed will remain at zero run hours. The run hours of each device can be independently reset by choosing “Yes” to the right of the accumulated run hours.

*Caution: Do not reset run hours unless you are replacing the device.*

There are three screens that show the amount of power that was consumed. The power (in kilowatt Hours) for each of the last 30 days is displayed. Upon completion (at midnight) of each day, the recorded power of each day is advanced by one day. (Example: power of a finished day becomes day 01 and the power of day 01 become day 02 and so on.)

On the third screen the total combined power of the 30 days is displayed. There is also a selection to reset all power usage records.

*Note: The power usage screens are only displayed when an optional power meter is installed and configured in the factory menu.*
The information menu offers specific information about the controller that is important while trouble-shooting. The menu contains up to five screens as described below.

**Information 1:** Lists the Manufacturer, Software Version, Software Date, Controller ID, Bios version and date, Boot version and date.

**Information 2:** Lists the controller type, Total flash memory size in kilobytes, Total Ram memory size in kilobytes, Number of times the user made changes to settings (1/10th actual), Program Execution Speed in milliseconds.

**Information 3:** Lists the Temperature near the processor, The Power Supply Voltage, The Power Supply current in milliamps.

**EEV Driver:** Lists information about the electronic expansion valve driver (only displayed when the driver is installed). It indicates the Firmware version, Modbus Address, Refrigerant, Online communication status.

**EEV Driver Valve –A-:** Lists information about the electronic expansion valve “A” driver settings (only displayed when the driver is installed).

**EEV Driver Valve –B-:** Lists information about the electronic expansion valve “B” driver settings (only displayed when the driver is installed).

**Unit Identification:** Lists information about the unit such as Model Number, Serial Number and Job Number.

⚠️ **Notice** – If the SW Version ends in “S” followed by a number, the controller has special software and some functions may operate differently from what is written in this manual.
MENU G – NETWORK CONFIG (Service Level)

**BMS PORT 1 Protocol:** This setting is for the type of communication card that is installed in the slot of the dap4 marked “BMS card.” Range of selection is N/A (card not installed- default), iDAP, LON, BACnet TCP/IP, BACnet MSTP and MODBUS (RTU).

**Detect Heartbeat:** (Default setting is Yes). The dap4 will determine that communications to the BMS is lost if the heartbeat point does not change after 3 minutes and it will cancel the BMS OFF command and automatically start up (if there are no other conditions will keep it off). To ensure reliable operation with the BMS, the heartbeat point should be toggled (0->1 or 1->0) at least once a minute.

**Heartbeat Ok:** should indicate “Yes” when the BMS is operating properly.

*This screen is only shown when port protocol is set to Modbus.*

**BMS PORT Address:** Sets the address for the card installed in the BMS slot. Range of selection is 1 to 128 with a default setting of 1.

**BMS Port Baud Rate:** Speed of communications with the BMS. Range of selection is 1200, 2400, 4800, 9600 or 19200 with a default setting of 19200.
This menu is used to allow analog sensors to be calibrated by a service technician using a calibrated instrument. Each screen in this menu identifies the function of the sensor and the terminal that the sensor is connected to.

**Offset:** The amount that the sensor needs to be corrected by so that the meter value will match the value shown on the screen. Range of adjustment is -99.0 to 99.0 with a default value of 0.0.

**Value:** The current reading of the sensor including the offset setting.
When any output is switched from Auto mode to Manual mode, the “Return to Auto” timer for that output is started. When the timer expires, the output will return to automatic mode value which is determined by the dap4 logic.

Note: The controller does not have to be turned on in order to use the manual control mode.

**Return to Auto:** This setting is the longest amount of time that manual control of any output may last. Range of adjustment is 10 to 300 seconds with a default of 60 seconds.

**Mode:** Each output can be temporarily switched from Automatic (Auto) to the manual mode (Man). When in the manual mode- digital outputs can be turned on or off and analog outputs may be given a voltage (0.0 to 10.00 volts).
Caution: This menu requires the Factory Level password and entry should be limited to qualified service personnel only. Consult with Data Aire before using this menu as incorrect settings may lead to equipment malfunctions. The Factory level is automatically cleared when no key is pressed within 5 minutes.

Model: The model of the equipment (not changeable).

Screen Flip Delay: This determines how quickly the status screens will change. Adjustment range is “None” (screens do not flip) to 15 seconds with a default setting of None.

Temperature Units: Displays temperature in Fahrenheit or Centigrade.

Out Status: (not on MiniDAP) This Setting determines what controls the Status Output relay. Choices are System On (default setting), Dehumidifier On, Humidifier On, Compressor On or Reheat On.

Analog Output: (MiniDAP only) Sets the function of the analog output,Y2. Choices are “None” (default setting), Humidifier or CW Valve.

Zone Mstr Control: (shown if zone master feature is enabled) Selection of “Yes” (default selection) allows the unit to participate in zone master control. Selection of “No” removes zone master control and the unit will operate independent of the zone.

Fan Mode: (MiniDAP only) Selection of “Automatic” only runs the fan when there is a call for temperature or humidity control. Selection of “Continuous” (default selection) runs the fan as long as system is turned on.

Fan Type: Is the selection of fan installed. Selections are “Std On/Off” or “Plug Fan” (default setting) which is variable speed. Note: The mindap4 does not support the plug fan, so this selection is disabled.
MENU J – FACTORY SETTINGS (factory level) continued

Note: The Fan Settings screen is only displayed when fan type is set to “Plug Fan” in the previous screen.

**CW Mode:** The fan control method while in CW cooling. The selections are:

- **Constant Speed:** (default selection) Fan runs at a constant speed.
- **BMS Speed**:* Fan begins at the constant speed setting then modulates via BMS.
- **Vlv Pos Speed:** Fan modulates based on CW valve position.
- **Air Pressure:** Fan modulates to maintain the static air pressure set point.
- **Const Flow:** Fan modulates to maintain the airflow set point.
- **BMS Flow**:* Fan modulates to maintain the airflow of the BMS.
- **Vlv Pos Flow:** Fan modulates to maintain the airflow based on CW valve position.
- **Return Air T.**:* Fan modulates to return air temperature to maintain temp set point.
- **Mod to Rack:** Fan modulates to rack temperature to maintain temp set point.

*Note: Except for the selections of Constant Speed and Vlv Pos Speed, optional sensors are required.*

**CW Speed:** (not shown on IRDX model) The CW constant speed has a range of adjustment from 60 to 100% with a default setting of 85%.
MENUS J – FACTORY SETTINGS (factory level) continued

Aire-Seal Damper: When enabled (default is disabled), the fan will run at a low speed when the unit is placed in standby mode (either by BMS, Zone Master or custom digital input).

DX Mode: The fan operation while compressor is running. The selections are:

- **Constant Speed**: (default selection) Fan runs at a constant speed.
- **BMS Speed**: Fan begins at the constant speed setting then modulates via the BMS communicated value.
- **Air Pressure**: (Not shown on IRDX model). Fan modulates to maintain the static air pressure set point.
- **Const Flow**: Fan modulates to maintain the airflow set point.
- **BMS Flow**: Fan modulates to maintain the airflow of the BMS.
- **Mod to Rack**: Fan modulates to rack temperature to maintain temp set point.
- **Mod to Comp**: Fan modulates to variable compressor speed.
- **Mod to deltaT**: (Shown only on IRDX model). Fan will modulate to the difference between return and discharge temperature to maintain the delta temperature set point.

*Note: Except for the selections of Constant Speed and Mod to Comp optional sensors are required.

**DX Speed**: The DX constant speed has a range of adjustment from 60 to 100% with a default setting of 85%.

*Warning: When using BMS fan modes: Data Aire will not be responsible for malfunctions or space control conditions caused by a BMS failure or an improper speed command.*
MENU J – FACTORY SETTINGS (factory level) continued

Note: The Fan Range Settings screen is only displayed when either CW or DX fan control is set to a mode that modulates the fan.

**Modulate Min:** This sets the lowest amount that the fan speed can be modulated. Range of adjustment is 40 to 100% with a default setting of 40%.

**Modulate Max:** This sets the highest amount that the fan speed can be modulated. Range of adjustment is 70 to 100% with a default setting of 100%.

**Aire Seal Speed:** (Shown only when Aire-Seal Damper is enabled). Sets the fan speed when unit is in standby mode. Range of adjustment is 10 to 50% with a default setting of 20%.

Note: The Fan Rack Settings screen is only displayed when either CW or DX fan control is set to a Rack modulation mode.

When modulating to rack temperature, a change in fan speed is limited incrementally by the “Ramp Set Rate” percentage.

**Ramp Step Rate:** This sets the maximum amount that the fan speed can increase or decrease in one second increments. Range of adjustment is .1 to 9.9% with a default setting of 0.5%. 
MENU J – FACTORY SETTINGS (factory level) continued

Ramp Pause delay: This sets the minimum time that the fan speed will not change when fan speed meets current demand. Range of adjustment is 1 to 5 minutes with a default setting of 2 minutes.

Note: The Static Air Pressure (or Differential Air pressure) screen is only displayed when CW or DX fan mode is set to modulate to maintain Air Pressure.

The dap4 uses a proportional integral algorithm (P+I) to maintain air pressure. The description of the settings offered below is only a guide. The difference between the set point and the actual measured air pressure is called the error.

Set Point: The pressure (inches or water coulomb) that the fan speed will modulate to maintain. Range of adjustment is 0.001 to 9.999"Wtr with a default setting of 0.500"Wtr.

Band: This setting is effectively the “sensitivity” of the algorithm. The smaller the band, the more the algorithm will try to correct the error. If the band setting is too low, the system will oscillate by being over-responsive. If the band setting is too high, fan speed may lack responsiveness. Ideally, the band setting should be as low as possible without causing oscillation. Range of adjustment is 0 to 32767cfm with a default of 666cfm.

Integration Time: Used to slowly shift the fan speed level as a result of an error between set point and the measured air pressure. The higher Integral time setting, the slower the fan speed level will be shifted. If the Integral time is set too low the fan speed could change quickly, causing oscillation. If Integral time setting is too high, fan speed may become sluggish to change. A setting of 0s (default) puts the algorithm in a proportional only mode. Range of adjustment is 0 to 999s.
MENU J – FACTORY SETTINGS (factory level) continued

![Fan Air Flow Screen](image)

*Note:* The Fan Air Flow screen is only displayed when CW or DX fan mode is set to modulate to maintain Air Flow.

**Number of Fans:** The total number of fans on this unit. Range of adjustment is from one to four fans, with a default of three fans.

**Fan K-Factor:** This setting should correspond to the K-Factor specified by the manufacturer of the fan.

**Minimum Airflow:** The lowest airflow setting that the fans should produce. Range of adjustment is 0 to 32000cfm with a default setting of 2000cfm.

**Maximum Airflow:** The highest airflow setting that the fans should produce. Range of adjustment is 0 to 32000cfm with a default setting of 32000cfm.

**Set Point:** The airflow setting that the fans will be modulated to maintain. Range of adjustment is between the fan minimum and maximum settings.
Note: The Fan Air Flow screen is only displayed when CW or DX fan mode is set to modulate to maintain Air Flow.

The dap4 uses a proportional integral derivative algorithm (PID) to maintain airflow. The description of the settings offered below is only a guide. The difference between the set point and the actual measured air flow is called the error.

**Status:** This is the display of the current airflow in cubic feet per minute.

**Setpoint:** This is the airflow set point in cubic feet per minute.

**Integration Time:** Used to slowly shift the fan speed level as a result of an error between set point and the measured airflow. The higher Integral time setting, the slower the fan speed level will be shifted. If the Integral time is set too low the fan speed level could change quickly, causing oscillation. If Integral time setting is too long, fan speed may become sluggish to change. A setting of 0s (default) puts the algorithm in a proportional only mode. Range of adjustment is 0 to 999s.

**Band Per Fan:** This setting is effectively the “sensitivity” of the algorithm. The smaller the band, the more the algorithm will try to correct the error. If the band setting is too low, the system will oscillate by being over-responsive. If the band setting is too high, fan speed may lack responsiveness. Ideally, the band setting should be as low as possible without causing oscillation. Range of adjustment is 0 to 32767cfm with a default of 666cfm.

**Derivative Time:** Causes a sudden change in fan speed to correct the error as a result of a quick change in measured air flow. Typically, the derivative setting is about a sixth of the Integral time setting.

**Current Demand:** This indicates what percentage of the maximum speed that fan is currently being driven.
Note: The Fan Delta Tuning PID screen is only displayed on IRDX models when fan mode is set to modulate to maintain Delta Temp.

The dap4 uses a selectable stepped method or proportional, integral and derivative algorithm (P, P+I or PID) to maintain the delta temperature to the delta temperature set point (Shown in the set points menu). The difference between the delta set point and the actual measured delta temperature is called the error.

**Delta Temp:** This is the display of the delta temperature, which is the difference between the Return and Discharge air temperatures.

**Control:** Selection of the algorithm used: Stepped, Proportional (P), Proportional and Integral (P+I) and Proportional Integral Derivative (PID). Note: Stepped control is similar to Proportional control except changes in fan speed are made up of ten steps rather than much finer increments.

**Band:** This setting determines the sensitivity of the algorithm. The smaller the band, the more the algorithm will try to correct the error. If the band setting is too low, the system will oscillate by being over-responsive. If the band setting is too high, fan speed may lack responsiveness. Ideally, the band setting should be as low as possible without causing oscillation. Range of adjustment is 1.0 to 99.0°F with a default of 50.0°F.

**Integration Time:** (Only shown when control set to P+I or PID). Used to slowly shift the fan speed level as a result of error. The higher the Integration time setting, the slower the fan speed level will be shifted. If the Integration time is set too low the fan speed level could change quickly, causing oscillation. A setting of 0s (default) puts the algorithm in a proportional only mode. Range of adjustment is 0 to 999s.

**Derivative Time:** (Only shown when control set to PID). Causes a sudden change in fan speed to correct the error as a result of a quick change in measured air flow. Typically, the derivative setting is about a sixth of the Integral time setting.

**Fan Modulation:** Indicates the percentage of fan speed demand.
Note: This Compressor Settings screen is not shown on the IRDX model, which is explained on the next screen.

**Type:** The available compressor selections include:
- **None** - Selection for chilled water cooling only.
- **Sngl Primary** - One fixed speed compressor.
- **Sngl Primary w/UnLdr** - One fixed speed compressor with an unloader.
- **Dual Pri** - Two fixed speed compressors.
- **Dual Pri w/Unldr** - Two fixed speed compressors, each with an unloader.
- **Four Tandem** - Four fixed speed compressors.
- **Sngl Variable** - One variable speed compressor.
- **Variable & Fixed** - One variable speed compressor.
- **Dual Variable** - Two variable speed compressors.

**Min Run Time:** (Only shown when variable compressor selected). Once the variable compressor is started, it must run for at least this much time. Range of adjustment is 1 to 10 mins with a default of 2 mins.

**Control:** The compressors will maintain the Return or Discharge air temperature.

**Cooling Mode:** (Shown only when control is set to discharge temp.) Normal mode uses the dead band between cooling and heating. Precise mode removes the dead band for temperature critical applications. Caution: Use of the precision mode may cause energy inefficiency.

**HP Lockout:** Is the selection of when the compressor should be locked out due to high pressure alarms. Once locked out, the compressor will not return to service until the alarm is acknowledged and cleared. Selections are: None (comps do not get locked out), or when HP alarms reach a frequency of: Max 2/Hr, Max 3/Hr, Max 4/Hr or Max 5/Hr. The default setting is None.

**Delay Btw Stages:** Is the minimum time it will take to stage the next compressor on. Selection is 30 to 300 seconds with a default setting of 60 seconds.
Note: This Compressor Settings screen is only shown on the IRDX model.

Type: The available compressor selections include:
- **None** - Selection for chilled water cooling only.
- **On/Off Comp** - One fixed speed compressor.
- **Variable** - One variable speed compressor (Default).

Mode: The compressors will be used to maintain:
- **Ret T-Constant** - Compressor will run at a constant speed to maintain the return air temperature.
- **Ret T-Variable** - Compressor will modulate in speed to maintain the return air temperature.
- **Dis T-Variable** - Compressor will modulate in speed to maintain the discharge air temperature.
- **D T-Var Latent** - Compressor will modulate in speed to maintain the discharge air temperature based on the calculated latent set point.

Min Run Time: (Only shown when variable compressor selected). Once the variable compressor is started, it must run for at least this much time. Range of adjustment is 1 to 10 mins with a default of 3 mins.

Run Speed: (Only show when mode is constant speed) Selection is from 1800 to 5400rpm with a default setting of 3600rpm.

HP Lockout: The selection of when the compressor should be locked out due to high pressure alarms. *(On units with auto-reset HP switch only)*. Once locked out, the compressor will not return to service until the alarm is acknowledged and cleared. Selections are: None (comps do not get locked out), or at a maximum HP alarm frequency of: Max 2/Hr, Max 3/Hr, Max 4/Hr or Max 5/Hr. The default setting is None.
MENU J – FACTORY SETTINGS (factory level) continued

Note: The Variable Compressor screen is only displayed when the compressor selection is set for a variable compressor.

The variable compressor will modulate to maintain the mode selected in the previous screen.

**Band:** This setting determines the sensitivity of the algorithm. The smaller the band, the more the algorithm will try to correct the error. If the band setting is too low, the system will oscillate by being over-responsive. If the band setting is too high, compressor speed may lack responsiveness. Ideally, the band setting should be as low as possible without causing oscillation. Range of adjustment is 1.0 to 99.0°F with a default of 18.0°F. (48.0 for IRDX model).

**Integration Time:** (Only shown when control set to P+I or PID). Used to slowly shift the compressor speed level to correct the error between temperature reading and set point. The higher Integral time setting, the slower the compressor speed will change. If the Integral time is set too low the compressor speed could change quickly, causing oscillation. If Integral time setting is too high, compressor speed may become sluggish to change. A setting of 0s puts the algorithm in a proportional only mode. Range of adjustment is 0 to 5000s.

  - If set to Discharge Temp Control: default is 60s.
  - If set to Return Temp Control: default is 1000s.

**Derivative Time:** (Only shown when control set to PID). Causes a sudden change in fan speed to correct the error as a result of a quick change in temperature. Typically, the derivative setting is about a sixth of the Integral time setting. Range of adjustment is 0 to 999s with a default of 5s.

**C1 Offset:** Is the amount that the temperature must drop below the Setpoint before the variable compressor is turned off. Range of adjustment is 0.0 to 9.9°F with a default of 1.0°F (2.0°F default if set to control discharge air temperature).
**MENU J – FACTORY SETTINGS (factory level) continued**

**Minimum Speed:** This setting determines the lowest speed that the variable compressor can run. Range of adjustment is 900 to 1500RPM with a default of 1500RPM.

**Maximum Speed:** This setting determines the highest speed that the variable compressor can run. Range of adjustment is 5000 to 6000RPM with a default of 6000RPM.

![Fixed Compressor screen](image)

**Note:** The **Fixed Compressor** screen is only displayed when the compressor selection is set for Variable & Fixed compressor.

**Delay Modulation:** The time that the variable compressor (C1) will run at maximum speed before modulating when it starts or when the fixed speed compressor is stopped. Range of adjustment is 0 to 999 with a default of 60s.

**C2 Offset:** (Only shown when control is set to discharge temp). This is the amount that the discharge temperature must drop below Setpoint before the fixed speed compressor is turned off. Range of adjustment is 0.0 to 9.9°F with a default of 2.0°F.

**C2 On Delay:** Is the time delay between when C1 starts before C2 can start. Range of adjustment is 0 to 999s with a default of 60s.

**C2 Off Delay:** (Only shown when control is set to return temp). This is the time delay before C2 can turn off. Range of adjustment is 0 to 999s with a default of 5s.

**Force to Exercise:** Manually forces the fixed compressor to run for the Exercise time setting.

**Exercise Time:** When the variable compressor has run for 10 hours and the fixed compressor has been idle, it will be run for the exercise time setting. Range of adjustment is 12s to 999s with a default of 100s.
Note: The Variable Compressor screen is only displayed when the compressor selection is set for a variable compressor.

Enable Pump-Down: The pump-down feature prevents refrigerant from migrating back to the compressor. Starting a compressor with a large amount of refrigerant dilutes the compressor lubrication, resulting in damage to the compressor.

Suction Pressure: The current suction pressure (for reference only).

Cut Out SP: The suction pressure must drop below this setting to end the pump down cycle. Range of adjustment is 80.0 to 120psi with a default of 90.0psi.

Differential: Should the suction pressure rise above the Cut Out SP + this setting; the compressor will be started to pump back down a second time. Range of adjustment is 10.0 to 40.0psi with a default of 30.0psi.

Maximum PD Time: The pump down cycle will be ended and an alarm will occur if the suction pressure does not drop below the PD Cut Out setting within this time. Range of adjustment is 30 to 120 seconds with a default of 60 seconds.

SH PD Cut-In: The level that Super Heat must rise above on a third cycle of pump-down. Range is 20 to 50 degrees with a default of 30 degrees.
MENU J – FACTORY SETTINGS (factory level) continued

Note: This compressor rotation screen is only displayed when more than one compressor is selected. However, it is not shown when a variable compressor is selected because the variable compressor is always the lead compressor.

**Rotation Enabled** – Allows lead compressor to change (default is enabled).

**Lead Compressor** – (Only displayed when there are two compressors) indicates the current lead compressor. You can also manually change which one is the lead.

**Rotation is by FIFO** – (Only displayed when there are four compressors). FIFO means that the first compressor started will also be the first compressor to stop.

**Rotate Lead** – (displayed when there are two compressors). After a compressor has run for the accumulated hours of this setting, the lead compressor will change. Range of adjustment is 12 to 999Hrs with a default setting of 168Hrs.

Note: The Options Installed screen should only be set by the factory. Additional screens will appear based on options that are installed.
MENU J – FACTORY SETTINGS (factory level) continued

Reheat – The type of reheat used. Choices are:

None - No reheat installed.

One - A single stage of reheat.

1-Elect - A single stage of reheat but used only in dehumidification mode.

HW Valve - (Not shown on IRDX Model). Hot Water valve used for heating. A discharge air temperature sensor must be installed to select this mode.

Two - (Not shown on IRDX Model or MiniDAP). Two stages of reheat.

Three - (Not shown on IRDX Model or MiniDAP). Three stages of reheat.

3-Elect - (Not shown on IRDX Model or MiniDAP). Three stages of reheat but used only in dehumidification mode.

HGRH - Hot Gas valve is modulated for reheat during dehumidification.

HGRH+1 – Like the Hot Gas mode but has a second stage of reheat.

HGRH+SCR – Like HGRH mode but also uses SCR to modulate reheat to maintain temperature.

Enable Rotation: (Only displayed when there is more than one stage of reheat. Default setting is rotation enabled.

Lead Reheat – (Only displayed when rotation is enabled) indicates the current lead reheat stage. You can also manually change which one is the lead.

Enable SCR Y4: This enables the SCR modulated reheat. This reheat mode is enabled automatically when the cooling mode is set to the precise selection.

SCR Band or HGRH Band: (Only displayed when SCR is enabled or HGRH+SCR mode is set). This setting determines how far below set point minus dead band temperature can drop until the SCR modulation will reach 100%. Range of adjustment is 1 to 20°F with a default setting of 1°F.
Wtr Vlv: The selection of the water valve function. Choices are:

None – No water valve used. (This is the default selection)

Chill Wtr Cool – Uses chilled water to perform all cooling, without DX. The return air is used for temperature control.

Engy Svg Cool – Uses chilled water to cool (if it is cold enough) before requiring compressors to run.

Aux Chill Wtr – Same energy saving as above but the chilled water source is independent from DX condensing circuit therefore the condenser / heat exchanger contact will not energize.

Chill Wtr Reg - Uses chilled water to perform cooling, without DX. The discharge air is used for temperature control. Therefore, a discharge air temperature sensor is required.

E-Saver Assist: (Only displayed in Engy Svg Cool or Aux Chill Wtr mode). The number of compressors that may assist chilled water cooling. Choices are: None, 1, 2 or 4 compressors. A discharge temperature sensor is required.

Wtr Vlv Voltage: The signal voltage used for the installed water valve. Choices are: 0-10, 2-10, 7-10, 6-9 and 4-7 volts.

E/S Startup Time: Allows flow of CW before detecting its temperature. Range is 0 to 300 seconds. The default is 0, which disables this function.

Wtr Vlv Action: The signal voltage can be Direct (default) which modulates up with increased demand or Reversed to modulate down with increased demand, to be compatible with a normally open valve.

Engy Lockout Time: (Only displayed in Engy Svg Cool or Aux Chill Wtr mode). The minimum time that energy saver will be disabled, E/S will not be restarted until DX cooling ends. Range of time is 15 (default), 30, 45 and 60 minutes.

Switch to DX: (Only displayed in Engy Svg Cool or Aux Chill Wtr mode). Forces DX into operation when only CW cooling has run past this setting. Range of adjustment is from 0 to 9999 hours. The default is 0, which disables this function.
Note: The CW Disch Air PID screen is only displayed when the water valve is set to Chilled Water Regulation.

**Control:** Selection of the algorithm used: Stepped, Proportional (P), Proportional and Integral (P+I) and Proportional Integral Derivative (PID).

**Simple Setting:** (Only shown when control set to PID). This setting will automatically set the other tuning parameters based on how tightly controlled the PID should be. 1 is the loosest and 100 is the tightest. The range is from 1 to 100 with a default of 25. Once the simple setting has been set, each of the individual tuning parameters below can be adjusted.

**Band:** This setting determines the sensitivity of the algorithm. The smaller the band, the more the algorithm will try to correct the error. If the band setting is too low, the CW valve will oscillate by being over-responsive. If the band setting is too high, the CW valve may lack responsiveness. Ideally, the band setting should be as low as possible without causing oscillation. Range of adjustment is 5.0 to 99.0°F with a default of 33°F.

**Integration Time:** (Only shown when control set to P+I or PID). Used to slowly shift the CW valve as a result of an error between set point and the measured temperature. The higher Integral time setting, the slower the CW valve will be shifted. If the Integral time is set too low the CW valve could change quickly, causing oscillation. If Integral time setting is too high, the CW valve may become sluggish to change. A setting of 0s puts the algorithm in a proportional only mode. Range of adjustment is 0 to 999s with a default of 95s.

**Derivative Time:** (Only shown when control set to PID). Causes a sudden change in water valve opening to correct the error as a result of a quick change in measured temperature. Typically, the derivative setting is about a sixth of the Integral time setting. Range of adjustment is 0 to 999s with a default of 11s.
MENU J – FACTORY SETTINGS (factory level) continued

**Min Modulation:** In some applications with very low load, the valve may modulate to a closed position, yet the load will cause a rise quicker than the valve can open. This unstable condition can be improved by setting this minimum modulation slightly below the heat load. The setting range is: 0 to 99.9% with a default of 0.

**Control:** Humidity can be controlled in two ways; by Relative Humidity (default) or by Dew Point.

**Humidify:** The type and method of adding humidity selections are:
- **None** – No humidifier is installed (default setting)
- **Computer Mod** – Modulated humidity control for computer equipment without reheat.
- **Computer Non-Mod** – On/Off humidity control for computer equipment without reheat.
- **Comfort Mod** – Modulated humidity control with reheat, which is used to maintain temperature control.
- **Comfort Non-Mod** – On/Off humidity control with reheat, which is used to maintain temperature control.

**Auto-Flush:** (Not shown on MiniDAP). This selection sets how many hours can elapse before the humidifier pan drain is opened for 4 minutes. The setting range is: None (default), 12, 24, 48 and 96 hours.

**Dsat Cyc:** The desaturation cycle is used to periodically interrupt the humidification mode so that the air has time to fully absorb the humidity. Choices are: Not Used (the default selection) or a humidifier off time of 1 to 5 minutes with run time of 5, 10, 15, 20, 25 or 30 minutes.

**Hum Anticipation:** When enabled, the humidity set point is offset by 1% for every 1.5 degrees that the temperature is from the Setpoint. The amount of offset is shown in a screen dedicated to this mode in the set points menu. The default selection is No (not enabled).
Dehum Mode: The type and method of dehumidification selections are:

- **None** – No dehumidification mode (default setting)
- **1C In Limit** – One compressor may run as long as temperature does not drop 2°F below the set point minus the dead band.
- **1C No Limit** – One compressor may run regardless of a drop in temperature.
- **2C In Limit** – (Not shown on IRDX models). Two compressors may run as long as temperature does not drop 2°F below the set point minus the dead band. However, dehumidification mode will be limited to one compressor when the last stage of heat is on.
- **2C No Limit** – (Not shown on IRDX models). Two compressors may run regardless of a drop in the temperature.

**Fan Speed Assist:** When set to yes, the fan speed will be reduced during the dehumidification mode to aid condensation. Fan speed is not reduced while in the cooling mode. *Note: This mode will not run unless a discharge air temperature sensor is installed.*

**Reduce Speed:** Is the amount that the fan speed assist mode will slow down. Selection is: 5, 10, 15 or 20%, with a default setting of 20%.
Note: The Economizer Settings screen is only displayed when the economizer feature is enabled.

**SP Mode:** Modulation of damper position can be set to maintain Differential Enthalpy (default) or Fixed Dry Bulb.

**Min Damper Open:** This setting determines the minimum opening of the damper. Range of selection is 0 to 70% with a default setting of 0%.

**Max Damper Open:** This setting determines the maximum opening of the damper. Range of selection is 70% to 100% with a default setting of 100%.

**Pr Atmosphere:** This setting allows for altitude correction in enthalpy calculation. Range of adjustment is 600 to 1100 millibar with a default setting of 1000mBar which is accurate at sea-level.
Temp Sensors Used: Select how many rack sensors are installed. If 1 or more sensors are installed, the rack mode is enabled and the settings below will appear. Range of selection is 0 (default) to 32. Note: An external rack sensor module is required when more than 1 sensor is selected. However, on the IRDX and IRCW model, up to three rack sensors may be installed without needing an external rack sensor module.

Groups Used: (only shown when external module is installed). This is the total number of groups that the sensors will be arranged in. Range of adjustment is: None (default setting) to 16. When groups are not used, all sensors are effectively in the same group.

Exclude T Band: (only shown when external module is installed). This is the amount of deviation from the average rack temperature. If a sensor deviates more that this setting, it will be excluded from control and determining the average temperature. Once it comes back within the exclude T band for at least 60 seconds, it will return to normal function. Range of adjustment is 5.0°F to 99.0°F with a default setting of 10.0°F

Use Highest: The rack temperature can be determined by using the Highest or the Average temperature of sensors or groups of sensors.

Avg: (Shown only when using groups are used and using average setting). Allows you to choose how the average temperature of groups is made up. Range of selection is: All Groups (default), Highest 2 Groups to Highest 15 groups.

Refresh Rate: This is how often the highest sensors and groups are determined. Range of adjustment is 5m, 15m, 30m, 45m, 1Hr, to 24Hrs with a default of 5m.

Offset Setpoint: (Default is No). When enabled, causes the cooling set point to be offset when the fan runs at 100%. The set point will be offset at a rate of -0.1°F per minute. The maximum offset is limited by the set point’s lower limit of adjustment.
Note: The Rack Settings screens are only displayed when the rack mode is enabled.

Select a function for each installed sensor and which group (if groups are used) that the sensor should be part of. Selectable functions are:

- **Disabled** – The temperature and alarms of the sensor are disabled.
- **Monitor Only** – The temperature of the sensor is displayed, but not used to make up the average or highest rack temperature.
- **Monitor+Alarm** – The temperature of the sensor is displayed, but not used to make up the average or highest rack temperature. The high and low rack temperature alarms (set in the Alarms and Limits menu) are enabled.
- **Control** – (Default setting) the temperature of the sensor is used to make up the average or highest rack temperature.
- **Control+Alarm** – The temperature of the sensor is used to make up the average or highest rack temperature. The high and low rack temperature alarms (set in the Alarms and Limits menu) are enabled.
The selections on this screen are performed at the factory and should never be changed. These settings are displayed in the information menu and are useful for technical support.

Language: Selections are: English (default), Portuguese, French and Spanish.

Import DEV File? When set to “Yes”, the controller will accept a DEV (a file containing all current settings) to be uploaded so it will be a copy of that controller. Note: Use of this feature will remove the Zone Master and/or Airside Economizer password keys from this controller. Please consult Data Aire service department for the procedure to use this feature.

Clear user settings and replace them with factory defaults? When set to “Yes” and entered, the message “Please Wait Resetting” will appear while all settings return to their original default value. A screen will then appear that reads “Please cycle power to begin execution”. After the power is cycled, the program will begin running with the default values.

Important Notice – This function should only be used by qualified technicians. All menu settings should be recorded so that they can be restored.
Audio Mode: The selection for how the buzzer should sound. Selections are:

- None: Buzzer will have no sound (default setting).
- Short Beep: Buzzer will beep with an interval of 1 second on and 2 seconds off as long as there is an active alarm.
- Long Beep: Buzzer will beep with an interval of 3 seconds on and 2 seconds off as long as there is an active alarm.
- Full On: Buzzer will be constantly on as long as there is an active alarm.

Power-Up: Selection of what the controller should do when power is restored.

- Auto. No Alarm: (Default selection) There will be no alarm and startup as normal.
- Auto. With Alm: There will be an alarm and startup as normal.
- Man. Clr Alarm: There will be an alarm and controller will not startup until the alarm is acknowledged.

EVD Alm Shutdown: (This selection is only displayed when the optional EVD is configured in the Factory menu). When set to “Yes” (default setting), the following alarms will cause the compressor to shut down: EVD memory error, EVD pressure/temperature sensor error, EVD Valve Motor error, EVD Low Evaporator Temperature alarm, EVD High Evaporator Temperature alarm, High Superheat alarm and Low Superheat alarm.

Maint Due Message: The message due alarm can be disabled by setting it to “None” (the default) otherwise, the alarm will occur in the time selected. The range of time is 1 to 1000 hours. The maintenance due alarm can be cleared by acknowledging the alarm and then pressing the Alarm key again.
Comp Short Cycle: When set to “Yes” (default) the short cycle alarm is enabled and will occur when a short cycle condition is detected.

Notice: A short cycle condition will occur regardless of whether the short cycle alarm is enabled or not. It is caused when any compressor cycles on and off more than 10 times per hour. An additional 60 seconds is added to the minimum off time setting of the compressor as result of a short cycle condition.

Floor Water Alarm Action: This is the setting of what should happen in the event that floor water is detected. The floor water alarm cannot be disabled. The selections for the alarm action are:

- **Alarm Only**: (Default) The alarm will not cause any change in operation.
- **Lockout Comps**: The compressors will be shut down and kept off until the floor water alarm is no longer active.
- **Shutdown Unit**: The unit will be shut down and kept off until the floor water alarm is no longer active.

Reset Alarm Log: Selecting “Yes” will cause the alarm log in the Historical Data menu to be reset.

Alarm Screen Contact: This selection is for the information that will be displayed at the bottom of all alarm screens. Selections are: No Contact Message (default), Data Proc Mngr, Maint Engineer, Service Company and Custom Message.

When the custom message is selected, the bottom line allows you to set each individual character of the message. The message may contain up to 22 characters. Selection of each character is letters A to Z (all upper case) and numbers 1 to 9 and also space and punctuation marks.
No Water Flow Action: This is the setting of what should happen in the event that no water flow is detected (flow sensor required). The water flow alarm cannot be disabled and is checked only when there is a cooling demand and the CW valve has opened at least 60%. The selections for the alarm action are:

- Alarm Only: (Default) The alarm will not cause any change in operation.
- Turn Compressors Off: The compressors will be shut down and kept off for 5 minutes after the water flow alarm is no longer active. A countdown showing the time remaining until the compressors will be allowed to run is shown on the no water flow alarm screen.

Wtr Flow Alm Dly: This is the amount of time that the water flow alarm is delayed from occurring. The selection is from 5 to 180 seconds with a default of 5 seconds.

No Air Flow: The air flow alarm cannot be disabled and is checked when the fan is on. The alarm is delayed for about a minute when the system is initially turned on.

Air Flow Alm Dly: This is the amount of time that the air flow alarm is delayed from occurring. The selection is from 5 to 180 seconds with a default of 5 seconds.
Firestat Setpoint: This is the maximum temperature of the return air temperature for the firestat alarm to occur and it cannot be disabled. A firestat alarm will cause the unit to turn off until the alarm is no longer active. The range of adjustment is 100 to 150°F with a default setting of 150°F.

Hi Temp Alarm: When set to “Yes” (default) the alarm is enabled. When the return air temperature rises above the set point, a high temp alarm will occur. During this alarm, the fan will run at the maximum speed setting (plug fan only). The range of set point adjustment is 70 to 90°F (70 to 120°F on CW units) with a default setting of 80°F.

Lo Temp Alarm: When set to “Yes” (default) the alarm is enabled. When the return air temperature drops below the set point, a low temp alarm will occur. During this alarm, the fan will run at the maximum speed setting (plug fan only). The range of set point adjustment is 70 to 55°F with a default setting of 60°F.

The rack sensor alarm screen will only appear if Rack Sensors are installed, enabling the feature in the Factory menu.
The individual rack sensors are configured in the Factory menu where the alarm may be enabled (Monitor+Alarm and Control+Alarm) or disabled (Monitor Only and Control Only).

**Hi Temp Alarm:** When the temperature of any rack sensor rises above the alarm set point, a high rack temperature alarm will occur. This alarm is a warning only. The range of set point adjustment is 70 to 90°F with a default setting of 90°F.

**Lo Temp Alarm:** When the temperature of any rack sensor drops below the alarm set point, a low rack temperature alarm will occur. This alarm is a warning only. The range of set point adjustment is 50 to 90°F with a default setting of 50°F.

The Discharge Alarm screen will only appear if a Discharge Temperature sensor or a Discharge Pressure sensor is enabled in the I/O Config menu.

**Low Disch Temp Alm:** When enabled the alarm will occur when the temperature exceeds the setpoint. The default setting is “No” (disabled)

**Shut Off Comps:** When enabled the alarm will cause the compressors to turn off. Otherwise, the alarm is only a notification.

**Setpoint:** The range is 40 to 60°F with a default setting of 45°F.

**Hi Disch Pres Alm:** When enabled the alarm will occur when the temperature exceeds the setpoint. The default setting is “No” (disabled)

**Cut-Out:** The pressure threshold of high pressure alarm. The range is 500 to 600psi with a default setting of 550psi.

**Cut-In:** The minimum pressure to cancel the high pressure alarm. The range is 350 to 500psi with a default setting of 475psi.
MENU K – ALARMS & LIMITS (Service Level) continued

Hi Humidity Alarm: When set to “Yes” (default) the alarm is enabled. When the return air relative humidity rises above the set point, a high humidity alarm will occur. During this alarm, the humidifier will be disabled. The range of set point adjustment is 35 to 90% with a default setting of 60%.

Lo Humidity Alarm: When set to “Yes” (default) the alarm is enabled. When the return air relative humidity drops below the set point, a low humidity alarm will occur. The range of set point adjustment is 10 to 65% with a default setting of 40%.

Freeze-Stat Alarm: When set to “Yes” (default) the discharge temperature alarm is enabled. A freeze-stat alarm will cause the fan to run at maximum speed. If the alarm condition is not corrected within 1 minute, the compressors will be shut down. The range of adjustment is 32 to 40°F with a default setting of 32°F.

Note: The freeze-stat alarm requires an optional freeze-stat sensor.
**MENU K – ALARMS & LIMITS (Service Level) continued**

**Envelope Protect:** When set to “Yes” (default) the compressor envelope protection alarm is enabled. The envelope logic will change the compressor’s speed to bring it into the normal operating zone. However, if compressor continues to run outside the envelope, the compressor will be locked out and require a manual reset. *Notice: since the envelope function protects the compressor, it should not be disabled unless directed by a factory technician.*

**Start-Up Delay:** This delay blocks the out of envelope alarm when the compressor starts. Range of adjustment is 0-99 seconds with a default setting of 60 seconds.

**Run Outside Delay:** This delay blocks the out of envelope alarm when the compressor leaves from an operational zone. Range of adjustment is 0-99 seconds with a default setting of 1 second.

*The Pump-Down Alarm screen will only appear if the feature is enabled in the Factory menu.*

**Failed PD alarm:** When set to “Yes” (default) the pump-down alarm is enabled. If set to “No”, the pump-down cycle will still operate, but without an alarm. The PD alarm results from a PD cycle taking too long or if there are more than three PD cycles required.
This Phase Loss Alarm screen is only shown when the optional power meter is installed and configured in the factory menu.

**Action:** The action to a phase loss alarm setting has three choices:
- **No Alarm:** (Default setting). The phase alarm is disabled.
- **Alarm Only:** The phase alarm is enabled but has no further action.
- **Alm & Turn Off:** The phase alarm is enabled and will cause the unit to turn off in the event of the alarm.

This CO2 Alarms screen is only shown on the gPOD model.

CO2 alarms are warnings only and will not prevent any of the unit functions from operating.

**Low CO2 Alarm:** When set to “Yes” (default setting), the alarm is enabled.

**Set Point:** This is the lowest CO2 level that will cause an alarm. Range of adjustment is 100 to 5000ppm with a default setting of 100ppm.

**High CO2 Alarm:** When set to “Yes” (default setting), the alarm is enabled.

**Set Point:** This is the highest CO2 level that will cause an alarm. Range of adjustment is 100 to 5000ppm with a default setting of 2000ppm.
Each of the custom alarm inputs can be given a unique message that will appear on its alarm screen and appear on the configuration screen of the input. Some messages also carry out a function as noted below. Additional sensors or switches may also be required. The selections are:

SEE TAG INSIDE DOOR (default setting)
REHEAT INHIBITED – The reheat function is disabled.
HUMIDIFIER INHIBITED – The humidifier function is disabled.
REHEAT & HUM INHIBITED – The reheat and humidifier functions are disabled.
UNIT IN STBY – Turns the unit off. Main status screen will indicate “OFFbySTB”.
UPS ON-CHK MAIN PWR
STANDBY PUMP ON
CHK HUMIDIFIER CYL
FAN MOTOR OVERLOAD - Inhibits heat function.
Custom Message (see explanation below*)
POWER A OPERATING
POWER B OPERATING
POWER A NOT AVAILABLE
POWER B NOT AVAILABLE
COMPRESSOR VFD ALARM
HUM FLT-CHK WTR PR
C1 HIGH PRESSURE – (MiniDAP only)
C2 HIGH PRESSURE– (MiniDAP only)
C1 LOW PRESSURE– (MiniDAP only)
DIRTY FILTER– (MiniDAP only)
SMOKE DETECTOR - Turns the unit off. Main status screen will indicate “OFFbyALM”.
NO FLOW-CHECK PUMP

*Note: When “Custom Message” is selected, you can choose your own custom message (up to 22 characters) for this input. A custom message does not function with a touch screen display.
Each of the custom alarm outputs can be assigned to any one or more alarm conditions. Not all alarms may be configured or applicable to your specific model. The specific alarm condition will turn on the output alarm when it is set to Yes (“Y”). The output will remain on as long as any one of the selected alarms is active. The default setting for alarm outputs #1 is “Y”. The default setting for alarm outputs #2 to #4 is “N”.

**CW Sensor:** Chilled water temperature sensor fault alarm.

**DA Sensor:** Discharge air temperature sensor fault alarm.

**Fan Ovld:** Fan overload alarm.

**Smoke:** Smoke detector alarm.

**Cond Wtr:** High condensation water level alarm.

**Fire Stat:** Fire status detected alarm
MENU K – ALARMS & LIMITS (Service Level) continued - Custom Outputs

C1 Hi Pr: Circuit #1 high pressure alarm.
C1 Low Pr: Circuit #1 low pressure alarm.
C2 Hi Pr: Circuit #2 high pressure alarm.
C2 Low Pr: Circuit #2 low pressure alarm.
Short Cycl: One or more compressors has caused a short cycle alarm.
Maint Timer: Maintenance timer alarm.

Hi Humid: High return air humidity alarm.
Low Humid: Low return air humidity alarm.
Humidifier: Humidifier fault alarm.
DA Low T: Discharge air low temperature alarm.
RA Low T: Return air low temperature alarm.
RA Hi Temp: Return air high temperature alarm.
Override: Scheduler in override mode.
Air Flow: Loss of airflow alarm.
Wtr Flow: Loss of water flow alarm.
Power Up: Power restored alarm.
Floor Wtr: Detection of floor water alarm.
Hum Inhibit: Humidifier inhibited alarm.

Heat Inhbt: Reheat is inhibited alarm.
Filter: Dirty filter alarm.
Manl Ovrd: Manual override input activated.
Hum Sensor: Return air humidity sensor fault alarm.
RA Sensor: Return air temperature sensor fault alarm.
“See Tag”: Optional alarm input set for message of “see tag” alarm.
Unit Stdby: Unit in standby by custom alarm input.

UPS is On: Custom alarm input set for “UPS ON” mode.

Stdby Pump: Custom alarm input set for “STANDBY PUMP ON” mode.

Hum Cyl: Custom alarm input set for “CHK HUMIDIFIER CYL” mode.

Cstm Msg 1: Custom alarm input #1 set for “Custom Message” mode.

Cstm Msg 2: Custom alarm input #2 set for “Custom Message” mode.

Cstm Msg 3: Custom alarm input #3 set for “Custom Message” mode.

Cstm Msg 4: Custom alarm input #4 set for “Custom Message” mode.

C1 Lockout: Compressor circuit 1 locked out alarm.

C2 Lockout: Compressor circuit 2 locked out alarm.

FreezeStat: Freeze Status alarm.

Rack Hi T: One or more rack sensors in high temperature alarm.
Rack Low T: One or more rack sensors in low temperature alarm.
Rack Sns F: Failure of one or more rack sensors alarm.
EVD Fault: EVD has a critical alar condition.
Lost Phase: Lost phase detected by optional power meter.
Cond Fan fault: Condenser fan communicated fault.
Evap Fan fault: Evaporator fan communicated fault.

VFD Fault: Custom alarm input set for “VFD FAULT” mode.
Pump-Down: A compressor had a pump-down failure
High CO2: High level CO2 alarm (shown only on gPOD model).
Low CO2: Low level CO2 alarm (shown only on gPOD model).
MENU L – CONFIGURE I/O (Factory Level)

Notice: The I/O Configuration menu should only be used by qualified technicians. It allows changes to the way inputs and outputs operate. Improper setting may prohibit safety functions from working and also affect the operation of controller.

Digital Input Screen (one of many) The top line identifies the function of the input. The second line indicates which input of the controller that it is wired to.

Action: This is the selection for when the input will be considered on (or in some cases, in alarm).

Delay: This is the time between the switch and the on status. Range of adjustment is 0 to 999 seconds with a default value of 5 seconds.

Status: Indicates the current status of the switch connected to the input.

Analog Input Screen (one of many) The top line identifies the function of the input. The second line indicates if the input is being used (enable on) and which input of the controller that it is wired to. The third line has the setting for resolution (Choices are Normal or High Res) and the type of sensor being used.

Minimum and Maximum - Sets the span of the sensor for voltage and current type sensors.

Offset – The offset value is used to calibrate the sensor.
MENU M – SET ZONE MASTER

Notice: The Zone Master menu only appears on the Master controller (Unit at address 1) when the zone master feature is enabled.

Zone ID: Within the same area, there may be more than one zone. This setting is sent out to all units to identify which zone the unit belongs to.

Units: Set this to the total number of units that are connected to the network (including the Master).

Online: The master will automatically detect how many units are connected to the Zone Master network. This number should match the number of units that you set above. An “off line” alarm will occur if any unit is not detected.

Finish Run->Stdby: When set to “Yes” any assisting unit must finish performing any temperature or humidity control operation before it can return to the standby mode.

Primary or Secondary Schedule: Selecting a secondary schedule offers even greater flexibility so that units can have different modes based on a time schedule.

Number Units On: This setting determines how many units will constantly be on, regardless of demand. The remainder of the units will be in standby (unless set to be in off mode). The Zone Master can be set to turn additional units on when demand increases.

Fan Modes:

Disabled (default) - The Zone Master does not control the fan of the units. Each unit will use its own fan control method.

Fan Mode: C. Airflow – The Zone Master will modulate the fan speed of all running units in the zone to maintain the zone airflow set point. This selection requires an optional airflow measuring sensor to be installed.

Unity Cl: Similar to the C. Airflow listed above, but the airflow setpoint is determined by a value communicated by an external control system.

Max Rack - The Zone Master will modulate the fan speed of all running units in the zone to the highest rack temperature. This selection requires optional rack temperature sensors.
**MENU M – Set Zone Master (continued)**

**Avg Rack** - The Zone Master will modulate the fan speed of all running units in the zone to the average rack temperature. This selection requires optional rack temperature sensors.

**C Air Prs** - The Zone Master will modulate the fan speed of all running units in the zone to maintain static air pressure. If all units have an air pressure sensor installed, the master will use the lowest usable reading. Otherwise the master will use its air pressure sensor.

![Zone Air Flow Screen](image)

*This screen will only appear if Fan Mode is set to “C. Flow”.*

**Zone AF SP** - The airflow set point for the zone in cubic feet per minute. This set point is the same one that appears on the “Zone Airflow” screen in the set points loop.

**Integration Time** – This setting determines the time before modulation will be changed to eliminate the difference between measured and set point.

**Band Factor** – This setting is how tight to the set point that modulation will swing. The larger the band, the less swing in modulation.

**Derivative Time** – This setting determines how sudden the modulation should change as a result of a change in measured air flow. It attempts to eliminate “overshooting” the set point.

**Assist on Demand** – Allows you to set the amount of fan demand where a standby unit will be requested to run (after the Standby On time setting described below). For example; if set to 75%, the master would request a standby unit to turn on when fan modulation reaches a demand of 75%.
Temperature Assist – If set to “Yes”, the Master will be allowed to request additional standby units to come on when the average zone temperature is higher than the cooling set point plus dead band plus 1.5°F.

ES Before DX: If set to “Yes”, the units in the zone will run in CW Energy Saver mode prior switching to DX cooling.

Tmp Assist Band: (only shown when ES Before DX is enabled). Offers an adjustable band of 1.0 to 10.0 degrees (default of 1.5) instead of the fixed 1.5°F for temperature assist.

Engy DX Band: (only shown when ES Before DX is enabled). Offers an adjustable band of 1.3 to 10.0 degrees (default of 1.3) instead of the fixed 1.3°F threshold that is added to DX staging when energy saver is running.

Standby On Delay – This is how long the master will wait before requesting a standby unit to turn on. The range of adjustment is 30 to 999 seconds, with a default setting of 30 seconds.

Standby Off Delay – This is how long the master will wait before allowing a unit to return to standby. The range of adjustment is 30 to 999 seconds, with a default of 900 seconds. Note: although the master may allow a unit to return to standby after this delay has expired, the unit may continue to run if the “Finish Run->Stdby” selection is set to “Yes”.

Enable Inhibit – If set to “Yes” (the default and recommended setting), the Zone Master will prevent units from performing conflicting operations. For example: If any unit is cooling, others will be prevented from heating, or if any unit is dehumidifying, other will be prevented from humidification.
Rotation: To even out runtime among standby units, a scheduled rotation of the lead unit may be chosen. The available selections are:

None – (Default) Rotation is disabled and the lead unit will not change. The lead unit selection will appear instead of the rotation timing selections below.

Day & Time – This selection will display an additional selection for the Day (Sunday through Saturday or Everyday) and the time when rotation will occur. The time is in AM/PM format.

Every “X” Hrs - Rotation will occur at the selected time increment beginning from when the increment is selected. It is not based on the clock hour status. Range is 1 to 48 Hrs

Exercise U2 – (Only shown when two units are installed). This setting is used for applications when unit 2 is a “backup unit” and unit 1 is normally doing all the cooling. This function sets how long the rotation to unit 2 will last before going back to unit 1. When “Exercise U2” is selected, the bottom line sets how many hours unit 2 will be allowed to run. Range of adjustment is 1 to 24 hours with a default setting of 1 hour.

Force Rotation – (Only shown when rotation is enabled and not selected as Exercise U2). This selection appears when rotation is enabled and allows you to manually cause a rotation. The timed rotation will still occur as expected and does not get reset when force rotation is used.
MENU M – Set Zone Master (continued)

Each unit in the zone must be assigned a mode of Standby (Stdby/Stdby1) or Off as described below. Note: More units may be displayed than are in the zone, their setting makes no difference.

**Stdby** (default) - Allows the master to request the standby unit to run due to one of these four causes:

1. To satisfy the minimum “Number Units On” setting. Based on this setting and the current lead unit, the master may request the unit to be on.

2. To satisfy the “Temperature Assist” feature (if enabled). If the average zone temperature gets too high, the master will request additional standby units to turn on.

3. To satisfy the airflow “Assist On Demand” setting (when fan mode set to “C Airflow”). Should the master modulate the fans of all running units greater than this setting, the master will request additional standby units to turn on.

4. To fill in for another unit that has an alarm, the master has selections for “Standby Alarms”. These selections determine which alarms the unit will send to the master. (The alarm selections are described later in this section). The master will then request a standby unit to turn on without delay. When the alarm condition is corrected on the unit that had the alarm, the master may request it to turn back on and return the requested unit to standby.

**Prior** - Priority mode operates the same as the standby mode described above, except it has first priority in the staging order. After all units in priority mode are requested to run, the master will begin staging the normal standby units.

**The OFF mode** - This mode does not allow the master to turn the unit on for any reason. It is normally only used when a unit is being serviced or if the unit is an unused spare. When a unit is set to OFF, it is not included in the rotation nor is it affected by the schedule.
This screen will only appear when the secondary schedule is used.

**Current Cfg:** shows which schedule is currently running. (Primary or Secondary).

**Override Active:** *(only shown when secondary schedule is running)*
Allows you to override the secondary schedule to run the primary schedule.

**Override Time:** is the setting for how many hours the override will last.
Range of adjustment is 1 to 12 hours, with a default of 4 hours.

*Note: The times displayed on the scheduler screens are in military (24 hour) format. Example; 6:00 PM = 18:00).*

**Day** – This is the selection of the weekday that you are currently configuring.

**Copy to** - This selection allows you to copy the settings of the day currently being displayed to another day without going through settings routine for each day. The field to the right of this selection causes the copy to take place by changing “No” to “Yes”. A message “Successful Copy” will then be momentarily displayed.

**Time and Setting** – Set the time of day when the schedules should change. Then set which schedule should be run at the time selected: Primary or Secondary.

When the clock reaches the time set, the schedule switches to the one selected. Under normal circumstances, each time setting would have the opposite schedule of the previous one. The schedules can be switched up to four times a day. Leave blank (----) if no additional scheduling is required.
MENU M – Set Zone Master (continued)

The holiday schedule allows you to set a span of one or more days to run the schedule selected: Primary or Secondary. Up to 4 holiday schedules may be set. While running a holiday schedule, it supersedes the weekday schedule. If a span of only one day is needed, consider using the special day scheduler described next.

Start – Choose the day and month to start the holiday.
Stop – Choose the day and month to end the holiday.
Setting – Choose which schedule will run during the holiday.

When the clock reaches the selected start day (at 12:00 midnight) the schedule that is selected will run. When the clock reaches the selected stop day (at 12:00 midnight) the holiday schedule will end and the normal weekday schedule will take over.

When (------) is shown, no holiday schedule is set.

This screen will only appear on the Master controller (Unit #1).

The special day schedule is like the Holiday schedule except it is limited to just one day that will run the schedule selected: Primary or Secondary. When a special day schedule is set, it supersedes the weekday schedule.
Menu M – Set Zone Master (continued)

Date – Choose the day and month of the special day.
Setting – Choose which schedule will run during the special day.
When the clock reaches the selected special day (at 12:00 midnight) the schedule that is selected for this day will run. When the clock reaches the end of this day (at 12:00 midnight) the special day schedule will end and the normal weekday schedule will take over. When (-----) is shown, no special day schedule is set.

This screen will only appear on the Master controller (Unit #1).

The Zone Alarms screens allow all units in the zone to report selected alarms to the master. Based on the alarm selection, the master will act as described below. There are up to 34 types of alarms that can be chosen.

**Standby (Stby):** When the selected alarm occurs in the unit, the Zone Master temporarily activates a standby unit to supplement the unit in alarm.

**Off:** As in standby alarms described above; when the selected alarm occurs in the unit, the Zone Master activates a standby unit to supplement the unit that had the alarm. In addition; the master will reconfigure the unit as Off (for both Primary and Secondary schedules) so that it will no longer be allowed to run. Once a unit is reconfigured to be Off, the unit must be set back to standby at the master in order to resume operation.

However, if all standby units have already been requested to turn on, the master will not reconfigure the last remaining unit as Off and allow it to continue to run.
Operation of Fan

When the system is turned on, the fan(s) will start running and must run for a full minute before any temperature or humidity control functions will begin.

*Note on minidap4:* The fan can be set to “Automatic” mode. This allows the fan to turn off until there is a need for temperature or humidity control.

**Fan Speed:**

Modulation of plug fan speed is based on the CW and DX mode selection. (Note: selections are limited based on the unit model).

- **Constant Speed:** Fan runs at a constant speed setting and is not modulated.
- **BMS Speed**: Fan begins at the constant speed setting then modulates according to a BMS value.
- **Vlv Pos Speed:** Fan modulates based on the position of the CW valve.
- **Air Pressure:** Fan modulates to maintain the static air pressure set point.
- **Const Flow:** Fan modulates to maintain the airflow set point.
- **BMS Flow:** Fan modulates to maintain the airflow of the BMS.
- **Vlv Pos Flow:** Fan modulates to maintain the airflow based on CW valve position.
- **Return Air T.:** Fan modulates to return air temperature to maintain temp set point.
- **Mod to Rack:** Fan modulates to rack temperature to maintain temperature set point.
- **Mod to Comp:** Fan modulates to variable compressor speed.
- **Mod to deltaT:** (Shown only on IRDX model). Fan will modulate to the difference between return and discharge temperature to maintain the delta temperature set point.

*Note: Except for the selections of Constant Speed and Mod to Comp optional sensors are required.*

**Safeties:** Fan modulation will be forced to maximum speed due to the following conditions: Humidifier On, Heater On, Energy Saver and Compressor On, Low Discharge Temp alarm, High or Low Return Temp alarm, Freeze Temp alarm, Rack Temp error (only if Fan set to modulate to Comp) or a Floor Water alarm.

On CW units, the fan will be forced to 100% due to a fan overload alarm so that other fans (if any) can make up for the one that shut-down.
Operation of Chilled Water Cooling

The CW valve can be controlled by the Return or Discharge air temperature. On energy saver units, after the “Switch to DX” setting (setting in the Factory menu) of continuous chilled water cooling, the unit will switch to DX cooling for one hour to exercise the compressors. The method of modulation depends on the controlled temperature selection.

If controlling the Return air temperature:

The chilled water valve will open 10% for each 0.1°F that the return air temperature is above the set point plus dead band. The chilled water valve will close 10% for each 0.1°F that the return air temperature is below the set point plus 1.0°F.

If controlling the discharge air temperature:

The chilled water valve will modulate by a PID algorithm (factory settings menu) to maintain the discharge air temperature.

Note: When running in the Energy Saver mode (Wtr Vlv configured as Engy Svg Cool or Aux Chill Wtr in factory menu) the CW valve does not modulate open unless the chilled water temperature is below the energy saver set point minus dead band and it must remain below the set point. Chilled water cooling will be inhibited for the “Energy Saver Lockout Time” (setting in the Factory menu) if the controlled temperature rises above the set point plus deadband plus “Change Over Band”. DX cooling will take over during this lockout time.

Safeties for CW Cooling: The CW valve will close under the following conditions: Condensation alarm, Air Flow alarm, or if the BMS sends a Cooling Inhibit command.

The CW valve will be fully open under the following conditions: Temperature sensor failure. Water Valve Flush Cycle running, Relative Hum Dehumidification running.
Operation of DX Cooling

The following types of safeties are used to protect the compressors.

**Pressure Safeties:**

For safety reasons, the High / Low pressure alarm functions are not performed by the dap4 controller. The compressor is shut down externally and the dap4 will indicate and log the alarm.

**General Safeties:**

All compressors will be shut down under the following conditions: Freeze Alarm, Floor Water Alarm (if set to turn off compressors), Condensation Alarm, Water Flow Alarm (if set to turn off compressors), BMS Cooling Inhibit command, Air Flow Alarm, Low Discharge Temp Alarm (if set to turn off compressors), EVD Off-line Alarm, EVD memory fault.

**Circuit Specific Safeties:**

The compressors of the circuit will be shut down under the following conditions: Repetitive High Pressure Alarms or an Out of Envelope Alarm (types of alarm that must be reset on alarm screen), Low Evap Temp Alarm, High Evap Temp Alarm, Suction Line Temp Sensor Failure, Suction Line Pressure Sensor Failure, Hot Gas Temp Alarm, High Superheat Alarm, Low Superheat Alarm, EVD valve motor alarm.

**Timing Safeties:**

The next compressor will not stage on until the “Delay Btw Stages” time cycle is completed. Once a compressor is turned off (for any reason) it must complete a 5-minute Minimum Off Time cycle before it can be run again (This time delay is increased by 1 minute following a compressor short-cycle alarm). When the variable compressor is started, it must complete a “Minimum Run Time” cycle before it can turn off.

**Variable Speed Compressor Envelope Safeties:**

The variable compressor must operate within an area called an “envelope”. Once the compressor is started, it must be inside the envelope before the Start-up delay time (0-99s with default of 60s) expires. An Out of Envelope alarm will occur if the compressor runs outside of the envelope for more than the Run Outside Delay time setting (0-99 seconds with default setting of 1s). This alarm will lock out the compressor requiring a manual reset. If the compressor starts running near the perimeter of the envelope (referred to as zones 2-5), corrective logic will force the speed of the compressor higher or lower. If after 30 seconds of corrective action the compressor did not move back into the normal zone, an Out of Envelope alarm will occur.
Please Note: Compressor operation is based on the type of compressor(s) that are configured and the temperature being controlled. Please refer to the proper section for the type of compressors and control mode that you are using.

Standard On/Off compressors:

When temperature is increasing:
Stage 1 ON at Setpoint + Deadband
Stage 2 ON at Setpoint + Deadband + Stage-to-Stage
Stage 3 ON at Setpoint + Deadband + Stage-to-Stage X 2
Stage 4 ON at Setpoint + Deadband + Stage-to-Stage X 3

When temperature is decreasing:
Stage 4 OFF at Temperature Setpoint + Stage-to-Stage X 3
Stage 3 OFF at Temperature Setpoint + Stage-to-Stage X 2
Stage 2 OFF at Temperature Setpoint + Stage-to-Stage
Stage 1 OFF at Temperature Setpoint

Note: The “Stage To Stage” setting is in the Setpoints menu (its default value is 0.3°F). There is a minimum delay between stages that is set as the “Delay Btw Stages” in the factory menu (its default value is 60 seconds).

When running in the waterside economizer mode (Wtr Vlv configured as Engy Sng Cool or Aux Chill Wtr in factory menu). The Setpoint is offset by +1.3°F.

When running in the airside economizer mode (feature that requires factory configuration), the Setpoint is offset by -0.9°F.

Note on Unloaders: When using dual compressors with unloaders the staging order is:

Stage 1 = C1 + Unloader 1
Stage 2 = C1 + Unloader 1 + C2 + Unloader 2
Stage 3 = C1 + C2 + Unloader 2
Stage 4 = C1 + C2
Single Variable Speed Compressor Controlling Return Air Temp.

The variable compressor turns on when the return air temperature rises above the Setpoint + Deadband.

It turns off when temperature drops below the Setpoint minus the C1 Ofs setting (default of 1.0°F).

Note if the Energy Saver mode is running: The variable compressor turns on when the return air temperature rises above the Setpoint + Deadband + Stage to Stage setting + 1.0°F. It turns off when the return air temperature drops below the Setpoint.

Modulation of the variable compressor to control the return air temperature will be by a proportional + Integral (PI) algorithm. The tuning parameters for this algorithm are in the Factory Setting menu.

Single Variable Speed Compressor Controlling Discharge Air Temp.

The variable compressor turns on when the discharge air temperature rises above the Setpoint + Deadband.

It turns off when temperature drops below the Setpoint minus the C1 Ofs setting (default of 1.0°F).

Note if the Energy Saver mode is running: The variable compressor turns on when the discharge air temperature rises above the Setpoint + Deadband + Stage To Stage setting. It turns off when the return air temperature drops below the Setpoint.

Modulation of the variable compressor to control the discharge air temperature will be by a proportional + Integral + derivative (PID) algorithm. The tuning parameters for this algorithm are in the Factory Setting menu.
Variable + Fixed Speed Compressors – Controlling Return Air Temp.

The variable compressor (C1) turns on when the return temperature rises above the Setpoint + Deadband. As temperature continues to rise, the variable compressor will run faster. Once it is running at 95% of maximum speed for the “C2 On Delay” setting, the fixed speed compressor is allowed to run.

The Fixed speed compressor (C2) turns on when the return temperature rises above the Setpoint + Deadband + The Stage-to-Stage setting.

The Fixed speed compressor (C2) turns off when the return temperature drops below the Setpoint minus the Stage-to-Stage setting for the duration of the C2 Off Delay time setting.

The variable speed compressor (C1) turns off when the return temperature drops below the Setpoint minus The C1 Offset setting (default of 1.0°F).

Modulation of the variable compressor to control the return air temperature will be by a proportional + Integral (PI) algorithm. The tuning parameters for this algorithm are in the Factory Setting menu.

Note if the Energy Saver mode is running (Wtr Vlv configured as EngySvg Cool or Aux Chill Wtr in factory menu). The variable compressor turns on when the return air temperature rises above the Setpoint + Deadband + Stage To Stage setting + 1.0°F. It turns off when the return air temperature drops below the Setpoint.
**Variable + Fixed Speed Compressors – Controlling Discharge Air Temp.**

The variable compressor (C1) turns on when the discharge air temperature rises above the Setpoint + Deadband. As temperature continues to rise, the variable compressor will run faster. Once it is running at 95% of maximum speed for the “C2 On Delay” setting, the fixed speed compressor is allowed to run.

The Fixed speed compressor (C2) turns on when the discharge air temperature rises above the Setpoint + Deadband + The Stage-to-Stage setting.

The Fixed speed compressor (C2) turns off when the discharge air temperature drops below the Setpoint minus the Stage-to-Stage setting for the duration of the C2 Off Delay time setting.

The variable speed compressor (C1) turns off when the discharge air temperature drops below the Setpoint minus The C1 Offset setting (default of 1.0°F).

Modulation of the variable compressor to control the discharge air temperature will be by a proportional + Integral + derivative (PID) algorithm. The tuning parameters for this algorithm are in the Factory Setting menu.

Note if the Energy Saver mode is running (Wtr Vlv configured as Engy Svg Cool or Aux Chill Wtr in factory menu). The variable compressor turns on when the discharge air temperature rises above the Setpoint + Deadband + Stage To Stage setting. It turns off when the discharge air temperature drops to the Setpoint.

Note: The variable compressor (C1) will always be the lead compressor as the compressor rotation feature is disabled. However, C2 can be forced to run in the event that it has not been used for the period of the “Exercise Time”. This feature can be enabled on the Fixed Compressor screen in the factory menu.
Operation of Reheat

The dap4 can be configured to use the following reheat modes:

- **None** - No reheat installed. DX dehumidification cannot operate.
- **One** - A single stage of reheat.
- **1-Elect** - A single stage of reheat but runs only in dehumidification mode.
- **HW Valve** - (Not on IRDX Model). A discharge air temperature sensor must be installed to select this mode. An On/Off Hot Water valve connects to heat stage 1 output and if modulated type, uses the SCR output (Y4). (dehum fan speed is not affected by using HW valve).
- **Two** - (Not on IRDX Model or MiniDAP). Two stages of reheat.
- **Three** - (Not on IRDX Model or MiniDAP). Three stages of reheat.
- **3-Elect** - (Not on IRDX Model or MiniDAP). Three stages of reheat but runs only in dehumidification mode.
- **HGRH** – A modulated Hot Gas valve connects to output (Y4). It is modulated to maintain return/discharge air temperature only while compressor is running in the dehum mode.
- **HGRH+1** – Operates the same as the HGRH mode but will have a second reheat stage.
- **HGRH+SCR** Operates the same as the HGRH mode but will also use SCR modulated reheat that can operate without dehum mode.

**Safeties:** The heaters will be shut down under the following conditions: Air Flow Alarm, Condensation Alarm, Fan Overload Alarm, or a Reheat Inhibit command (from BMS, Zone Master, or custom alarm input).

*Note: Heating will be interrupted if humidification is running when the humidifier is set to a “Computer” mode.*

**Timed Safeties:** There is a 60 second delay between heating stages.
Operation of Reheat – Continued

Staging Heating Elements:
When temperature is dropping:
Stage 1 ON at Setpoint minus Deadband
Stage 2 ON at Setpoint minus Deadband minus Stage-to-Stage
Stage 3 ON at Setpoint minus Deadband minus 2 X Stage-to-Stage
Note: there is a minimum delay of 60 seconds before next stage turns on.

When temperature is rising:
Stage 3 OFF at Setpoint minus 2 X Stage-to-Stage
Stage 2 OFF at Setpoint minus Stage-to-Stage
Stage 1 OFF at Setpoint

SCR Reheat: This feature uses an optional SCR reheat module. (Note: SCR reheat mode is enabled automatically when the cooling mode is set to “precise” setting. Rather than heat stages, the SCR module modulates the heaters for better regulation. The SCR Band setting determines how far below set point minus dead band the temperature can drop for modulation to reach 100%.

HGRH: This feature uses a Hot Gas proportional control valve. The HGRH Band setting determines how far below set point minus dead band the temperature can drop for modulation to reach 100%.

HGRH+1: Operates like the HGRH mode above but will stage a second reheat element when temperature drops below the setpoint minus the stage-to-stage setting.
Operation of Dehumidification

**Humidity Anticipation:** When this feature is enabled (set in the factory menu), the Humidity set point is offset ±1% for every 1.5° that the return air temperature is from the set point to a maximum 10° offset.

**Fan Speed Assist:** When this function is enabled in the factory menu, the fan speed will be reduced (by 5 to 20%) during the dehumidification mode (CW or DX units). The lower fan speed helps to condense the humidity in the air. *Note: This feature requires a discharge air temperature sensor to be installed.*

**Safeties** Dehumidification will not run under the following conditions: Air Flow Alarm, Floor Water alarm, Condensation Alarm or a Dehumidification Inhibit command (from BMS).

**Timed Safeties:** Dehumidification mode cannot run within 5 minutes of a humidification cycle.

**Temperature Safeties:** When Dehumidification mode is set to “In Limit” it will stop if the temperature drops 2°F below the set point minus the dead band. Operation will resume when the temperature rises back to the set point.

**Dehumidification - Chilled Water**

The method of CW valve modulation depends which type of humidity control (selected in the factory menu) is selected:

**Relative Humidity Control:** When the humidity rises above the humidity Setpoint + Deadband the valve will open 100%. It will return to cooling modulation when humidity drops to the humidity Setpoint.

**Dewpoint Humidity Control:** The CW valve will open 10% for every 0.1° that the dewpoint rises above the High Dewpoint setpoint + deadband. When there is no dewpoint demand, the CW valve will open 10% for every 0.1% that the relative humidity rises above the humidity setpoint + deadband. The CW valve will modulate to whichever has greater demand: Dewpoint control or Temperature control.
Dehumidification Operation (continued)

**Dehumidification DX Unit:** Operation is based on the mode selected in the factory menu.

- **None** – No dehumidification mode (default setting)
- **1C In Limit** – One compressor may run as long as temperature does not drop 2°F below the set point minus the dead band. Dehumidification will resume when the temperature rises back to the set point.
- **1C No Limit** – One compressor may run regardless of a drop in temperature.
- **2C In Limit** – (Not shown on IRDX models). Two compressors may run as long as temperature does not drop 2°F below the set point minus the dead band. Dehumidification will resume when the temperature rises back to the set point.
- **2C No Limit** – (Not shown on IRDX models). Two compressors may run regardless of a drop in temperature.

**Operation:** The compressors are staged on for temperature or humidity control, whichever has the greater demand. Dehumidification can be set to control: Relative Humidity or Dew point. Please refer to the following section that covers your factory setting and the type of compressor installed.

**On/Off Compressors Controlling Relative Humidity:**

- When humidity is increasing:
  - Stage 1 ON at Setpoint + Deadband
  - Stage 2 ON at Setpoint + Deadband + 1%
  - Stage 3 ON at Setpoint + Deadband + 2%
  - Stage 4 ON at Setpoint + Deadband + 3%

- When humidity is decreasing:
  - Stage 4 OFF at Setpoint + 3%
  - Stage 3 OFF at Setpoint + 2%
  - Stage 2 OFF at Setpoint + 1%
  - Stage 1 OFF at Setpoint
Dehumidification Operation (continued)

**On/Off Compressors Controlling Dew Point:** In Dew Point control mode, compressors are staged according to dew point, but the relative humidity level is also factored as well.

When dew point or humidity is increasing:
Stage 1 ON at High DP Setpoint
  or if R.Humidity is above Setpoint + Deadband
Stage 2 ON at High DP Setpoint minus 0.2°F
  or if R.Humidity is above Setpoint + Deadband + 1%
Stage 3 ON at High DP Setpoint minus 0.4°F
  or if R.Humidity is above Setpoint + Deadband + 2%
Stage 4 ON at High DP Setpoint minus 0.6°F
  or if R.Humidity is above Setpoint + Deadband + 3%

When dew point or humidity is decreasing:
Stage 4 OFF at High DP Setpoint minus High DP DB minus 0.6°F
  and if R.Humidity is below Setpoint + 3%
Stage 3 OFF at High DP Setpoint minus High DP DB minus 0.4°F
  and if R.Humidity is below Setpoint + 2%
Stage 2 OFF at High DP Setpoint minus 0.2°F minus High DP DB
  and if R.Humidity is below Setpoint + 1%
Stage 1 OFF at High DP Setpoint minus High DP DB
  and if R.Humidity is below Setpoint
Dehumidification Operation (continued)

Variable Compressor Controlling Relative Humidity

**Temp Control set to Return Air**: The variable compressor starts at Humidity Setpoint plus Deadband. The compressor demand will increase 10% for each 0.1% increase in humidity and reach 100% at Humidity Setpoint + Deadband + 1%. C2 (if enabled) will turn on when humidity reaches Humidity Setpoint + Deadband + 1.1%. As humidity decreases, C2 will turn off when humidity drops to humidity setpoint + 1% and the variable compressor demand will begin to decrease and turn off at Humidity Setpoint minus 1%.

**Temp Control set to Discharge Air**: The variable compressor starts at Humidity Setpoint + Deadband. The compressor demand will increase 10% for each .1% increase in humidity above the Setpoint minus Deadband + 1.1% and reach 100% at Humidity Setpoint + Deadband + 2.1%. As humidity decreases, the compressor demand will decrease to zero and turn off at Humidity Setpoint.

**Variable Compressor Controlling Relative Humidity (IRDX)**:

**Temp Control set to Return Air**: The variable compressor starts at Humidity Setpoint + Deadband. The compressor demand will increase 10% for each .2% increase in humidity and reach 100% at Humidity Setpoint + Deadband + 2%. As humidity decreases, the compressor demand will decrease to zero and turn off at Humidity Setpoint.

**Temp Control set to Discharge Air**: The variable compressor starts at Humidity Setpoint + Deadband and will run at 50% for the first two minutes. The compressor demand will increase 10% for each .4% increase in humidity above the Setpoint + Deadband + 1.1% and reach 100% at Humidity Setpoint + Deadband + 3.1%. As humidity decreases, the compressor demand will decrease to zero and turn off at Humidity Setpoint.

**Variable Compressor Controlling Dewpoint**

The variable compressor starts when dew point reaches Hi Dewpoint SP minus 1.0°F. The compressor demand will increase 10% for each 0.1°F increase in dew point and reach 100% at Hi Dewpoint SP. As the dew point decreases, the compressor demand will begin to decrease at Hi Dewpoint SP minus Hi Dewpoint DB. It will reach zero at Hi Dewpoint SP minus Hi Dewpoint DB minus 1.0°F.

When dew point modulation has no demand, the Relative humidity logic may determine compressor modulation (dew point modulation having the priority).
Operation of Humidifier

There are two types of humidifiers: Modulated and Non-Modulated (On/Off type). Each type can control Relative Humidity (default) or Dew Point. The humidifier operation depends on these settings. Please refer to the section that applies to your equipment:

**Non Modulating, Controlling Relative Humidity:**
Humidification mode starts when humidity drops below the Humidity Setpoint minus the Humidity Deadband. The humidifier turns off when the humidity rises to 1% below the humidity Setpoint.

**Non Modulating, Controlling Dewpoint:**
Humidification mode starts when dewpoint drops below the Low Dewpoint Setpoint. The humidifier turns off when the dewpoint rises above the Dewpoint Setpoint plus the Low Dewpoint Deadband.

**Modulating, Controlling Relative Humidity:**
Humidification mode starts when humidity drops below the Humidity Setpoint minus 1%. As humidity drops, the humidifier demand will rise proportionally to reach 100% at setpoint – minus deadband. As humidity rises, humidifier demand will drop proportionally and will turn off when the humidity rises to setpoint minus 0.5%.

**Modulating, Controlling Dewpoint:**
Humidification mode starts when humidity drops below the Low Dewpoint Setpoint. As dewpoint drops, the humidifier demand will rise proportionally to reach 100% at Low Dewpoint Setpoint – minus Low Dewpoint Deadband. As dewpoint rises, humidifier demand will drop proportionally and turn off when the dewpoint rises above the Dewpoint Setpoint plus the Low Dewpoint Deadband.
**Auto-Flush**: This feature is enabled in the factory menu. It sets how many hours can elapse before the humidifier pan drain is opened for 4 minutes.

**Desaturation cycle**: When this feature is enabled (in the factory menu) it will periodically interrupt the humidification mode (every 5 to 30 mins) so that the air has time (1 to 5 mins) to fully absorb the humidity.

**Hum Anticipation**: When this feature is enabled (set in the factory menu), the Humidity setpoint is offset ±1% for every 1.5° that the return air temperature is from the setpoint to a maximum 10° offset. The amount of offset is shown in a screen dedicated to this mode in the set points menu.

**Safeties** Humidification will not run under the following conditions: Humidifier Fault Alarm, High Humidity Alarm, Air Flow Alarm, Humidity Sensor Failure Alarm, Fan Overload Alarm, Condensation Alarm or a Dehumidification Inhibit Command (from BMS or Zone Master or Custom Alarm Switch).

**Timed Safeties**: Humidification mode cannot run within 5 minutes of a dehumidification cycle or within 3 minutes of a drain cycle to allow time for the water pan to refill.

*Note: When Humidifier mode is set to Computer Mod or Computer Non-Mod, reheat is inhibited during humidification mode.*
Operation of Zone Master

Zone Master is an optional feature that offers a dap4 control teamwork solution. Up to sixteen dap4 units may be arranged in the Zone Master network. Each unit in a zone is given a unique sequential network address. The unit at address 1 is designated as the master and has menus with selectable features of:

- Minimum number of units that must always be on
- Automatic lead/lag and standby unit rotation
- Activate a standby unit due to an alarm condition
- Deactivate a running unit due to an alarm condition
- Activate one or more standby units to assist with controlling temperature
- Inhibit certain control functions to prevent units from conflicting operations
- Primary and secondary schedules for economical control
- Unified zone airflow control

The master can request additional standby units to run in the event of an alarm condition (customizable) or if the master cannot meet the demand for cooling, airflow or static air pressure.

To even out run time between units, the master has a rotation schedule that will change which unit is in the lead. Beginning with the lead unit, the master will stage units that are capable of running (i.e. not off by Keypad or due to an alarm). Units in the Priority mode will stage on before units in the Standby mode. The master will not stage any unit set to the Off mode. For even greater flexibility, a secondary mode may be used so that units can have a deferent mode based on a time schedule.

Note: If communication of the Zone Master is broken, all units will operate independently using their own setpoints. If the unit was in standby, it will turn on. The message “Master (U1) has Gone Offline” will displayed on each slave unit.

If communication is lost between the Master and a slave unit (for example Unit #3), the master will display “Unit 3 is Offline”. The Master will exclude Unit 3 from its average temp/hum calculations and remove it from rotation. As a result of the slave unit going off-line, the Master may request another unit to take its place.
**Zone Master Operation (continued)**

<table>
<thead>
<tr>
<th>Important Notice</th>
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</thead>
<tbody>
<tr>
<td>The Zone Master feature requires an activation code for each unit connected to the Zone Master network.</td>
</tr>
<tr>
<td>Also, all units in a zone must have the same software version. If units were installed at different times, they may not have the same software version. Please check the dap4 software version by using menu F- “Information”. If needed, please contact the Data Aire service department to obtain a software update for USB installation.</td>
</tr>
<tr>
<td>Please read the Zone Master supplement for installation information.</td>
</tr>
</tbody>
</table>

Fan Operation is based on the fan mode setting of the master:

**Disabled** - (default) The Zone Master does not control the fan of the units and the unit will use its own fan control mode.

**Constant Airflow** – The Zone Master will modulate the fan speed of all running units in the zone to maintain the zone airflow set point. All units in the zone will be controlled by the master regardless of the unit’s own setting. This selection requires an optional airflow measuring sensor to be installed. An additional airflow tuning screen will appear in the Zone Master menu allowing you adjust the airflow set point and tune the airflow modulation.

**Unity Cooling** – Allows a BMS system to control the airflow set point.

**Maximum Rack** - The Zone Master will modulate the fan speed of all running units in the zone based on the maximum rack temperature.

**Average Rack** - The Zone Master will modulate the fan speed of all running units in the zone based on the average rack temperature.

**C Air Prs** - The Zone Master will modulate the fan speed of all running units in the zone to maintain static air pressure. If all units have an air pressure sensor installed, the master will use the lowest usable reading. Otherwise the master will use its air pressure sensor.

Note: The rack selections described above, require each unit to have rack temperature sensors installed. The rack temperature of each unit can be
customized to use the average or highest temperature of its sensors. The master can be set to take the average or highest temperature of the units in the zone. Additional rack sensor information is available on a publication dedicated to this optional feature.

**Temperature Assist** – If set to “Yes”, the Master will be allowed to request additional standby units to come on when the average zone temperature is higher than the cooling set point plus dead band plus 1.5°F*.

**ES Before DX**: If set to “Yes”, (default is No) all of the units in the zone will run in CW Energy Saver mode prior switching to DX cooling. Use this feature only when all units in the zone have CW cooling and are set to Energy Saver mode.

* **Tmp Assist Band**: (only shown when ES Before DX is enabled). Offers an adjustable band of 1.0 to 10.0 degrees (default of 1.5) instead of the fixed 1.5°F for temperature assist.

**Engy DX Band**: (only shown when ES Before DX is enabled). Offers an adjustable band of 1.3 to 10.0 degrees (default of 1.3) instead of the fixed 1.3°F threshold that is added to DX staging when energy saver is running.

**Standby On Delay** – This is how long the master will wait before requesting a standby unit to turn on. The range of time is 30 to 999 seconds, with a default setting of 30 seconds.

**Standby Off Delay** – This is how long the master will wait before allowing a unit to return to standby. The range of time is 30 to 999 seconds, with a default of 900 seconds. Note: although the master may allow a unit to return to standby after this delay period, the unit may continue to run if the “Finish Run->Stby” selection is set to Yes.

**Enable Inhibit** – If set to Yes (default and recommended setting), the Zone Master will prevent units from performing conflicting operations. For example: If any unit is cooling, others will be prevented from heating. If any unit is dehumidifying, then other will be prevented from humidification.
Unit Settings - Standby mode (default) or Prior mode allows the master to request the unit to run due to one of these four causes:

To satisfy the minimum "Number Units On" setting. Based on this setting and the current lead unit, the master may request the unit to be on.

To satisfy the “Temperature Assist” feature (if enabled). If the average zone temperature gets too high, the master will request additional standby units to turn on.

To satisfy the airflow or air pressure feature (if enabled) the “Assist On Demand” setting will allow additional standby units to run. Should the master modulate the fans of all running units greater than this setting, the master will request additional standby units to turn on.

To fill in for another unit that has an alarm, the master has selections for “Standby Alarms”. These selections determine which alarms the unit will send to the master. (The alarm selections are described later in this section). The master will then request a standby unit to turn on without delay. When the alarm condition is corrected on the unit that had the alarm, the master may request it to turn back on and return the requested unit to standby.

Unit Settings - The OFF mode This mode does not allow the master to turn the unit on for any reason. It is normally only used when a unit is being serviced or if the unit is an unused spare. When a unit is set to OFF, it is not included in the rotation nor is it affected by the schedule.

Rotation: To even out runtime among standby units, a scheduled rotation of the lead unit may be chosen. The available selections are:

- None - Rotation is disabled and the lead unit will not change. The lead unit selection will appear instead of the rotation timing selections below.

- Every 8 Hrs, Every 12 Hrs, Every 16 Hrs - Rotation will occur at the selected time increment beginning from when the increment is selected. It is not based on the clock hour status.
Zone Master Operation (continued)

Exercise U2 – *Only shown when two units are installed*. This setting is used for applications when unit 2 is a “backup unit” and unit 1 is normally doing all of the cooling. This function sets how long the rotation to unit 2 will last before going back to unit 1. When “Exercise U2” is selected, the bottom line sets how many hours unit 2 will be allowed to run. Range of adjustment is 1 to 24 hours with a default setting of 1 hour.

Day & Time – This selection will display an additional selection for the Day (Sunday through Saturday or Everyday) and the time when rotation will occur. The time is in AM/PM format.

Time and Setting – Set the time of day when the schedules should change. Then set which schedule should be run at the time selected: Primary or Secondary.

When the clock reaches the time set, the schedule switches to the one selected. Under normal circumstances, each time setting would have the opposite schedule of the previous one. The schedules can be switched up to four times a day. Leave blank (------) if no additional scheduling is required.

In addition to the daily scheduler described above, a holiday or special day schedule may also be used.

**Holiday schedule** allows you to set a span of one or more days to run the schedule selected: Primary or Secondary. Up to 4 holiday schedules may be set. While running a holiday schedule, it supersedes the weekday schedule.

**Special day schedule** is similar to the Holiday schedule except it is limited to just one day that will run the schedule selected: Primary or Secondary. While running a special day schedule, it supersedes the weekday schedule.
Alarms

During an alarm condition, the status LED bar of the display will light up in red. The red box on the main screen will indicate what alarm(s) is occurring. This table offers assistance troubleshooting what may be causing the alarm.

Each alarm is logged in the History menu. This log is useful because it shows all alarms, even ones that may have automatically reset. It records the name of the alarm, the date and time when it occurred and the temperature and humidity readings.

Alarm Legends
- **Warning** - *Alarm offers a notification only
- **Urgent** - **Alarm will shut down effected functions like compressor or fan
- **Critical** - ***Alarm will cause complete unit shutdown

<table>
<thead>
<tr>
<th>Alarm Screen</th>
<th>Description &amp; Classification</th>
<th>Possible Causes</th>
<th>Corrective Actions</th>
</tr>
</thead>
</table>
| Chilled Water Sensor Failure | Chilled water sensor failure detected              | • Chilled Water Sensor input is enabled, but no sensor is connected.            | • Go to Menu L – Configure I/O and change the Chilled Water Sensor (U10) Enable to Off  
<p>|                              | *Warning                                          | • Loose Connection                                                             | • Check connection and cable                                                                |
|                              |                                                   | • Faulty Sensor                                                               | • Use Temperature Sensor Chart to verify resistance of sensor and replace if necessary                                                      |
| Return Air Sensor            | Return Air Sensor failure                         | • Loose sensor                                                                | • Check connection                                                                             |
|                              | *Warning                                          | • Faulty sensor                                                               | • Use sensor chart to check sensor, replace sensor if required.                              |
|                              |                                                   | • Incorrect settings on the controller                                        | • Go To Menu L – Configure I/O and change the Return Air Temp Sensor (U04) Enable to Off    |
| Power UP                     | Loss of power                                    | • Loss of power, can be set to not automatically restart unit                  | • Check power.                                                                                |
|                              | Urgent/Critical                                  |                                                                                  |                                                                                                                                                  |
| UPS is On                    | UPS/alternate Power On                            | • Primary power is off                                                         | • Check main power                                                                            |</p>
<table>
<thead>
<tr>
<th>Alarm Screen</th>
<th>Description &amp; Classification</th>
<th>Possible Causes</th>
<th>Corrective Actions</th>
</tr>
</thead>
</table>
| Smoke Detector      | Smoke detector is sensing smoke and will shut down unit ** Urgent | - The smoke detector sensing smoke  
- Bad smoke detector  
- Incorrect settings on the controller | - Check the smoke detector and reset after smoke has cleared  
- Check for 24 volt power at Smoke Detector and replace if necessary  
- Go to Menu L –Configure I/O and change the Smoke Detector action setting |
| High Condensate Water Level | Condensation water level is above the condensate alarm switch level *Warning | - Clogged condensate drain line  
- Bad condensate pump  
- Float switch is loose or broken  
- Loose Connection  
- Too high vertical drain line  
- Incorrect settings on the controller | - Blow out or clean drain line  
- Replace condensate pump  
- Check and replace float switch  
- Check wire connections  
- Check vertical drain line (Lift), The highest lift for the Little Giant pump should be 11 feet and 23 feet for the Becket pump  
- Go to Menu L –Configure I/O and change the Condensation Switch action setting |
| Fire Stat Temperature | Return Air temperature is above the Fire Stat set point and will shut down unit ***Critical | - High Return air temperature  
- Return Air Temp sensor is out of calibration  
- Faulty Sensor | - Check return air temperature and also check the Fire stat set point and raise setting if needed (range 100º-150º)  
- Calibrate Sensor  
- Use Temperature Sensor Chart to verify resistance of the sensor |
<p>| Maintenance Timer   | Schedule normal maintenance | - Maintenance needs to be performed | - Perform maintenance that is required |</p>
<table>
<thead>
<tr>
<th>Alarm Screen</th>
<th>Description &amp; Classification</th>
<th>Possible Causes</th>
<th>Corrective Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Warning</strong></td>
<td>• Maintenance timer has not been reset</td>
<td></td>
<td>Reset timer</td>
</tr>
</tbody>
</table>
| C1 or C2 Low Pressure | Circuit pressure is under 50 PSI (it will cut-in at 90 PSI) | • Not enough air flow though evaporator coil  
• Low Indoor Temperature  
• Dirty Filters  
• Low refrigerant charge  
• Inoperative Expansion valve  
• Filter Drier clogged up  
• Restricted liquid line  
• Undersized lines  
• Inefficient Compressor  
• Incorrect settings on the controller | • Blower motor on low speed or failed motor, High static pressure, or undersized plenums  
• Raise the temperature above 68° degrees  
• Replace filters  
• Check sub-cooling, and test for leaks. Repair leaks and add refrigerant  
• Adjust and check valve operation and replace if needed  
• Replace filter drier  
• Repair restriction  
• Check line design at IOM  
• Test compressor efficiency  
• Go to Menu L – Configure I/O and change the Low Pressure Switch action setting |
| **Urgent**   |                          |                 |                   |
| C1 or C2 High Pressure | Circuit pressure is over the pressure setting of switch | • High outdoor ambient temperature  
• Recirculating of condensing air  
• Low heat rejection at condenser  
• Not enough air across Condenser coil | • Wait until ambient temperature drops  
• Remove obstruction to air flow  
• Check condenser fan motor operations on air cooled, check water flow on water cooled.  
• Check condenser fan cut-in temperatures, and clean condenser coil if needed  
• Check blower speed |
<table>
<thead>
<tr>
<th>Alarm Screen</th>
<th>Description &amp; Classification</th>
<th>Possible Causes</th>
<th>Corrective Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alarm Screen</td>
<td>Excessive Airflow across the evaporator coil</td>
<td>• Heavy Load</td>
<td>• High indoor temperature, check blower speed, and check equipment selection</td>
</tr>
<tr>
<td></td>
<td>• Excessive Airflow across the evaporator coil</td>
<td>• Return duct damaged</td>
<td>• Check return duct for leakage and check temperature entering evaporator coil</td>
</tr>
<tr>
<td></td>
<td>• Sensing Bulb is loose</td>
<td>• Sensing Bulb is loose</td>
<td>• Tighten bulb bracket</td>
</tr>
<tr>
<td></td>
<td>• Over charge of refrigerant</td>
<td>• Over charge of refrigerant</td>
<td>• Check sub-cooling (8-10) and adjust charge if necessary</td>
</tr>
<tr>
<td></td>
<td>• Non-condensable</td>
<td>• Non-condensable</td>
<td>• Recover charge, evacuate, then re-charge system</td>
</tr>
<tr>
<td></td>
<td>• Undersized refrigerant pipe</td>
<td>• Undersized refrigerant pipe</td>
<td>• Refer to your respective IOM manuals for more details. Follow the recommended tables.</td>
</tr>
<tr>
<td></td>
<td>• Expansion valve Overfeed</td>
<td>• Expansion valve Overfeed</td>
<td>• Adjust and check valve operations</td>
</tr>
<tr>
<td></td>
<td>• Faulty high pressure switch. Cut out: R410A at 575 PSI or R407 at 450PSI.</td>
<td>• Faulty high pressure switch. Cut out: R410A at 575 PSI or R407 at 450PSI.</td>
<td>• Replace high pressure switch</td>
</tr>
<tr>
<td></td>
<td>• Incorrect settings on the controller</td>
<td>• Incorrect settings on the controller</td>
<td>Go to Menu L- Configure I/O and change the High Pressure Switch action setting</td>
</tr>
</tbody>
</table>

** Compressor Short Cycle**
Compressor has started more than 10 times in an hour.

** Urgent

<table>
<thead>
<tr>
<th>Possible Causes</th>
<th>Corrective Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not enough Heat Load or Oversized System</td>
<td>• Check for heat load</td>
</tr>
<tr>
<td>Temperature Dead Band is set too low</td>
<td>• Check and raise Temperature Dead Band</td>
</tr>
<tr>
<td>Humidity Dead Band is too low (causing frequent dehum cycles)</td>
<td>• Check and raise Humidity Dead Band</td>
</tr>
<tr>
<td>Alarm Screen</td>
<td>Description &amp; Classification</td>
</tr>
<tr>
<td>--------------</td>
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<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Hi Humidity</td>
<td>The return air humidity is higher than the high humidity alarm limit.</td>
</tr>
<tr>
<td></td>
<td>*Warning</td>
</tr>
<tr>
<td></td>
<td></td>
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<td></td>
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<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Low Humidity</td>
<td>The return air humidity is lower than the low humidity alarm limit</td>
</tr>
<tr>
<td></td>
<td>*Warning</td>
</tr>
<tr>
<td></td>
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</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Humidifier failure</td>
<td>Humidifier malfunction</td>
</tr>
<tr>
<td></td>
<td>*Warning</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Alarm Screen</td>
<td>Description &amp; Classification</td>
</tr>
<tr>
<td>--------------</td>
<td>-----------------------------</td>
</tr>
</tbody>
</table>
| Discharge Air Low Temp | Discharge air temperature is below alarm set point | - Incorrect settings on the controller  
- Supply air temperature is below set point  
- Dehumidification set to low or Fan Speed Assist setting may be running fan too slow.  
- Not enough heat load  
- Faulty Sensor  
- Loose Connection  
- Out of calibration  
- Reheat Coils are not working correctly during dehumidification mode  
- Incorrect settings on the controller | - Replace tank if necessary  
- Go to Menu L- Configure I/O and change the Humidifier Fault Switch action setting  
- Adjust the Discharge Air alarm limit set points (range 45º-60º).  
- Increase Dehum setpoint, Lower Dehum Fan Speed Assist setting.  
- Increase heat load  
- Check discharge air temp sensor against the Temperature Sensor Chart to verify resistance of sensor  
- Check connection, cable and correct connection points  
- Calibrate sensor  
- Check Reheat coil operations  
- Go To Factory Settings in Menu J scroll down to Reheat Settings and enter the correct information |
| Return Air Low Temp | Return Air Temperature is below alarm set point limit | - Return air temperature is too low  
- Not enough heat load  
- Faulty Sensor  
- Loose Connection  
- Out of calibration | - Increase Temperature set point or adjust the low Return Air alarm set point lower (range 55º-75º)  
- Increase heat load  
- Use Temperature Sensor Chart to verify resistance of the sensor  
- Check Connection, cable and correct connection points  
- Calibrate sensor |
<table>
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<th>Description &amp; Classification</th>
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<th>Corrective Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Return Air</td>
<td>Return Air Temperature is above the alarm set point</td>
<td>• Return air temperature is above set point</td>
<td>• Check return air temperature. Adjust Return Air Hi alarm set point (range 70º-90º)</td>
</tr>
<tr>
<td>High Temp</td>
<td>*Warning</td>
<td>• Heavy load</td>
<td>• Reduce heat load</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Electrical Problem</td>
<td>• Check voltage and fuses to compressor</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Loose Connection</td>
<td>• Check connection and cable</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Out of calibration</td>
<td>• Calibrate sensor</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Faulty Sensor</td>
<td>• Use Sensor Chart to check Return Air temp sensor</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Refrigerant charge is incorrect</td>
<td>• Check Sub cooling and Superheat</td>
</tr>
<tr>
<td>Override</td>
<td>Manual Override Alarm</td>
<td>• One or more Manual Override switches are switched to on position</td>
<td>• Switch Manual Override switches to off position</td>
</tr>
<tr>
<td></td>
<td>*Warning</td>
<td>• Incorrect settings on the controller</td>
<td>• Go to Menu L- Configure I/O and change Manual Override Switch action setting</td>
</tr>
<tr>
<td>Air Flow</td>
<td>No Airflow alarm</td>
<td>• No air flow</td>
<td>• Check airflow</td>
</tr>
<tr>
<td></td>
<td>**Urgent</td>
<td>• Speed of the motor to low</td>
<td>• Check fan speed</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Bad blower motor</td>
<td>• Check blower motor windings and amp draw</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Current Sensor not sensing current</td>
<td>• Adjust Current Sensor</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Loose Connection</td>
<td>• Check Connection and cable</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Dirty filter</td>
<td>• Check filter</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Faulty Current Sensor</td>
<td>• Replace sensor if necessary</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Incorrect settings on the controller</td>
<td>• Go To Factory Settings in Menu J scroll down to Fan Settings and enter the correct information</td>
</tr>
<tr>
<td>Alarm Screen</td>
<td>Description &amp; Classification</td>
<td>Possible Causes</td>
<td>Corrective Actions</td>
</tr>
<tr>
<td>--------------</td>
<td>------------------------------</td>
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<td>-------------------</td>
</tr>
<tr>
<td>Water Flow</td>
<td>No Water Flow <strong>Urgent</strong></td>
<td>No water flow</td>
<td>• Go to Menu L- Configure I/O and change the Air Flow Switch action setting</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Wiring problem</td>
<td>• Check pump</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bad Flow Switch</td>
<td>• Check electrical wiring</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Incorrect settings on the controller</td>
<td>• Replace flow Switch</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Go to Menu L- Configure I/O and change the Water Flow Switch action setting</td>
</tr>
<tr>
<td>Floor Water</td>
<td>Senses water at the floor Urgent/Critical</td>
<td>Water or moisture detected on floor</td>
<td>• Allow water or moisture to dry and alarm will auto reset</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Faulty or damaged sensor</td>
<td>• Check for 10K resistance, replace sensor if necessary</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Faulty Water Detection Module</td>
<td>• Check 24 volts at the Water Detection Module</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Incorrect settings on the controller</td>
<td>• Go To I/O Input in Menu L Floor Water Switch and change the Action</td>
</tr>
<tr>
<td>Humidity Inhibited</td>
<td>Humidification mode is prohibited from running *Warning</td>
<td>Optional alarm input switch is configured to inhibit humidifier</td>
<td>• Check optional alarm settings and inputs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>BMS command sent</td>
<td>• Check BMS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Unit is in a Zone Master network that inhibits humidification if any unit has recently been dehumidifying</td>
<td>• Check zone master settings and humidity set points of all units.</td>
</tr>
<tr>
<td>Heat Inhibited</td>
<td>Reheat mode is prohibited from running *Warning</td>
<td>Optional alarm input switch is configured to inhibit reheat</td>
<td>• Check optional alarm settings and inputs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>BMS command sent</td>
<td>• Check BMS</td>
</tr>
<tr>
<td>Alarm Screen</td>
<td>Description &amp; Classification</td>
<td>Possible Causes</td>
<td>Corrective Actions</td>
</tr>
<tr>
<td>-----------------------</td>
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<td>---------------------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td>inhibits humidification if any unit has recently been dehumidifying</td>
<td>• Check zone master settings and temperature/humidity set points of all units</td>
</tr>
<tr>
<td>Dirty Filter</td>
<td>Dirty filter switch is detected</td>
<td>• Dirty filter (detected by tan mounted pressure differential switch)</td>
<td>• Change Filter</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Calibrate differential switch</td>
<td>• Adjust differential pressure set point of switch</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Faulty Sensor</td>
<td>• Replace differential pressure switch if needed</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Loose Connection</td>
<td>• Check Connection and cable</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Incorrect settings on the controller</td>
<td>• Go to Menu L- Configure I/O and change the Dirty Filter Switch action setting</td>
</tr>
<tr>
<td>Humidity Sensor</td>
<td>Humidity Sensor failure</td>
<td>• Loose sensor</td>
<td>• Check connection</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Faulty sensor</td>
<td>• Use sensor chart to check sensor signal (in milliamps). Replace sensor if required</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Check connections for polarity</td>
<td>• Connect wiring to correct connection points</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Incorrect settings on the controller</td>
<td>• Go to Menu L- Configure I/O and check the Humidity Sensor (U01) settings</td>
</tr>
<tr>
<td>Custom message</td>
<td>Custom Alarm</td>
<td>• The indicated Custom Alarm input has not been assigned a custom message or</td>
<td>• Check this alarm switch setting and assign it a name or custom message</td>
</tr>
<tr>
<td></td>
<td></td>
<td>given a name</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clock Board Fault or</td>
<td>Clock may not function when</td>
<td>• Battery could be bad or not re-charging</td>
<td>• Replace battery (please contact factory) for help.</td>
</tr>
<tr>
<td>Not Connected</td>
<td>power is off</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unit in Standby</td>
<td>Optional Alarm switch</td>
<td>• Optional Alarm switch connected to DARA4 controller if installed</td>
<td>• Check DARA-4 wiring to units and configuration</td>
</tr>
<tr>
<td>(This is a not an actual)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alarm Screen</td>
<td>Description &amp; Classification</td>
<td>Possible Causes</td>
<td>Corrective Actions</td>
</tr>
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</tr>
<tr>
<td>alarm, just a notification and shown only on unit status line)</td>
<td>standby status (not running) *Notice</td>
<td>• Optional Alarm switch wired to cabinet door switch (standard on In Row units) • Incorrect optional alarm inputs configuration</td>
<td>• Close the cabinet door • Check controller optional alarm inputs configuration</td>
</tr>
<tr>
<td>Standby Pump</td>
<td>Pump Auto-Changeover Control *Warning</td>
<td>• Pump is changing over • Loss of power to one of the pumps • Pump has failed</td>
<td>• Check the Pump Auto-Changeover contacts • Check power to pumps • Check pump operation</td>
</tr>
<tr>
<td>Humidifier Cylinder</td>
<td>Humidifier cylinder alarm is active-optimal alarm *Warning</td>
<td>• Active alarm on humidifier cylinder from the humidifier controller • Loose wiring or damage wiring from humidifier controller to dap4 • Incorrect settings on the controller</td>
<td>• Using wiring diagram to check wiring of humidifier cylinder and humidifier controller • Go to Menu L- Configure I/O and change the Humidifier Fault Switch action setting</td>
</tr>
<tr>
<td>C1 or C2 Lockout</td>
<td>Compressor is Locked out **Urgent</td>
<td>• Compressor tripped its High Pressure switch more than allowed by alarm setting.</td>
<td>• Requires alarm acknowledgement to reset. Check number of compressor high pressure trips allowed within an hour (range none or 2 to 5 /Hr.)</td>
</tr>
<tr>
<td>Freeze Stat</td>
<td>Freeze stat safety sensor (optional) *** Critical</td>
<td>• Optional analog input #1 temperature is too low</td>
<td>• Check freeze stat temp and setpoint. Alarm will clear when temp rises 2º above the alarm set point.</td>
</tr>
<tr>
<td>External Temp. Module Sensor T** High Temperature</td>
<td>The optional Rack sensor has a High Temp Alarm</td>
<td>• Temperature is above rack sensor high alarm set point</td>
<td>• Check temperature of sensor and set point for alarm</td>
</tr>
<tr>
<td>Alarm Screen</td>
<td>Description &amp; Classification</td>
<td>Possible Causes</td>
<td>Corrective Actions</td>
</tr>
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<td>--------------------</td>
</tr>
<tr>
<td>*Warning</td>
<td></td>
<td>Faulty sensor</td>
<td>Check sensor and replace sensor</td>
</tr>
<tr>
<td>External Temp. Module Sensor T** Low Temperature</td>
<td>The optional Rack sensor has a High Temp Alarm</td>
<td>Temperature is below rack sensor low alarm set point</td>
<td>Check temperature of sensor and set point for alarm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Faulty sensor</td>
<td>Check sensor and replace sensor</td>
</tr>
<tr>
<td>External Temp. Module Sensor T** Failure</td>
<td>The optional Rack sensor in Fault Alarm</td>
<td>Faulty Rack Sensor</td>
<td>Check senor and replace sensor</td>
</tr>
<tr>
<td>Suction Pressure/Temp</td>
<td>High Suction Pressure of Temperature</td>
<td>Compressor running at minimal speed.</td>
<td>Check input signal to compressor speed control and the compressors actual speed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Heavy Load on Evaporator.</td>
<td>Check temperature set point and compressors mode of operation (Discharge or Return control)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Too much air flow</td>
<td>Check fan speed control and set point</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EEV failed Open</td>
<td>Check EEV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Faulty Sensor</td>
<td></td>
</tr>
<tr>
<td>EVD Failure</td>
<td>Electronic Valve Driver failure</td>
<td>Damaged EVD</td>
<td>Replace EVD</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EVD Sensors Failure</td>
<td>Check or replace sensors</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Refrigerant Charge problem</td>
<td>Check refrigerant charge</td>
</tr>
<tr>
<td>Lost Phase</td>
<td>Phase failure alarm when optional power meter installed</td>
<td>Lost power on a phase of the high voltage supply. Unit will shut down.</td>
<td>Check high voltage connections to unit. Check power meter or phase loss detector</td>
</tr>
<tr>
<td>High CO2</td>
<td>CO2 level is higher than alarm set point</td>
<td>CO2 level is too high</td>
<td>Check CO2 level in the air and check the CO2 valve to make sure it turns off</td>
</tr>
<tr>
<td>Alarm Screen</td>
<td>Description &amp; Classification</td>
<td>Possible Causes</td>
<td>Corrective Actions</td>
</tr>
<tr>
<td>--------------</td>
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<td>-------------------</td>
</tr>
</tbody>
</table>
| Low CO₂      | CO₂ level is higher than alarm set point (gPOD units only) | • CO₂ level is lower than normal  
• Incorrect settings  
• Faulty Sensor  
• Loose Connection  
• Out of calibration | • Check CO₂ Level  
• Check settings  
• Check CO₂ Sensor  
• Check Connection and cable  
• Calibrate sensor |
| VFD Failure  | VFD alarm relay is energized | • VFD has an alarm  
• Low or High Pressure alarm | • Check VFD’s display for alarm or warning.  
• When a low or high pressure alarm occurs, it may cause the VFD alarm to happen as well. Resolve this by focusing on the cause of the Low or High pressure alarm. |
| Pump-Down Exceeded Maximum Time or Count | Compressor failed to Pump-Down | • Suction pressure remained above pump-down setpoint or rose after being pumped down.  
• Alarm requires acknowledgement to clear | • Replace LLSV  
• Check Suction Pressure Sensor |
Manual Override Switches

For testing, during start-up and in the event of emergency, each Data Aire gForce unit is provided with manual override slide switches. There are seven slide switches, one for each of the following functions:

- Water Valve
- Humidifier
- Cool 2
- Blower
- Fan Speed
- Heat 1
- Cool 1

Simply slide the manual switches to energize the load and, the display module will indicate “Manual Override”. All automatic functions of the controller are disabled and all desired functions must be performed with the manual override switches.

The fan speed of the EC (Electronically Commutated) motor can be adjusted from 0 – 10 volts by adjusting the potentiometer at the left of the Fan Speed switch. The fan will turn 10% for each volt adjustment. One volt equals 10%. At ten volts the motor is at full speed.

**Warning:** Do not leave the unit in manual override. Slide the switches to the OFF position when completing testing and/or start-up. An alarm will be activated if any switch is left in the ON position.
# Dap4 Connections

<table>
<thead>
<tr>
<th>Control &amp; Alarms – Digital Outputs</th>
<th>I/O Board Pin ID</th>
<th>ID Connector number</th>
<th>Unit TB</th>
</tr>
</thead>
<tbody>
<tr>
<td>System Blower</td>
<td>NO1</td>
<td>J12-2</td>
<td>TB1-4</td>
</tr>
<tr>
<td>Compressor 1</td>
<td>NO2</td>
<td>J12-3</td>
<td>TB1-5</td>
</tr>
<tr>
<td>Compressor 2</td>
<td>NO3</td>
<td>J12-4</td>
<td>TB1-6</td>
</tr>
<tr>
<td>Cooling 3rd Stage</td>
<td>NO4</td>
<td>J13-2</td>
<td>TB2-37</td>
</tr>
<tr>
<td>Cooling 4th Stage</td>
<td>NO5</td>
<td>J13-3</td>
<td>TB2-38</td>
</tr>
<tr>
<td>Humidifier</td>
<td>NO6</td>
<td>J13-4</td>
<td>TB1-8</td>
</tr>
<tr>
<td>Status Contact</td>
<td>C7</td>
<td>J14-1</td>
<td>TB1-9</td>
</tr>
<tr>
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<td>NO7</td>
<td>J14-2</td>
<td>TB1-10</td>
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<tr>
<td>Condenser Aux</td>
<td>NO8</td>
<td>J15-1</td>
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<td></td>
<td>C8</td>
<td>J15-2</td>
<td>TB2-46</td>
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<tr>
<td>Reheat 1</td>
<td>NO9</td>
<td>J16-2</td>
<td>TB1-7</td>
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<td>Reheat 2</td>
<td>NO10</td>
<td>J16-3</td>
<td>TB1-20</td>
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<td>Reheat 3</td>
<td>NO11</td>
<td>J16-4</td>
<td>TB1-21</td>
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<td>Alarm 3</td>
<td>NO12</td>
<td>J17-1</td>
<td>TB1-45</td>
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<td></td>
<td>C12</td>
<td>J17-2</td>
<td>TB1-43</td>
</tr>
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<td>NC-12</td>
<td>J17-3</td>
<td>TB1-44</td>
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<td>Alarm 4</td>
<td>NO13</td>
<td>J18-1</td>
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<td></td>
<td>C13</td>
<td>J18-2</td>
<td>TB2-48</td>
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<tr>
<td></td>
<td>NO13</td>
<td>J18-3</td>
<td>TB2-49</td>
</tr>
<tr>
<td>Alarm 1</td>
<td>NO14</td>
<td>J21-1</td>
<td>TB1-13</td>
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<td></td>
<td>C14</td>
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<td>NC14</td>
<td>J21-3</td>
<td>TB1-12</td>
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<td>Alarm 2</td>
<td>NO15</td>
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<td>J21-5</td>
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<td>NC15</td>
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<tr>
<td>Energy Saver</td>
<td>NO16</td>
<td>J22-2</td>
<td>TB1-19</td>
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<tr>
<td>Humidifier Drain (Autoflush)</td>
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<td>J22-3</td>
<td>TB2-39</td>
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<td>Control – Analog Output</td>
<td>I/O Board Pin ID</td>
<td>ID Connector number</td>
<td>Unit TB</td>
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<td>Water Valve Control Y1 J4-3</td>
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<td>VG0 J4-2</td>
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<td>Humidifier Modulating Control Y2 J4-4</td>
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<td>VG0 J4-2</td>
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<td>Blower Fan Speed Control Y3 J4-5</td>
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<tr>
<td>VG0 J4-2</td>
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</tbody>
</table>
Glossary

**Aire-Seal**: A feature that allows the fan to run slowly to stop backdraft, like a damper.

**BMS**: Acronym for Building Maintenance System otherwise known as a Building Automation System (or BAS). It is a computer-based control system installed in buildings that controls and monitors the building’s electrical equipment such as climate control, lighting, security etc. It uses communication protocols such as Internet protocols (IP), BACnet (Building Automation Control network), LON and Modbus.

**Control Temp**: The temperature (Return or Discharge) that is selected for cooling control in the factory menu.

**CRAC**: Computer Room Air Conditioning unit that is used primarily to keep electronic equipment cool and can also be used to control the humidity.

**CW**: Chilled water cooling. It can also be used to supplement DX cooling.

**Default**: A starting value of a selection that is set by the factory.

**DX**: Direct Expansion or cooling supplied by use of a compressor.

**Enthalpy**: The quantity of energy used to heat or cool the air between two temperatures.

**Envelope**: An area defined by the evaporator and condenser temperatures that the compressor is designed to run.

**EVD**: Electronic Valve Driver that is used to control an electrical expansion valve.

**gPOD**: Is a model that is specifically suited for agricultural applications. It has additional features of lighting control, CO₂ level control, CO₂ level alarms and Night time temperature and humidity offsets.

**I/O**: Inputs and Outputs are broken into two types: digital and analog. Analog inputs are typically wired to sensors that have variable resistance, voltage or current values. Digital inputs are normally wired to switches, which are either open (off) or closed (on).

**Minidap4**: A smaller version of the regular dap4 controller. It has the same processing power, but is limited in I/O.

**NTC**: Negative Temperature Coefficient sensor that uses a thermistor to sense temperature. It is a two-wire device that has a unique non-linear resistance curve. Therefore, the dap4 must be used with NTC sensors supplied only by Data Aire.

**PPM**: Parts Per Million. A ratio often used to measure air quality.

**VFD**: Variable Frequency Drive is used to control the speed of a variable compressor.

**“WC**: Inches of Water Column is used to measure static or differential air pressure.
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Job/Unit Information:

  Data Aire Job Number: ________________________________
  Serial Number: _______________________________________
  Model Number: _______________________________________
  Date Installed: _____ / _____ / 20_____
  Installing Contractor: _________________________________