## Installation, Operation and Maintenance Manual

Please read and save these instructions for future reference. Read carefully before attempting to assemble, install, operate or maintain the product described. Protect yourself and others by observing all safety information. Failure to comply with instructions could result in personal injury and/or property damage!
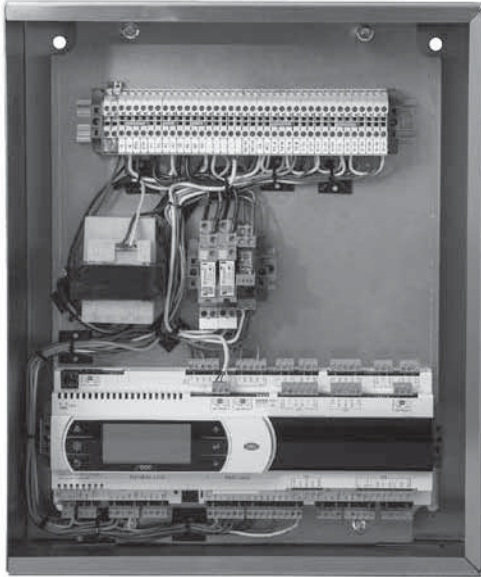
General Safety Information

Only qualified personnel should install this unit. Personnel should have a clear understanding of these instructions and should be aware of general safety precautions. Improper installation can result in electric shock, possible injury due to coming in contact with moving parts, as well as other potential hazards. Other considerations may be required if high winds or seismic activity are present. If more information is needed, contact a licensed professional engineer before moving forward.

1. Follow all local electrical and safety codes, as well as the National Electrical Code (NEC), the National Fire Protection Agency (NFPA), where applicable. Follow the Canadian Electrical Code (CEC) in Canada.

2. Do not allow the power cable to kink or come in contact with oil, grease, hot surfaces, or chemicals. Replace cord immediately if damaged.

3. Verify that the power source is compatible with the equipment.

WARNING
Electrical shock hazard. Can cause equipment damage, personal injury or death. Service must only be performance by personal that are knowledgeable in the operation of the equipment being controlled.

DANGER
Always disconnect power before working on or near a unit. Lock and tag the disconnect switch or breaker to prevent accidental power up.

CAUTION
When servicing the unit, variable frequency drives may be hot enough to cause pain or injury. Allow motor to cool before servicing.

CAUTION
It is the responsibility of the installer to make sure both electrical and gas appliances shut down in the event of a fire or in the event of a power loss to the building when this sequence is required by the authority having jurisdiction.

Table of Contents

Receiving and Handling

Receiving

Upon receiving the product, check to make sure all items are accounted for by referencing the bill of lading to ensure all items were received. Notify the carrier if any damage is noticed. The carrier will make notification on the delivery receipt acknowledging any damage to the product. All damage should be noted on all of the copies of the bill of lading which is countersigned by the delivering carrier. If damaged upon arrival, file a claim with the carrier. Any physical damage to the unit after acceptance is not the responsibility of the manufacturer.

Unpacking

Verify that all required parts and the correct quantity of each item have been received. If any items are missing, report shortages to your local representative to arrange for obtaining missing parts.

Storage

If a kitchen fan control center must be stored prior to installation, it must be protected from dirt and moisture. Indoor storage is highly recommended.

NOTE
Improper storage which results in damage to the unit will void the warranty.

Handling

Make sure the equipment does not suffer any heavy vibration or knocks.

Installation

Control Box Mounting

1. Locate an area with enough space to mount the control box and fasten to the wall.

NOTE
Control box may be factory mounted. If so, continue to the next section.

NOTE
If the Vari-Flow system is equipped with static pressure controls it will be located in the Vari-Flow cabinet, therefore this control box should be mounted in the space to be controlled. If the control box is mounted outside of this space, please refer to the Pneumatic Static Pressure Kit section on page 4.

Resistive Temperature Detector(s) (RTD) Mounting

NOTE
Resistive temperature detector(s) may be factory installed. If so, continue to the next section.

1. Locate flat area(s) at the top interior of the hood in front of the filters, towards the front of the hood.

Exhaust Area
Sensor Install Cut Out Area
Supply Area (optional)
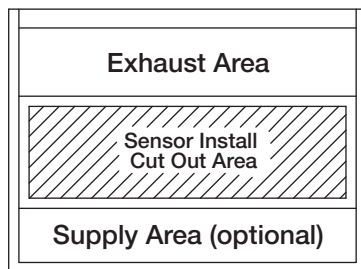
Top View of Exhaust Hood

2. Cut a 3/4-inch diameter hole into the top of the capture tank. Make sure the resistive temperature detector(s) will not interfere with fire system nozzles and is not within 12 inches of light fixtures.

.75 to .875 inch diameter hole
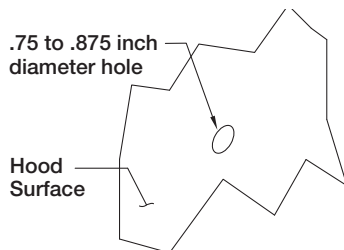
Hood Surface

3. Center the octagon extension over the hole on the hood surface.

Octagon Extension
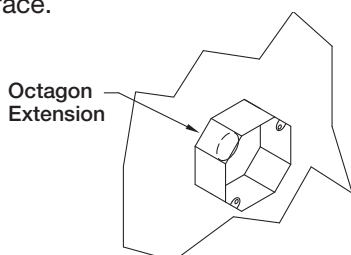
4. Insert the compression seal into the hole from the inside of the hood making sure the gasket is placed on the fitting before inserting it into the hole. Place the octagon box and J-box plate provided over the fitting on the top of the hood, keeping the fitting centered in the box. Install the lock washer and 1-1/2 inch nut on the threaded portion of the compression seal and tighten securely.

1/4 inch Compression Seal

Gasket

J-Box Plate

Temperature Sensor

Lock Washer

Nut
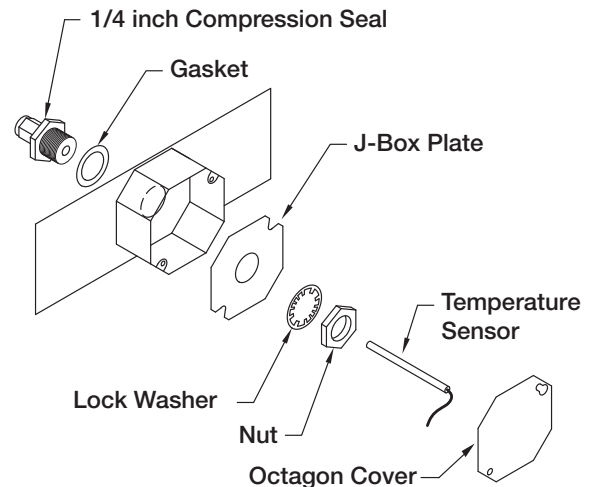
Octagon Cover

5. Insert the resistive temperature detector (RTD) into compression seal and tighten to 35 ft-lbs.

6. Place octagon cover onto J-box plate and fasten it.

NOTE
All field installation and wiring of electrical equipment must be done to meet NEC and local codes.

Pneumatic Static Pressure Kit

- if equipped

NOTE
The Vari-Flow system may not be provided with the static pressure controls. If not, move onto the next section.

1. Locate the Kele® static pressure sensor outside of the building in a secure location free from as many obstructions as possible.
2. Refer to the instruction manual with the static pressure sensor for installation and operation details.
3. Once the static pressure probe is mounted, run vinyl tubing from the probe back to the control panel and coil the excess tubing. Do not kink or trim the tubing.
4. If the control panel is located in the space to be controlled, go to the next section. If the control panel is mounted remotely from the space to be controlled, continue to step 5.
5. Run 1/4 inch virgin poly tubing (by others) from the sensor in the control panel to a secure location in the space to be controlled.

Keypad Mounting

NOTE
The keypad may be factory mounted. If so, continue to the Electrical Connections section.

1. For systems with remote controls or keypad, a 35, 75, or 150 foot RJ25 cable is supplied to connect the keypad to the controls. The cable is plenum rated and does not need to be run through conduit unless required by local codes. If the keypad is to be mounted further away than the cable that is received, additional cable will be needed. Additional cable is available at the lengths mentioned above.

Keypad Mounting Diagram

Keypad Dimensions

Front View

Top View

Side View
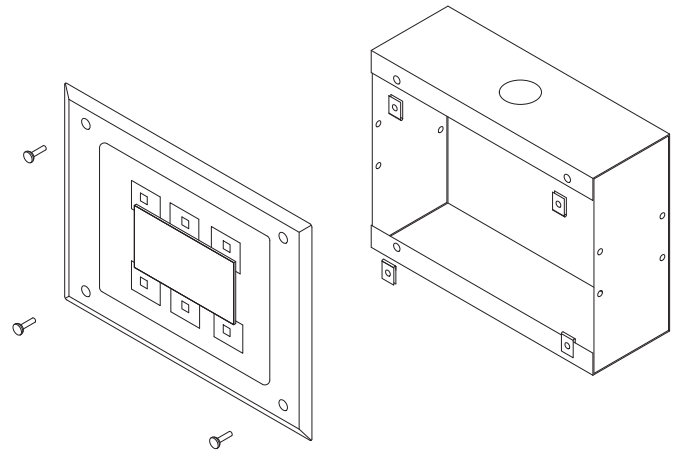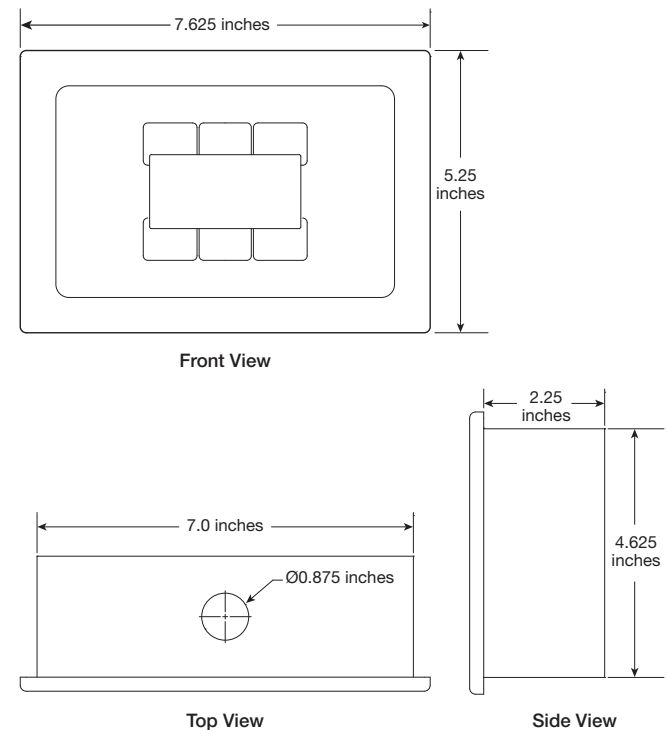
Touch Screen Mounting - *if equipped*

1. For systems with remote controls or touch screen, two 35, 75, or 150 foot sets of cables are supplied to connect the touch screen to the controls. The cables are plenum rated and do not need to be run through conduit unless required by local codes. If the keypad is to be mounted further away than the cable that is received, additional cable will be needed. Additional cables are available at the lengths mentioned above.

Touch Screen Mounting Diagram
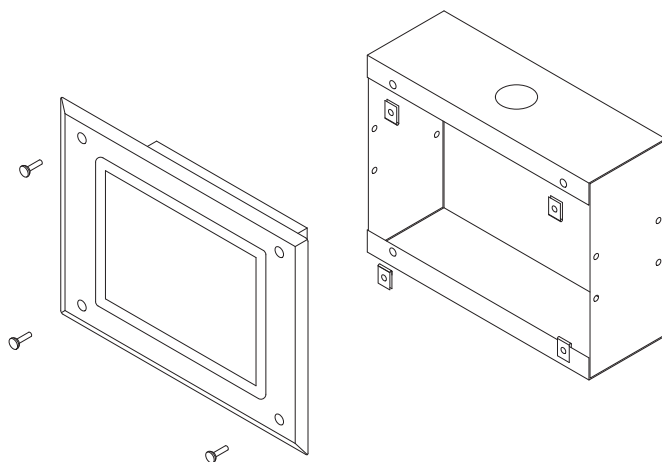
Touch Screen Dimensions
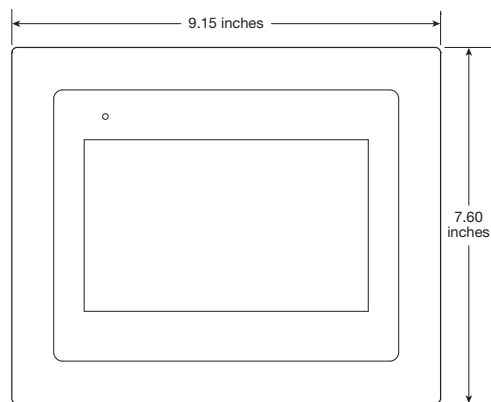
Front View
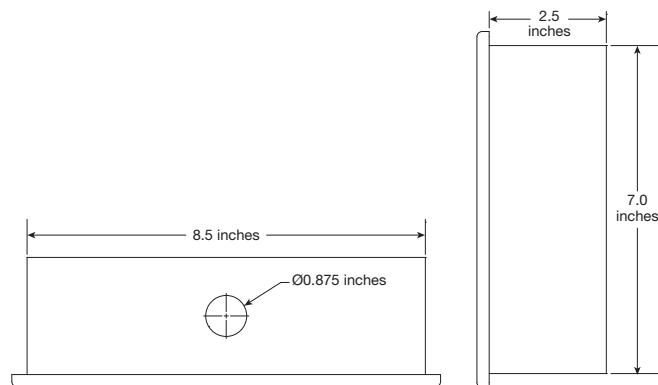
Top View

Side View

Electrical Connections

Power for Vari-Flow Cabinet

• 115 VAC, power for controls (Terminals H and N)
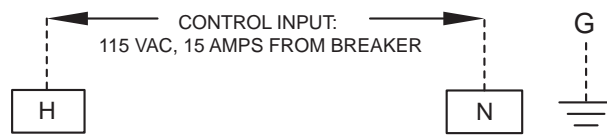
Power for Lights

• 115 VAC, power for hood lights, one per light circuit (Terminals H1, N1 | H2, N2 | H3, N3 | H4, N4)
• 115 VAC, power to lights, one per light circuit (Terminals B1, W1 | B2, W2 | B3, W3 | B4, W4)

EACH CANOPY LIGHTING CIRCUIT MUST NOT EXCEED 15A TOTAL CURRENT
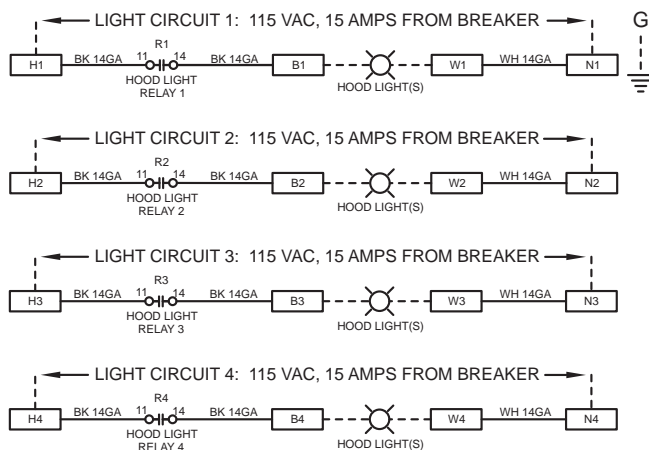
Variable Frequency Drives (VFD) - *if equipped*

NOTE
If electrically commutated motors are being used, VFDs will not be needed.

1. Bring power to the input of each VFD from a dedicated power source using conduit to the NEMA-1 enclosure on the bottom of the drive. Each power source shall be of the same voltage as the respective fan and of a high enough amp rating to handle the full load amp draw of the respective fan.

NOTE
The VFD motor overload parameter (E2-01) needs to be set to match the motor nameplate FLA. Refer to the Quick Start Guide from Yaskawa (pages 83-89), or the Variable Frequency Drive information found on pages 32-33 for setting these parameters on the drive.

NOTE
Be sure to use appropriately sized wire for the full load amp draw.

2. To avoid interference between the conductors, separate conduit from the VFD output to the input power of the fan must be used for each fan.
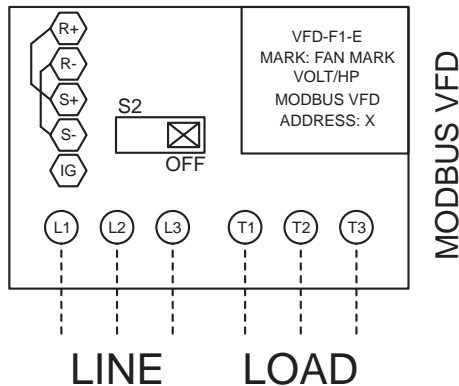
Each variable frequency drive must have the LINE and LOAD wiring in separate conduit

Vari-Green® Fan Wiring - *if equipped*

- 24 VAC from Vari-Flow to Vari-Green motor control wire, black (Terminal E__-24)
- 0-10 VDC Speed Reference from Vari-Flow to Vari-Green motor control wire, red (Terminal E__S+)
- Common from Vari-Flow to Vari-Green motor control wire, white (Terminal E__S-)
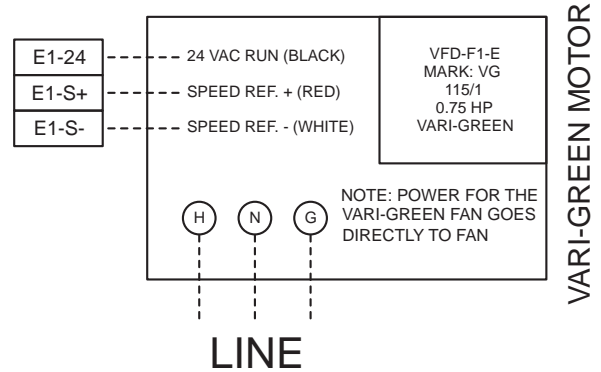
This is an example of Exhaust Fan 1 provided with a Vari-Green motor.

NOTE
Two horsepower Vari-Green motors do not require the 24 VAC wiring.

VFD Provided by Others, Control Wiring - *if equipped*

- Fault command from Vari-Flow to VFD provided by others (Terminal E__-FA, E__-FB)
- Run command from Vari-Flow to VFD provided by others (Terminal E__-RA, E__-RB)
- Speed reference from Vari-Flow to VFD provided by others (Terminal E__S+, E__S-)
- Line power to VFD
- Load power from VFD to fan
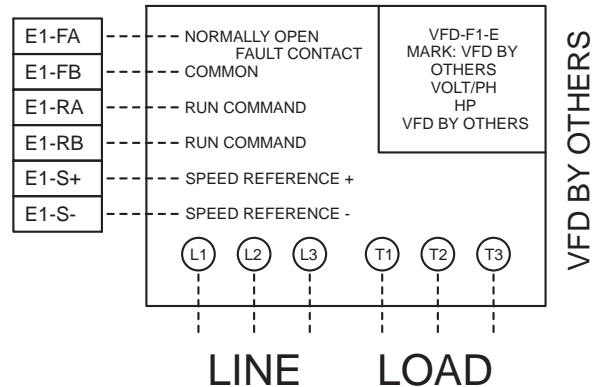
This is an example of Exhaust Fan 1 provided with a VFD by others.

Make-Up Air VFD in Vari-Flow Wiring - *if equipped*

- 24 VAC run command from Vari-Flow to make-up air unit (Terminals S__-42, S__-43)
- Tempering status from Vari-Flow to make-up air unit (Terminals S__-44, S__-45)
- Line power to VFD input, bottom left of VFD (Terminals L1, L2, L3)
- Load power from VFD output, bottom right of VFD to make-up air disconnect (Terminals T1, T2, T3)

Make-up air unit requires separate 115 VAC control power circuit.
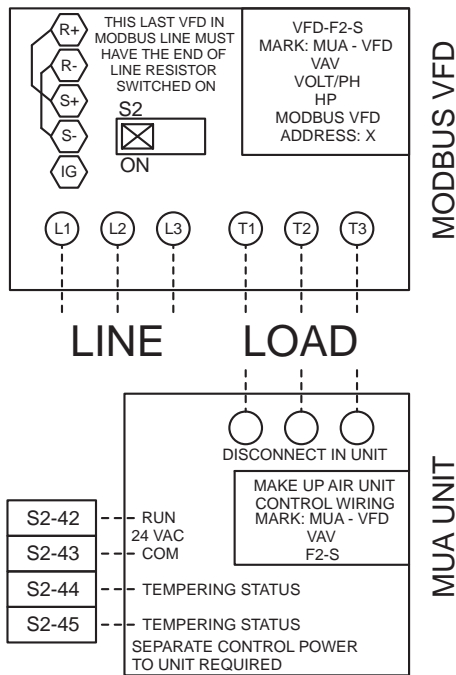
This is an example of Supply Fan 1 being a make-up air with VFD in the Vari-Flow.

Make-Up Air VFD in Make-Up Air Wiring - *if equipped*

- 24 VAC run command from Vari-Flow to make-up air unit (Terminals S__-42, S__-43)
- Tempering status from Vari-Flow to make-up air unit (Terminals S__-44, S__-45)
- 0-10 VDC speed reference from Vari-Flow to make-up air unit (Terminals S__-46, S__-47)

Power for make-up air goes directly to make-up air unit.
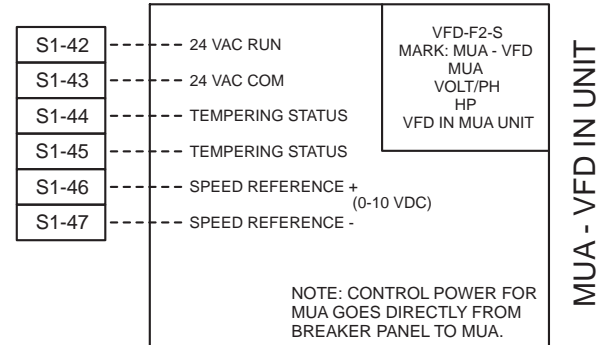
This is an example of Supply Fan 1 being a make-up air with VFD in the make-up air unit.

Auto Tempering - *if equipped*

- Auto Heat/Cool enable (Terminals S1-R, S1-W1, S1-Y1)
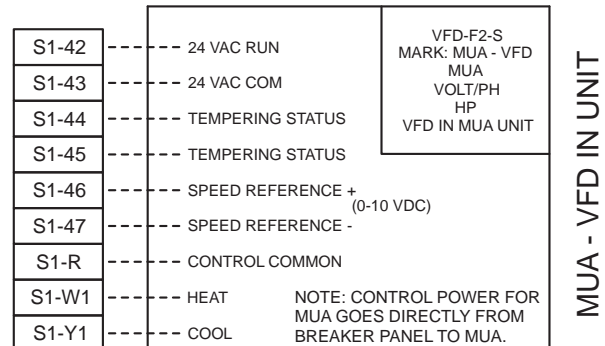
This is an example of Supply Fan 1 with auto tempering.

Fire System Microswitch

- Fire system microswitch common to Vari-Flow (Terminal C1)
- Fire system microswitch normally closed contact to Vari-Flow (Terminal NC1)

Resistive Temperature Detectors (RTD)

Wire the two leads of the sensors to be designated terminals in the control panel as shown below. This is determined by the number of temperature sensors on the job (1-10 sensors). The two wires of the sensor are not polarity sensitive. If more than one hood is being controlled, be sure that the appropriate sensor is wired to the appropriate terminals as depicted on the job specific wiring diagram.

NOTE
The RTD's should not be exposed to direct flame. The RTD's are rated up to 250°F

CAUTION
Exposing the sensor to direct flame may render the sensor inoperable and will void the warranty.

Temperature Sensors* - *installed in hood*

- Temperature Sensor T1 to Vari-Flow (Terminals T1-A, T1-B)

Refer to table *(example below)* to cross reference the temperature sensor and the hood mark.

*Repeat based on the number of temperature sensors. (Terminals T2-A, T2-B | T3-A, T3-B | T4-A, T4-B | T5-A, T5-B | T6-A, T6-B | T7-A, T7-B | T8-A, T8-B | T9-A, T9-B | T10-A, T10-B)
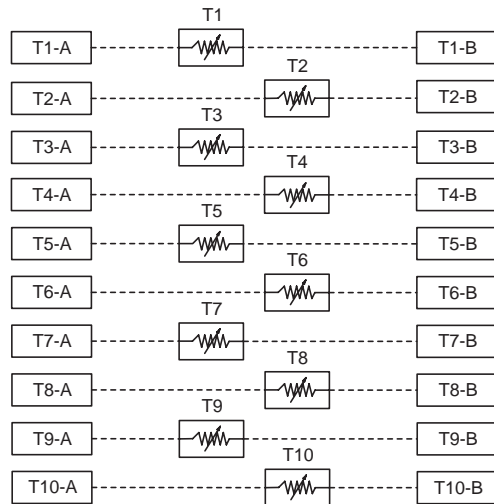
NOTE: The Vari-Flow job specific temperature sensor table is found in the wiring diagram located on the Vari-Flow panel door. This table is an example, do not use for your specific job.

Sensors (Field Wiring)		Related Fans	
Sensor	Hood Mark	Exhaust Fans	Supply Fans
T1	Hood Mark Name 1	F1-E	F11-S
T2	Hood Mark Name 2	F2-E	F11-S
T3	Hood Mark Name 3	F3-E	F12-S
T4	Hood Mark Name 4	F4-E	F12-S
T5	Hood Mark Name 5	F5-E	F12-S
T6	Hood Mark Name 6	F6-E	F13-S
T7	Hood Mark Name 7	F7-E	F13-S
T8	Hood Mark Name 8	F8-E	F14-S
T9	Hood Mark Name 9	F9-E	F14-S
T10	Hood Mark Name 10	F10-E	F14-S

Keypad - *if equipped*

- Connect provided cable from back of keypad to CAREL® PCO5+ controller (Terminal J10)

CONNECT FACTORY PROVIDED RJ25 CABLE
TO J10 ON PCO5+ AND BACK OF KEYPAD

PCO5+ J10   35 Foot Cable Provided   KEYPAD
75 or 150 Foot Cable is Optional
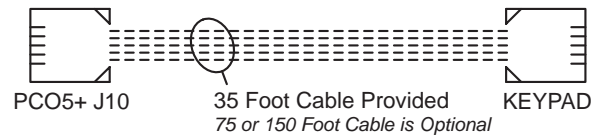
Touch Screen - *if equipped*

Power Wiring

- Connect provided 2-wire cable from Vari-Flow (Terminals 24H, 24C) to touch screen (Terminals G, GO)

Control Wiring

- Connect provided 3-wire cable from Vari-Flow (Terminals -, +, GND) to touch screen (Terminals -, +, GND)
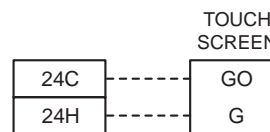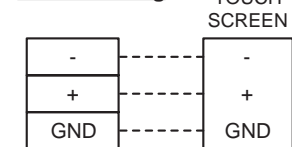
Remote Enable - *if used*

- Connect remote enable common and normally open from BMS to Vari-Flow (Terminals RE-1A, RE-1B)

  A closed contact will turn on all fans.
  An open contact will turn off all fans.

NOTE: Temperature interlock will override the remote enable input.
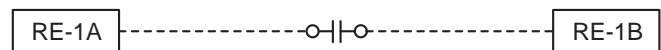
Shunt Trip - *if used*

- 115 VAC from Vari-Flow to shunt trip breaker coil (provided by others) (Terminals STH, STN)

Voltage across STH, STN when in fire will be 115 VAC
Voltage across STH, STN when not in fire will be 0 VAC

NOTE
Shunt trip contacts will lose voltage during momentary losses in power to the Vari-Flow control cabinet, tripping the connected shunt trip breaker. If installed in areas with frequent losses in power, it is recommended that all shunt trip breakers be wired through a normally open (N.O.) contact of an additional fire system microswitch instead.

Electric Gas Valve with Gas Reset - *if equipped*

- 115 VAC from Vari-Flow to gas solenoid (Terminals SVH, SVN)

Voltage across SVH, SVN when in fire will be 0 VAC
Voltage across SVH, SVN when not in fire and turn on will be 115 VAC
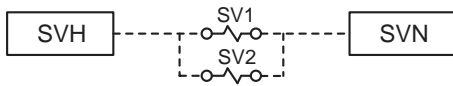
Spare Fire Relay Contacts - *if equipped*

- Power to common (Terminal C3)
- Power out, normally open, closed in fire (Terminal NO3)
- Power out, normally closed, open in fire (Terminal NC3)

- Power to common (Terminal C4)
- Power out, normally open, closed in fire (Terminal NO4)
- Power out, normally closed, open in fire (Terminals NC4)

(Can be used for shunt trip, alarms, etc.)
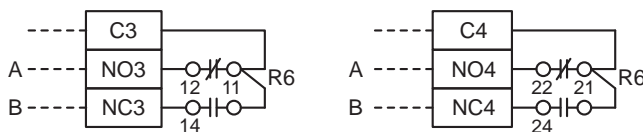
A: Open with power at H & N and fire system armed closed on fire or no power

B: Closed with power at H & N and fire system armed open on fire or no power

Grease Trapper Pollution Control Unit (PCU) Filter Status - *if equipped*

- PCU filter 24VAC hot from terminal FH in enclosure on the access side of the unit to Vari-Flow (Terminal FH)
- PCU filter 1 module status from terminal F1 in enclosure on access side of the unit to Vari-Flow (Terminal F1)
- PCU filter 2 module status from terminal F2 in enclosure on access side of the unit to Vari-Flow (Terminal F2)
- PCU filter 3 module status from terminal F3 in enclosure on access side of the unit to Vari-Flow (Terminal F3)
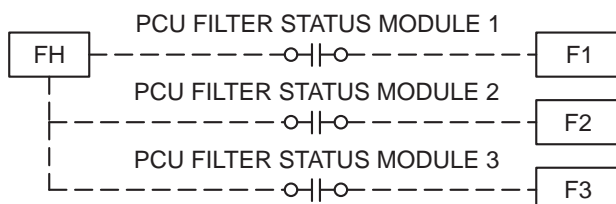
High Temperature Alarm Contacts - *if equipped*

- Power to common (Terminal HT-C)
- Power out, normally closed, open in high temperature alarm (Terminal HT-NC)
- Power out, normally open, closed in high temperature alarm (Terminal HT-NO)

(Can be used for shunt trip, alarms, etc.)
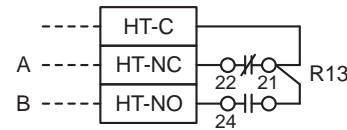
A: Closed with power at H & N and high temperature alarm inactive, closed with no power

B: Open with power at H & N and high temperature alarm active, open with no power

Airflow Proving Switch(es) (provided by others) - *if equipped*

- Common and normally open from supply fan 1 air proving switch to Vari-Flow (Terminals AP-1A, AP-1B)
- Common and normally open from supply fan 2 air proving switch to Vari-Flow (Terminals AP-2A, AP-2B)
- Common and normally open from supply fan 3 air proving switch to Vari-Flow (Terminals AP-3A, AP-3B)
- Common and normally open from supply fan 4 air proving switch to Vari-Flow (Terminals AP-4A, AP-4B)

NOTE: Airflow proving switch(es) are not provided with the Vari-Flow system.
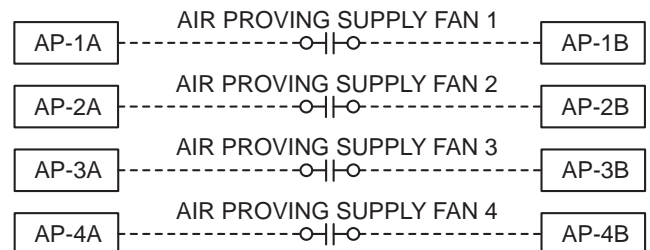
Wash Interface - *if equipped*

- Wash input from waterwash control panel (WWCP) to Vari-Flow (Terminals WI-1A, WI-1B)
- Wash output from Vari-Flow to Grease Grabber H_2O or WWCP (Terminals WO-1A, WO-1B)
- Low detergent input from Grease Grabber H_2O or WWCP to Vari-Flow (Terminals WD-1A, WD-1B)
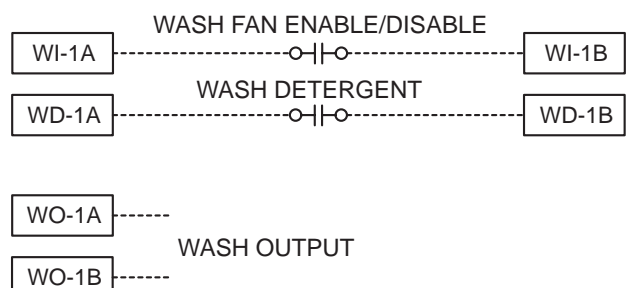
Vari-Flow Connection Checklist

Power for Vari-Flow Cabinet
- ☐ Connect 115 VAC power for controls (Terminals H, N)
- ☐ Connect 115 VAC power for hood lights, one per light circuit (Terminals H1, N1 | H2, N2 | H3, N3 | H4, N4)
- ☐ Connect 115 VAC power to lights, one per light circuit (Terminals B1, W1 | B2, W2 | B3, W3 | B4, W4)

Power to Variable Frequency Drives (VFD)*
- ☐ Line power to VFD input, bottom left of VFD (Terminals L1, L2, L3)
- ☐ Load power from VFD output, bottom right of VFD (Terminals T1, T2, T3)

Vari-Green® Fan Wiring* - *if equipped*
- ☐ 24 VAC from Vari-Flow to Vari-Green motor control wire, black (Terminal E__-24)
  Not required on 2 HP Vari-Green motors
- ☐ 0-10 VDC Speed Reference from Vari-Flow to Vari-Green motor control wire, red (Terminal E__S+)
- ☐ Common from Vari-Flow to Vari-Green motor control wire, white (Terminal E__S-)

VFD Provided by Others, Control Wiring* - *if equipped*
- ☐ Fault command from Vari-Flow to VFD provided by others (Terminal E__-FA, E__-FB)
- ☐ Run command from Vari-Flow to VFD provided by others (Terminal E__-RA, E__RB)
- ☐ Speed reference from Vari-Flow to VFD provided by others (Terminal E__S+, E__S-)
- ☐ Line power to VFD
- ☐ Load power from VFD to fan

Make-Up Air VFD in Vari-Flow Wiring* - *if equipped*
- ☐ 24 VAC run command from Vari-Flow to make-up air unit (Terminals S__-42, S__-43)
- ☐ Tempering status from Vari-Flow to make-up air unit (Terminals S__-44, S__-45)
- ☐ Line power to VFD input, bottom left of VFD (Terminals L1, L2, L3)
- ☐ Load power from VFD output, bottom right of VFD to make-up air disconnect (Terminals T1, T2, T3)

Make-Up Air VFD in Make-Up Air Wiring* - *if equipped*
- ☐ 24 VAC run command from Vari-Flow to make-up air unit (Terminals S__-42, S__-43)
- ☐ Tempering status from Vari-Flow to make-up air unit (Terminals S__-44, S__-45)
- ☐ 0-10 VDC speed reference from Vari-Flow to make-up air unit (Terminals S__-46, S__-47)

Auto Tempering - *if equipped*
- ☐ Auto Heat/Cool enable (Terminals S1-R, S1-W1, S1-Y1)

Fire System Microswitch
- ☐ Fire system microswitch common to Vari-Flow (Terminal C1)
- ☐ Fire system microswitch normally closed contact to Vari-Flow (Terminal NC1)

Resistive Temperature Sensors* - *installed in hood*
- ☐ Temperature Sensor T1 (Terminals T1-A, T1-B)
  If more than one temperature sensor is used, wire the following if applicable:
- ☐ Temperature Sensor T2 (Terminals T2-A, T2-B)
- ☐ Temperature Sensor T3 (Terminals T3-A, T3-B)
- ☐ Temperature Sensor T4 (Terminals T4-A, T4-B)
- ☐ Temperature Sensor T5 (Terminals T5-A, T5-B)
- ☐ Temperature Sensor T6 (Terminals T6-A, T6-B)
- ☐ Temperature Sensor T7 (Terminals T7-A, T7-B)
- ☐ Temperature Sensor T8 (Terminals T8-A, T8-B)
- ☐ Temperature Sensor T9 (Terminals T9-A, T9-B)
- ☐ Temperature Sensor T10 (Terminals T10-A, T10-B)

Keypad - *if equipped*
- ☐ Connect provided RJ25 cable from back of keypad to CAREL® PCO5+ (Terminal J10).

Touch Screen - *if equipped*
- ☐ Connect provided 2-wire cable from Vari-Flow (Terminals 24H, 24C) to touch screen (Terminals G, GO)
- ☐ Connect provided 3-wire cable from Vari-Flow (Terminals -, +, GND) to touch screen (Terminals -, +, GND)

Remote Enable- *if used*
- ☐ Connect remote enable common and normally open from BMS to Vari-Flow (Terminals RE-1A, RE-1B)

Shunt Trip - *if used*
- ☐ 115 VAC from Vari-Flow to shunt trip breaker coil (provided by others) (Terminals STH, STN)

## Electric Gas Valve with Gas Reset - *if equipped*
- ☐ 115 VAC from Vari-Flow to gas solenoid (Terminals SVH, SVN)

Spare Fire Relay Contacts - *if equipped*
- ☐ Power to common (Terminal C3)
- ☐ Power out, normally open, closed in fire (Terminal NO3)
- ☐ Power out, normally closed, open in fire (Terminal NC3)

- ☐ Power to common (Terminal C4)
- ☐ Power out, normally open, closed in fire (Terminal NO4)
- ☐ Power out, normally closed, open in fire (Terminal NC4)

Grease Trapper Pollution Control Unit (PCU)
Filter Status - *if equipped*
- ☐ PCU filter status 24 VAC hot (FH)
- ☐ PCU filter 1 module status (F1)
- ☐ PCU filter 2 module status (F2)
- ☐ PCU filter 3 module status (F3)

High Temperature Alarm Contacts - *if equipped*
- ☐ Power to common (Terminals HT-C)
- ☐ Power out, normally closed, open in high temperature alarm (Terminal HT-NC)
- ☐ Power out, normally open, closed in high temperature alarm (Terminal HT-NO)

Air Proving Switch(es) (provided by others) - *if equipped*
- ☐ Common and normally open from supply fan 1 air proving switch to Vari-Flow (Terminals AP-1A, AP-1B)
- ☐ Common and normally open from supply fan 2 air proving switch to Vari-Flow (Terminals AP-2A, AP-2B)
- ☐ Common and normally open from supply fan 3 air proving switch to Vari-Flow (Terminals AP-3A, AP-3B)
- ☐ Common and normally open from supply fan 4 air proving switch to Vari-Flow (Terminals AP-4A, AP-4B)

Wash Interface - *if equipped*
- ☐ Wash input from waterwash control panel (WWCP) to Vari-Flow (Terminals WI-1A, WI-1B)
- ☐ Wash output from Vari-Flow to Grease Grabber H_2O or WWCP (Terminals WO-1A, WO-1B)
- ☐ Low detergent input from Grease Grabber H_2O or WWCP to Vari-Flow (Terminals WD-1A, WD-1B)

> ***Wiring repeated based on the number of fans of that type. This is based on the job specific Vari-Flow wiring diagram.**

Sequence of Operation

Normal Operation

1. Press the fans on/off button on the Vari-Flow keypad or touch screen to turn the fans on (manual mode).
   a. Vari-Flow will turn on all exhaust and supply fans.
   b. The Vari-Flow system starts the fans at idle speed and automatically adjusts exhaust fan speeds between the low speed setpoint (50% default) and high speed setpoint (100% default) based on actual cooking loads as sensed by the temperature sensors mounted in the hood capture area. This is determined by the low temperature setpoint (90°F default) and high temperature setpoint (115°F default).
   c. The Vari-Flow system adjusts the supply speed based on a weighted average of the exhaust fan speed. *If static pressure sensor is used for supply airflow control it will adjust the supply speed based on static pressure.
2. Press the fans button on the Vari-Flow keypad or touch screen again to turn off the fans.
   a. The Vari-Flow system may go into auto mode if conditions 3.a-3.c are met.
3. Temperature interlock mode (auto mode).
   a. If the temperature in the hood goes above the temperature interlock on setpoint (115°F default) and the fans are currently off, the Vari-Flow will automatically turn on the associated exhaust and/or supply fans.
   b. If the temperature in the hood goes below the temperature interlock off setpoint (90°F default) and the fans are not currently turned on manually the fans will turn off after the temperature interlock off delay time setpoint (10 minute default).
   c. If the fans were turned on manually and the user attempts to turn off the fans with the hood temperature not meeting condition b the fan(s) will remain on until such conditions are met.
4. With the fan(s) on via manual or auto mode, the 100% override button will force the exhaust fan(s) that are currently on to full speed for the 100% override off delay setpoint. The supply fan will adjust speed the same as 1.c.
5. Pressing the 100% override button on the Vari-Flow keypad or touch screen again will turn the 100% override off and return the fans to the speed as discussed in 1.b.
6. Pressing the hood lights on/off button on the Vari-Flow keypad or touch screen will turn on the hood lights.
7. Pressing the hood lights on/off button on the Vari-Flow keypad/touch screen again will turn off the hood lights.

Fire Operation:

1. With the fire system microswitch wired to terminal C1 and NC1 and the fire system in a fire state, the following will occur:
   a. System fault will appear on keypad or touch screen.
   b. Vari-Flow will force the exhaust fan(s) to full speed.
   c. Vari-Flow will force the supply fan(s) off.
   d. Vari-Flow will send 115 VAC signal to shunt trip breaker coil (breaker provided by others).
   e. Vari-Flow will force the lights off (if selected with lights out in fire).
   f. Vari-Flow will force the electric gas valve off (if selected with gas valve reset option).

Fault Operation:

1. Temperature sensor fault.
   a. System fault will appear on keypad or touch screen.
   b. Associated fan(s) will be turned on and forced to full speed until fault is rectified.
2. Exhaust VFD fault.
   a. System fault will appear on keypad or touch screen.
   b. All fans will be turned on and forced to full speed. It will remain this way until the fault is rectified.
3. Supply VFD fault.
   a. System fault will appear on keypad or touch screen.
   b. All fans will be turned on and forced to full speed (for the event that if the fault clears it will automatically run the fans at full speed). It will remain this way until the fault is rectified.
4. Supply airflow proving fault - *if equipped.*
   a. System fault will appear on keypad or touch screen.
   b. Exhaust fans will not turn on until supply airflow has been proven. It will remain this way until the fault is rectified.
5. Pressure sensor fault - *if equipped.*
   a. System fault will appear on keypad or touch screen.
   b. Supply fan speed will automatically be controlled via weighted average until the fault is rectified.
6. High temperature alarm - *if equipped.*
   a. System fault will appear on keypad or touch screen.
   b. Vari-Flow will send 115 VAC signal to shunt trip breaker coil (breaker provided by others).
   c. Vari-Flow will force the electric gas valve off (if selected with gas valve reset option).

System Optimization

Low Temperature Set Point (90°F default)

Record the kitchen ambient temperature _____

Set the low temperature set point 5°F above the ambient kitchen temperature

Setting the Low Temperature Set Point

NOTE: If the system is provided with a keypad, press the Prg button (◎) for 5 seconds to enter the main menu.

1. Go to Setpoints menu.
2. Go to Exhaust Fan Setup on page 16.
3. Adjust the Low Temp Setpoint to the previously recorded value.

High Temperature Set Point (115°F default)

1. Turn the fans on by pressing the 'FAN' button on the keypad.
2. Turn on all cooking appliances and allow them to reach normal cooking temperatures.
3. Record the temperature in the hood by looking at the temperature in the main menu. _____
4. Set the high temperature set point 5°F below the previously recorded temperature.

Setting the High Temperature Set Point

NOTE: If the system is provided with a keypad press the Prg button (◎) for 5 seconds to enter the main menu.

1. Go to Setpoints menu.
2. Go to Exhaust Fan Setup on page 16.
3. Adjust the High Temp Setpoint to the previously recorded value.
4. Press ESC until you reach the keypad indicators on the LCD screen.

Controller Setup and Tutorial

When the user interface is a keypad, the user will need to press the ◎ button to enter the main menu.

When the user interface is a touch screen, the user will see the main menu without having to press the ◎ button.

Within the programmable logic controller, factory set points can be modified to configure the system for specific functions if necessary. All parameters are shown in this section.
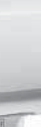
Some of the menus require the user to enter a password in order to enter the menu. The service password is 1000 and is entered by pressing the ↑ ↓ and ↵ buttons.

The DDC controller is located in the unit control panel. The face of the controller has six buttons, allowing the user to view unit conditions and alter parameters. The DDC controller is pre-programmed with easy to use menus.

To change the display contrast, hold the Alarm ⚠ and Program ◎ buttons simultaneously while pressing the ↑ and ↓ arrows.

A keypad also connects via the J10 port. A RJ25 cable is needed.

Information regarding most of the settings within the Controller U1 are provided in this Installation, Operation and Maintenance Manual.

Keypad Navigation		
↩	Escape	Allows the user to exit the current menu, jumping to the Main Menu.
↑ ↓	Up | Down	The arrow buttons allow the user to scroll through different screens and adjust parameters.
⚠	Alarm	Button will blink red, indicating an alarm condition. Press to review current alarms. To review previous alarms, access the DATA LOGGER through the main menu.
↵	Enter	A. In screens with adjustable parameters, pressing the Enter button moves the cursor from the upper left corner of the screen to the parameter. The arrow buttons can then be used to adjust the parameter. B. To move to the next parameter on the same screen, press the Enter button. C. To save the change, press the Enter button until the cursor moves back to the upper left corner of the screen.
◎	Program	Pressing the Program button allows the user to enter the Main Program Menu.

Example of Parameter Adjustment

Exhaust Fan 1 Setup

	Temp	Speed
Low:	90.0°F	50.0%
High:	115.0°F	100.0%

The cursor always begins in the upper left corner of the display and will be blinking. Press the ↵ button to move the cursor down for parameter adjustment.

Exhaust Fan 1 Setup

	Temp	Speed
Low:	90.0°F	50.0%
High:	115.0°F	100.0%

Once the cursor has reached the desired parameter, press the ↑ ↓ buttons to adjust the value.

Exhaust Fan 1 Setup

	Temp	Speed
Low:	90.0°F	50.0%
High:	115.0°F	100.0%

When satisfied with the adjustment, press the ↵ button to save the parameter. **When finished, make certain the cursor is in the upper left corner. If the cursor is not in the upper left corner, the changes will not be saved.** The cursor must be in the upper left corner to enable screen advancement.

Main Menu Overview

The Vari-Flow controller will revert to a default main menu loop. This loop includes several screens to view the operating conditions of the unit. Scroll through the menu screens by using the ↑↓ buttons. **Screens with a dashed line border are dependent upon an optional accessory and may not always appear.**

```
TIME      DATE      UNIT##
Hood 1:    ON      Speed
XXX.X°F            XXX.X%
*Exp:     Offline
VFD:      Offline
Status:  UNIT ON
```

EXHAUST FAN #1 STATUS:

The temperature on this screen displays real-time conditions from the sensors located in the hood. The speed on this screen displays the real-time conditions of the fan.

The "*Exp: Offline" only appears if the system is equipped with an expansion controller, but the DDC controller sees it as off the network. The "VFD: Offline" only appears if the DDC controller is not connected to the drive.

If there are additional exhaust fans, the display on the screen will be the same besides the fan number.

```
TIME      DATE      UNIT##
Supply 1:  ON      Speed
XXX.X%            XXX.X%
*Exp:     Offline
VFD:      Offline
Status:  UNIT ON
```

SUPPLY FAN #1 STATUS. (IF EQUIPPED)

If equipped with supply fan, this screen will display the airflow percentage (left) and the supply fan speed signal (right).

If there are additional supply fans the display on the screen will be the same besides the fan number.

Example of Alarms

If an alarm occurs, the ⚠ button will flash red on the controller and the remote display (if installed).

```
        Alarms
Press DOWN to review current
alarm(s).
Press ESC to exit.
Press ALARM to reset.
```

To view alarm, press the ⚠ button once. This will display the most recent alarm. Press the ⚠ button again to reset all alarms. If the alarm cannot be cleared, the cause of the alarm has not been fixed. Press the ↑↓ buttons to view any occurring alarms.

```
      *** Alarm ***
    Temp Sensor Input 1
          Failure
  Confirm sensor is connected
   to terminals T1-A & T1B.
```

This is an example of a hood temperature sensor failure.

```
        Alarms
No active alarm
        📄  Press ENTER
            to DATA LOGGER
```

This screen appears if there are no active alarms.

To view all saved alarms, press the ↵ button to enter the DATA LOGGER. For more information, see the Data Logger menu.

Alarm	Alarm Description
Exhaust VFD Fault	Failure of an exhaust VFD
Supply VFD Fault	Failure of a supply VFD
Hood Temperature Sensor Failure	Failure of a hood temperature sensor
Hood High Temperature Alarm	Indicates a high hood temperature
Pressure Sensor Failure	Indicates a pressure that is out of range
Supply Airflow Alarm	Indicates a loss of airflow in the supply fan
Fire Alarm	Indicates a kitchen fire
Exhaust/Supply Fan Offline Alarm	Indicates a loss of communication to the VFD(S)
Low Detergent Alarm	Indicates detergent is low in wash system
Grease Trapper PCU filter Status Alarm	Indicates filter change required on Grease Trapper PCU

Menus

The controller is equipped with several menus to help guide users with altering program parameters. The following menus can be accessed by pressing the ◎ button. To enter the desired menu, press the ↵ button.

A. ⏻ On/Off Unit

The **On/Off Unit** menu allows the user to view the detailed On/Off status of the controller.

On/Off Unit	
Unit address:	1
Power By Display:	ON
Status:	UNIT ON

Status: The controller may be in following On/Off states:
   a. Unit On: Unit is ON, functioning normally.
   b. Off by ALARM: Unit is OFF due to an alarm. View alarms by pressing ALARM button.
   c. Off by PLAN: Unit is OFF by pLAN network.
   d. Off by BMS: Unit is OFF by BMS command
   e. Off by SCHEDULER: Unit is OFF by internal Clock.
   f. Off by DIGITAL INPUT(ID4): Unit is OFF by digital input 4 (ID4).
   g. Off by KEYPAD: Unit is commanded OFF by this screen.

On/Off Exhaust	
1:	ON
2:	ON

THIS SCREEN DISPLAYS THE STATE OF THE EXHAUST FANS AND ALLOWS THE USER TO TURN THE FAN(S) ON/OFF INDEPENDENTLY.

Exhaust: The number of fans listed is based on the number of fans for the specific job.

On/Off Light Circuits	
1:	ON
2:	ON
3:	ON
4:	ON
Lights Out in Fire:	ON

THIS SCREEN DISPLAYS THE STATE OF LIGHTS AND ALLOWS THE USER TO TURN THE LIGHT CIRCUITS ON/OFF INDEPENDENTLY.

Lights: The number of light circuits listed is based on the number of light circuits for the specific job.

Note: If "Lights Out in Fire" is set to ON, hood lights will shut off in a fire state.

On/Off Options	
Gas Valve:	OFF

THIS SCREEN DISPLAYS THE STATE OF THE ELECTRIC GAS VALVE AND ALLOWS THE USER TO TURN THE GAS VALVE ON/OFF. (IF EQUIPPED)

Note: In the event of a fire, the gas valve will turn off automatically. You are required to manually turn it back on after the fire system has been reset.

Wash Setup	
Wash:	OFF
Time:	60m
Low Detergent:	OFF

THIS SCREEN DISPLAYS THE STATE OF THE WASH BUTTON AND ALLOWS THE USER TO START A WASH.

Time: The length of time the Vari-Flow is in a wash state and will not allow the fans to run.

Override	
Start:	OFF
Full Speed:	OFF

THIS SCREEN DISPLAYS THE STATE OF THE FAN 100% BUTTON AND ALLOWS THE USER TO START THE 100% OVERRIDE.

Note: When start is changed to ON it will immediately turn back to off, the full speed status will change to ON until the override time is met or the 100% button is pressed again. This page is used for a status of the "Fan 100" button.

Auto Tempering	
Auto Tempering:	OFF

THIS SCREEN DISPLAYS THE STATE OF THE AUTO TEMPERING BUTTON AND ALLOWS THE USER TO TURN AUTO TEMPERING ON/OFF.

Auto Tempering: Enables/Disables the make-up air from automatically heating/cooling based on the inlet air sensor.

B. ⚙ Setpoint

The **Setpoint** menu allows the user to view and adjust temperature related parameters.

Temperature Interlock

Enable:	ON
Temp On:	115.0°F
Temp Off:	90.0°F
Delay Off:	600s

THIS SCREEN DISPLAYS THE CURRENT SET POINTS FOR THE TEMPERATURE INTERLOCK FEATURE.

The user can use the default exhaust fan temperature set points or configure them using the system optimization process. This option satisfies IMC 507.2.1.1 (Fan(s) must automatically activate when cooking operations occur.)

- **Temp On Set Point:** The temperature at which the fan(s) automatically turn on based on the temperature of the associated hood. The default is 115°F and is adjustable.
- **Temp Off Set Point:** The temperature at which the fan(s) automatically turn off based on the temperature of the associated hood. It must also satisfy the requirement of the Minimum Off Delay Set Point. The default is 90°F and is adjustable.
- **Off Delay Set Point:** The amount of time the temperature must remain below the Minimum Off Set point before the fan(s) will turn off. The default is 10 minutes and is adjustable.

Exhaust Fan 1 Setup

	Temp	Speed
Low:	90.0°F	50.0%
High:	115.0°F	100.0%
CFM:		XXXX

THIS SCREEN DISPLAYS EXHAUST FAN SETUP.

Low Temp: Temperature that the fan will start to increase in speed from the low speed set point.
High Temp: Temperature that the fan will be at the high speed set point.
Low Speed: Minimum speed of the fan.
High Speed: Maximum speed of the fan.

Depending on the number of exhaust fans, other exhaust fan setup pages will appear.

Supply Fan 1 Setup

Design MaxSpd	CFM:XXX
Min:	50.0%
Max:	100.0%
Min Tempering:	66.0%

THIS SCREEN DISPLAYS THE SUPPLY FAN SETUP.

Design Max Speed: Design airflow of the supply fan.
Min: Minimum speed of the supply fan.
Max: Maximum speed of the supply fan.
Min Tempering: Minimum speed of the supply fan when it is tempering.

Depending on the number of supply fans, other supply fan setup pages will appear.

Override

Duration:	10m

THESE PARAMETERS DICTATE THE AMOUNT TIME THE THAT THE FAN RUNS AT FULL SPEED WHEN THE "FAN 100%" BUTTON IS PRESSED.

Factory Settings

Smoke Fire Stat	
Exhaust Fans:	100%

THIS SCREEN DISPLAYS THE SETTING FOR THE EXHAUST FANS IN THE EVENT OF A FIRE.

Once the fire inspection has been completed, this should not be changed.

High Temperature Alm

Enable:	Off
Temp On:	210.0°F
Temp Off:	205.0°F

THIS SCREEN DISPLAYS THE HIGH TEMPERATURE ALARM SETTINGS.

When enabled and the temperature reaches the Temp On set point the shunt trip output will become active, forcing the electric equipment off. If there is an electric gas valve and it is wired into the VAV system it will also turn that off. Once the temperature is below the Temp Off set point the shunt trip output and gas valve will return to normal state.

Remember that the shunt trip breaker will have to be manually reset as well as the electric gas valve.

C. ⏰ Clock

The **Clock** menu allows the user to view and alter the time and date. The user can also adjust the daylight savings time setting.

Clock	
Date:	MM/DD/YY
Hour:	15:30
Day:	Monday

THIS SCREEN ALLOWS THE USER TO ADJUST DAYLIGHT SAVINGS TIME SETTING.

The Daylight Savings time feature can be adjusted to meet the current daylight savings time requirements.

Clock	
DST:	Enable
Transition time:	60min
Start:	LAST SUNDAY
in MARCH	at 2.00
End:	LAST SUNDAY
in OCTOBER	at 3.00

D. ⬅️➡️ Input/Output

The **Input/Output** menu allows the user to quickly view the status of the controller inputs and outputs.

Analog Input	
Temperature 1	
Input B001:	95.0°F

To manually control I/O values, go to the **Service menu > Manual management.**

Similar screens appear for all controller inputs and outputs.

Your controller may not utilize the input shown. See unit wiring diagram for your specific configuration.

Digital Input	
Remote On/Off	
DI 1 STATUS:	Closed

Similar screens appear for all controller inputs and outputs.

Your controller may not utilize the input shown. See unit wiring diagram for your specific configuration.

Relay Output	
Lights 1	
Relay 1 STATUS:	OFF

Similar screens appear for all controller inputs and outputs.

Your controller may not utilize the output shown. See unit wiring diagram for your specific configuration.

Analog Output	
Supply Fan 1	
Output:	5.00vdc

Similar screens appear for all controller inputs and outputs.

Your controller may not utilize the output shown. See unit wiring diagram for your specific configuration.

G. 🦆 Service

The **Service** menu allows the user to access several sub-menus regarding controller information, controller overrides, operating hours, BMS configuration, I/O manual management and Probe Adjustment. By accessing the **BMS Config** sub-menu, the user can adjust BMS protocol settings. (BACnet®, LonWorks®, Modbus)

G. 🦆 Service
b. Information

The **Information** sub-menu displays information about the controller and the program loaded on the controller.

Information

Accurex
Code:
Ver.: 1.02   04/20/15
Bios: 6.31   10/29/14
Boot: 5.02   09/30/13

THIS SCREEN SHOWS VERSION, BOOT AND BIOS INFORMATION.

G. 🦆 Service
c. VFD Status

The **VFD Status** sub-menu is for commissioning and troubleshooting. This sub-menu allows the user to view the Yaskawa VFD current status. If further control is required, the user can also manually control the controller inputs and outputs. To access the **VFD Status** sub-menu, enter the service password (Default=1000).

YASKAWA V1000   1

Speed: 0.0Hz
Ref Frequency: 0.0Hz
Volts out: 0.0V
Rated Current: 0.0A
Amps out: 0.0A
Power out: 0.0kW

THIS SCREEN ALLOWS THE USER TO VIEW THE CURRENT STATUS OF THE YASKAWA VFD. THERE WILL BE ADDITIONAL VFD SCREENS BASED ON THE NUMBER OF EXHAUST AND SUPPLY VFDS PROVIDED WITH THE SYSTEM.

Speed: This is the actual speed of the Yaskawa VFD in Hertz.

Ref Frequency: This is the reference speed signal sent to it from the Vari-Flow Controls.

Volts out: The voltage on the output side of the Yaskawa VFD .

Rated Current: This is the maximum rated current of the Yaskawa VFD.

Amps out: This is the current amperage that the Yaskawa VFD is providing to the motor.

Power out: This is the current power (kW) that the Yaskawa VFD is providing to the motor.

G. 🦆 Service
e. BMS Config

The **BMS Config** sub-menu allows the user to view and alter BMS protocol settings. If the BMS protocol is BACnet or Modbus, additional screens allow further configuration. See below for details. To access the **BMS Config** sub-menu, enter the service password (Default=1000).

BMS Configuration

Protocol: BACnet MSTP
BACnet Plugin?   YES

THIS SCREEN ALLOWS THE USER TO SELECT THE BMS PROTOCOL. ALL BMS PROTOCOLS REQUIRE A COMMUNICATIONS CARD INSTALLED IN THE SERIAL CARD PORT, LOCATED ON THE FACE OF THE CONTROLLER.

If the protocol is BACnet MSTP or BACnet IP/Eth, the user can change common BACnet parameters via the controller. The BACnet Plugin must be set to YES.

MODBUS SETUP

Address: 1
Baudrate   9600

THIS SCREEN ALLOWS THE USER TO ADJUST MODBUS PARAMETERS.

This screen only appears if the selected BMS protocol is set to Modbus.

The address is the Modbus address of the card installed in the SERIAL CARD port located on the face of the controller. (Factory Default Address = 1).

The Baud Rate should be set to the BMS baud rate. (Factory Default Baud Rate is 9600).

```
┌─────────────────────────────┐
│        MSTP SETUP           │
├─────────────────────────────┤
│ Instance:          77000    │
│ Baudrate           38400    │
│ MAC Addr:              0    │
│ MaxMasters:          127    │
│ MaxInfoFrames:        20    │
└─────────────────────────────┘

┌─────────────────────────────┐
│      BACnet Read/Write      │
├─────────────────────────────┤
│ Function:           Read    │
│ Update?              Yes    │
│ *Cycle unit power to confirm│
│ write command.              │
└─────────────────────────────┘
```

THIS SCREEN ALLOWS THE USER TO ADJUST BACNET MSTP PARAMETERS.

This screen only appears if the selected BMS protocol is set to BACnet MSTP and BACnet Plugin = YES.

If a BACnet MSTP card has been installed, the default parameters can be changed via the controller display. Factory settings are shown in the screen to the left.

To view current parameters:
1. Power on controller and allow several minutes to initialize.
2. Go to **BMS Config** menu and view BACnet Read/Write screen.
3. Change *Function* to *Read* and *Update?* to *YES*.

Current BACnet MSTP parameters should now be displayed in the BACnet MSTP SETUP screen. If all values appear to be zeros, consult the factory. (Make sure you have allowed several minutes for the controller to initialize).
Values may appear to be zero prior to setting the Function to READ.

To change BACnet MSTP parameters:
1. Power on controller and allow several minutes to initialize.
2. Go to BMS Config menu and view MSTP SETUP screen.
3. Move cursor to desired parameter by pressing the ↑↓ buttons. Press ↵ to select the parameter to change. Press the ↑↓ buttons to adjust the parameter. Press ↵ to save adjusted value.
4. Once desired parameters have been entered, go to BACnet Read/Write screen. Change *Function* to *Write* and *Update?* to *YES*.
5. Reboot the controller by cycling power to the unit. Allow several minutes for the controller to initialize.
6. View MSTP parameters. If changed values did not save, contact the factory.

```
┌─────────────────────────────┐
│       TCP/IP SETUP          │
├─────────────────────────────┤
│ Instance:          77000    │
│ IP set by:          DHCP    │
│ IP:        128.2.104.134    │
│ Subnet:  255.255.000.000    │
│ Gatewy:       128.2.0.12    │
└─────────────────────────────┘

┌─────────────────────────────┐
│       TCP/IP SETUP          │
├─────────────────────────────┤
│ DNS 1:     192.168.001.001  │
│ DNS 2:     192.168.001.001  │
│ Type: IP                    │
└─────────────────────────────┘

┌─────────────────────────────┐
│      BACnet Read/Write      │
├─────────────────────────────┤
│ Function:           Read    │
│ Update?              Yes    │
│ *Cycle unit power to confirm│
│ write command.              │
└─────────────────────────────┘
```

THIS SCREEN ALLOWS THE USER TO ADJUST BACNET IP PARAMETERS.

This screen only appears if the selected BMS protocol is set to BACnet IP/Eth and BACnet Plugin = YES.

If a BACnet IP card has been installed, the default parameters can be changed via the controller display. **The card is in DHCP mode from the factory.** Once communication is established, the user can enter static IP parameters.

To view current parameters:
1. Power on controller and allow several minutes to initialize.
2. Go to **BMS Config** menu and view BACnet Read/Write screen.
3. Change *Function* to *Read* and *Update?* to *YES*.

Current BACnet IP parameters should now be displayed in the BACnet TCP/IP SETUP screen. If all values appear to be zeros, consult the factory. (Make sure you have allowed several minutes for the controller to initialize).
Values may appear to be zero prior to setting the Function to READ.

To change BACnet TCP/IP parameters:
1. Power on the controller and allow several minutes to initialize.
2. Go to **BMS Config** menu and view TCP/IP SETUP screen.
3. Move cursor to desired parameter by pressing the ↑↓ buttons. Press ↵ to select the parameter to change. Press the ↑↓ buttons to adjust the parameter. Press ↵ to save adjusted value.
4. Once desired parameters have been entered, go to BACnet Read/Write screen. Change *Function* to *Write* and *Update?* to *YES*.
5. Reboot the controller by cycling power to the unit. Allow several minutes for the controller to initialize.
6. View TCP/IP parameters. If changed values did not save, contact the factory.

G. 🔧 Service

d. Service Settings
  a. Balancing
  b. Probe adjustment
  c. Thermoregulation
  d. User Save

The **Service Settings** sub-menu allows the user to balance exhaust and supply fans, calibrate sensors, adjust fan run settings, save user defaults, and clear alarm history, along with other items.

Balancing

Exhaust Fan 1	
Balance:	OFF
Minimum:	50.0
Maximum:	100.0

THIS SCREEN ALLOWS THE USER TO BALANCE THE EXHAUST AND SUPPLY FANS.

There will be additional fans listed based on the number of exhaust and supply fans on this system.

Balance: When it is in the OFF position, fans will work in normal operation. When set to *MAX* the fan will be forced to full speed. When set to *MIN* the fan will be forced to minimum speed.

Minimum: Based on the setting of *Balance*, the user can adjust the minimum speed to meet the requirements for the design of the system.

Maximum: Based on the setting of *Balance*, the user can adjust the maximum speed to meet the requirements for the design of the system.

Make sure to return the mode of operation to OFF when balancing is complete. If the mode of operation is left in either MIN or MAX, the fan will not turn off.

Analog Input

Input B001	
Offset:	0.0°F
Value:	70.5°F

THE PROBE ADJUSTMENT sub-menu ALLOWS THE USER TO CALIBRATE SENSOR PROBES WITH AN OFFSET VALUE.

Similar screens are available for remaining sensor probes.

Exhaust Fan Setup

Minimum On:	1s
Minimum Off:	1s
Supply Fan Airflow	
Delay:	15s

THE THERMOREGULATION sub-menu ALLOWS THE USER TO BALANCE THE EXHAUST FAN RUN SETTINGS.

Minimum On: Minimum amount of time the exhaust fan(s) will run if they are turned on.

Minimum Off: Minimum amount of time the exhaust fan(s) will remain off if the fans were turned off, before they can be turned on again.

Supply Fan Airflow Delay: *This is only valid with the Airflow Proving option.* The amount of time that the control waits for the supply fan to prove airflow before it goes into an airflow alarm.

User Default

🔑

Save:	OFF
Restore?	OFF
Enable Auto Save:	ON

THIS USER SAVE SCREEN ALLOWS THE USER TO SAVE AND RESTORE THE DEFAULT PARAMETERS STORED IN MEMORY

If the user would like to save their settings, move the cursor to the SAVE position and change to ON. This will save all of the current parameters into memory as Service Settings. If the user would like to restore to these values at some point in the future, moving the cursor to the RESTORE position, and selecting ON will restore the controller to the user saved defaults

---

Alarm History Reset

This will clear the Alarm history	
Continue?	OFF

THIS SCREEN ALLOWS THE USER TO CLEAR THE ALARM FROM MEMORY.

If the user would like to clear the alarm log, move the cursor to the OFF position and change to ON.

G. ⚙ Service

d. Manual Management
　　a. Analog Inputs
　　b. Digital Inputs
　　c. Relay Outputs
　　d. Analog Outputs

The **Manual Management** sub-menu allows the user manually adjust inputs/outputs.

NOTE: The manual adjustment of these input and/or outputs should only be adjusted in the event of troubleshooting. Change parameters to the advice of factory personnel.

Analog Input

Temperature 1	
Manual Control B001	OFF
Manual Position:	0
Value:	80.0°F

THE PROBE ADJUSTMENT MENU ALLOWS THE USER TO CALIBRATE SENSOR PROBES WITH AN OFFSET VALUE.

Manual Control: Allows the user to override the analog input for troubleshooting.
Manual Position: The value to force the input to when in an override state.
Value: The current value of the analog input.
Similar screens appear for all additional controller analog inputs.

Digital Input

Remote On/Off	
Manual DI 1:	OFF
Manual Position:	CLOSED
DI 1 Status:	Closed

Manual DI: Allows the user to override the digital input for troubleshooting.
Manual Position: The value to force the input to when in an override state.
Value: The current state of the digital input.
Similar screens appear for all additional controller digital inputs.

Relay Output

Lights 1	
Manual Relay 1:	OFF
Manual Position:	OFF
Relay 1 Status:	OFF

Manual Relay: Allows the user to override the digital input for troubleshooting.
Manual Position: The value to force the output to when in an override state.
Value: The current state of the relay output.
Similar screens appear for all additional controller relay outputs.

Analog Output

Supply Fan 1	
Mode:	Auto
Manual Value:	0.00vdc
Output:	5.00vdc

Manual Control: Allows the user to override the analog output for troubleshooting.
Manual Value: The value to force the input to when in an override state.
Output: The current value of the analog output.
Similar screens appear for all additional controller analog inputs.

H. 🏭 Manufacturer

a. Configuration

The **Configuration** sub-menu allows the user to change the units, enable Scheduling, Holidays, expansion I/O and change other settings. Users are welcome to enable Scheduling and Holidays. However, configuration changes and expansion I/O enabling are to be done under factory advice only!

Configuration

Temperature Units:	°F
Force Clock Enable:	OFF
Clock Mode:	12h
Disable Buzzer:	OFF
Startup Delay:	5s

THIS SCREEN DISPLAYS AND ALLOWS ADJUSTMENT OF THE UNIT SETTINGS.

These settings have been set from the factory to operate the components selected with the control system. When troubleshooting, refer to the wiring diagram sent with the unit (located on the control center door).

Configuration

Enable Unit On/Off	
By digit input:	OFF
By Supervisor:	OFF
By pLAN network:	OFF
By Schedule:	OFF

THIS SCREEN DISPLAYS AND ALLOWS ADJUSTMENT OF THE UNIT ON/OFF SETTINGS.

These settings have been set from the factory to operate the components selected with the control system. When troubleshooting, refer to the wiring diagram sent with the unit (located on the control center door).

Configuration	
Unit Control	
Custom 1:	ON
Custom 2:	OFF
Custom 3:	OFF
Custom 4:	OFF

THIS SCREEN DISPLAYS AND ALLOWS ADJUSTMENT OF THE CUSTOM UNIT SETTINGS.

These settings have been set from the factory to operate the components selected with the control system. When troubleshooting, refer to the wiring diagram sent with the unit (located on the control center door). *These items should not be changed without advice from factory personnel.*

Configuration	
Analog input filtering	
Enable:	OFF
Input 1:	19s
Input 2:	19s
Input 3:	19s
Input 4:	19s
Input 5:	19s

THIS SCREEN DISPLAYS AND ALLOWS ADJUSTMENT OF THE ANALOG INPUT SETTINGS.

These settings have been set from the factory to operate the components selected with the control system. When troubleshooting, refer to the wiring diagram sent with the unit (located on the control center door). *These items should not be changed without advice from factory personnel.*

Factory settings	
Manual Control Reset	
Enable:	OFF
Time:	0m

THIS SCREEN DISPLAYS AND ALLOWS ADJUSTMENT OF THE MANUAL CONTROL RESET SETTINGS.

These settings have been set from the factory to operate the components selected with the control system. When troubleshooting, refer to the wiring diagram sent with the unit (located on the control center door). *These items should not be changed without advice from factory personnel.*

Factory settings	
Smoke Fire Stat	
Exhaust Fans:	100%

THIS SCREEN DISPLAYS AND ALLOWS ADJUSTMENT OF THE EXHAUST IN FIRE SETTINGS.

These settings have been set from the factory to operate the components selected with the control system. When troubleshooting, refer to the wiring diagram sent with the unit (located on the control center door). *These items should not be changed without advice from factory personnel.*

Scheduler	
Number of Schedules:	0
Optimized Start:	NO
Set 1 Adjust:	NO
Set 2 Adjust:	NO

THIS SCREEN DISPLAYS AND ALLOWS ADJUSTMENT OF THE SCHEDULER SETTINGS.

These settings have been set from the factory to operate the components selected with the control system. When troubleshooting, refer to the wiring diagram sent with the unit (located on the control center door).

Holidays	
Number:	0

THIS SCREEN DISPLAYS AND ALLOWS ADJUSTMENT OF THE SCHEDULER SETTINGS.

These settings have been set from the factory to operate the components selected with the control system. When troubleshooting, refer to the wiring diagram sent with the unit (located on the control center door). *These items should not be changed without advice from factory personnel.*

Factory settings	
Modbus Master	
Port:	FieldBus 2
BaudRate:	19200
Data: 8,None,2	

THIS SCREEN DISPLAYS AND ALLOWS ADJUSTMENT OF THE VFD COMMUNICATION SETTINGS.

These settings have been set from the factory to operate the components selected with the control system. When troubleshooting, refer to the wiring diagram sent with the unit (located on the control center door). *These items should not be changed without advice from factory personnel.*

MODULATING SETUP	
Supply Fan	
Cntrl: REV PID	
Band:	50.0
Output Period:	500mS

THIS SCREEN DISPLAYS AND ALLOWS ADJUSTMENT OF THE SUPPLY FAN STATIC PRESSURE SETTINGS.

These settings have been set from the factory to operate the components selected with the control system. When troubleshooting, refer to the wiring diagram sent with the unit (located on the control center door). *These items should not be changed without advice from factory personnel.*

H. 🏭 Manufacturer
b. I/O Configuration

The **I/O Configuration** sub-menu allows adjustment of all controller inputs and outputs. This menu is similar to the **Probe Adjustment** menu, except that it additionally allows adjustment of the factory default 'normal' states of the digital inputs and the direction of the analog outputs. Additionally, it allows adjustment of the physical location of each I/O. ADJUSTMENT OF I/O PHYSICAL LOCATION MUST ONLY BE DONE UNDER FACTORY GUIDANCE! IMPROPER ADJUSTMENT MAY RESULT IN SYSTEM DAMAGE!

This is an example of an analog input configuration screen.

In the I/O configuration screens, the user can alter the physical location and type of each point.

Similar configuration screens appear for the remaining I/O.

Analog Input	
Temperature 1	
En: ON	Ch: 1
Normal	PT1000
Offset:	0.0°F
Value:	70.5°F

Analog Input	
Temperature 1	
En: ON	Ch: 1
Normal	PT1000
Offset:	0.0°F
Value:	70.5°F

Digital Input	
Remote On/Off	
Enable; ON Channel:	1
Action:	CLOSED
Delay:	0s
Status:	Open

Relay Output	
Lights 1	
Enable:	ON
Channel:	1
Status:	OFF

Analog Output Config	
Supply Fan 1	
Enable:	ON
Channel:	1
Action:	DIRECT
Minimum:	0.0vdc
Maximum:	10.0vdc

H. 🏭 Manufacturer
d. Initialization

The **Initialization** sub-menu allows the user to save and restore the controllers default parameters. The controller can be restored with either the Manufacturer's default parameters from shipment, or an unconfigured factory default.

THIS SCREEN ALLOWS THE USER TO RESTORE BACK TO THE ORIGINAL FACTORY DEFAULT PARAMETERS.

Restoring to the original default parameters will result in a non-customized controller. The user should not restore to these settings unless instructed by the factory.

Initialization	
DEFAULT INSTALLATION	
Erase user settings and install	
global default values:	NO

THIS SCREEN ALLOWS THE USER TO SAVE AND RESTORE THE FACTORY DEFAULT PARAMETERS STORED IN MEMORY.

The Factory Settings include the Factory default parameters and the unit setup code. If the user would like to restore to these parameters, move the cursor to the Restore position and change to ON.

Factory Save	
Save?	OFF
Restore?	OFF
Auto Restore?	No

THIS SCREEN ALLOWS THE USER TO SAVE AND RESTORE THE USER PARAMETERS STORED IN MEMORY.

The User Settings include the Factory default parameters. If the user would like to restore to these parameters, move the cursor to the Restore position and change to ON.

User Save	
Save?	OFF
Restore?	OFF
Auto Restore?	No

THIS SCREEN ALLOWS THE USER TO CLEAR ALL SAVED DATA.

Factory Delete	
CLEAR ALL SAVED DATA	
FACTORY+USER:	OFF

THIS SCREEN ALLOWS THE USER TO CHANGE THE SERVICE (PW1) AND MANUFACTURER PASSWORD (PW2).

The default service (PW1) password is 1000.

Passwords	
Insert new passwords	
Service (PW1):	0000
Manufacturer (PW2):	0000

Keypad Navigation
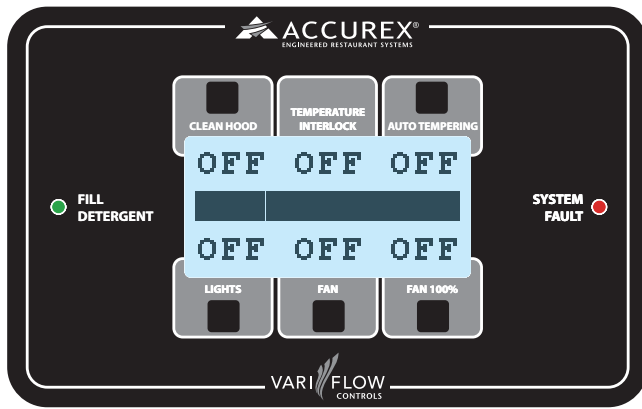
The following information details the Daily Operations of the Vari-Flow System keypad buttons and their functions.

LIGHTS - Momentarily pressing the 'LIGHTS' button will turn on all lights for the respective hood(s) attached to the system. An indicator on the LCD display above the button will display the status of the lights. Pressing the 'LIGHTS' button again will turn off the lights for the respective hood(s).

FANS - Momentarily pressing the 'FAN' button will turn on all fan(s) (exhaust and supply where applicable) for the respective hood(s) attached to the system. An indicator on the LCD display above the button will display the status of the fans. The fans will start at a minimum speed and vary automatically based on heat load generated by the appliances.

FAN 100% - Momentarily pressing the 'FAN 100%' button while the fans are on will send the speed to the fans that are currently on to full speed for 10 minutes (adjustable) or until the Fan 100% button is pressed again. Pressing the Fan 100% button again will take the fans out of 100% operation and return them to standard operating conditions.

CLEAN HOOD, *if equipped* – Momentarily pressing the 'CLEAN HOOD' button will turn off all fan(s) (exhaust and supply where applicable) for the respective hood(s) attached to the system. An indicator on the LCD display below the button will display the status of the cleaning function. It will start a wash procedure for the external wash system.

TEMPERATURE INTERLOCK – If the fans were not manually turned on by pressing the 'FAN' button and the temperature in the hood(s) is above the temperature interlock setpoint it will force the respective fan(s) on. An indicator on the LCD display below the button will display the status of the temperature interlock.

AUTO TEMPERING, *if equipped* – Momentarily pressing the 'AUTO TEMPERING' button will enable the make-up air unit to automatically temper the air based on the outside air sensor. An indicator on the LCD display below the button will display the status of the Auto Tempering function.

Touch Screen Navigation

ALL LIGHTS ON/OFF - turns all lights on/off.

INDIVIDUAL LIGHT ON/OFF - directs you to the individual light control screen where you can turn individual lights on or off.

ALL FANS ON/OFF - turns all fans on/off.

INDIVIDUAL FAN ON/OFF - provides control of each individual fan allowing you to turn individual fans on/off.
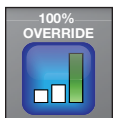
100% OVERRIDE - forces the fans that are currently on to full speed. The fans will return to the speed determined by the hood temperature after the timer has expired (preset to 10 minutes). Pressing the icon when 100% OVERRIDE is on will also return the fans to the speed determined by the hood temperature.

AUTO TEMPERING *(if equipped)* – enables/disables the make up air unit to automatically heat and/or cool based on the inlet air temperature. When it is enabled, the make-up air until will heat and/or cool as determined by the inlet air sensors (part of the make-up air unit). When it is disabled, the make-up air unit's heat and/or cool functions are disabled.

CLEAN HOOD *(if equipped)* – forces the Waterwash Control Panel (WWCP) or Grease Grabber H_2O to wash. This will force the fans off during the wash cycle.
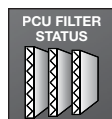
PCU FILTER STATUS *(if equipped)* – indicates loaded/clogged filter(s). If filters are satisfactory, filter image will remain gray. The image of the affected filter(s) will flash red. Once clogged, the filter(s) must be replaced.
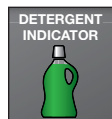
DETERGENT INDICATOR *(if equipped)* – indicates low detergent present in either the Waterwash Control Panel (WWCP) or Grease Grabber H_2O control panel. Upon full detergent, the image will be green. Upon low detergent the image will be empty and flash "LOW" in red lettering.
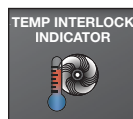
TEMP INTERLOCK INDICATOR – if the fan(s) were not turned on via the fan on/off button(s) and the temperature in the hood is above the temperature interlock setpoint the TEMP INTERLOCK INDICATOR icon will be lit up. The fan(s) will continue to run until it is below the setpoint for the amount of time in the temperature interlock settings.

HELP – this will display a help menu for this particular page.

NAVIGATION BAR *(arrow at bottom of the screen)* – pulls up the hidden NAVIGATION menu allowing access to ALARMS, HOME, SETTINGS.

Individual light control directs you to the individual light control page where you can turn individual lights on or off.

Individual fan control directs you to the individual light control page where you can turn individual fans on or off.

Navigation icon will display a submenu showing alarms, home and settings.

Alarm directs you to the alarms page. This alarm button will illuminate red when an alarm has been triggered.

Home directs you to the HOME page (current page shown).

Settings directs you to the main settings page.

NOTE
The Service Password must be entered to access the SETTINGS, CONFIGURATION and INFORMATION screen. The default service password is 1000.
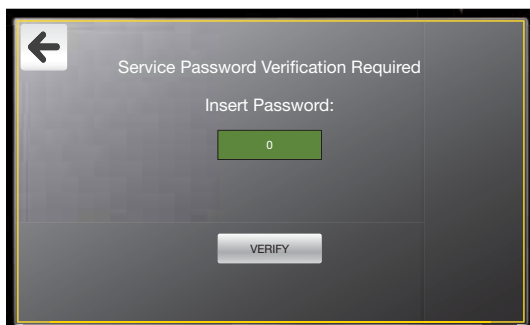
Pressing to the left or right side of the ALARM - HOME - SETTINGS will hide those buttons.
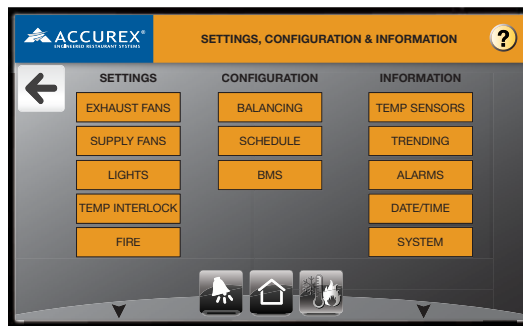
Back arrow returns you to the previous screen.

General Information

Any field that has a black border with a green fill, indicates it is editable.

If the field displays a numerical value, a number keypad will display. After entering the desired value, press the Enter button.

If the field is an alphanumeric value, a standard keyboard will display. After entering the desired value, press the Enter button.

The field may also display a multiple choice. After selecting the desired choice, press the OK button.

Settings

Exhaust Fans allows the user to change the setpoints for the fan.
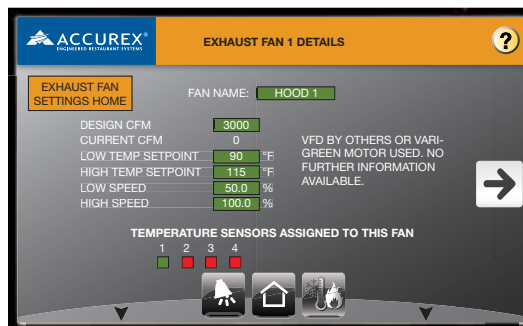
Fan Name: User can adjust the "nickname" of the fan to something such as "HOOD1".

Design CFM: Set from factory (full speed airflow rate).

Low Temp Setpoint: Temperature at which the speed of the fan is at the low speed.

High Temp Setpoint: Temperature at which the speed of the fans is at the high speed.

Settings - continued

Low Speed: Speed at which the fan is at when at or below the low temp setpoint.

High Speed: Speed at which the fan is at when at or above the high temp setpoint.

NOTE
The fans will modulate speed when the temperature is between the low and high temp setpoints.

Temperature Sensors Assigned: Shows which temperature sensors are controlling this fan speed.

Supply Fan allows the user to change the setpoints for the fan.

Fan Name: User can adjust the "nickname" of the fan to something such as "SUP1".

Design CFM: Set from factory (full speed airflow rate)

Current CFM: Current estimated supply airflow.

Low Speed: Lowest speed the fan can run at.

High Speed: Highest speed the fan can run at.

NOTE
The fans will modulate speed based on the exhaust fans assigned to this supply fan.

Exhaust Fans Controlling this Supply Fan: Shows which exhaust fans are controlling this fan speed.

Lights allows the user to adjust the names of the light circuits.

Temp Interlock: Allows the user to change the setpoints of the temperature interlock setpoints.
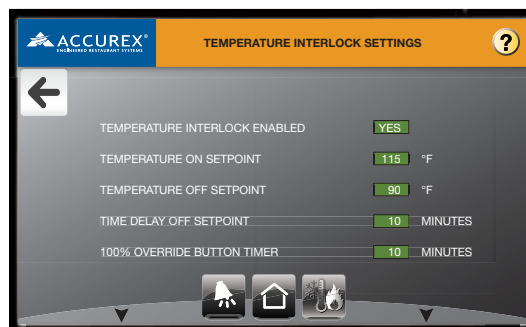
Temperature Interlock Enabled: Enables/disables the temperature interlock feature. Used to meet IMC 507.2.1.1. DO NOT CHANGE THIS ONCE THE SYSTEM HAS PASSED INSPECTION.

Temperature On: The temperature at which the fan(s) automatically turn on.

Temperature Off: The temperature at which the fans(s) will turn off once the time delay setpoint is reached.

Time Delay Setpoint: Amount of time the fan(s) need to be below the temperature off setpoint before the fan(s) will shut off.

100% Override Timer: Amount of time the fans are overridden when the 100% override button is pressed.

Fire allows the user to adjust the fire system settings.
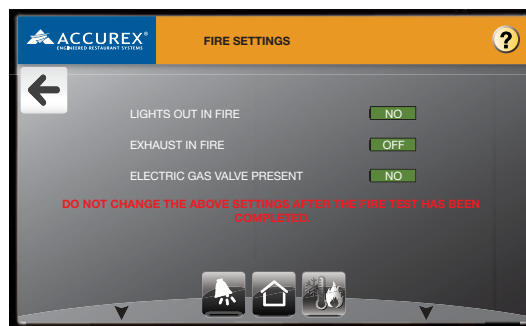
Lights Out in Fire: Setting for what the hood lights are to do in fire.

Exhaust in Fire: Setting for what the exhaust fans should do in a fire.

Electric Gas Valve Present: Setting for whether there is a electric gas valve being controlled by the Vari-Flow.

Configuration

Balancing allows the user to easily balance the exhaust and supply fans.

Mode of Operation:

Normal Operation: Fans operate based off of the fan on/off buttons and temperature interlock.

Balancing Minimum: Forces the fan on and at the speed shown in minimum speed.

    Minimum Speed: Adjust the minimum fan speed as necessary for the design of the system.

Balancing Maximum: Forces the fans on and at the speed shown in the maximum speed.

    Maximum Speed: Adjust the maximum fan speed as necessary for the design of the system.

NOTE
Make sure to return the mode of operation to "normal operation" when balancing is complete. If the mode of operation is left in either balancing mode the fan will not turn off.

Scheduling allows the user to set an on and off time for each exhaust fan.
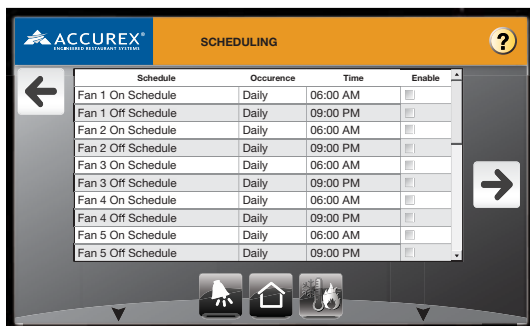
Schedules for each exhaust fan are listed. User can adjust the occurrence, time on and time off. In order for the scheduling to be used, the Enable check box must be selected.

BMS settings can only be adjusted via the main Vari-Flow controller.

Information

Temp Sensors displays the current fan control temperatures.
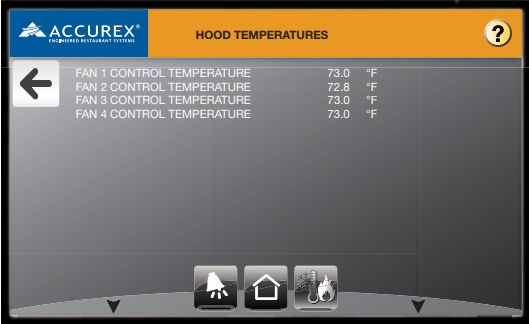
Trending allows the user to view real time and history trends for exhaust and supply fan speeds and temperature.

Fan Control Temperature: Temperature that is controlling the associated fan.

Live Trending: Schedules for each exhaust fan are listed. User can adjust the occurrence, time on and time off. In order for the scheduling to be used, the Enable check box must be selected.

History Trending: Show the history trend for the value (exhaust speed, supply speed or temperature). The user can go back in "history" to monitor activity

Alarms shows the possible alarms.

In the event of an alarm, the alarm page will automatically be displayed. The alarm description, date, and time will be displayed for each current fault. If no faults exist, "No Active Alarms" will be displayed. Once a fault is corrected, see Troubleshooting for assistance correcting the fault, the user can press the RESET ALARMS button to clear the list.

System Information displays current firmware and software versions.
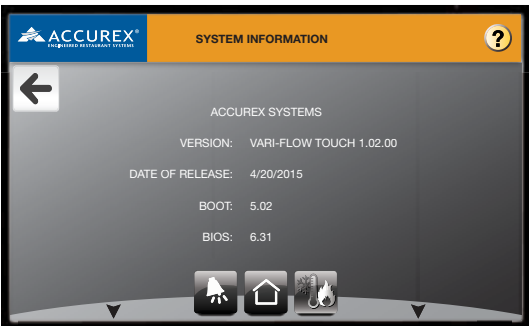
Troubleshooting

Problem: Smoke spilling out of hoods at 100% operation.	
Maximum fan speed has been scaled down from 100%	Increase exhaust fan maximum speed to 100%. Refer to information provided on page 20 to adjust setpoints.
Improper hood design	Check hood overhang, cross drafts or proper make-up air

Problem: Smoke spilling out of hood(s) at lowest speeds	
Fan minimum speed is set too low	Increase exhaust fan minimum speeds. Refer to information provided on page 20 to adjust setpoints.
Improper hood design	Check hood overhang, cross drafts or proper make-up air

Problem: Fans do not turn up to maximum speed	
Dirty temperature sensor	Clean grease from temperature sensor
High temperature set point is set too high	Decrease the high temperature set point (115ºF default). Refer to information provided on page 16 to adjust setpoints.
Fans are in balancing mode	Check balancing menus to determine if fans are in balancing mode. Refer to information provided on page 20 to adjust setpoints.
Fan 100% button is activated	Check 100% timer setting

Problem: Fans do not turn down to minimum speed	
Dirty temperature sensor	Clean grease from temperature sensor
Low temperature set point is set too low	Increase the low temperature set point (90ºF default)
Fans are in balancing mode	Check balancing menus to determine if fans are in balancing mode

Problem: Exhaust fan on and supply fan off	
Broken supply fan belt	Replace fan belt
Fire fault	Check fire suppression microswitch connection
Exhaust fan VFD in local control	Put exhaust fan VFD back into remote control
Supply fan breaker tripped	Reset breaker

Problem: Supply fan on and exhaust fan off	
Broken exhaust fan belt	Replace fan belt
Supply fan VFD in local control	Put supply fan VFD back into remote control
Exhaust fan breaker tripped	Reset breaker

Problem: Fan wheel rotates in wrong direction	
VFD output wiring incorrect	Switch any two leads on the hood side of the VFD to the fan motor **OR** change PAR b1-14 from 00 to 01 on the VFD

Problem: 100% override does not increase exhaust speed	
Exhaust already at 100% due to hood temperature	Proper operation

Problem: Fan button is on, but fans do not turn on	
Broken fan belt	Replace fan belt
VFD fault	Check VFD for faults

Problem: Fan button is off, but the fans will not turn off	
Vari-Flow is operating in temperature interlock mode. Temperature interlock indicator on keypad or touch screen will be on.	The temperature in the hood is still above the temperature interlock off set point. It will automatically turn off once below the setpoint and off delay time has expired.

Problem: Hood light(s) button on, but actual lights are not on	
Light bulbs are burned out	Replace hood light bulbs
Bad wiring connection	Verify lights are wired to the correct terminals. Refer to the lights wiring instructions on page 5

Problem: Fans do not turn on automatically	
Temperature interlock is disabled	Enable the temperature interlock option (default is enabled) in the set point menu
Interlock set point set too high	Decrease the temperature interlock on set point

Problem: Pressure sensor fault	
Kinked hose	Remove kink or replace hose
Controlled space not holding pressure	Adjust the static pressure set point or change supply mode

Problem: Fire fault	
Kitchen fire is in progress; fire suppression has dumped	Evacuate the facility immediately and contact your local fire department.
Fire system microswitch is in the fire position	Check the fire suppression microswitch connections

Problem: Temperature sensor fault	
Faulty wiring to temperature sensor	Check wiring at Vari-Flow control panel and at hood connection
Incorrect programming	Check the temperature sensor settings
Dirty/Faulty sensor	Clean or replace sensor

Problem: Exhaust / supply VFD fault - general	
Look at the VFD for fault identification	Refer to the Yaskawa Quick Start Guide for fault and tips to correct. Once corrected, recycle power to the VFD via the breaker. Wait until all power is drained from the VFD before turning power back on.

Problem: Exhaust / supply VFD fault. Fault code "CE" or "CALL"	
Faulty communication wiring between VFD and controller	Check all communication wiring between VFD and the Vari-Flow controller. Confirm all wiring corresponds with factory wiring diagram.
Incorrect programming in VFD	Check VFD communication parameters
Incorrect programming in Vari-Flow controller	Check Vari-Flow controller factory settings pages

Problem: Fan is making grinding/winding noise and/or appears to struggle to operate	
Carrier frequency on VFD needs adjustment	Change parameter C6-02 on the VFD anywhere between values 01 and 06, testing the fan at maximum speed with each adjustment. Set this parameter at whichever value corrects this issue.
Issue with fan bearings/drive components	Check fan bearings and fan drive components. Replace if necessary.

Problem: Keypad connected via factory-supplied RJ25 cable to J10 port on main controller, but keypad displays a blank screen	
Vari-Flow controller/panel is off	Turn panel on
Contrast on keypad has been adjusted	Press and hold top left button and top middle hidden button on the keypad overlay. While holding these buttons down, repeatedly press the bottom left button (makes the screen darker) or bottom right button (makes the screen lighter) until suitable to read.
Faulty keypad	Replace keypad

Problem: Touch screen displaying "Communication Error" screen	
Communication to touch screen is faulty	Check communication wiring from bottom of touch screen (-, +, O) and confirm this is connected back to main CAREL® controller on the J25 port (-, +, O)

Problem: Fault light flashing red on the keypad; alarm button red on touch screen	
Fault has been detected in Vari-Flow system	Clear the faults. If the faults will not clear, there is a current fault on system. Correct the fault and then proceed to clear the fault.

Problem: Low detergent fault	
Detergent is low in the wash panel	Refill detergent

Problem: Pollution control unit (PCU) filter status alarm	
PCU filter is clogged/full	Replace filter

Variable Frequency Drive (VFD) Information

Yaskawa V1000 (200-230 VAC and 460 VAC) or Yaskawa A1000 (575 VAC) variable frequency drives (VFDs) will be provided if the Vari-Flow is configured to use VFDs to control the fans. These drives will come programmed from the factory, and little to no adjustment will be necessary in most cases. For more in-depth information on wiring and programming these drives, please utilize the Quick Start Guide provided with the package. This quick start guide and other technical manuals can also be found on the Yaskawa website at www.yaskawa.com.

Parameter	Description	Default Value	Factory Adjustment
b1-01	Reference Source Speed Control Method	01	02
b1-02	Run Source – Start/Stop Control Method	01	02
b1-07	LOCAL/REMOTE Run Selection	00	01
b1-17	Run Command at Power Up	00	01
C1-01	Acceleration Time 1	10.00 seconds	30.00 seconds
C1-02	Deceleration Time 1	10.00 seconds	30.00 seconds
E1-01	Input Voltage	Dependent on drive type	Dependent on motor voltage*
E2-01	Motor Rated Current	Dependent on drive type	Dependent on motor FLA (full load amperage)*
H5-01	Drive Node Address	1F	Dependent on VFD address*
H5-02	Communication Speed Selection	03	04
H5-09	CE Detection Time	2.0 seconds	10.0 seconds
L2-01	Momentary Power Loss Operation Selection	00	02
L5-01	Number of Auto Restart Attempts	00	10

*See Vari-Flow wiring diagram for more information.

Model V1000

Changing Parameters

Step 1: V1000 Digital Operator power-up state.

Step 2: Select Parameter Menu

Press ∨ two times until the digital operator show the parameter menu (PAr) then press ENTER.

Step 3: Select Parameter

Press RESET to select the digit you would like to change. Next use ∧ and ∨ to select the parameter group, sub-group or number.

Once the parameter you wish to change is displayed on the screen and the digit furthest to the right is flashing, press ENTER.

Step 4: Change Parameter Value

Press RESET to select the digit of the parameter value you would like to change.

Modify the parameter value using

∧ and ∨ and press ENTER to save the new value.

Monitor Motor Frequency and Motor Current

Step 1: V1000 Digital Operator power-up state:

Step 2: Output Frequency

Press ∧ until the **FOUT** LED turns on. The display now shows the actual drive output frequency in hertz (Hz).
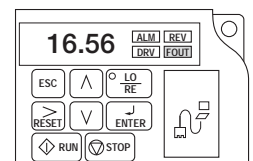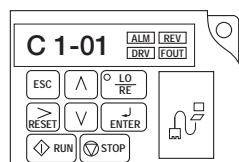
Step 3: Motor Current

Press ∧ again will show the motor output current. The 'A' behind the value means 'Amps'.
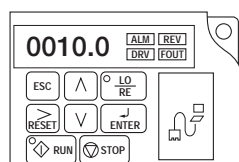
Model A1000

Changing Parameters

Step 1: A1000 Digital Operator power-up state.

```
DIGITAL OPERATOR JVOP-180        [ALM]

- MODE -              DRV Rdy
      Fref Ref (AI)
U1-01=        0.00 Hz
U1-02    0.00 Hz          [RSEQ]
U1-03    0.00A            [RREF]
  JOG      FWD

   [ F1 ]          [ F2 ]
  [ ESC ]  [ /\ ]  [ LO/RE ]
  [ >/RESET ] [ \/ ] [ ENTER ]
  [ RUN ]        [ STOP ]
```

Monitor Motor Frequency and Motor Current

With the drive running, press ∧ until reaching the Monitor Menu. This will display output frequency and amperage of the motor.

```
DIGITAL OPERATOR JVOP-180        [ALM]

- MODE -              DRV Rdy
      Fref Ref (AI)
U1-01=       60.00 Hz
U1-02    60.00 Hz         [RSEQ]
U1-03    2.07A            [RREF]
  JOG      FWD

   [ F1 ]          [ F2 ]
  [ ESC ]  [ /\ ]  [ LO/RE ]
  [ >/RESET ] [ \/ ] [ ENTER ]
  [ RUN ]        [ STOP ]
```
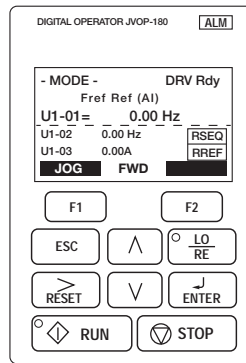
Step 2: Select Parameter Menu

Press ∨ two times until the digital operator shows the programming menu, then press ⏎ENTER.

```
DIGITAL OPERATOR JVOP-180        [ALM]

- MODE -              PRG
       Programming


  HELP     FWD      DATA

   [ F1 ]          [ F2 ]
  [ ESC ]  [ /\ ]  [ LO/RE ]
  [ >/RESET ] [ \/ ] [ ENTER ]
  [ RUN ]        [ STOP ]
```
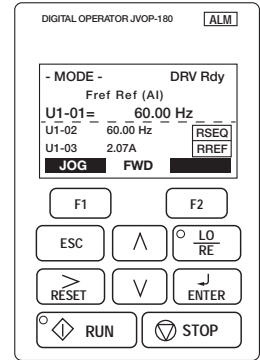
Resetting the VFD Faults

Upon a VFD fault, first determine the cause of the fault and correct. Typically, if the drive detects a fault, it will remain inoperable until that fault has been corrected and the drive has been reset.

Once a fault has been corrected, the easiest way to clear the displayed fault on the VFD is to shut off power to the drive from the power source (breaker). Wait for the VFD to fully discharge and then restore the power.

Upon correcting a minor fault, recycling power may not be necessary. Simply press >/RESET, then press LO/RE twice.

Once the fault has been corrected and the drive has been reset, the main controller alarm must also be cleared. See page 14 for details.

Step 3: Select Parameter

Press >/RESET to select the digit you would like to change. Next use ∧ and ∨ to select the parameter group, sub-group or number.

One the parameter you wish to change is displayed on the screen and the digit furthest to the right is flashing, press ⏎ENTER.

```
DIGITAL OPERATOR JVOP-180        [ALM]

- PRMSET -            PRG
- - - - - - - - - - -
C1-01=        10.0 sec
      Accel Time 1

  ⟵        FWD      ⟶

   [ F1 ]          [ F2 ]
  [ ESC ]  [ /\ ]  [ LO/RE ]
  [ >/RESET ] [ \/ ] [ ENTER ]
  [ RUN ]        [ STOP ]
```

Step 4: Change Parameter Value

Press >/RESET to select the digit of the parameter value you would like to change.

Modify the parameter value using ∧ and ∨ and press ⏎ENTER to save the new value.

```
DIGITAL OPERATOR JVOP-180        [ALM]

- PRMSET -            PRG
- - - Accel Time 1 - - -
C1-01= 0010.0 sec
      (0.0 - 6000.0)
       "10.0 sec"
  ⟵        FWD      ⟶

   [ F1 ]          [ F2 ]
  [ ESC ]  [ /\ ]  [ LO/RE ]
  [ >/RESET ] [ \/ ] [ ENTER ]
  [ RUN ]        [ STOP ]
```

BMS Points List • Vari-Flow v1.02 Modbus / BACnet®

Type	BACnet Device Instance: 77000 (default) Analog = AV, Integer = AV, Digital = BV				Modbus - RTU/TCP Address: 1 (default)	Read Write	Description
	Instance	Name	Units		Register		
Analog	11	Ef1_Ctemp	°F		40012	R	Exhaust Fan 1 Control Temperature
Analog	12	Ef2_Ctemp	°F		40013	R	Exhaust Fan 2 Control Temperature
Analog	13	Ef3_Ctemp	°F		40014	R	Exhaust Fan 3 Control Temperature
Analog	14	Ef4_Ctemp	°F		40015	R	Exhaust Fan 4 Control Temperature
Analog	15	Ef5_Ctemp	°F		40016	R	Exhaust Fan 5 Control Temperature
Analog	16	Ef6_Ctemp	°F		40017	R	Exhaust Fan 6 Control Temperature
Analog	17	Ef7_Ctemp	°F		40018	R	Exhaust Fan 7 Control Temperature
Analog	18	Ef8_Ctemp	°F		40019	R	Exhaust Fan 8 Control Temperature
Analog	19	Ef9_Ctemp	°F		40020	R	Exhaust Fan 9 Control Temperature
Analog	20	Ef10_Ctemp	°F		40021	R	Exhaust Fan 10 Control Temperature
Analog	51	Ef1_Amps	amperes		40052	R	Exhaust Fan 1 Amps from VFD
Analog	52	Ef2_Amps	amperes		40053	R	Exhaust Fan 2 Amps from VFD
Analog	53	Ef3_Amps	amperes		40054	R	Exhaust Fan 3 Amps from VFD
Analog	54	Ef4_Amps	amperes		40055	R	Exhaust Fan 4 Amps from VFD
Analog	55	Ef5_Amps	amperes		40056	R	Exhaust Fan 5 Amps from VFD
Analog	56	Ef6_Amps	amperes		40057	R	Exhaust Fan 6 Amps from VFD
Analog	57	Ef7_Amps	amperes		40058	R	Exhaust Fan 7 Amps from VFD
Analog	58	Ef8_Amps	amperes		40059	R	Exhaust Fan 8 Amps from VFD
Analog	59	Ef9_Amps	amperes		40060	R	Exhaust Fan 9 Amps from VFD
Analog	60	Ef10_Amp	amperes		40061	R	Exhaust Fan 10 Amps from VFD
Analog	71	Sf1_Amps	amperes		40072	R	Supply 1 Amps from VFD
Analog	72	Sf2_Amps	amperes		40073	R	Supply 2 Amps from VFD
Analog	73	Sf3_Amps	amperes		40074	R	Supply 3 Amps from VFD
Analog	74	Sf4_Amps	amperes		40075	R	Supply 4 Amps from VFD
Analog	81	Ef1_kW	kilowatts		40082	R	Exhaust Fan 1 Power Output
Analog	82	Ef2_kW	kilowatts		40083	R	Exhaust Fan 2 Power Output
Analog	83	Ef3_kW	kilowatts		40084	R	Exhaust Fan 3 Power Output
Analog	84	Ef4_kW	kilowatts		40085	R	Exhaust Fan 4 Power Output
Analog	85	Ef5_kW	kilowatts		40086	R	Exhaust Fan 5 Power Output
Analog	86	Ef6_kW	kilowatts		40087	R	Exhaust Fan 6 Power Output
Analog	87	Ef7_kW	kilowatts		40088	R	Exhaust Fan 7 Power Output
Analog	88	Ef8_kW	kilowatts		40089	R	Exhaust Fan 8 Power Output
Analog	89	Ef9_kW	kilowatts		40090	R	Exhaust Fan 9 Power Output
Analog	90	Ef10_kW	kilowatts		40091	R	Exhaust Fan 10 Power Output
Analog	101	Sf1_kW	kilowatts		40102	R	Supply Fan 1 Power Output
Analog	102	Sf2_kW	kilowatts		40103	R	Supply Fan 2 Power Output
Analog	103	Sf3_kW	kilowatts		40104	R	Supply Fan 3 Power Output
Analog	104	Sf4_kW	kilowatts		40105	R	Supply Fan 4 Power Output
Analog	111	Ef1_FrRe	hertz		40112	R	Exhaust Fan 1 Frequency Reference
Analog	112	Ef2_FrRe	hertz		40113	R	Exhaust Fan 2 Frequency Reference
Analog	113	Ef3_FrRe	hertz		40114	R	Exhaust Fan 3 Frequency Reference
Analog	114	Ef4_FrRe	hertz		40115	R	Exhaust Fan 4 Frequency Reference
Analog	115	Ef5_FrRe	hertz		40116	R	Exhaust Fan 5 Frequency Reference
Analog	116	Ef6_FrRe	hertz		40117	R	Exhaust Fan 6 Frequency Reference
Analog	117	Ef7_FrRe	hertz		40118	R	Exhaust Fan 7 Frequency Reference
Analog	118	Ef8_FrRe	hertz		40119	R	Exhaust Fan 8 Frequency Reference
Analog	119	Ef9_FrRe	hertz		40120	R	Exhaust Fan 9 Frequency Reference
Analog	120	Ef10_FrRe	hertz		40121	R	Exhaust Fan 10 Frequency Reference
Analog	131	Sf1_FrRe	hertz		40132	R	Supply Fan 1 Frequency Reference
Analog	132	Sf2_FrRe	hertz		40133	R	Supply Fan 2 Frequency Reference
Analog	133	Sf3_FrRe	hertz		40134	R	Supply Fan 3 Frequency Reference
Analog	134	Sf4_FrRe	hertz		40135	R	Supply Fan 4 Frequency Reference
Analog	141	Ef1_LoTemp	°F		40142	R/W	Exhaust Fan 1 Low Temperature Setting
Analog	142	Ef2_LoTemp	°F		40143	R/W	Exhaust Fan 2 Low Temperature Setting
Analog	143	Ef3_LoTemp	°F		40144	R/W	Exhaust Fan 3 Low Temperature Setting
Analog	144	Ef4_LoTemp	°F		40145	R/W	Exhaust Fan 4 Low Temperature Setting
Analog	145	EF5_LoTemp	°F		40146	R/W	Exhaust Fan 5 Low Temperature Setting
Analog	146	EF6_LoTemp	°F		40147	R/W	Exhaust Fan 6 Low Temperature Setting
Analog	147	EF7_LoTemp	°F		40148	R/W	Exhaust Fan 7 Low Temperature Setting
Analog	148	EF8_LoTemp	°F		40149	R/W	Exhaust Fan 8 Low Temperature Setting

	BMS Points List • Vari-Flow v1.02 Modbus / BACnet®					
Type	BACnet Device Instance: 77000 (default) Analog = AV, Integer = AV, Digital = BV			Modbus - RTU/TCP Address: 1 (default)	Read Write	Description
	Instance	Name	Units		Register		
Analog	149	EF9_LoTemp	°F		40150	R/W	Exhaust Fan 9 Low Temperature Setting
Analog	150	EF10_LoTemp	°F		40151	R/W	Exhaust Fan 10 Low Temperature Setting
Analog	151	Ef1_HiTemp	°F		40152	R/W	Exhaust Fan 1 High Temperature Setting
Analog	152	Ef2_HiTemp	°F		40153	R/W	Exhaust Fan 2 High Temperature Setting
Analog	153	Ef3_HiTemp	°F		40154	R/W	Exhaust Fan 3 High Temperature Setting
Analog	154	Ef4_HiTemp	°F		40155	R/W	Exhaust Fan 4 High Temperature Setting
Analog	155	Ef5_HiTemp	°F		40156	R/W	Exhaust Fan 5 High Temperature Setting
Analog	156	Ef6_HiTemp	°F		40157	R/W	Exhaust Fan 6 High Temperature Setting
Analog	157	Ef7_HiTemp	°F		40158	R/W	Exhaust Fan 7 High Temperature Setting
Analog	158	Ef8_HiTemp	°F		40159	R/W	Exhaust Fan 8 High Temperature Setting
Analog	159	Ef9_HiTemp	°F		40160	R/W	Exhaust Fan 9 High Temperature Setting
Analog	160	Ef10_HiTemp	°F		40161	R/W	Exhaust Fan 10 High Temperature Setting
Analog	161	Ef1_LoSpeed	percent		40162	R/W	Exhaust Fan 1 Low Speed Setting
Analog	162	Ef2_LoSpeed	percent		40163	R/W	Exhaust Fan 2 Low Speed Setting
Analog	163	Ef3_LoSpeed	percent		40164	R/W	Exhaust Fan 3 Low Speed Setting
Analog	164	Ef4_LoSpeed	percent		40165	R/W	Exhaust Fan 4 Low Speed Setting
Analog	165	Ef5_LoSpeed	percent		40166	R/W	Exhaust Fan 5 Low Speed Setting
Analog	166	Ef6_LoSpeed	percent		40167	R/W	Exhaust Fan 6 Low Speed Setting
Analog	167	Ef7_LoSpeed	percent		40168	R/W	Exhaust Fan 7 Low Speed Setting
Analog	168	Ef8_LoSpeed	percent		40169	R/W	Exhaust Fan 8 Low Speed Setting
Analog	169	Ef9_LoSpeed	percent		40170	R/W	Exhaust Fan 9 Low Speed Setting
Analog	170	Ef10_LoSpeed	percent		40171	R/W	Exhaust Fan 10 Low Speed Setting
Analog	171	Ef1_HiSpeed	percent		40172	R/W	Exhaust Fan 1 High Speed Setting
Analog	172	Ef2_HiSpeed	percent		40173	R/W	Exhaust Fan 2 High Speed Setting
Analog	173	Ef3_HiSpeed	percent		40174	R/W	Exhaust Fan 3 High Speed Setting
Analog	174	Ef4_HiSpeed	percent		40175	R/W	Exhaust Fan 4 High Speed Setting
Analog	175	Ef5_HiSpeed	percent		40176	R/W	Exhaust Fan 5 High Speed Setting
Analog	176	Ef6_HiSpeed	percent		40177	R/W	Exhaust Fan 6 High Speed Setting
Analog	177	Ef7_HiSpeed	percent		40178	R/W	Exhaust Fan 7 High Speed Setting
Analog	178	Ef8_HiSpeed	percent		40179	R/W	Exhaust Fan 8 High Speed Setting
Analog	179	Ef9_HiSpeed	percent		40180	R/W	Exhaust Fan 9 High Speed Setting
Analog	180	Ef10_HiSpeed	percent		40181	R/W	Exhaust Fan 10 High Speed Setting
Analog	181	Sf1_LoSpeed	percent		40182	R/W	Supply Fan 1 Low Speed Setting
Analog	182	Sf2_LoSpeed	percent		40183	R/W	Supply Fan 2 Low Speed Setting
Analog	183	Sf3_LoSpeed	percent		40184	R/W	Supply Fan 3 Low Speed Setting
Analog	184	Sf4_LoSpeed	percent		40185	R/W	Supply Fan 4 Low Speed Setting
Analog	191	Sf1_HiSpeed	percent		40192	R/W	Supply Fan 1 High Speed Setting
Analog	192	Sf2_HiSpeed	percent		40193	R/W	Supply Fan 2 High Speed Setting
Analog	193	Sf3_HiSpeed	percent		40194	R/W	Supply Fan 3 High Speed Setting
Analog	194	Sf4_HiSpeed	percent		40195	R/W	Supply Fan 4 High Speed Setting
Integer	1011	Ef1_Speed	percent		40220	R	Exhaust Fan 1 Speed Percentage
Integer	1012	Ef2_Speed	percent		40221	R	Exhaust Fan 2 Speed Percentage
Integer	1013	Ef3_Speed	percent		40222	R	Exhaust Fan 3 Speed Percentage
Integer	1014	Ef4_Speed	percent		40223	R	Exhaust Fan 4 Speed Percentage
Integer	1015	Ef5_Speed	percent		40224	R	Exhaust Fan 5 Speed Percentage
Integer	1016	Ef6_Speed	percent		40225	R	Exhaust Fan 6 Speed Percentage
Integer	1017	Ef7_Speed	percent		40226	R	Exhaust Fan 7 Speed Percentage
Integer	1018	Ef8_Speed	percent		40227	R	Exhaust Fan 8 Speed Percentage
Integer	1019	Ef9_Speed	percent		40228	R	Exhaust Fan 9 Speed Percentage
Integer	1020	Ef10_Speed	percent		40229	R	Exhaust Fan 10 Speed Percentage
Integer	1031	Sf1_Speed	percent		40240	R	Supply Fan 1 Speed Percentage
Integer	1032	Sf2_Speed	percent		40241	R	Supply Fan 2 Speed Percentage
Integer	1033	Sf3_Speed	percent		40242	R	Supply Fan 3 Speed Percentage
Integer	1034	Sf4_Speed	percent		40243	R	Supply Fan 4 Speed Percentage
			Inactive_Text	Active_Text			
Digital	10	GLOBAL_ALARM	Off	Alarm	10011	R	Global Alarm
Digital	11	Ef1_On_Off	Off	On	10012	R/W	Exhaust Fan 1 On/Off (0: Off; 1: On)
Digital	12	Ef2_On_Off	Off	On	10013	R/W	Exhaust Fan 2 On/Off (0: Off; 1: On)
Digital	13	Ef3_On_Off	Off	On	10014	R/W	Exhaust Fan 3 On/Off (0: Off; 1: On)
Digital	14	Ef4_On_Off	Off	On	10015	R/W	Exhaust Fan 4 On/Off (0: Off; 1: On)

BMS Points List • Vari-Flow v1.02 Modbus / BACnet®

Type	BACnet Device Instance: 77000 (default) Analog = AV, Integer = AV, Digital = BV				Modbus - RTU/TCP Address: 1 (default)	Read Write	Description
	Instance	Name	Units		Register		
Digital	15	Ef5_On_Off	Off	On	10016	R/W	Exhaust Fan 5 On/Off (0: Off; 1: On)
Digital	16	Ef6_On_Off	Off	On	10017	R/W	Exhaust Fan 6 On/Off (0: Off; 1: On)
Digital	17	Ef7_On_Off	Off	On	10018	R/W	Exhaust Fan 7 On/Off (0: Off; 1: On)
Digital	18	Ef8_On_Off	Off	On	10019	R/W	Exhaust Fan 8 On/Off (0: Off; 1: On)
Digital	19	Ef9_On_Off	Off	On	10020	R/W	Exhaust Fan 9 On/Off (0: Off; 1: On)
Digital	20	Ef10_On_Off	Off	On	10021	R/W	Exhaust Fan 10 On/Off (0: Off; 1: On)
Digital	91	T1_Alm	Off	Alarm	10092	R	Temp Sensor 1 Failure
Digital	92	T2_Alm	Off	Alarm	10093	R	Temp Sensor 2 Failure
Digital	93	T3_Alm	Off	Alarm	10094	R	Temp Sensor 3 Failure
Digital	94	T4_Alm	Off	Alarm	10095	R	Temp Sensor 4 Failure
Digital	95	T5_Alm	Off	Alarm	10096	R	Temp Sensor 5 Failure
Digital	96	T6_Alm	Off	Alarm	10097	R	Temp Sensor 6 Failure
Digital	97	T7_Alm	Off	Alarm	10098	R	Temp Sensor 7 Failure
Digital	98	T8_Alm	Off	Alarm	10099	R	Temp Sensor 8 Failure
Digital	99	T9_Alm	Off	Alarm	10100	R	Temp Sensor 9 Failure
Digital	100	T10_Alm	Off	Alarm	10101	R	Temp Sensor 10 Failure
Digital	101	Fire_Alm	Off	Alarm	10102	R	Fire System Status (0: Ok; 1: Fire)
Digital	102	Rem_En	Off	On	10103	R/W	Remote Enable (0: Off; 1: On)
Digital	131	Sf1_Af_Alm	Off	Alarm	10132	R	Airflow Alarm Supply Fan 1
Digital	132	Sf2_Af_Alm	Off	Alarm	10133	R	Airflow Alarm Supply Fan 2
Digital	133	Sf3_Af_Alm	Off	Alarm	10134	R	Airflow Alarm Supply Fan 3
Digital	134	Sf4_Af_Alm	Off	Alarm	10135	R	Airflow Alarm Supply Fan 4
Digital	141	Sf1_Pres_Alm	Off	Alarm	10142	R	Supply Fan 1 Pressure Alarm
Digital	161	Exh_VBO_Alm	Off	Alarm	10162	R	Exhaust VFD By Others Fault
Digital	162	Sup_VBO_Alm	Off	Alarm	10163	R	Supply VFD By Others Fault
Digital	163	Exh_VBF_Alm	Off	Alarm	10164	R	Exhaust VFD By Factory Fault
Digital	164	Sup_VBF_Alm	Off	Alarm	10165	R	Supply VFD By Factory Fault
Digital	171	Ef1_Status	Off	On	10172	R	Exhaust Fan 1 Status
Digital	172	Ef2_Status	Off	On	10173	R	Exhaust Fan 2 Status
Digital	173	Ef3_Status	Off	On	10174	R	Exhaust Fan 3 Status
Digital	174	Ef4_Status	Off	On	10175	R	Exhaust Fan 4 Status
Digital	175	Ef5_Status	Off	On	10176	R	Exhaust Fan 5 Status
Digital	176	Ef6_Status	Off	On	10177	R	Exhaust Fan 6 Status
Digital	177	Ef7_Status	Off	On	10178	R	Exhaust Fan 7 Status
Digital	178	Ef8_Status	Off	On	10179	R	Exhaust Fan 8 Status
Digital	179	Ef9_Status	Off	On	10180	R	Exhaust Fan 9 Status
Digital	180	Ef10_Status	Off	On	10181	R	Exhaust Fan 10 Status
Digital	181	Sf1_Status	Off	On	10182	R	Supply Fan 1 Status
Digital	182	Sf2_Status	Off	On	10183	R	Supply Fan 2 Status
Digital	183	Sf3_Status	Off	On	10184	R	Supply Fan 3 Status
Digital	184	Sf4_Status	Off	On	10185	R	Supply Fan 4 Status

Type	NV_Index/Bit	Name NV	Type NV	Read (Unit to BMS) Write (BMS to Unit)	Description
		BMS Points List • Vari-Flow v1.02 LonWorks®			
Analog	13	nvoEf1_Ctemp	105	Read	Exhaust Fan 1 Control Temperature
Analog	14	nvoEf2_Ctemp	105	Read	Exhaust Fan 2 Control Temperature
Analog	15	nvoEf3_Ctemp	105	Read	Exhaust Fan 3 Control Temperature
Analog	16	nvoEf4_Ctemp	105	Read	Exhaust Fan 4 Control Temperature
Analog	17	nvoEf5_Ctemp	105	Read	Exhaust Fan 5 Control Temperature
Analog	18	nvoEf6_Ctemp	105	Read	Exhaust Fan 6 Control Temperature
Analog	19	nvoEf7_Ctemp	105	Read	Exhaust Fan 7 Control Temperature
Analog	20	nvoEf8_Ctemp	105	Read	Exhaust Fan 8 Control Temperature
Analog	21	nvoEf9_Ctemp	105	Read	Exhaust Fan 9 Control Temperature
Analog	22	nvoEf10_Ctemp	105	Read	Exhaust Fan 10 Control Temperature
Integer	23	nvoEf1_Speed	81	Read	Exhaust Fan 1 Speed Percentage
Integer	24	nvoEf2_Speed	81	Read	Exhaust Fan 2 Speed Percentage
Integer	25	nvoEf3_Speed	81	Read	Exhaust Fan 3 Speed Percentage
Integer	26	nvoEf4_Speed	81	Read	Exhaust Fan 4 Speed Percentage
Integer	27	nvoEf5_Speed	81	Read	Exhaust Fan 5 Speed Percentage
Integer	28	nvoEf6_Speed	81	Read	Exhaust Fan 6 Speed Percentage
Integer	29	nvoEf7_Speed	81	Read	Exhaust Fan 7 Speed Percentage
Integer	30	nvoEf8_Speed	81	Read	Exhaust Fan 8 Speed Percentage
Integer	31	nvoEf9_Speed	81	Read	Exhaust Fan 9 Speed Percentage
Integer	32	nvoEf10_Speed	81	Read	Exhaust Fan 10 Speed Percentage
Integer	33	nvoSf1_Speed	81	Read	Supply Fan 1 Speed Percentage
Integer	34	nvoSf2_Speed	81	Read	Supply Fan 2 Speed Percentage
Integer	35	nvoSf3_Speed	81	Read	Supply Fan 3 Speed Percentage
Integer	36	nvoSf4_Speed	81	Read	Supply Fan 4 Speed Percentage
Digital	37	nvoGLOBAL_ALARM	81	Read	Global Alarm
Digital	3	nviEf1_On_Off	95	Write	Exhaust Fan 1 On/Off (0: Off; 1: On)
Digital	4	nviEf2_On_Off	95	Write	Exhaust Fan 2 On/Off (0: Off; 1: On)
Digital	5	nviEf3_On_Off	95	Write	Exhaust Fan 3 On/Off (0: Off; 1: On)
Digital	6	nviEf4_On_Off	95	Write	Exhaust Fan 4 On/Off (0: Off; 1: On)
Digital	7	nviEf5_On_Off	95	Write	Exhaust Fan 5 On/Off (0: Off; 1: On)
Digital	8	nviEf6_On_Off	95	Write	Exhaust Fan 6 On/Off (0: Off; 1: On)
Digital	9	nviEf7_On_Off	95	Write	Exhaust Fan 7 On/Off (0: Off; 1: On)
Digital	10	nviEf8_On_Off	95	Write	Exhaust Fan 8 On/Off (0: Off; 1: On)
Digital	11	nviEf9_On_Off	95	Write	Exhaust Fan 9 On/Off (0: Off; 1: On)
Digital	12	nviEf10_On_Off	95	Write	Exhaust Fan 10 On/Off (0: Off; 1: On)
	42	nvoTmp_Snsr_Alms	83		Temperature Sensor Alarms
Digital	(LSB) bit0	T1_Alm		Read	Temp Sensor 1 Failure
Digital	bit1	T2_Alm		Read	Temp Sensor 2 Failure
Digital	bit2	T3_Alm		Read	Temp Sensor 3 Failure
Digital	bit3	T4_Alm		Read	Temp Sensor 4 Failure
Digital	bit4	T5_Alm		Read	Temp Sensor 5 Failure
Digital	bit5	T6_Alm		Read	Temp Sensor 6 Failure
Digital	bit6	T7_Alm		Read	Temp Sensor 7 Failure
Digital	bit7	T8_Alm		Read	Temp Sensor 8 Failure
Digital	bit8	T9_Alm		Read	Temp Sensor 9 Failure
Digital	bit9	T10_Alm		Read	Temp Sensor 10 Failure
Digital	38	Fire_Alm	95	Read	Fire System Status (0: Ok; 1: Fire)
Digital	39	Rem_En	95	Write	Remote Enable (0: Off; 1: On)
	43	nvoAirProvAlms	83		Supply Airflow Proving Alarms
Digital	(LSB) bit0	Sf1_Af_Alm		Read	Airflow Alarm Supply Fan 1
Digital	bit1	Sf2_Af_Alm		Read	Airflow Alarm Supply Fan 2
Digital	bit2	Sf3_Af_Alm		Read	Airflow Alarm Supply Fan 3
Digital	bit3	Sf4_Af_Alm		Read	Airflow Alarm Supply Fan 4
Digital	40	Sf1_Pres_Alm		Read	Supply Fan 1 Pressure Alarm

		BMS Points List • Vari-Flow v1.02 LonWorks®			
Type	**NV_Index/Bit**	**Name NV**	**Type NV**	**Read (Unit to BMS) Write (BMS to Unit)**	**Description**
	44	nvoVFDAlms	83		Supply Airflow Proving Alarms
Digital	(LSB) bit0	Exh_VBO_Alm		Read	Exhaust VFD By Others Fault
Digital	bit1	Sup_VBO_Alm		Read	Supply VFD By Others Fault
Digital	bit2	Exh_VBF_Alm		Read	Exhaust VFD By Factory Fault
Digital	bit3	Sup_VBF_Alm		Read	Supply VFD By Factory Fault
	45	nvoEF_Status	83		Exhaust Fans Status
Digital	(LSB) bit0	Ef1_Status		Read	Exhaust Fan 1 Status
Digital	bit1	Ef2_Status		Read	Exhaust Fan 2 Status
Digital	bit2	Ef3_Status		Read	Exhaust Fan 3 Status
Digital	bit3	Ef4_Status		Read	Exhaust Fan 4 Status
Digital	bit4	Ef5_Status		Read	Exhaust Fan 5 Status
Digital	bit5	Ef6_Status		Read	Exhaust Fan 6 Status
Digital	bit6	Ef7_Status		Read	Exhaust Fan 7 Status
Digital	bit7	Ef8_Status		Read	Exhaust Fan 8 Status
Digital	bit8	Ef9_Status		Read	Exhaust Fan 9 Status
Digital	bit9	Ef10_Status		Read	Exhaust Fan 10 Status
	46	nvoSF_Status	83		Supply Fans Status
Digital	(LSB) bit0	Sf1_Status		Read	Exhaust Fan 1 Status
Digital	bit1	Sf2_Status		Read	Exhaust Fan 2 Status
Digital	bit2	Sf3_Status		Read	Exhaust Fan 3 Status
Digital	bit3	Sf4_Status		Read	Exhaust Fan 4 Status
Digital	41	nvoHiTemp_Alm	95	Read	High Temperature Alarm

Maintenance Log

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Our Commitment

As a result of our commitment to continuous improvement, Accurex reserves the right to change specifications without notice.

Specific Accurex product warranties are located on accurex.com within the product area tabs and in the Library under Warranties.

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ENGINEERED RESTAURANT SYSTEMS