

DemandAire Silver

Kitchen Ventilation Control System

Installation and Operations Manual



Striving for Excellence

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General Information

Acronyms

ARTD	Ambient Resistance Temperature Detector
BMS	Building Management System
CKV	Commercial Kitchen Ventilation
DCKV	Demand Control Kitchen Ventilation
DCP	DemandAire Control Panel
EC	Electronically Commutated
ECM	Exhaust Collar Mounted
FSS	Fire Suppression System
HCM	Hood Canopy Mounted
HMI	Human Machine Interface
IHF	Internal Hood Fan
MBD	Motorized Balance Damper
MUA	Make Up Air
PLC	Programmable Logic Controller
PTC	Programmable Time Clock
RTD	Resistance Temperature Detector
VFD	Variable Frequency Drive

General Information

Pre-Installation Precautions

!
WARNING
!

PRIOR TO MAKING ANY ELECTRICAL CONNECTIONS TO THE CONTROL PANEL, READ AND UNDERSTAND THIS ENTIRE INSTALLATION AND OPERATIONS MANUAL. ALL WORK ON THE CONTROL PANEL SHOULD BE PERFORMED BY QUALIFIED CONTRACTORS IN ACCORDANCE WITH ALL APPLICABLE PREVAILING CODES AND STANDARDS.

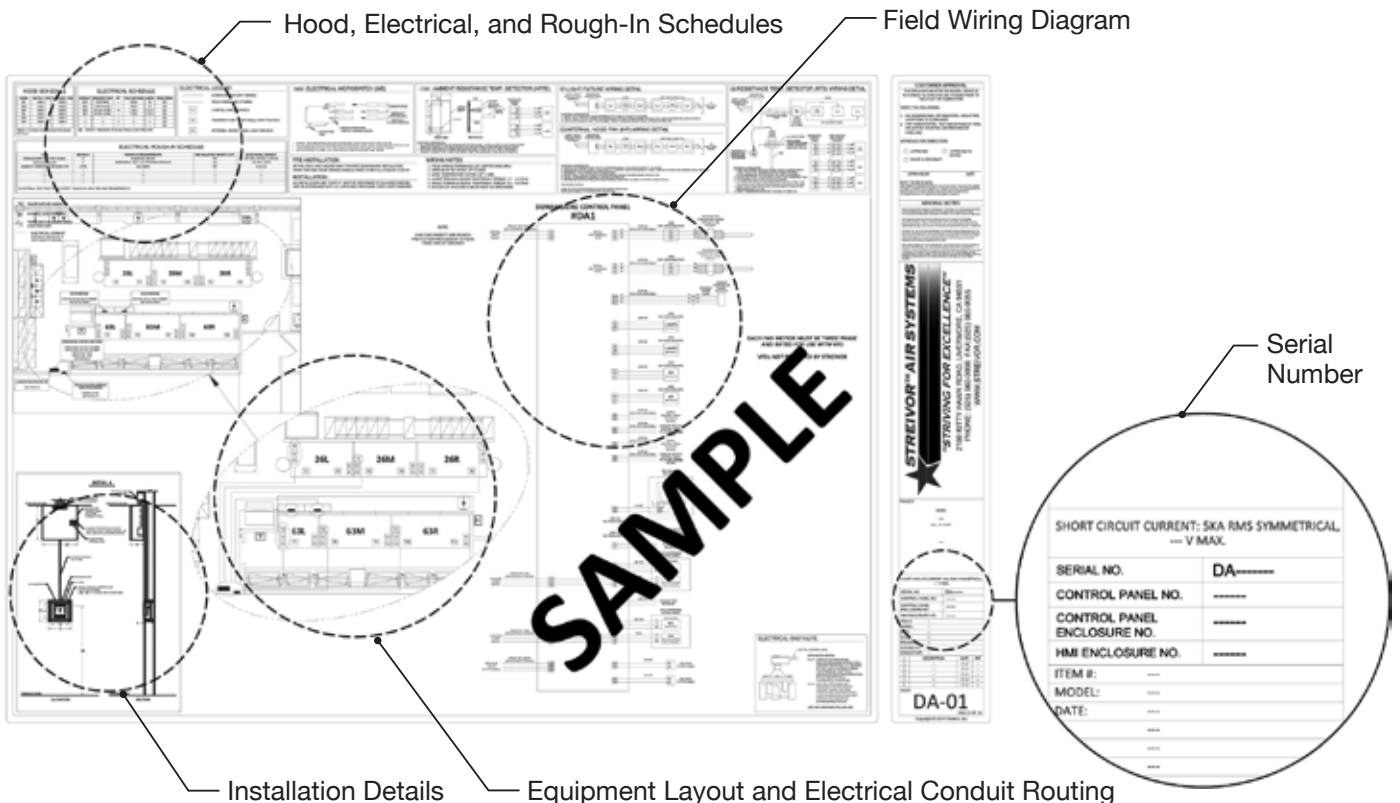
THE CONTROL PANEL HAS MULTIPLE ELECTRICAL CONNECTIONS. VERIFY THAT ALL POWER HAS BEEN DISCONNECTED TO THE CONTROL PANEL PRIOR TO WORKING ON OR NEAR THE CONTROL PANEL. LOCK OUT / TAG OUT ALL OF THE DISCONNECT SWITCHES OR CIRCUIT BREAKERS TO PREVENT ACCIDENTAL POWER UP.

ALL ELECTRICAL WIRING AND CONNECTIONS TO THE CONTROL PANEL SHALL BE IN ACCORDANCE WITH THE PREVAILING CODES, THE NATIONAL ELECTRICAL CODES, AND ANSI/NFPA70.

VERIFY THAT THE SERIAL NUMBER ON THE WIRING DIAGRAM (SEE SAMPLE DRAWING) PROVIDED WITH THE CONTROL PANEL MATCHES THE SERIAL NUMBER OF THE CONTROL PANEL BEFORE USING THE WIRING DIAGRAM FOR REFERENCE.

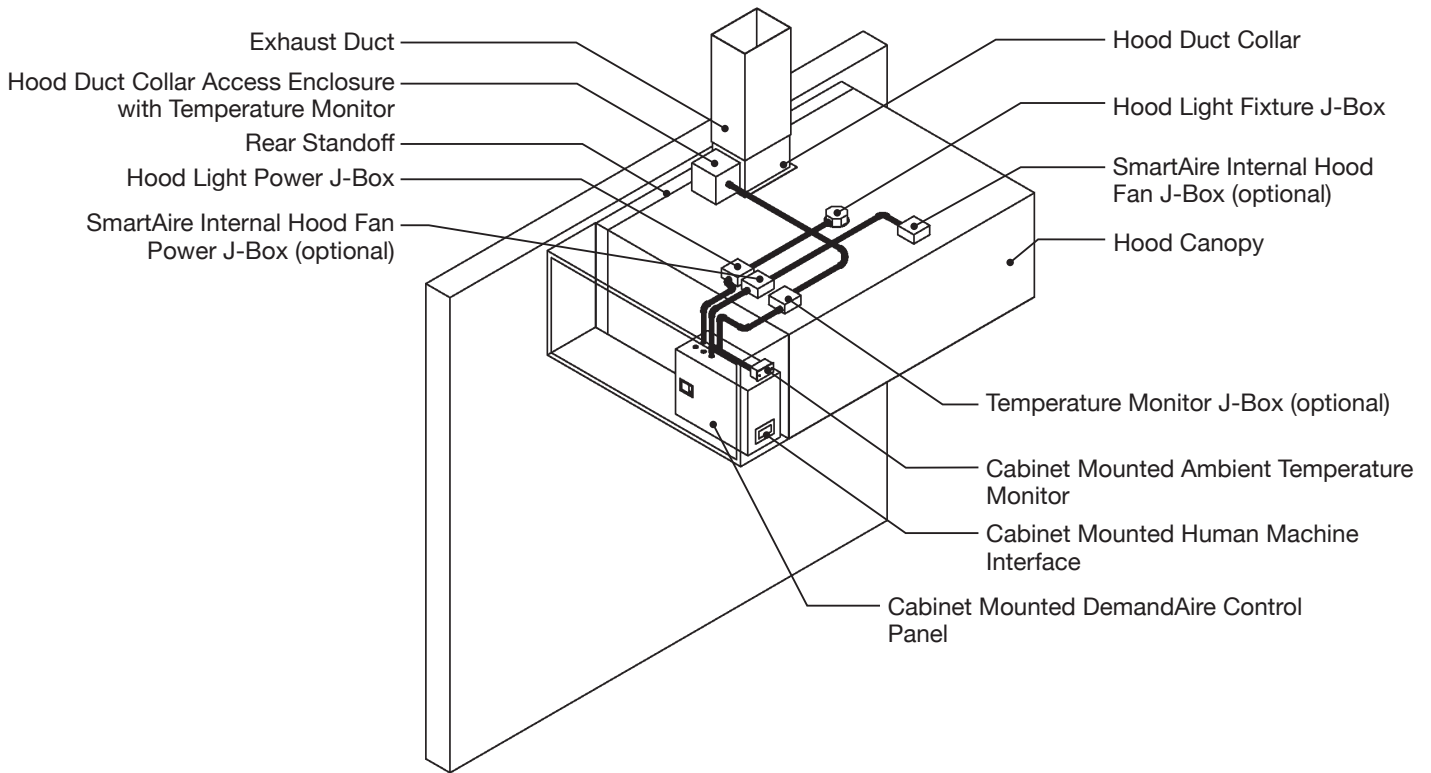
VERIFY THAT THE VOLTAGE AND WIRE AMPERAGE CAPACITY AND WIRE INSULATION IS IN ACCORDANCE WITH THE CONTROL PANEL NAMEPLATE.

DemandAire Control Panel Drawing Sample

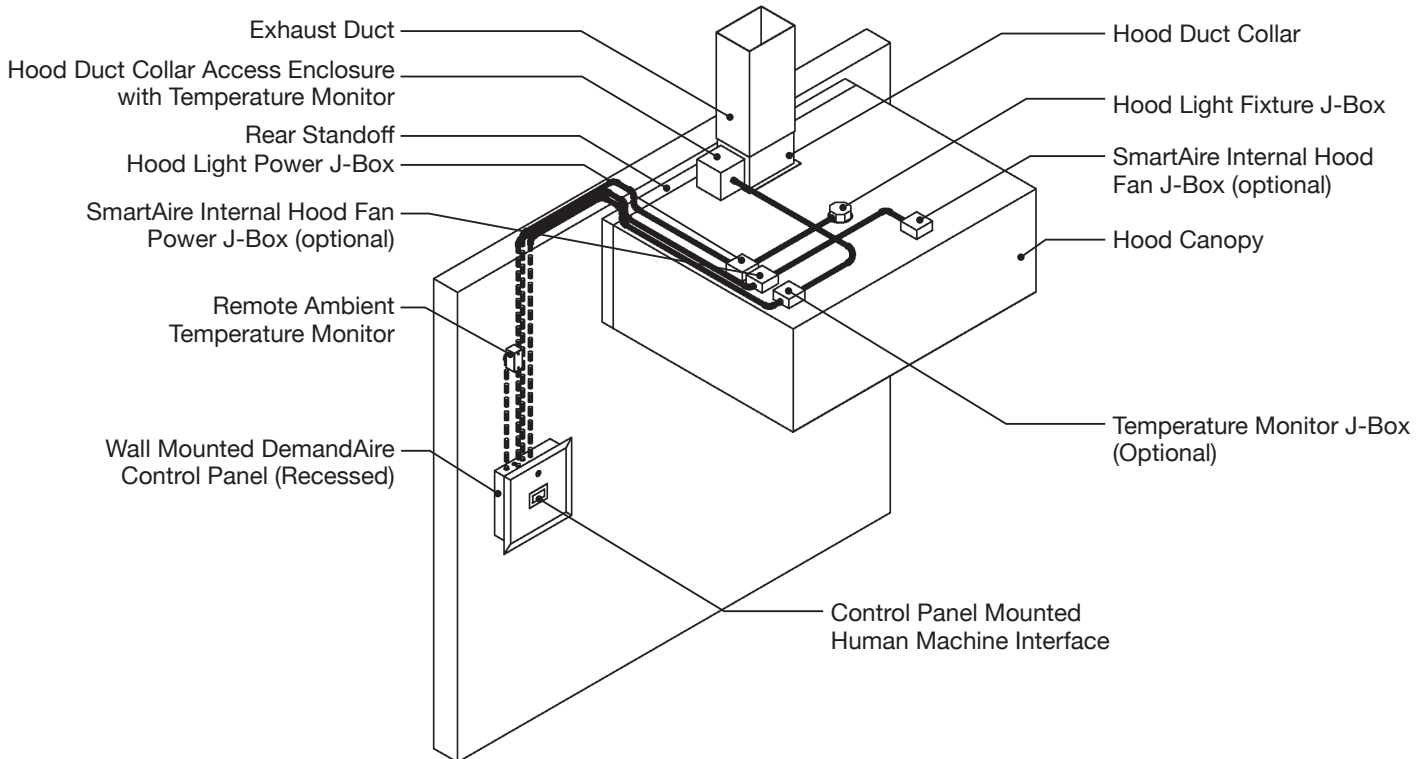


General Information

DemandAire Control Panel: Hood Mounted



DemandAire Control Panel: Wall Mounted



Installation Procedures

Control Circuit Input Power Wiring

- Verify that all supply power to the control panel is locked out and tagged out.
- Verify that the circuit breaker amperage is sized correctly for the control circuit per DemandAire Control Panel (DCP) Drawings.
- Connect 120 VAC single phase power to the terminal blocks in the control panel labeled *H*, *N*, and *Ground* (*Figure 1*).
- The wires should be torqued to 1.5-1.8 N•m at the terminal blocks.

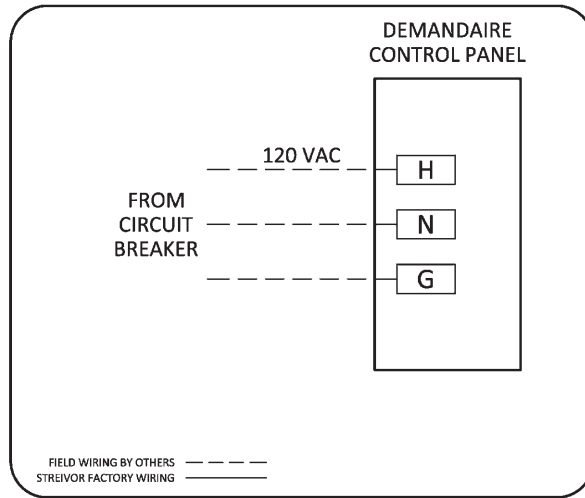


FIGURE 1: Control Circuit Input Power

Fan Control Signal Wiring (VFDs Not Provided by Streivor or VFDs Provided by Streivor in Remote VFD Enclosure)

- Verify that all power to the control panel is locked out and tagged out.
- Connect the terminal blocks in the control panel designated for the 4-20mA or 0-10VDC fan control signals to the appropriate external destination (*Figure 2*) (i.e. VFDs, BMS, EC Motors, VAV, etc.)
- Refer to the DCP Drawings for more detail.
- The wires should be torqued to 0.6-0.8 N•m at the terminal blocks.

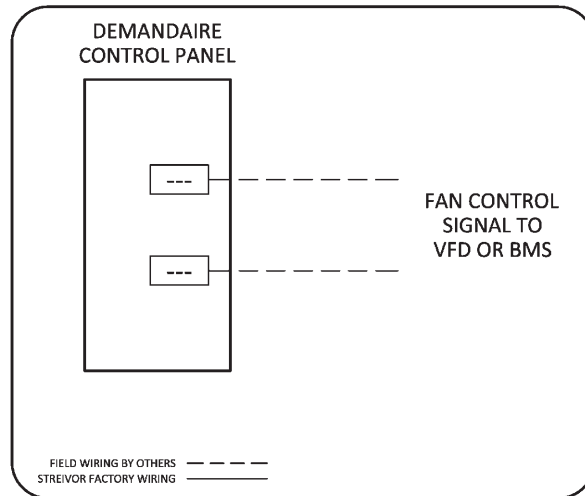


FIGURE 2: Fan Control Signal Wiring

Installation Procedures

Motor Circuit Input Power Wiring (VFDs Provided by Streivor)

- Verify that all power to the control panel is locked out and tagged out.
- Verify that the circuit breaker amperage is sized correctly for each motor input power circuit.
- Verify that the voltage and phase of each motor circuit is correct per the DCP Drawings.
- Connect input power to the input power terminal blocks as shown on the DCP Drawings (*Figure 3*).
- The wires should be torqued to 1.5-1.8 N•m at the terminal blocks.

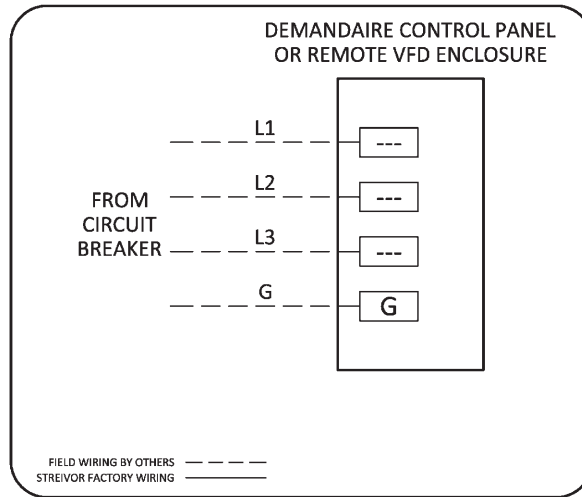


FIGURE 3: VFD Input Power Wiring

Motor Circuit Output Power Wiring (VFDs Provided by Streivor)

- Verify that all power to the control panel is locked out and tagged out.
- The output terminals located on the VFD(s) have been pre-wired to the designated output power terminal blocks in the DemandAire Control Panel or Remote VFD Enclosure (if applicable). Connect the output power terminal blocks to the designated fan motor(s) as shown on the DCP Drawings (*Figure 4*).
- The wires should be torqued to 1.5-1.8 N•m at the terminal blocks.

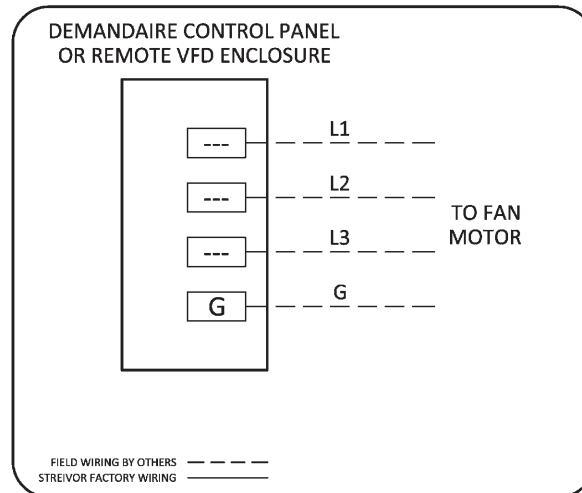


FIGURE 4: VFD Output Power Wiring

Installation Procedures

Optional: Run Signals (Fans)

- Verify that all power to the control panel is locked out and tagged out.
- Connect the terminal blocks in the control panel designated for fan run signals (dry contacts) to the appropriate external destination (*Figure 5*) (i.e. VFDs, BMS, dampers, etc.)
- Refer to DCP Drawings for more detail.
- The wires should be torqued to 1.5-1.8 N•m at the terminal blocks.

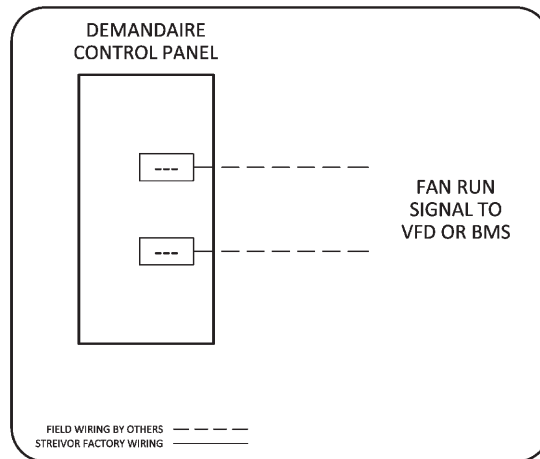


FIGURE 5: Optional: Run Signals (Fans)

Light Power Circuit Wiring

- Verify that all supply power to the control panel is locked out and tagged out.
- Connect 120 VAC single phase power from terminal block 11 (hot), terminal block 12 (neutral), and *ground* in the control panel to the wires labeled “Lights” in the junction box on the hood (*Figure 6*).
- The wires should be torqued to 1.5-1.8 N•m at the terminal blocks.

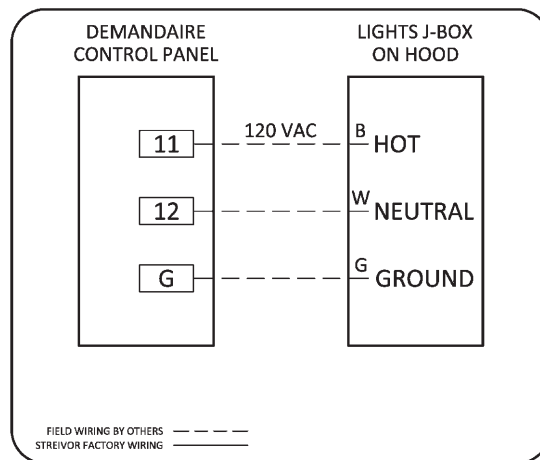


FIGURE 6: Light Power Circuit Wiring

Installation Procedures

Internal Hood Fan (IHF) Power Circuit Wiring for SmartAire Technology Hoods

Per NFPA 96 Section 8.3.2: When its fire-extinguishing system discharges, makeup air supplied internally to a hood shall be shut off.

- Verify that all power to the control panel is locked out and tagged out.
- Connect 120 VAC single phase power from terminal block 3 (hot), terminal block 4 (neutral), and ground in the control panel to the wires labeled "IHF" in the junction box on each hood (*Figure 7*).
- Internal Hood Fan power to terminal blocks 3 and 4 will be automatically shunt during a fire suppression system activation to comply with NFPA 96 Section 8.3.2.
- The wires should be torqued to 1.5-1.8 N•m at the terminal blocks.

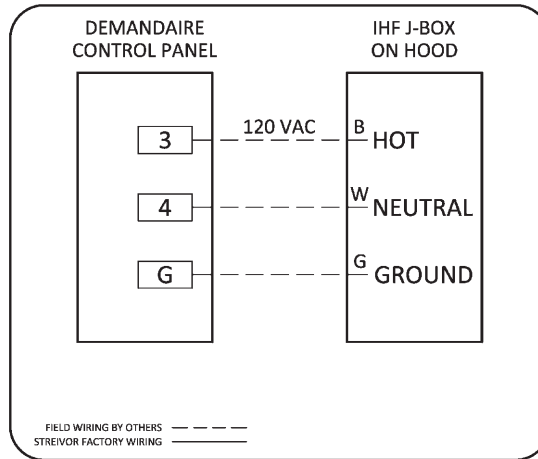


FIGURE 7: Internal Hood Fan Power Circuit Wiring

Installation Procedures

Fire Suppression System (FSS) Switch Circuit Wiring

- Verify that all power to the control panel is locked out and tagged out.
- Locate the FSS switch in the FSS control panel. The FSS switch (also referred to as microswitch) shall have one set of single-pole-double-throw contacts (*Figure 8A*).
- Connect the terminal blocks in the control panel to the FSS Switch(es) (*Figure 8A*). The building alarm circuit must be connected to the switch with lugs (*Figure 8B*).
- Connect the building alarm circuit to the terminal blocks designated for the building alarm in the DCP (*Figure 8A*).
- Refer to the DCP drawings for more detail regarding wiring additional FSS switches.
- The wires should be torqued to 1.5-1.8 N·m at the terminal blocks.

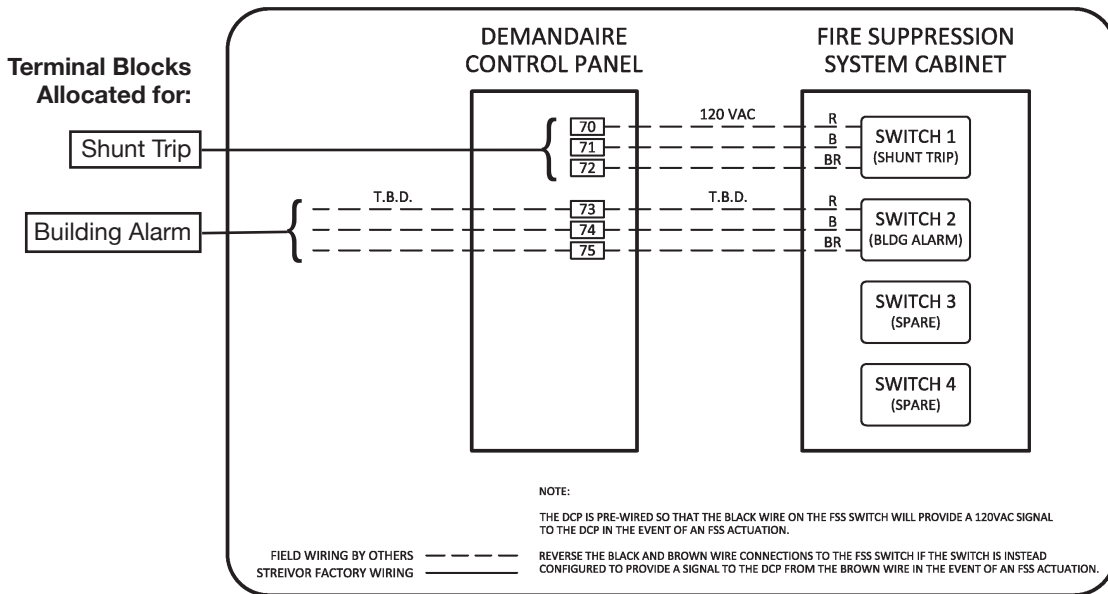


FIGURE 8A: Fire Suppression System (FSS) Switch Circuits



Note: Use FSS Switch with Lugs for Building Alarm Circuit

FIGURE 8B: FSS Switch for Building Alarm Circuit

Installation Procedures

Ambient Resistance Temperature Detector (ARTD) Wiring (Cabinet Mounted)

- a. ARTDs that are Control Panel or Cabinet Mounted are pre-wired by the factory. No field connections are required.
- b. Refer to DemandAire drawings to verify ARTD installation location.

Ambient Resistance Temperature Detector (ARTD) Wiring (Remote)

- a. Verify that all power to the control panel is locked out and tagged out.
- b. The ARTD requires a 2x4 J-Box to which it may be directly mounted (*Figure 10*).
- c. Connect the terminal blocks labeled *T0-A*, *T0-B*, etc., in the control panel to the ARTD using UL-Listed 22 AWG Three Strand Shielded Communication Cable (*Figure 9*). Connect the black lead on the monitor to the red wire leading to the DemandAire control panel. Connect one of the brown leads on the monitor to the black wire leading to the control panel and connect the other brown lead on the monitor to the white wire leading to the control panel (*Figure 9*).
- d. The ARTD should be installed in the location shown on the DemandAire drawings or in the kitchen space at least 80" above finished floor (A.F.F.), away from direct sunlight, makeup air diffusers airstreams, and other sources of heated or cooled air. The ARTD should be located within 20 ft. of at least one hood controlled by the DemandAire system.
- e. The wires should be torqued to 0.6-0.8 N•m at the terminal blocks.

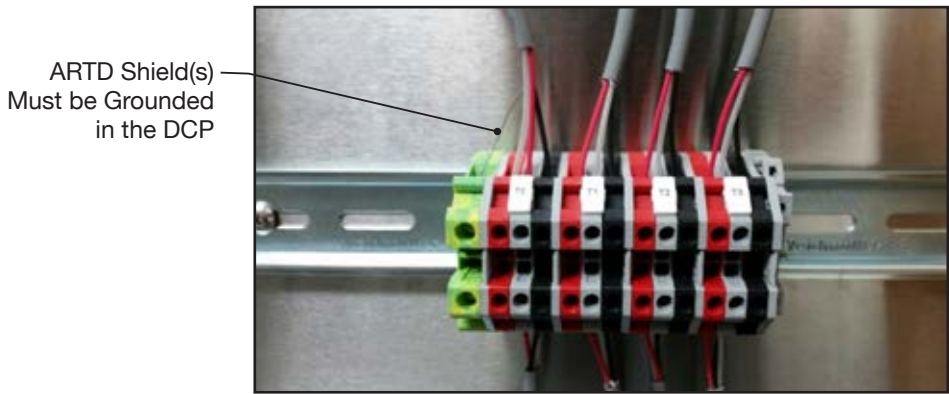


Figure 9: ARTD Wiring Connections in DCP

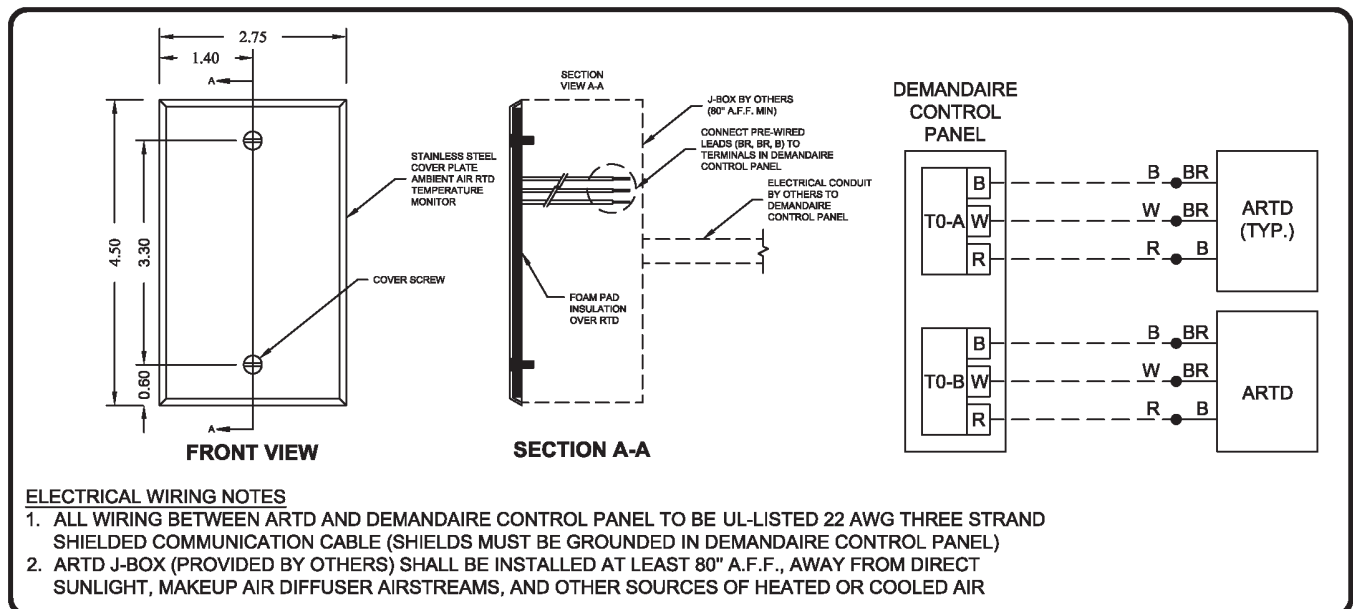


FIGURE 10: ARTD Installation Details

Installation Procedures

Hood Canopy and/or Duct Collar Temperature Monitor Wiring

- Verify that all supply power to the control panel is locked out and tagged out.
- Connect the terminal blocks labeled *T1*, *T2*, *T3*, etc., in the control panel to the corresponding terminal blocks in the J-Box on the hood using the UL-Listed 22 AWG Three-Strand Shielded Communication Cable (Figure 11, 12).
- The wires should be torqued to 0.6-0.8 N•m at the terminal blocks.

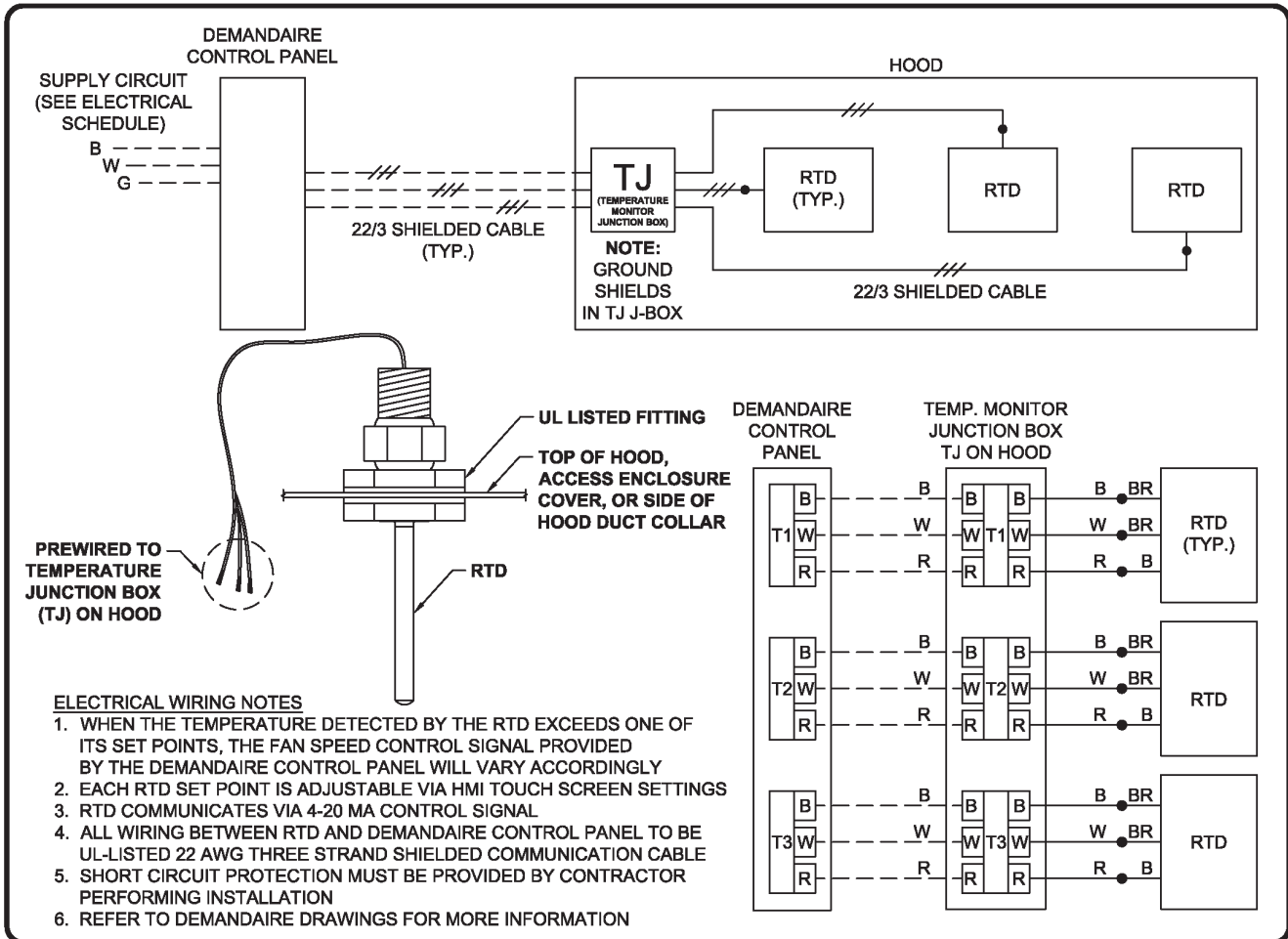
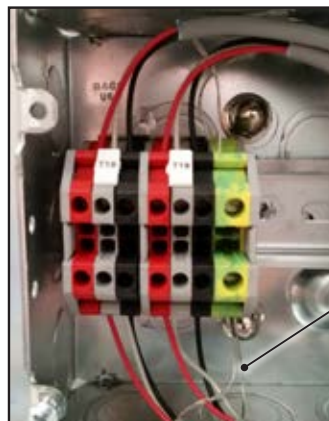


Figure 11: Hood Canopy and/or Duct Collar Resistance Temperature Detector (RTD) Wiring



RTD Shields Must be Grounded in Temperature Monitor Junction Box TJ on Hood

Figure 12: Hood Canopy and/or Duct Collar RTD Wiring Connections in Temperature Monitor Junction Box

Installation Procedures

Optional: Shunt Trip Breaker Wiring

Per NFPA 96 Section 10.4.1: Upon activation of any fire-extinguishing system for a cooking operation, all sources of fuel and electrical power that produce heat to all equipment requiring protection by that system and all electrical outlets located under the exhaust hood shall automatically shut off.

- Verify that all power to the control panel is locked out and tagged out.
- Terminal block 71 can be used to provide power to a shunt trip device to comply with NFPA 96 Section 10.4.1. Terminal block 71 provides 120 VAC power upon fire suppression system activation (Figure 13).
- The wires should be torqued to 1.5-1.8 N·m at the terminal blocks.

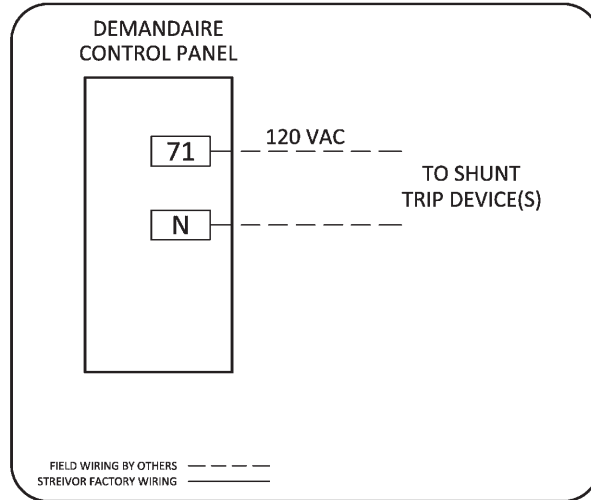


FIGURE 13: Optional Shunt Trip Wiring

Optional: Modbus TCP Communication Wiring

- Verify that all supply power to the control panel is locked out and tagged out.
- A CAT5 or greater Ethernet communication cable may be connected to the RJ45 port on the HMI in the control panel for Modbus TCP communication with Building Management System(s) (Figure 14).
- Contact Streivor for Modbus TCP communication points list and associated communication setup parameters.

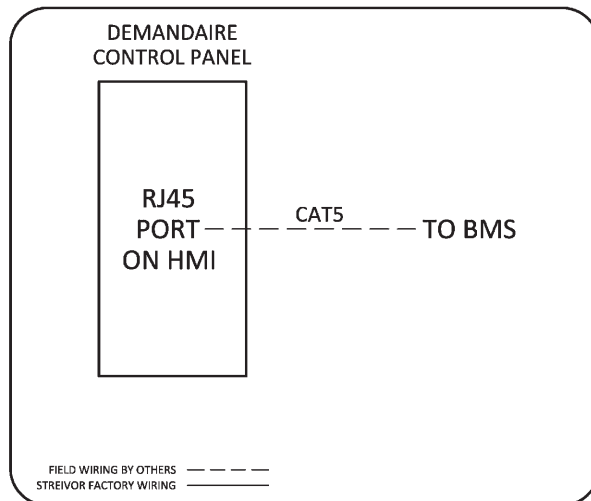


FIGURE 14: Optional Modbus TCP Communication Wiring

Installation Procedures

Electric Gas Valve Input Power Wiring

- Verify that all supply power to the control panel is locked out and tagged out.
- Verify that the circuit breaker amperage is sized correctly for the electric gas valve power circuit per the DCP drawings.
- Connect 120 VAC single phase power to the terminal blocks in the control panel labeled *H1*, *N1*, and *Ground* (Figure 15). Note: The electric gas valve circuit input power is separate from the control circuit input power.
- The wires should be torqued to 1.5-1.8 N•m at the terminal blocks.
- Repeat for additional electric gas shutoff valve circuits if applicable. Refer to DCP drawings for more information.

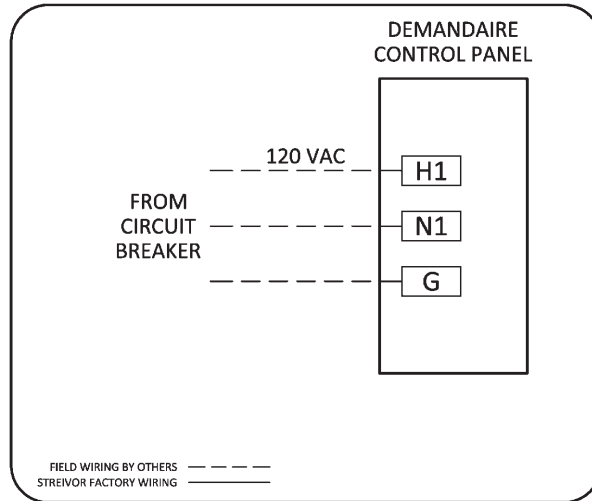


FIGURE 15: Electric Gas Valve Circuit Input Power Wiring

Electric Gas Valve Output Power Wiring

- Verify that all supply power to the control panel is locked out and tagged out.
- Connect 120 VAC single phase power from terminal block *130*, *131*, and *ground* in the control panel to the corresponding pre-wired leads on the electric gas valve solenoid(s) (Figure 16).
- The wires should be torqued to 1.5-1.8 N•m at the terminal blocks.
- Repeat for additional electric gas shutoff valve circuits if applicable. Refer to DCP drawings for more information.
- Note: A manual keylock bypass switch is pre-wired in the DCP to provide power to the electric gas valve circuit during commissioning and troubleshooting if necessary.

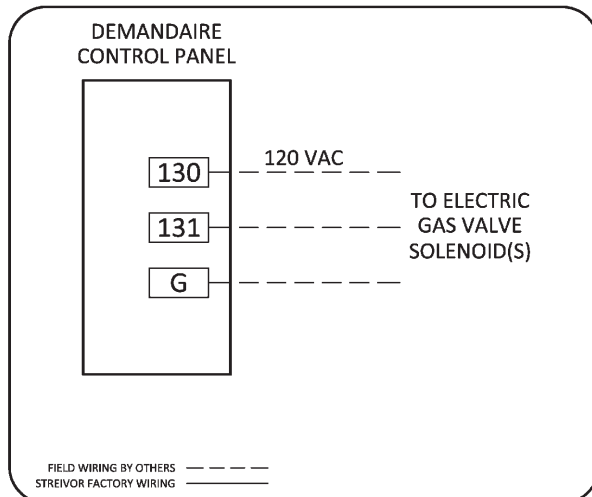


FIGURE 16: Electric Gas Valve Circuit Output Power Wiring

Operation Procedures

Start Up

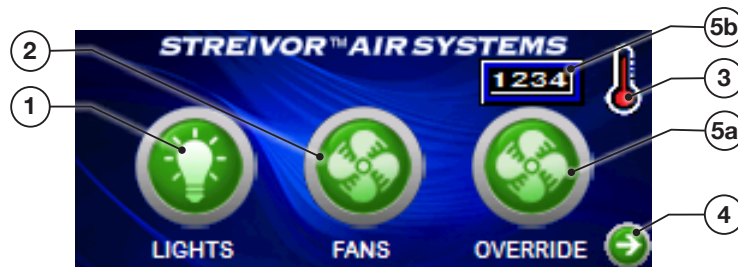
1. Apply power to the DemandAire Control Panel CONTROL circuit via the appropriate circuit breaker protecting the DCP.
 - a. Verify that 120 VAC is applied between terminal blocks H and N.
2. If the fire suppression system includes an electric gas valve(s), apply power to the GAS VALVE circuit via the appropriate circuit breaker protecting the electric gas valves.
 - a. To open the electric gas valve(s) via the HMI touch screen, refer to the *Electric Gas Valve Reset Relay* section.
3. If the control panel includes VFDs, apply power to the MOTOR circuits via the appropriate circuit breakers protecting the fan motors.
 - a. Verify that the specified fan motor power is applied to incoming power terminal blocks of each corresponding VFD.
 - b. Refer to the DCP drawings for voltage, phase, and designated terminal blocks for each fan motor.

Human Machine Interface (HMI) Touch Screen Control

The HMI touch screen should be installed in a location where it is readily accessible as it contains all of the switches required to operate the DemandAire system. The HMI also serves as an interface where programming changes are made to temperature monitor set points. Fan delay settings, fan operation history and current temperature in each hood system can be viewed on the HMI as well.

Home Screen

The home screen is the default screen for the HMI which provides the switches required for normal operation of the DemandAire system.



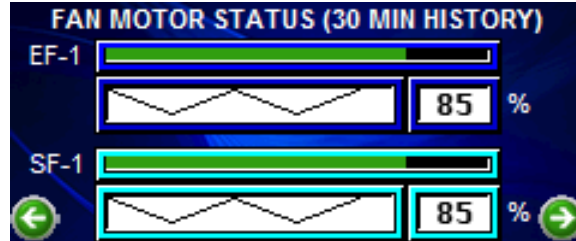
Home Screen

- 1. Light Switch**
Provides power to the light(s) manually.
- 2. Fan switch**
Provides power to the fan motor(s) manually.
- 3. Temperature Indicator**
Appears in the top right corner of the home screen when the fans are activated automatically due to an increase in temperature sensed below the hood(s).
- 4. Next or Previous Buttons**
Allows cycling through each HMI screen.
- 5. 100% Override Button**
 - a. Provides power to the fan motor(s) at 100% capacity manually for a timed duration.
 - b. When the 100% Override is activated, a timer will appear that displays the remaining duration of time (in seconds) that the fan motor(s) power will remain at 100%.

Operation Procedures

Fan Motor Status Screens

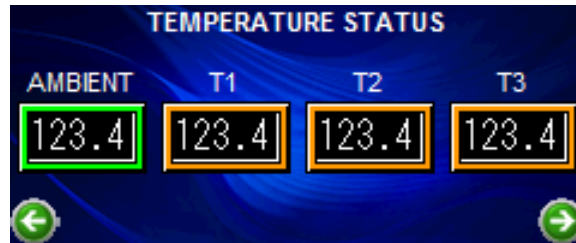
Display the percentage of maximum motor power provided to each fan. 30-minute and 24-hour history graphs are available.



Fan Motor Status Screen

Temperature Status Screen

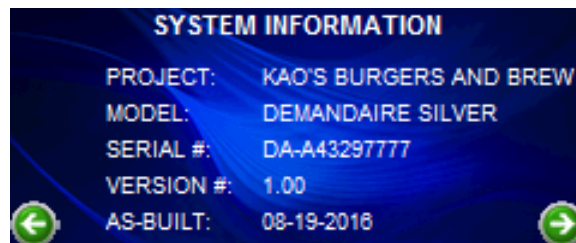
Displays the current temperature (°F) readings of the ambient and the hood temperature monitors.



Temperature Status Screen

System Information Screen

Displays the project name, model number, serial number and other pertinent information that identifies this specific DemandAire system that has been installed.

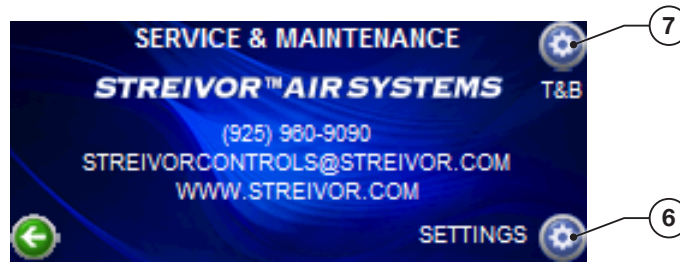


System Information Screen

Operation Procedures

Service & Maintenance Screen

Displays Streivor’s company phone number, email address, and website information.



Service & Maintenance Screen

6. Secure Settings Button

Acts as a login/administrative tool which is password protected. Contact Streivor to receive the password which will allow the user to modify secure settings such as temperature differential set points, timer and lighting settings. The *Secure Settings Button* also provides access to restore factory settings.

7. Test & Balance (T&B) Button

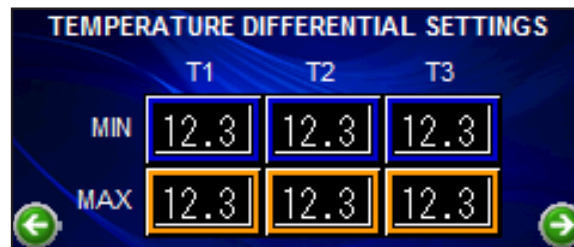
Press the *T&B* Button to access the Test and Balance Secure Settings. Refer to the *Test and Balance Screen (Test & Balance)* section for more information.

Secure Settings (Password Protected)

The DemandAire system provides password protection of secure systems settings, such as settings for the temperature monitors, timers, etc. Only password holders have access to the secure system settings. Streivor technicians will adjust and save the secure settings during commissioning, however, secure settings may have to be adjusted or changed due to changes to or around of the CKV System and/or the cooking appliances after the initial commissioning. Consult Streivor for information on accessing or adjusting secure settings.

Temperature Differential Settings (Management)

Displays the temperature monitor differential settings. Each temperature monitor has an adjustable minimum and maximum differential set point. Refer to the DCP drawings to determine the location of each temperature monitor. The temperature differential set points have been preset by the factory and adjusted during the commissioning process. Customized adjustments can be made to enhance system performance based on the cooking operation trends developed after the kitchen has opened for operation. Contact Streivor for temperature differential set point guidelines related to specific cooking appliances. **WARNING: Consult Streivor prior to modifying temperature differential set points. Setting the temperature differentials too high may result in inadequate exhaust airflow which may cause the fire suppression system to be activated.**



Temperature Differential Settings



WARNING

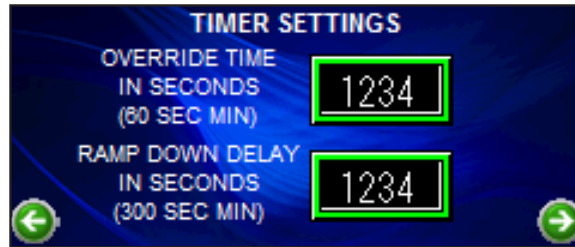


NOTE: HOOD(S) WHICH INCLUDE TEMPERATURE MONITOR(S) MAY AUTOMATICALLY PROVIDE POWER TO THE FAN(S) CONTROLLED BY THE DCP EVEN IF THE FAN SWITCH IS IN THE OFF POSITION.

Operation Procedures

Timer Settings (Management)

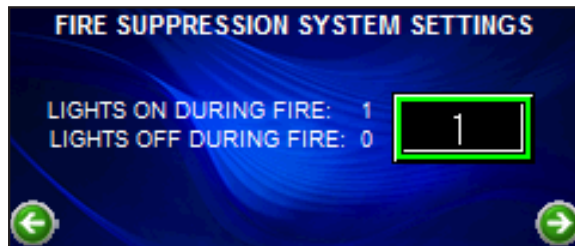
Use the Fan Delay timer to set the time duration (in seconds) that will elapse prior to the initialization of the fan power turn down after a decrease in temperature has been sensed by the temperature monitors. Use the 100% Override timer to set the time duration (in seconds) that will fan power will remain at 100% after the 100% Override function has been activated from the Home Screen.



Timer Settings Screen

Fire Suppression System Settings (Management)

Use the Fire Suppression System (FSS) settings screen to configure the hoods lights state during a fire suppression system actuation. To shunt power to the lights during a FSS activation (recommended) set the system setting to (0), to not shunt power to the lights during a FSS activation set the system setting to (1).

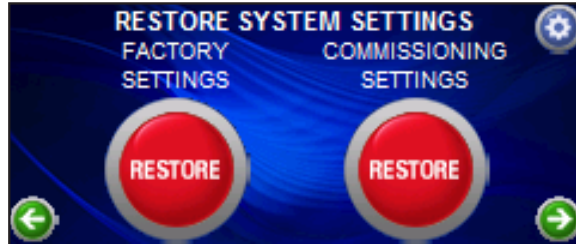


Fire Suppression System Settings Screen

Operation Procedures

Restore System Settings (Management)

Use the *Restore Factory Settings* button to restore the settings that were preset by the factory when the control panel shipped. Use the *Restore Commissioning Settings* button to restore settings that were saved during the commissioning and/or air balancing process(es).



Restore System Settings Screen

Test and Balance Screen (Test & Balance)

The Test and Balance (T&B) screen may be used to make motor power adjustments. The T&B screen displays the current fan speed (as a percentage of maximum motor power), the maximum fan speed input adjustment (displayed as 10 times the fan percentage of maximum motor power), *Test Fans* button and *Save* button. To adjust the fan power during the T&B process, the maximum fan speeds may be modified and the fans can be activated manually using the *Test Fans* button to operate the fans at the newly adjusted maximum speeds. Press the *Save* button to save adjustments made to the maximum fan speeds.



Test and Balance Screen

Operation Procedures

Alarms

The DemandAire Silver control system provides audible and/or visual indicators on the HMI touch screen in the event of an alarm condition. Alarms include Temperature Monitor Alarms, High Temperature, and Fire Suppression System Activation.

Temperature Monitor Alarm

In the event of a temperature monitor alarm, the alarm screen will appear on the HMI indicating which temperature monitor is causing the alarm. The temperature monitor alarm may occur if the temperature monitor has been damaged or if it is not wired correctly. The exhaust and supply fan(s) controlled by the DCP will automatically go to full capacity upon sensing a temperature monitor alarm. Once the alarm has been resolved, press the *Reset* button to return to the home screen to resume normal operation.



Temperature Monitor Alarm Screen

High Temperature Alarm

This screen will appear when the temperature below the hood exceeds a predetermined alarm setpoint. If the high temperature alarm occurs, turn off all cooking appliances below the hood that is activating the alarm and verify that the exhaust fan is working as specified. Failure to turn off cooking appliances generating heat may result in loss of capture and containment and/or an actuation of the fire suppression system. Contact a qualified HVAC technician to inspect the exhaust system to determine the reason for the alarm. Once the hood temperature decreases below the high temperature alarm setpoint, press the *Reset* button to return to the home screen to resume normal operation.



High Temperature Alarm Screen

Operation Procedures

Alarms (cont.)

Fire Suppression System Alarm

Displays in the event of a fire suppression system actuation. Contact an authorized fire suppression system distributor to inspect and rearm the fire suppression system once the fire has been contained. After the fire suppression system has been rearmed, press the *Reset* button to clear the fire suppression system alarm and proceed to manually reset power to the electric gas shutoff valve(s) (See also: *Electric Gas Valve Reset Relay* below).



Fire Suppression System Alarm Screen

Electric Gas Valve Reset Relay

The DemandAire system includes an integrated reset relay to allow the electric gas shutoff valve to be manually reset following a fire suppression system actuation. In the event of a fire suppression system actuation, the DemandAire system will shunt power being provided to the electric gas shutoff valve. The valve will close to discontinue the supply of gas to cooking appliances and will remain in the closed position until manually reset. Contact a certified plumbing technician to inspect the system following a fire suppression system actuation. Upon approval by certified plumbing technician, press the *Reset* button to manually reset power to the electric gas shutoff valve. The system will automatically return to the home screen to resume normal operation.



Electric Gas Valve Reset Screen

Warranty

Streivor, Inc., (Seller), warrants this equipment to be free from defects in materials and workmanship, under normal use and service, for the period of 18 months from the date of shipment.

This warranty shall not apply if:

1. The equipment is not installed by a qualified installer per the Seller's installation instructions (copy of which is shipped with the product).
2. The equipment is not installed in accordance with federal, state and local codes and regulations by a qualified installer.
3. The equipment is misused or neglected.
4. The equipment is not operated within its published capacity.
5. The equipment is modified internally.

The Seller shall not be liable for incident and consequential losses and damages potentially attributed to malfunctioning equipment.

Should any part of the equipment prove to be defective in material or workmanship within the 12 months warranty period, upon examination by the Seller, such part will be repaired or replaced by Seller at no charge. The Buyer shall pay all labor costs incurred in connection with such repair or replacement.

Equipment shall not be returned without Seller's prior authorization and all returned equipment shall be shipped by the Buyer, F.O.B. Seller's factory, freight prepaid.

The ULTIMATE In Kitchen Ventilation Systems



SmartAire Hoods

The Ultimate in Energy Efficient Hood Design
US Patent No. 8,857,424



ExtractAire

The Ultimate Adjustable High Velocity Cartridge Filter
US Patent No. 6,394,083



BalanceAire

The Ultimate Hood Balancing Damper
US Patent No. D634,419



DemandAire

The Ultimate in Demand Control Ventilation Systems



Enclosures

The Ultimate Enclosures for the Protection of Hood and Duct Monitoring Equipment



Monitors

The Ultimate in Hood and Duct Monitoring Controls



Utility Cabinet Systems

The Ultimate in Modular Utility Cabinets

Striving for Excellence

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