# **DemandAire Bronze**

**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

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.

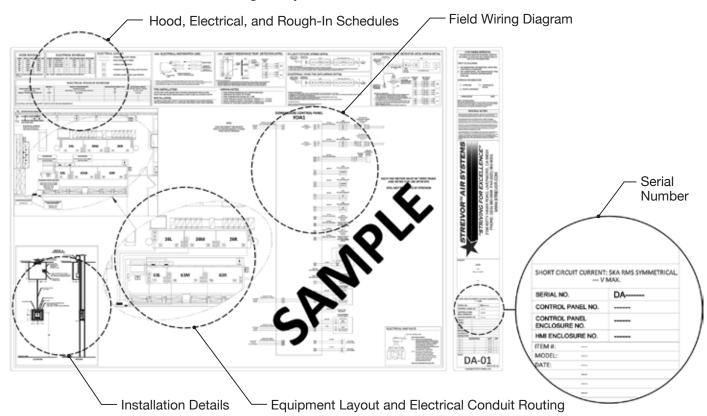
THE CONTROL PANEL HAS MULTIPLE ELECTRICAL CONNECTIONS. VERIFY THAT ALL POWER HAS BEEN DISCONNECTED TO THE CONTROL PANEL PRIOR TO WORKING ON OR NEAR THE CONTROL PANEL. LOCK OUT / TAG OUT ALL OF THE DISCONNECT SWITCHES OR CIRCUIT BREAKERS TO PREVENT ACCIDENTAL POWER UP.

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.

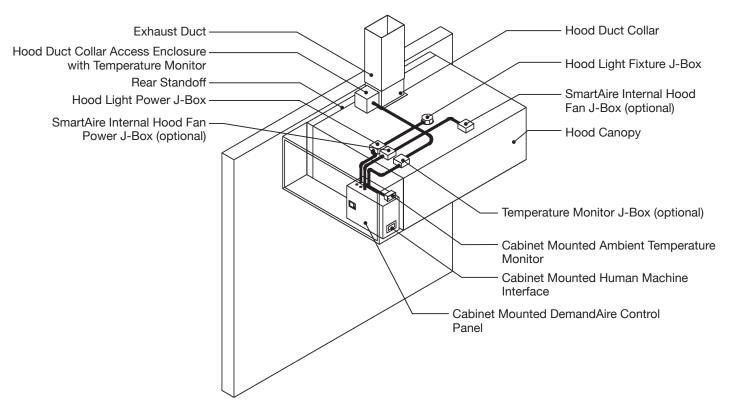
VERIFY THAT THE VOLTAGE AND WIRE AMPERAGE CAPACITY AND WIRE INSULATION IS IN ACCORDANCE WITH THE CONTROL PANEL NAMEPLATE.

#### **DemandAire Control Panel Drawing Sample**

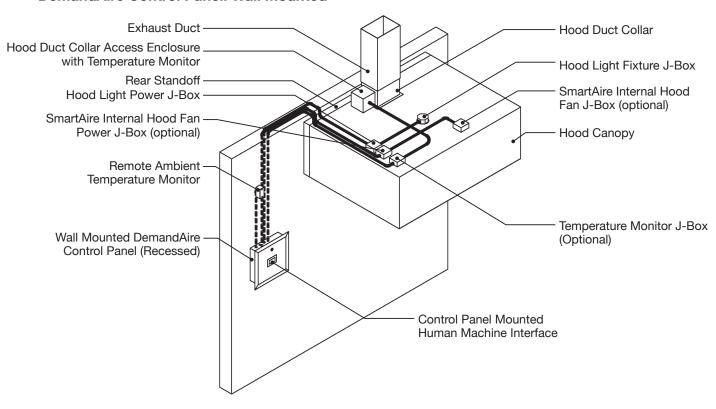


### **General Information**

#### **DemandAire Control Panel: Hood Mounted**



#### **DemandAire Control Panel: Wall Mounted**



#### **Control Circuit Input Power Wiring**

- a. Verify that all supply power to the control panel is locked out and tagged out.
- b. Verify that the circuit breaker amperage is sized correctly for the control circuit per the DemandAire Control Panel (DCP) drawings.
- c. Connect 120 VAC single phase power to the terminal blocks in the control panel labeled H, N, and Ground (Figure 1).
- d. The wires should be torqued to 0.6-0.8 N·m at the terminal blocks.

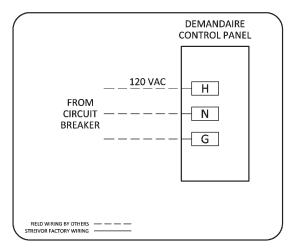


FIGURE 1: Control Circuit Input Power

#### Motor Circuit Input Power Wiring (Motor Starters Provided by Streivor)

- a. Verify that all power to the control panel is locked out and tagged out.
- b. Verify that the circuit breaker amperage is sized correctly for each motor input power circuit.
- c. Verify that the voltage and phase of each motor circuit is correct per the DCP drawings.
- d. Connect input power to the input power terminal blocks as shown on the DCP drawings (Figure 2).
- e. The wires should be torqued to 1.5-1.8 N $\cdot$ m at the terminal blocks.

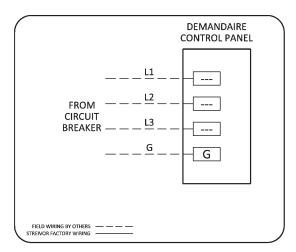


FIGURE 2: Motor Circuit Input Power

#### **Motor Circuit Output Power Wiring (Motor Starters Provided by Streivor)**

- a. Verify that all power to the control panel is locked out and tagged out.
- b. The output terminals located on the Motor Starter(s) have been pre-wired to the designated output power terminal blocks in the control panel. Connect the output power terminal blocks to the designated fan motor(s) as shown on the DCP drawings (*Figure 3*).
- c. The wires should be torqued to 1.5-1.8 N·m at the terminal blocks.

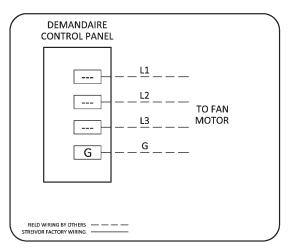


FIGURE 3: Motor Circuit Output Power

#### **Overload Setting (Motor Starters Provided by Streivor)**

- a. Verify that all power to the control panel is locked out and tagged out.
- b. Each overload should have been set by the factory to the recommended setting per the table(s) below.
- c. Verify that each overload has been set to 125% of the full load amps displayed on the corresponding motor nameplate.
- d. The overload setting can be adjusted as needed by rotating the dial to the desired amperage value (Figure 4).



FIGURE 4: Motor Starter (If Provided by Streivor)

#### **Recommended Motor Overload Settings for Single-Phase Motors**

НР	115V	208V	230V
1/6	5.5	3.0	2.8
1/4	7.3	4.0	3.7
1/3	9.0	5.0	4.5
1/2	12.3	6.8	6.1
3/4	17.3	9.5	8.6
1	20.0	11.0	10.0

#### **Recommended Motor Overload Settings for Three-Phase Motors**

НР	208V	230V	460V
1/2	3.0	2.8	1.4
3/4	4.4	4.0	2.0
1	5.8	5.3	2.6
1 1/2	8.3	7.5	3.8
2	9.4	8.5	4.3
3	13.3	12.0	6.0
5	20.9	19.0	9.5
7 1/2	30.3	27.5	13.8
10	38.5	35.0	17.5
15	57.8	52.5	26.3

#### Fan Control Signal Wiring (Motor Starters Not Provided by Streivor)

- a. Connect the terminal blocks in the control panel designated for the start/stop fan control signals to the appropriate external destination Motor Starter(s) (by others) or Building Management System (BMS) (*Figure 5*).
- b. Refer to the DCP drawings for more information on the control signals available (24 VDC, 120 VAC, or Dry Contact).
- c. The wires should be torqued to 0.6-0.8 N·m at the terminal blocks.

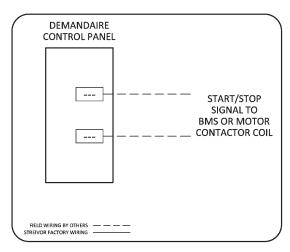


FIGURE 5: Fan Control Signal Wiring (if Motor Starters Not Provided by Streivor)

#### **Light Power Circuit Wiring**

- a. Verify that all power to the control panel is locked out and tagged out.
- b. 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).
- c. The wires should be torqued to 0.6-0.8 N·m at the terminal blocks.

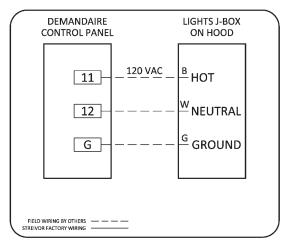


FIGURE 6: Light Power Circuit Wiring

#### 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.

- a. Verify that all power to the control panel is locked out and tagged out.
- b.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).
- c. 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.
- d.The wires should be torqued to 0.6-0.8 N•m at the terminal blocks.

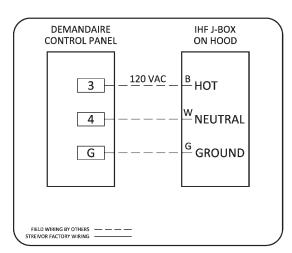


FIGURE 7: Internal Hood Fan Power Circuit Wiring

#### Fire Suppression System (FSS) Switch Circuit Wiring

- a. Verify that all power to the control panel is locked out and tagged out.
- b. 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*).
- c. 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*).
- d. Connect the building alarm circuit to the terminal blocks designated for the building alarm in the DCP (Figure 8A).
- e. Refer to the DCP drawings for more detail regarding wiring additional FSS switches.
- f. The wires should be torqued to 0.6-0.8 N·m at the terminal blocks.

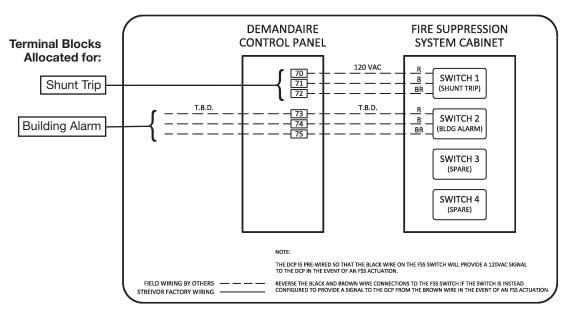


FIGURE 8A: Fire Suppression System (FSS) Switch Circuits



FIGURE 8B: FSS Switch for Building Alarm Circuit

#### **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 10*).
- 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.

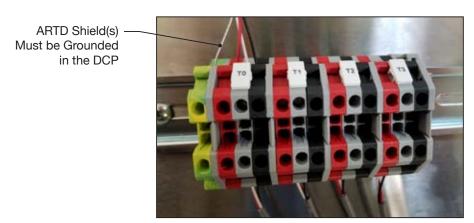


Figure 9: ARTD Wiring Connections in DCP

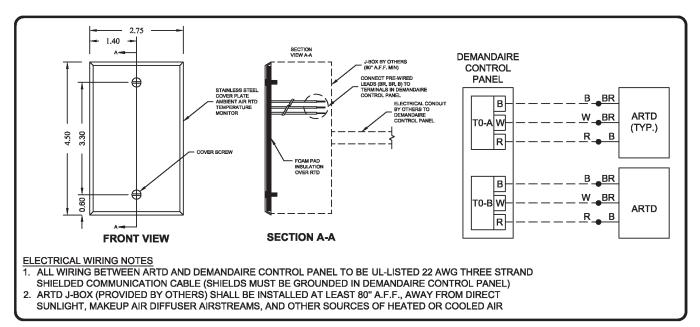


FIGURE 10: ARTD Installation Details

#### **Hood Canopy and/or Duct Collar Temperature Monitor Wiring**

- a. Verify that all supply power to the control panel is locked out and tagged out.
- b. 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*).
- c. The wires should be torqued to 0.6-0.8 N·m at the terminal blocks.

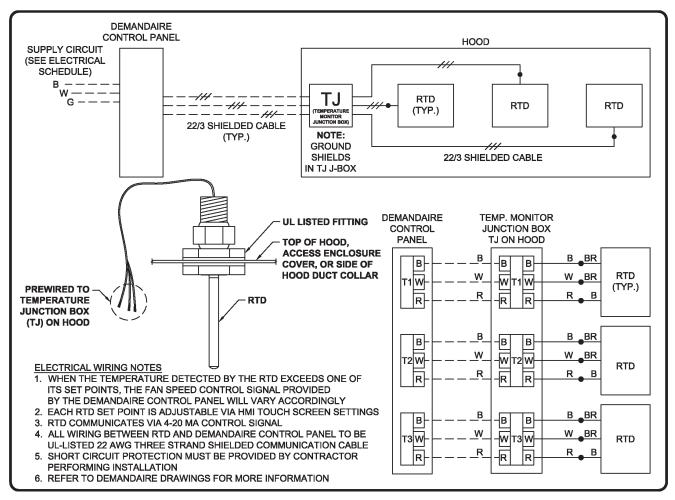


Figure 11: Hood Canopy and/or Duct Collar Resistance Temperature Detector (RTD) Wiring

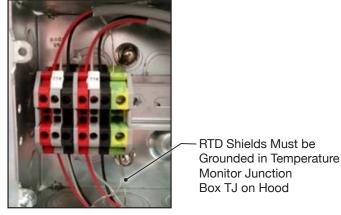


Figure 12: Hood Canopy and/or Duct Collar RTD Wiring Connections in Temperature Monitor Junction Box

#### **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.

- a. Verify that all power to the control panel is locked out and tagged out.
- b. 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*).
- c. The wires should be torqued to 0.6-0.8 N·m at the terminal blocks.

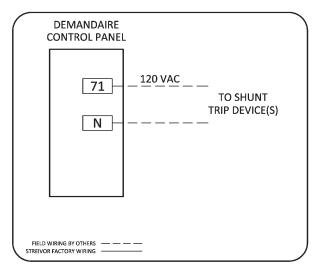


FIGURE 13: Optional Shunt Trip Wiring

#### **Optional: Modbus TCP Communication Wiring**

- a. Verify that all supply power to the control panel is locked out and tagged out.
- b. 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*).
- c. Contact Streivor for Modbus TCP communication points list and associated communication setup parameters.

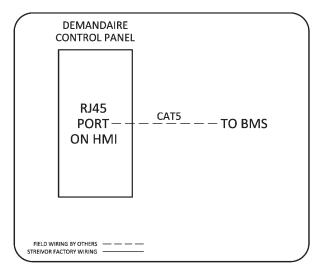


FIGURE 14: Optional Modbus TCP Communication Wiring

#### **Electric Gas Valve Input Power Wiring**

- a. Verify that all supply power to the control panel is locked out and tagged out.
- b. Verify that the circuit breaker amperage is sized correctly for the electric gas valve power circuit per the DCP drawings.
- c. 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.
- d. The wires should be torqued to 0.6-0.8 N·m at the terminal blocks.
- e. Repeat for additional electric gas shutoff valve circuits if applicable. Refer to DCP drawings for more information.

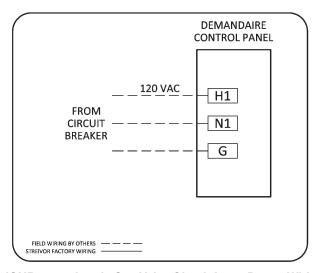


FIGURE 15: Electric Gas Valve Circuit Input Power Wiring

#### **Electric Gas Valve Output Power Wiring**

- a. Verify that all supply power to the control panel is locked out and tagged out.
- b. Connect 120 VAC single phase power from terminal blocks 130, 131, and ground in the control panel to the corresponding pre-wired leads on the electric gas valve solenoid(s) (Figure 16).
- c. The wires should be torqued to 0.6-0.8 N•m at the terminal blocks.
- d. Repeat for additional electric gas shutoff valve circuits if applicable. Refer to DCP drawings for more information.
- e. 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.

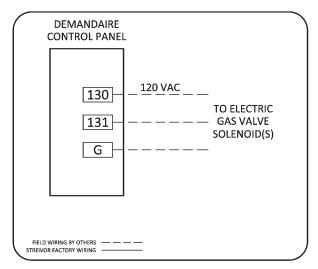


FIGURE 16: Electric Gas Valve Circuit Output Power Wiring

#### 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 motor starter(s), 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 motor starter(s).
  - 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. Secure Settings Button

Allows access to password protected system settings. Contact Streivor for help accessing secure settings.

#### 6. Electric Gas Valve Power Indicator

Appears on the top left corner of the home screen when power to the electric gas shutoff valve is on.

#### **Customer Service Screen**

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



**Customer Service Screen** 

#### **System Information Screen**

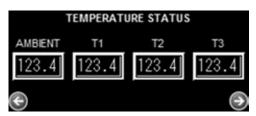
Displays the project name, model number, serial number and other pertinent information that indentifies this specific DemandAire system that has been installed.



System Information Screen

#### **Temperature Status Screen**

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



Temperature Status Screen

#### **Fan Motor Status Screens**

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



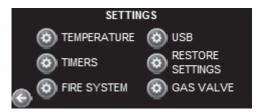
Fan Motor Status Screen

#### **Secure Settings (Password Protected)**

The DemandAire system provides password protection of secure system settings, such as settings for the temperature monitors, timers, etc. Only password holders have access to the secure system settings. Adjustments to secure settings may be necessary due to changes to or around the CKV System and/or the cooking appliances after initial startup. Consult Streivor for information on accessing or adjusting secure settings.

#### **Settings Screen**

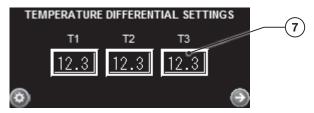
Displays access to all secure system settings. Press the settings button next to the settings description, select the user, and input the password to view and/or adjust the secure settings.



Secure Settings Screen

#### **Temperature Differential Settings Screen (Management)**

Displays the temperature monitor differential settings. The temperature monitor(s) located in each hood are engineered to automatically turn on the fan(s) controlled by the DemandAire system once the adjustable set point of at least one temperature monitor has been reached. Temperature differential set points may be adjusted from the Temperature Differential Setting Screen.



Temperature Differential Settings Screen

#### 7. Temperature Monitor Differential Set Point

Each temperature monitor has an adjustable temperature differential set point. The set point(s) have been preset by the factory; however, depending on field conditions and cooking appliances below the hood, further adjustment may be necessary in the field to maintain optimal operation. The recommended temperature differential set point is approximately 5°F - 15°F above the ambient temperature in the kitchen. **WARNING:** Consult Streivor prior to modifying temperature differential set points. Setting the temperature differentials too high may result in inadequate exhaust airflow which may result in the loss of capture and containment and/or activation of the fire suppression system.



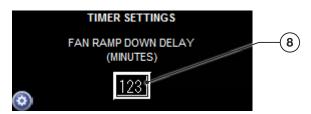


NOTE: HOOD(S) WHICH INCLUDE TEMPERATURE MONITOR(S) MAY AUTOMATICALLY PROVIDE POWER TO THE FAN(S) CONTROLLED BY THE DCP EVEN IF THE FAN SWITCH IS IN THE OFF POSITION.

#### **Timer Settings (Management)**

#### 8. Fan Ramp Down Delay

Displays the fan ramp down delay time duration which provides power to the fan(s) for a designated time after the temperature in the hood(s) decreases below the temperature monitor differential set point.



**Timer Settings Screen** 

#### **Fire Suppression System Settings (Management)**

#### 9. Lights Operation Settings

Allows the hood lights to remain on (1) or off (0) in the event of a fire suppression system actuation.



Fire Suppression Systems Settings Screen

#### **USB Removal Screen**

#### 10. USB Safe Removal Button

Allows USB drive to be safely removed from HMI touch screen.



USB Removal Screen

#### **Restore Factory Settings (Management)**

#### 11. Restore Factory Settings Button

Restores all settings preset by the factory.



Restore Factory Settings Screen

#### **Electric Gas Valve Reset Relay**

The electric gas valve power can be reset from the HMI touch screen for DemandAire systems which include an integrated Electric Gas Valve Reset Relay. 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, proceed to reset power to the electric gas shutoff valve.

Following a power outage, the popup screen below will automatically appear over the Home Screen indicating that the electric gas valve power has been shut off.



Electric Gas Valve Power Off Popup Screen

Press the arrow button to proceed to reset the electric gas shutoff valve(s), following the on-screen instructions until arriving at the Electric Gas Valve Reset screen below. Press the Reset button to manually reset power to the electric gas shutoff valve. The Electric Gas Valve Reset screen can also be accessed directly from the Secure Settings screen or through the on-screen instructions following a fire suppression system actuation.



Electric Gas Valve Reset Screen

After power has been reset to the electric gas shutoff valve(s), a confirmation screen will appear and the Electric Gas Valve Power Indicator will appear in the top left corner of the Home screen.

#### **Alarms**

The DemandAire Bronze control system provides audible and/or visual indicators on the HMI touch screen in the event of an alarm condition. Alarms include Temperature Monitor Faults, High Temperature, Fan Motor Overload, 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 not functioning properly. 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

#### **Fan Motor Overload Alarm**

When motor starters for the fan(s) are provided by Streivor in the DCP, a fan motor overload alarm can occur due to an overcurrent condition. The fan motor overload alarm will indicate which fan motor overload has tripped. When a fan motor overload alarm occurs, turn off all cooking appliances and contact a qualified electrician to inspect fan motors and overloads. Failure to turn off the cooking appliances generating heat may result in loss of capture and containment and/or an actuation of the fire suppression system. Once the fan motor overload has been inspected, resolved and reset, press the *Reset* button on the HMI to return to the home screen to resume normal operation.



Fan Motor Overload Alarm Screen

#### 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 follow the on-screen instructions to manually reset power to the electric gas shutoff valve(s) (Refer to: *Electric Gas Valve Reset Relay* section).



Fire Suppression System Alarm 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 18 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





Self-Cleaning **Hood System** The Ultimate in Rotating Manifold Water Wash and Fogging Systems

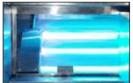
Patent Pending

**EVIENTILATIO** 



ExtractAire (1) The Ultimate in Adjustable High Velocity Cartridge Filters US Patent No. 6,394,083





Hoods with **Ultraviolet Light** Technology The Ultimate in **UV Hoods** 



The Ultimate in Demand Control Ventilation Systems



**BalanceAire** The Ultimate in Hood Balancing Dampers US Patent No. D634,419







**Utility Cabinet Systems** The Ultimate in Modular **Utility Cabinets** 



**Enclosures** The Ultimate in Enclosures

for the Protection of Hood and **Duct Monitoring Equipment** 

### **Monitors**

The Ultimate in Hood and **Duct Monitoring Controls** 



### **Striving for Excellence**

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