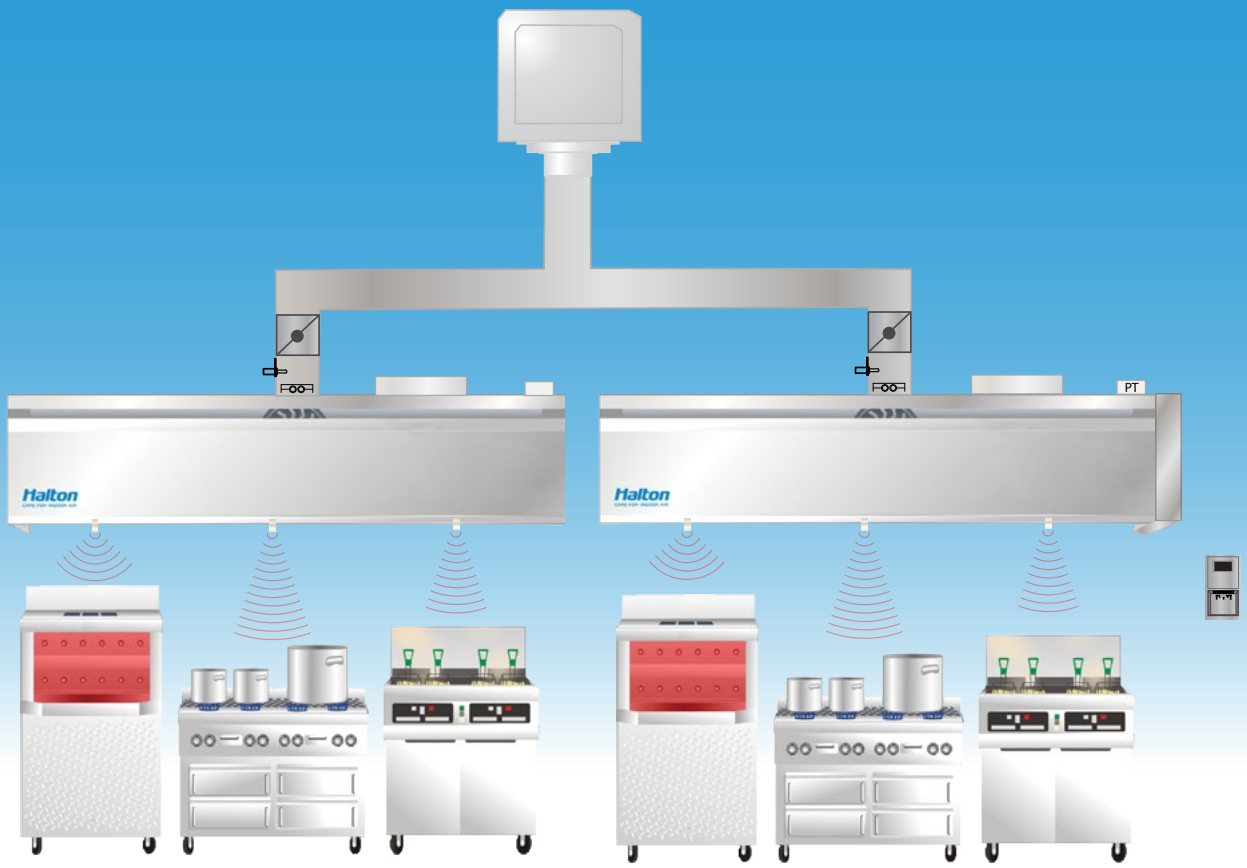
Operators Manual for **M.A.R.V.E.L.**

Manual provides
Installation, Operation, and Maintenance Instructions



Model: M.A.R.V.E.L.
(Model-based Automated Regulation of Ventilation Exhaust Levels)

Halton

Form#: OM070_M.A.R.V.E.L.
Date: September 2019 - Rev4

Table of Contents

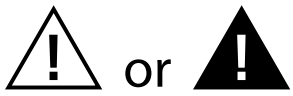
Table of Contents

Safety Information

The instructions contained in this manual have been prepared to aid you in learning the proper procedures for installing and servicing your unit.

Throughout this manual, safety precautions are identified through the use of the safety alert symbol and three signal words: DANGER, WARNING, and CAUTION. All safety alert information precedes the step(s) to which they apply. Suggested, recommended, or other noteworthy information is identified through the use of NOTES. Additionally, certain words are used to indicate a specific meaning or to add emphasis.

The following words are used as indicated throughout the manual:
Shall: understood to be mandatory.
Should: understood to be advisory.
May: understood to be permissive.
Will: indicates a future event/condition to occur.



(Safety Alert Symbol)
Used in conjunction with signal words (DANGER, WARNING, or CAUTION) to alert you of potential personal injury hazards, immediately preceding precautionary measures that pertain to subsequent step(s). Obey all safety messages that follow this symbol to avoid possible injury or death. Failure to adhere to safety precautions identified by the safety alert symbol may also void the warranty.

- Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury. Use of this is limited to the most extreme situations.

- Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

- Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. Also used to alert against unsafe practices.

- When used without the safety alert symbol, CAUTION indicates a potentially hazardous situation which, if not avoided, may result in equipment/property damage, and void the warranty.

NOTE:

- Identifies suggested, recommended, or other noteworthy information.

Specific Safety Precautions

For your safety, please observe the following precautions when operating or servicing your (Insert Name and Model of Hood here). Read the following important safety information to avoid personal injury and/or damage to the equipment.

DANGER

- Always disconnect the source of the main power before removing the service entrance box cover.
- Failure to ensure the Power switch is in the "OFF" position during servicing and when replacing filters could result in equipment damage, electrical shock and/or personal injury.
- Failure to comply with these **DANGER** notices will result in death or serious injury, equipment/property damage, and void the warranty.

WARNING

- DO NOT use or store flammable liquids or materials that produce flammable vapors in the vicinity of this or any other appliance!
- Consult a qualified electrician to ensure all electrical specifications have been met and the unit is properly grounded.
- Before installing or servicing this equipment, read the contents of this manual thoroughly.
- Improper installation, adjustment, alteration, service or maintenance could result in death or serious injury, equipment/property damage, and void the warranty.
- Failure to comply with these **WARNING** notices could result in death or serious injury and equipment or property damage.

WARNING

- Internal ultraviolet radiation source present.
- Keep protective barrier in place.
- Replace all removable parts after servicing.
- An interlock is in place to reduce the potential of exposure to excessive ultraviolet radiation. DO NOT attempt defeat or bypass this interlock system.

⚠CAUTION

- Exercise care when removing the wooden crating from around the unit.

⚠CAUTION

- **DO NOT** operate the unit unless you fully understand the components and their intended function.
- Failure to comply with these **CAUTION** notices may result in minor or moderate injury, equipment or property damage, and void the warranty.

CAUTION

- The electronic components of the Control Panel are impact-sensitive. Exercise care around the Control Panel to maintain proper operation.
- During cleaning of Hood.
  - **DO NOT** use products containing chlorine.
  - **DO NOT** use abrasive products, steel wool or scouring pads.
- Failure to comply with these CAUTION notices may result in equipment/property damage and void the warranty.

NOTE:

- If upon receipt, the palletized unit shows any signs of damaged, immediately inspect the entire Hood and the included accessories, and promptly notify the freight company of any damages.
- To aid the electrician, an electrical wiring diagram is included with this manual. Refer to the wiring diagram during installation or servicing. A wiring diagram may be obtained from the factory by calling Halton at 270-236-5600
- Comply with all appropriate state and/or local heath regulations regarding the cleaning and sanitation of equipment.
- For difficult areas with excessive particulate build up, a mild bio-degradable non-toxic degreaser (such as Clear Magic or Simple Green) may be used.
- Always ensure the unit is electrically grounded and installed in accordance with local codes, or in the absence of local codes, in accordance with the National Electrical Code ANSI/NFPA No. 70-1984.

NOTE:

- **An HVAC specialist may be required for some installations to confirm proper air exchange and the heat load capabilities of the on-site AC system.**

⚠CAUTION

- Use suitable equipment to lift the hood and carefully move it away from the pallet. Take precautions not to damage to the hood. If possible, it is advisable to rig and lift the hood from the topside, utilizing the hood's hanging brackets.
- Exercise care when removing the wooden framing from around the unit.
- Failure to comply with these CAUTION notices may result in minor or moderate injury, equipment or property damage, and void the warranty.

⚠CAUTION

- **DO NOT MODIFY, ALTER OR ADD ATTACHMENTS TO THIS EQUIPMENT**

M.A.R.V.E.L. System Overview

General Description

Halton's M.A.R.V.E.L. (Model based Automated Regulation of Ventilation Exhaust Levels) system offers a **demand control ventilation** (DCV) solution. M.A.R.V.E.L. builds upon the existing Halton product line, such as the Capture Jet™ technology, to deliver a product that reduces energy costs by scheduling and adjusting exhaust airflow based on hours of operation and appliance use.

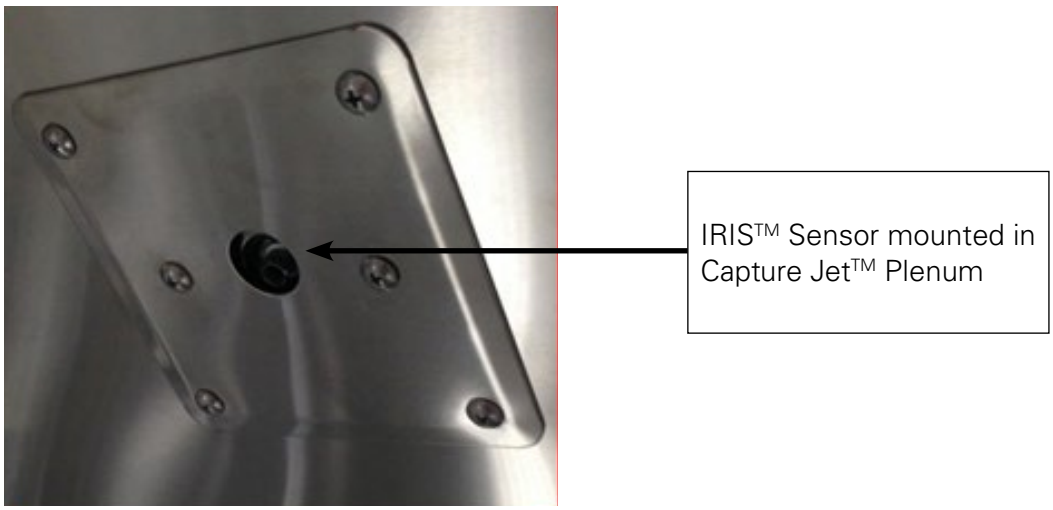
Halton's M.A.R.V.E.L. delivers:

- Hood exhaust airflow adjustment depending on cooking activities
- Control of common exhaust fan for minimum energy consumption at all times
- Automatic or on schedule start/ stops
- Automatic balancing dampers
- Direct appliance communication (where available)
- Early fire warning signals
- Internet monitoring and programming

M.A.R.V.E.L. Unique Design

Starting with the Halton extensive product line of commercial foodservice ventilation solutions, M.A.R.V.E.L. adds the following four unique components:

IRIS™ infrared temperature sensors: Used to measure the rate of change of the cooking surface temperature, the sensor acquires a "heat signature" of the equipment positioned below each sensor. The thermopile-based device is placed in the ball socket fixture in the Capture Jet™ plenum. An air jet exits the plenum around the sensor to protect the optic sensor from dirt and cooking debris. The sensor can be easily moved and re-aligned as needed using the provided Laser Alignment Tool.



MC8 Controller: The heart of the system, the controller features 22 inputs/outputs and is designed to collect real time information and to implement various automation control algorithms. The MC8 Controller responds to the infrared sensor(s) and duct temperature sensor to measure changes in cooking status.

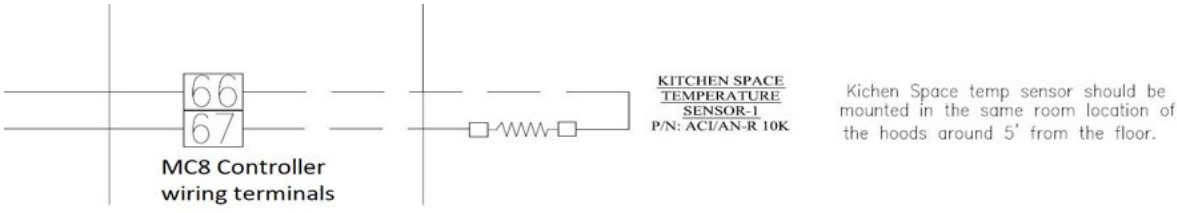
Example:

Differential Pressure Transducer: Used in conjunction with the value from the temperature sensor and IR Index to measure and control the airflow thru each hood.

Duct Temperature Sensor: Located in the hood collar, the temperature sensor is used in conjunction with the pressure transducer value and IR Index to control the airflow.

Room Temperature Sensor: Mounted on a kitchen wall close to a thermostat. **Connections:** to the control panel with 2 wires.

Room Temp Sensor Typical Wiring Diagram



M.A.R.V.E.L. System Components

Overview

A key feature of the M.A.R.V.E.L. system is flexibility. It can be applied to a single hood – or over multiple hoods – depending on the requirements.

Figure 1: Single Hood M.A.R.V.E.L. Installation

OM-070/092019/rev4/EN

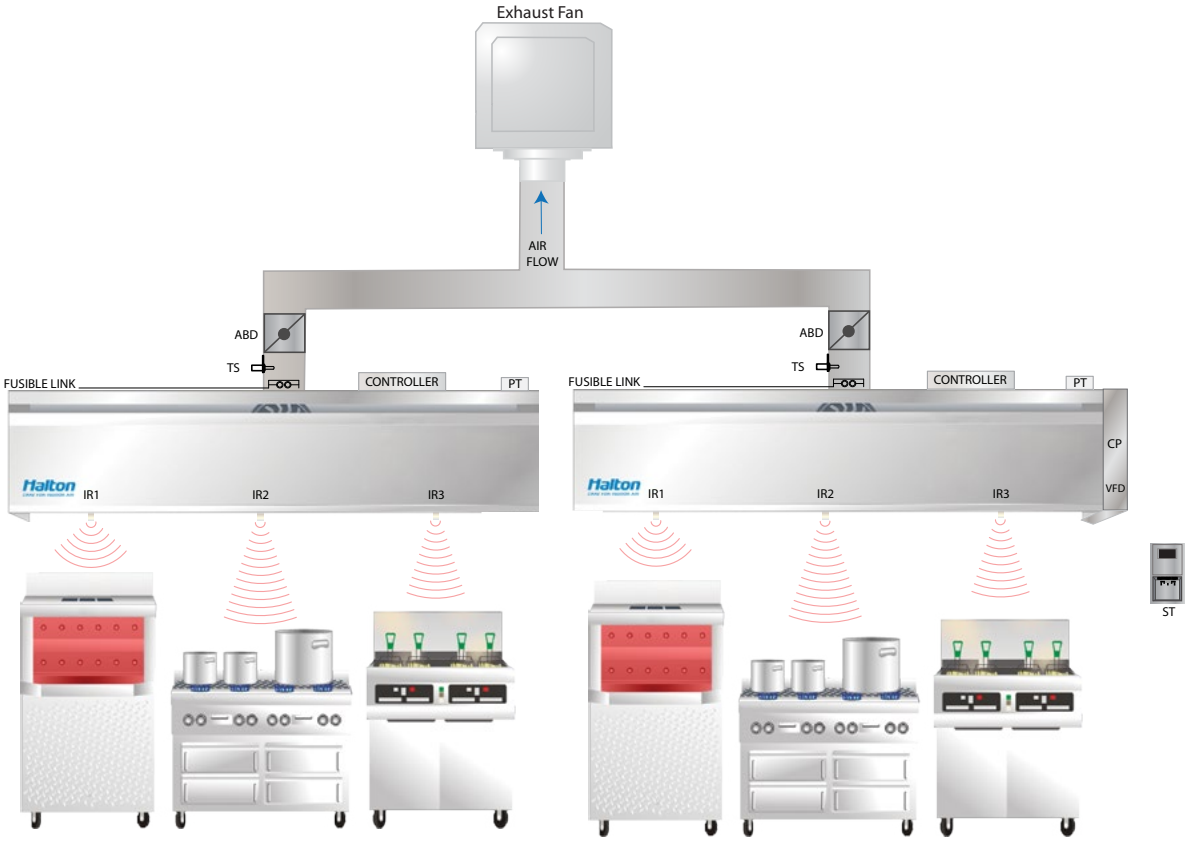


Figure 2: Multiple Hood M.A.R.V.E.L. Installation

Components

NOTE: Refer to Figure 1+2

Equipment	Description	Power + Connection Details
IR1, IR2, IR3, IR4 Infrared radiation sensor (IRIS™)	• Mount 1 to 4 IRIS™ sensors per hood depending on the length of the hood. • Calculates an index which averages the temperature radiation over the sensor's field-of-view. • Used to detect when one or more pieces of cooking equipment are turned on and it is necessary to start the hood fan in idle mode. • Used to measure a rapid change in temperature of cooking surfaces (for example, cooking activities) and adjust the air flow in the hood to the required level.	**Power source:** 5 volt DC power supply located behind a cover on the Capture Jet™ plenum. **Connection:** at terminal block located behind a cover on the Capture Jet™ plenum.
TS Duct temperature sensor	• Measures the temperature of the exhaust air. • Located in the hood collar. • Used (in conjunction with the IR Index) to detect the event of cooking equipment start-up. Duct temperature is often a better indicator of start-up in the case of certain types of equipment such as a gas fryer. • Used to activate the early fire detection alarm, activated before the fire system is triggered.	**Connection:** at terminal block located behind a cover on the Capture Jet™ plenum.

Equipment	Description	Power + Connection Details
PT Hood plenum pressure sensor	• Used to calculate air flow in a hood in real time.	**Power source:** 24 V DC power supply located behind a cover on the Capture Jet™ plenum. **Connection:** at terminal block located behind a cover on the Capture Jet™ plenum.
ABD Automatic balancing damper	*NOTE:* For multiple hood installations with a single exhaust fan only • Adjusts air flow with motorized balancing dampers attached to a collar at each hood. • Damper controlled by a 0-10 V DC position reference signal generated by a controller. • Upon power failure, the automatic balancing damper fully opens.	**Power source:** 24 V AC transformer located behind a cover on the Capture Jet™ plenum **Connection:** at terminal block located behind a cover on the Capture Jet™ plenum
Alarm light status on a touch screen	• Activated when any alarm condition is detected. • Common alarm conditions include: filter missing, filter clogged, fire suppression system activated, duct temperature dangerously high, sensor failed, or VFD is in fault. *NOTE:* To easily diagnose the alarm, use the remote Konsole™ Diagnostic Software.	
Override push button	• Used to override pre programmed operation, push button illuminated when activated. • Two modes: 1. Press and hold for 1 second to accelerate the exhaust rate to 100% of the design air flow for a pre programmed period of time (default 5 minutes.) 2. Press and hold for 3 seconds to accelerate the exhaust rate to 100% of the design air flow for a pre programmed period of time (default 1 hour.) Starts the hood if it has been overridden by a schedule or an 'off' state.	**Connection:** at terminal block located behind a cover on the Capture Jet™ plenum.
Room temperature sensor	• Mounted on a kitchen wall close to a thermostat.	**Connections:** to the control panel with 2 wires
VFD Variable Frequency Drive	• Controls the speed of a three-phase fan motor by changing the frequency of the current to the motor. • For smaller fans, mount the VFD in a cabinet attached to a hood. • For larger exhaust fan units, attach the VFDs to a fan unit or cabinet or mount remotely.	**Power source:** varies as per fan's voltage requirement **Connection:** at terminal block in VFD control panel to main control panel **Speed reference:** 0-10 VDC

Equipment	Description	Power + Connection Details
CP Control Panel	• Mounted on top of each hood with access from the bottom. *NOTE:* For multiple units with a single fan, a separate control panel (see below) is also required. • Provides permanent Ethernet connection (optional). • Provides temporary Ethernet connection for service. • Provides USB B Serial connection for on-site service	**Power source:** 120 VAC, 5 amp. fuse, grounded
Central control panel (for multiple units with single fan)	• Separate control panel mounted at a convenient location to link that individual control panels on the hoods with the VFD controller.	**Power source:** 120 VAC, 5 amp. fuse, grounded

CAUTION

Safety

Only authorized personnel should have access to the control panel.

In case of occurrence of any problem please call an authorized agency to help you.

WARNING

Warnings

- To reduce risk of electric shock do not expose control panel to any water.
- Disconnect the power from the mains before accessing the control panel.
- To provide protection against electric shock connect to a properly grounded power supply.
- Improper grounding can result in a risk of electric shock.
- Consult a qualified electrician if the grounding instructions are not properly understood, or if any doubt exists as to whether the control panel is properly grounded.
- Only authorized and qualified personnel should work on the control panel in event of a problem.

M.A.R.V.E.L. Sequence of Operations

Overview

A sequence of operations is a series of steps required to perform a given task. The DCV system uses the following sequence of operations to control the exhaust hood operation.

Sequence of Operations

Startup & Shutdown

Operation Step	Details

Startup	• Turns exhaust system on.
	• Can be started by:
	  • 24/7 pre-programmed schedule.
	  • The building management system or via an internet connection remotely.
	  • Using a locally mounted on/off switch.
	  • Reaching a pre-determined IR Index or duct temperature level.
	  • Pressing the override button.
	• After startup, enters Idle mode.
	• **Minimum Run Time** A hood that becomes active will always run the exhaust fan for a minimum of 15 minutes before shutting the exhaust fan down. This is done prevent the possibility of an exhaust fan being forced to start and stop frequently.

Shutdown	• Turns system off. • Can be shutdown by any of the parameters listed in the Startup step (above) except the override button.
Idle Mode	• System starts up in Idle mode (after startup). • Pending until signs of cooking activity sensed from IRIS™ sensor(s). • Minimal exhaust flow captures any appliance-generated heat. Default is 40% of design air flow or as adjusted to meet requirements. • After idle mode, enters Cooking.
Vent Mode	• Vent Mode is enabled when a hood or hoods are in Cook Mode and the design exhaust airflow of that hood(s) does not reach the minimum turn down of the system's exhaust fan. • In Vent Mode previously designated Relief Hoods' dampers will open to allow the exhaust fan to operate at its minimum turn down rate to avoid damage to the fan motor. • The relief hood(s) exhaust airflow will make up the difference between the active hood exhaust cfm and the cfm required to meet the exhaust fan's minimum turn down set point.
Cooking Mode	• System moves into cooking mode when an IRIS™ sensor detects cooking activities under the hood. • Exhaust fan speed increased to design air flow and balancing dampers (if present) adjusts the airflow in the hood to design level to assure sufficient capture and containment. • Air flow in the hood is maintained for a predetermined cooking time before returning to the Idle mode. **NOTE:** If during this time more cooking activities are detected, the cooking timer will be restarted.

Operation Step	Details
Override Mode	• Used to override pre programmed operation. • Two modes: 1. Press and hold for 1 second to accelerate the exhaust rate to 100% of the design air flow for a pre programmed period of time (default 5 minutes). 2. Press and hold for 3 seconds to accelerate the exhaust rate to 100% of the design air flow for a pre programmed period of time (default 1 hour.) Starts the hood if it has been overridden by a schedule or an 'off' state.
Fire Mode	• If a fire signal is detected in the kitchen, the system triggers a fire alarm and stops the make-up air fan. • The exhaust fan will either stop or continue running depending on the local fire code requirements.
Off Mode	• Exhaust and make-up air fans stop when no appliances are operating (e.g., turned off and cooled down).
Airflow Reporting and Replacement Air Control	• System continuously monitors exhaust airflow at each hood and generates a signal 0 to 10 V proportional to total exhaust airflow as fraction of total design. 0 V - system is off; 7 V - system operates at 70% of design airflow, etc. This signal is used to control Replacement air to maintain building pressurization.
Alarm and Fault Conditions	• System constantly monitors various parameters. If any unusual or abnormal condition is detected, an alarm is activated. • An alarm indicator can include: • Indication on HMI (Touch Screen). • Email or text message sent to a computer or a mobile device, pager, visual display on a computer screen or through a SCADA interface.

M.A.R.V.E.L. Plus VAV Operation

Introduction

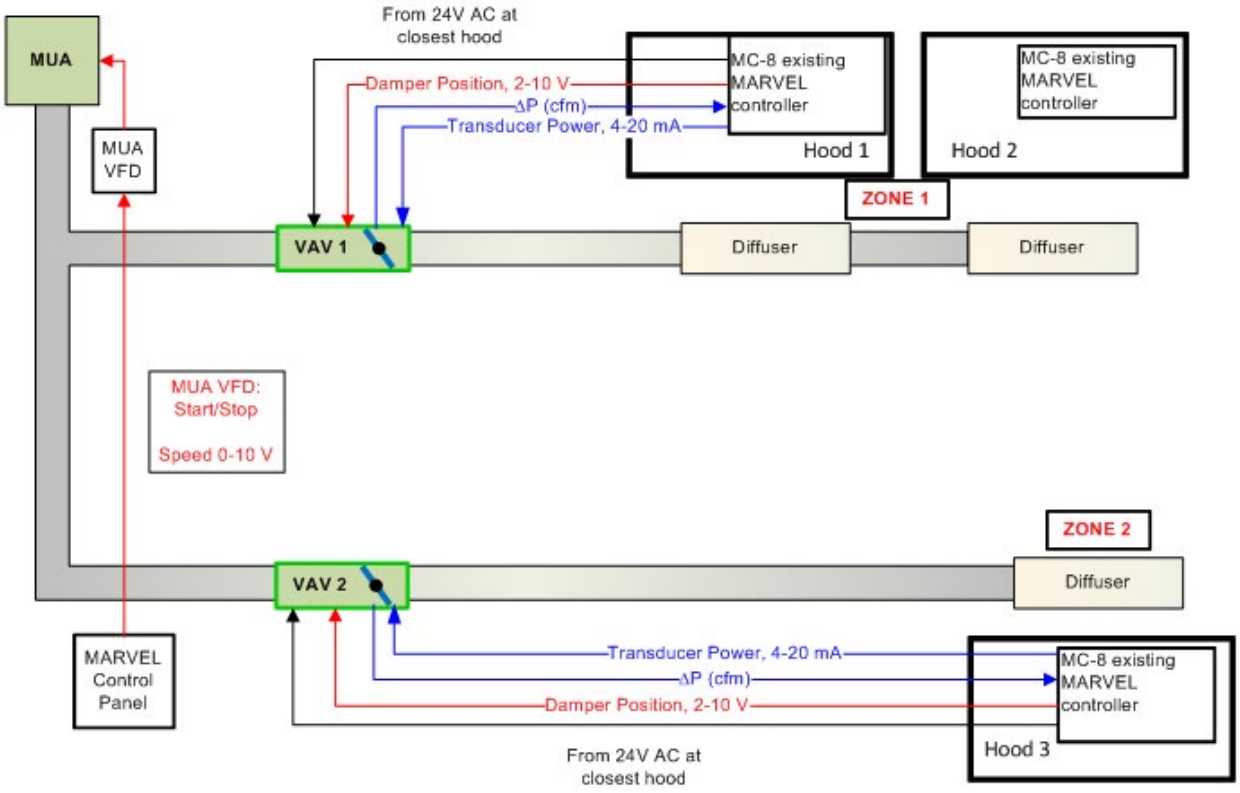
Halton's self-balancing kitchen (also referred to as MARVEL+) provides regulated exhaust and supply airflows to specified kitchen zones. The system works with the MARVEL 1 or MARVEL 2 platform to vary both the exhaust and supply airflows based on the status of the cooking appliances underneath the hood(s).

Zones can be defined either by exhaust fan group, room or usage schedule depending upon application.

The VAV boxes used in the MARVEL+ system are used to control airflow when supply air is being sent to more than one zone, regardless of whether it is in the kitchen or in another building zone.

The MARVEL+ system will balance each kitchen zone to maintain the desired space balance in the zone.

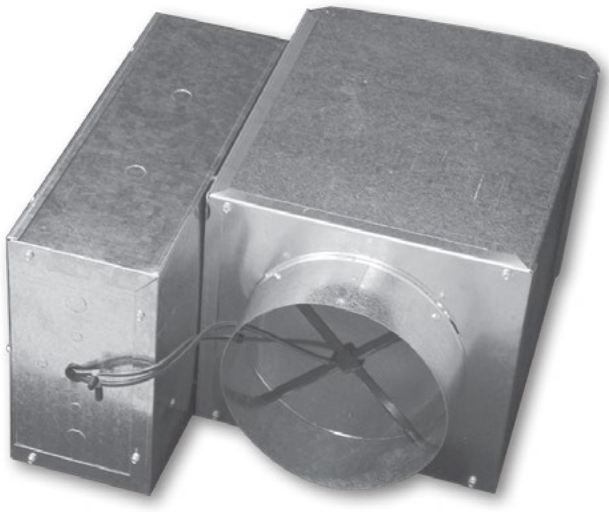
The airflows for the exhaust hoods and VAV boxes are both measured using pressure transducers and sent to the MC8 controllers at the hood. The hood controller will then send a 2-10 Volt signal back to the VAV box to adjust the dampers as needed. If a dedicated makeup unit (MUA) serving kitchen area is used, the system will also control the speed of the supply fan feeding the VAV boxes in order to optimize the energy consumption of the system.



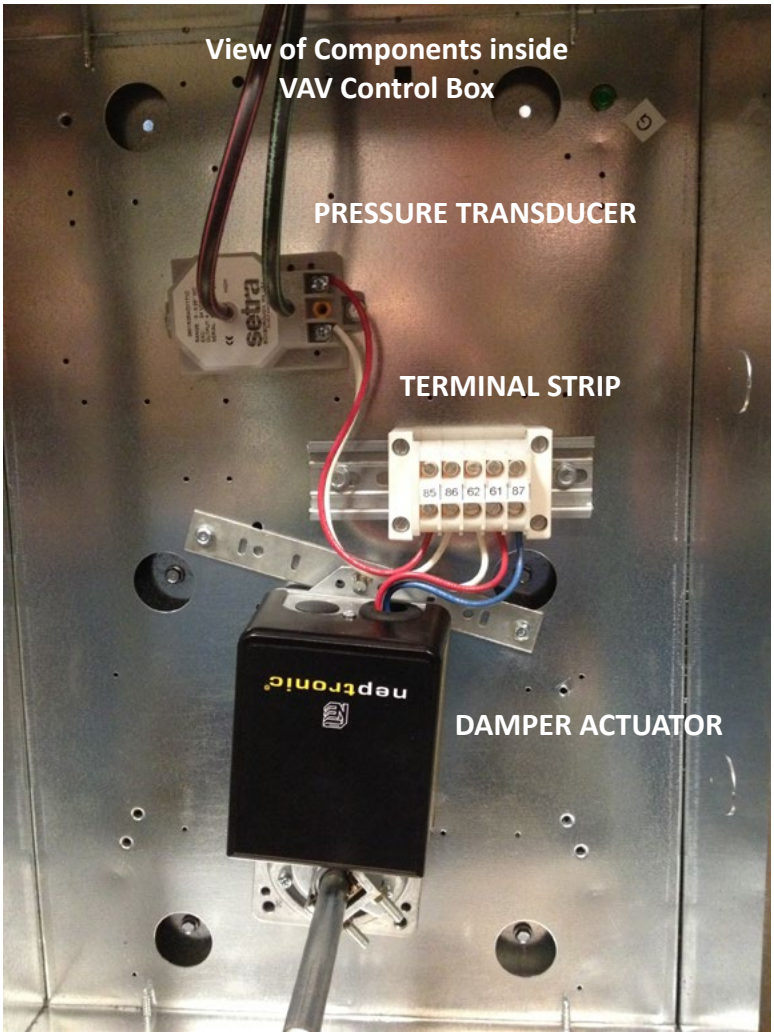
Make Up Air Control Diagram

VAV - Kitchen Variable Air Volume Terminal Unit

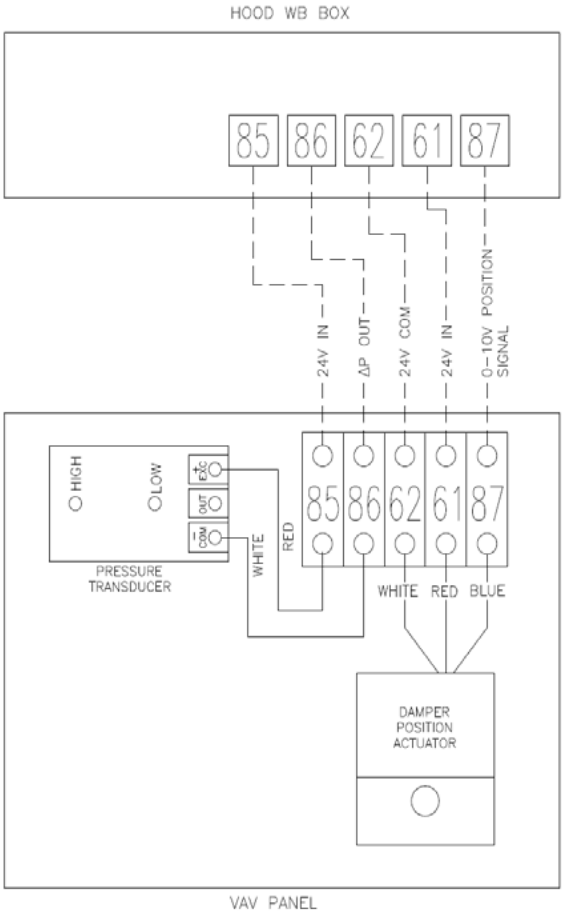
KVV-R



KVV-S



VAV Wiring Diagram



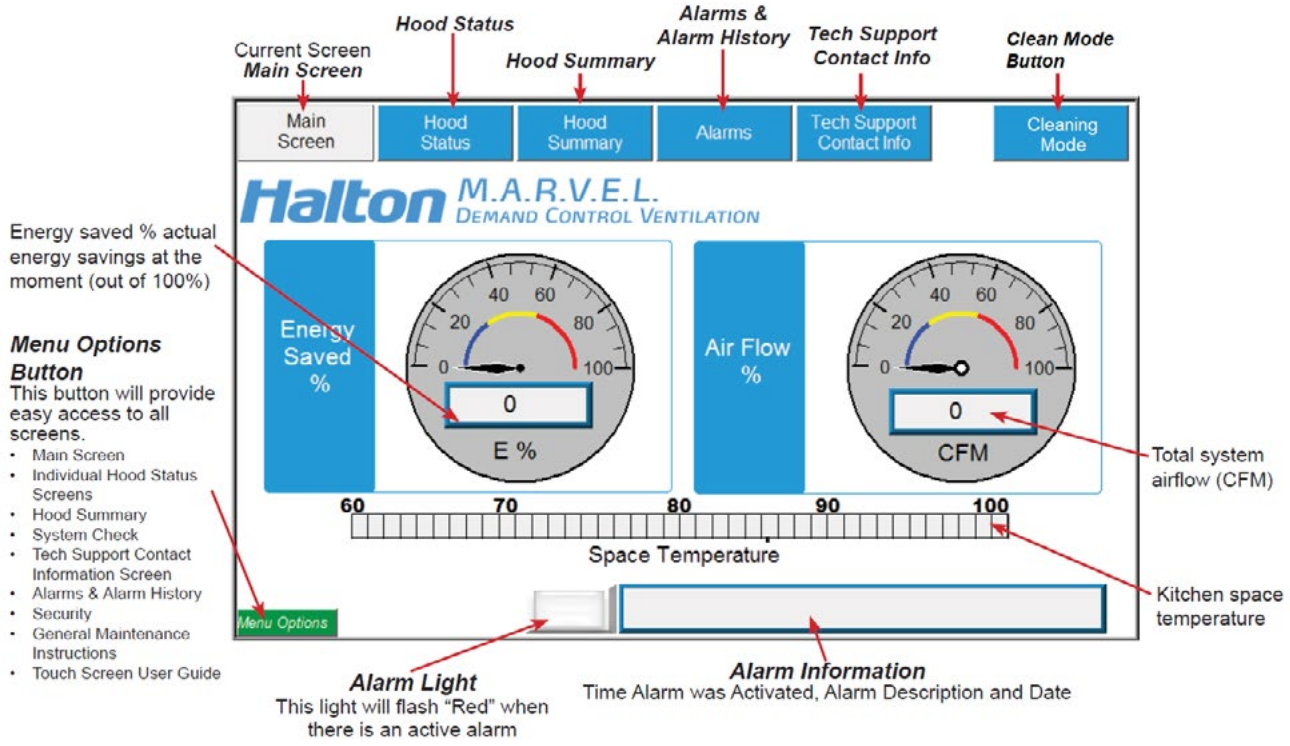
OM-070/092019/rev4/EN

M.A.R.V.E.L. Touch Screen Operation

The central control panel features a user friendly touch screen interface. The following illustrations depict the navigation and features of the touch screen.

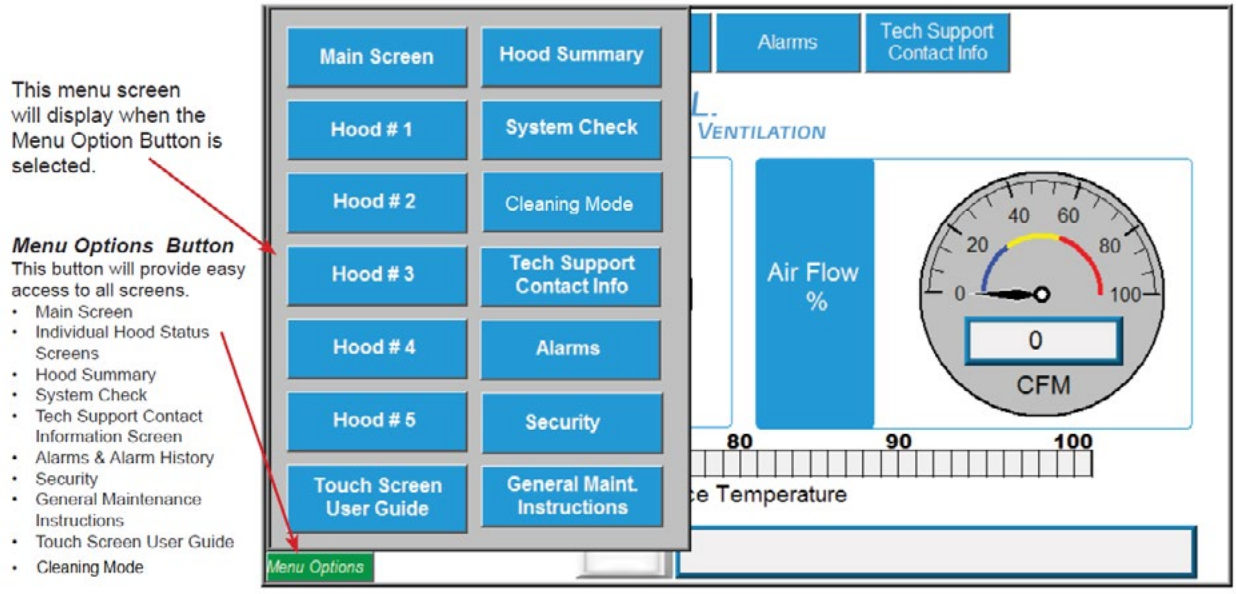
Note: Touch screen samples shown below are for the basic M.A.R.V.E.L. system, for all other M.A.R.V.E.L. systems including UV, Water Wash, Ecology & KGS or combination thereof, please refer to the Quick Reference Guides.

Main Screen



Menu Option Screen

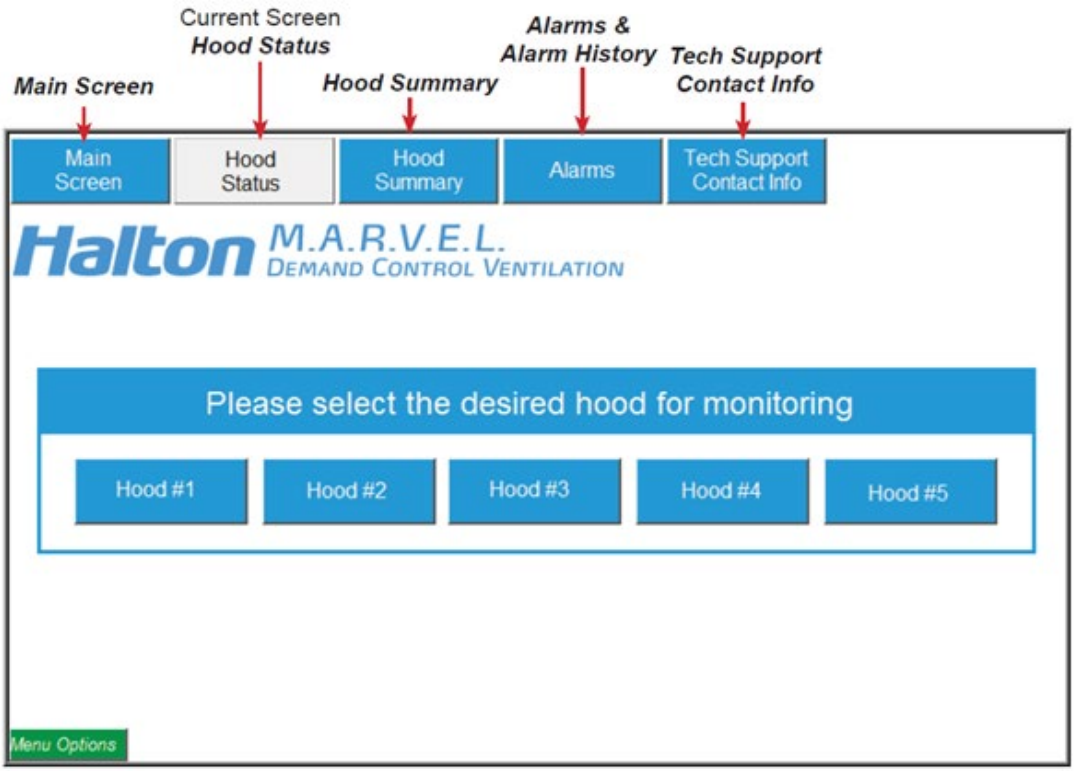
This screen will allow you to jump ahead to any of the below screens.



OM-070/092019/rev4/EN

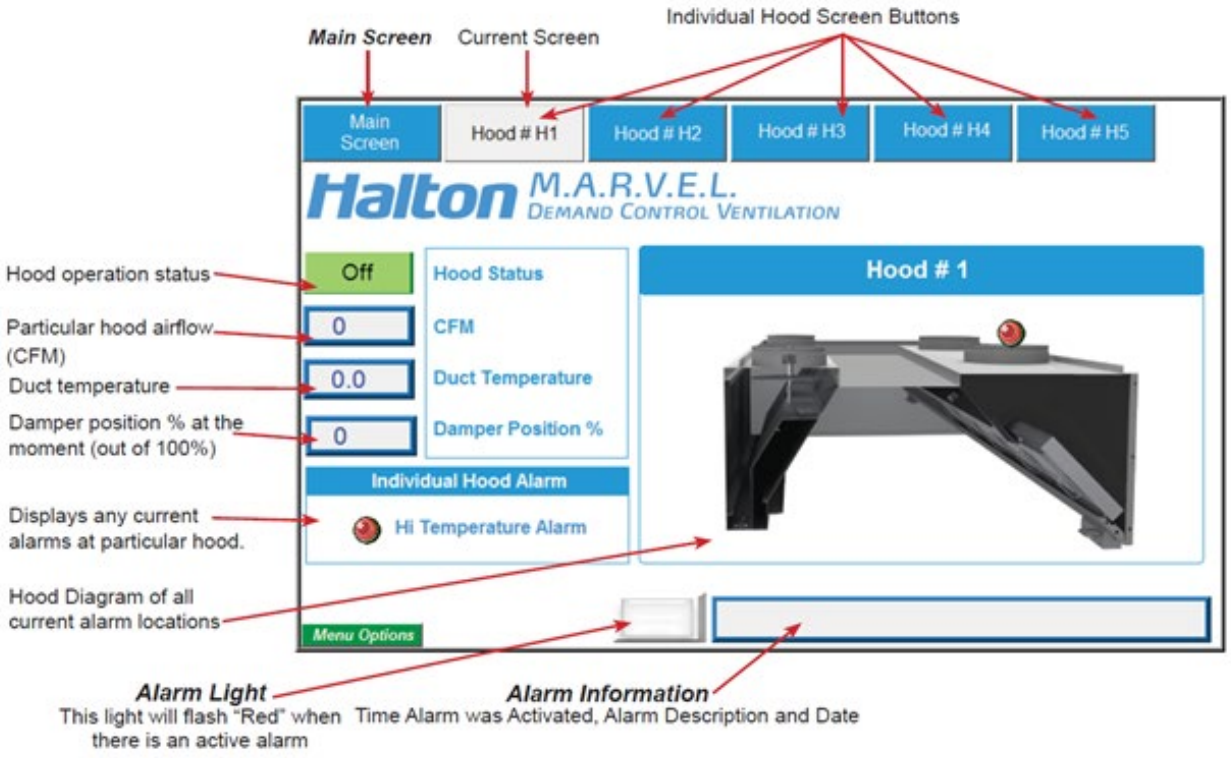
Individual Hood Selection Screen

This screen will allow you to move to your choice of Individual Hood Status screen.



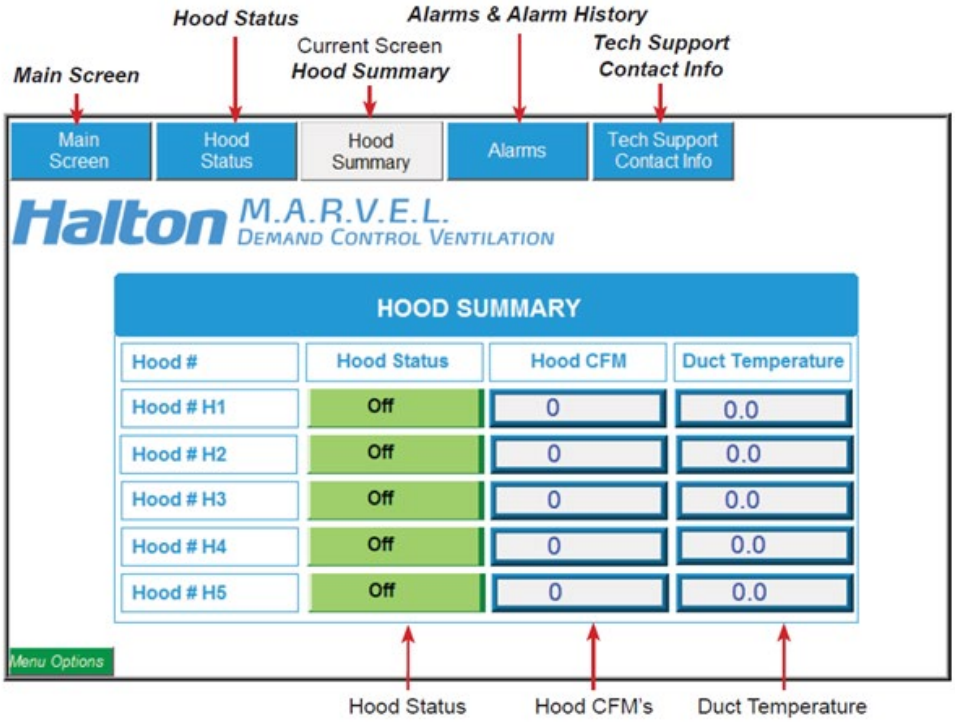
Individual Hood Status Screen

This screen will display all the information pertaining to each individual hood separately.



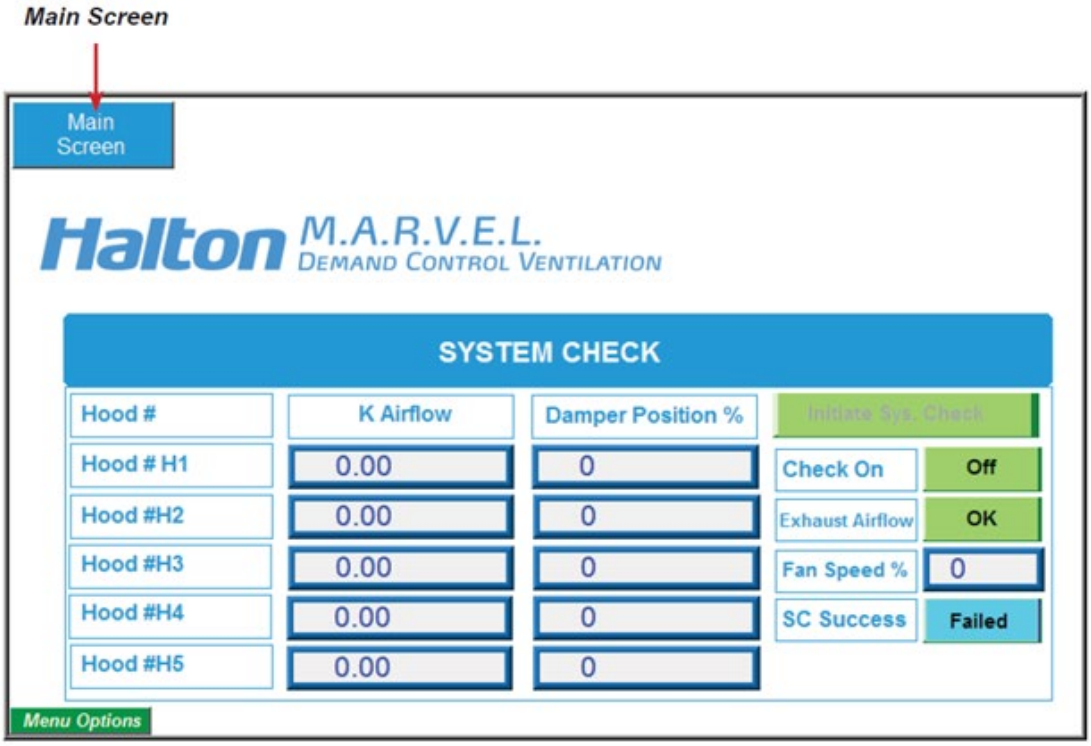
Hood Summary Screen

The Hood Summary screen shows the overall performance of the current hood.



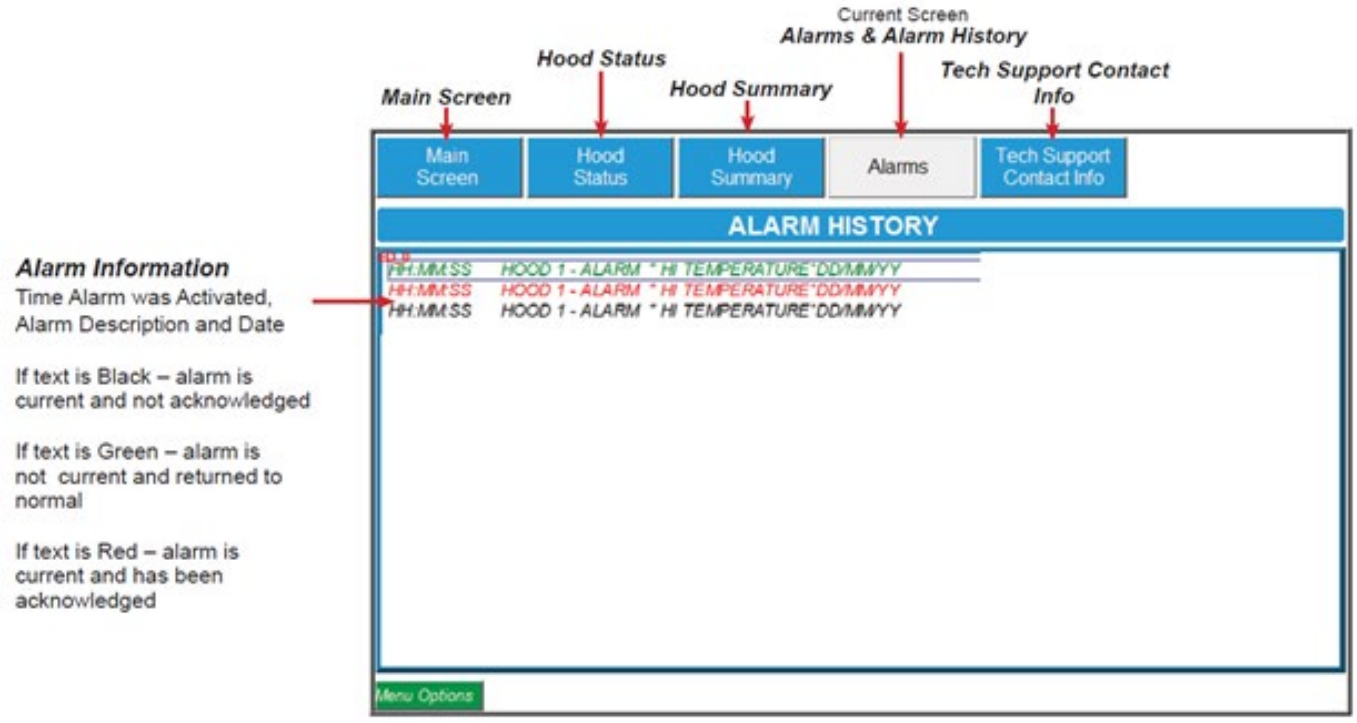
System Check Screen

The System Check screen will be used by your service agent only.



Alarm History Screen

This screen will display your current alarms along with the alarm history.



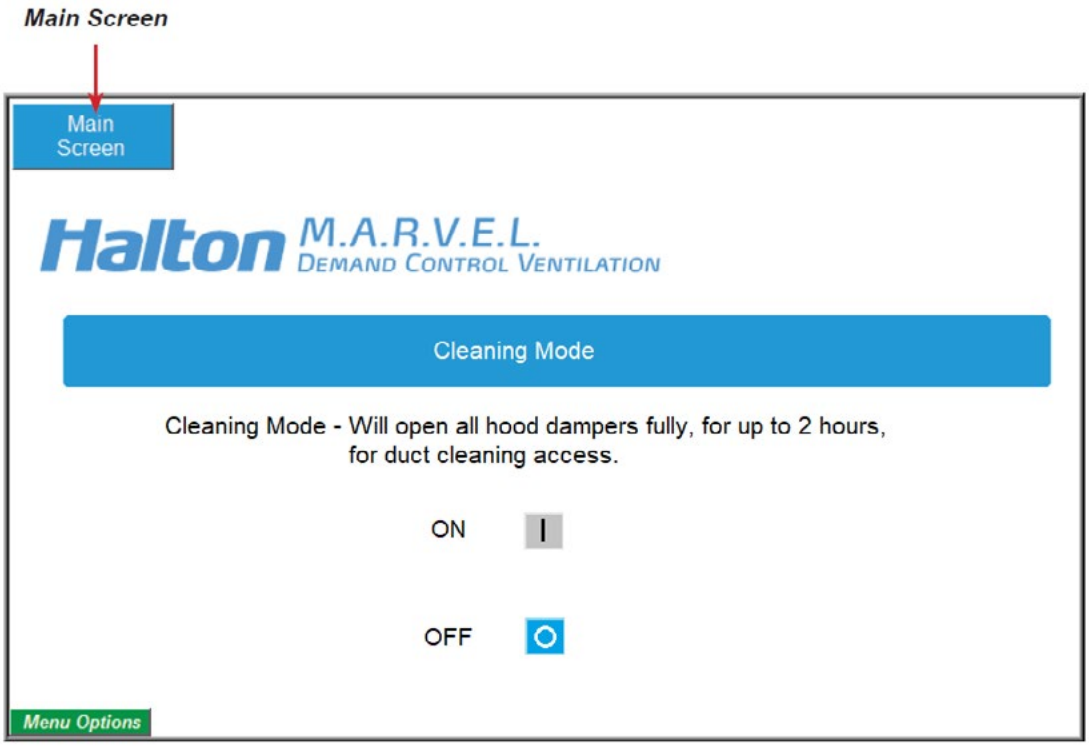
Information Screen

This Technical Information screen provides our USA and Canadian phone numbers for technical help.

OM-070/092019/rev4/EN

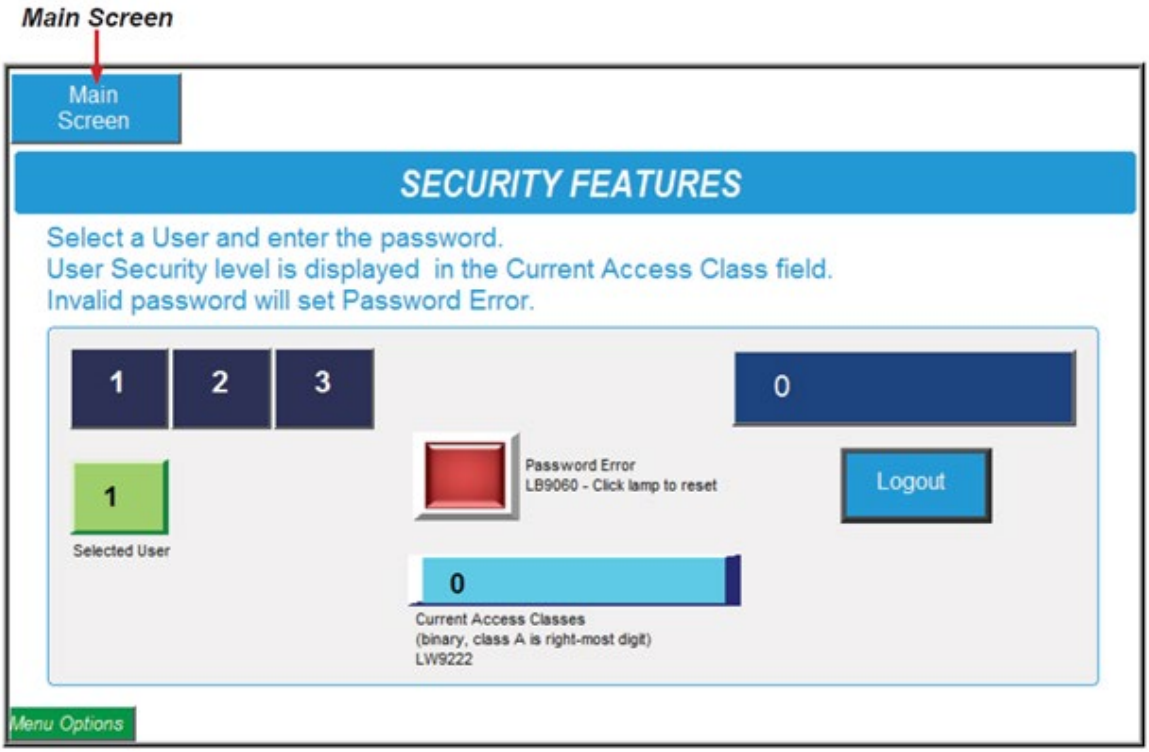
Cleaning Mode Screen

This screen will be used for duct cleaning access.



Security Features Screen

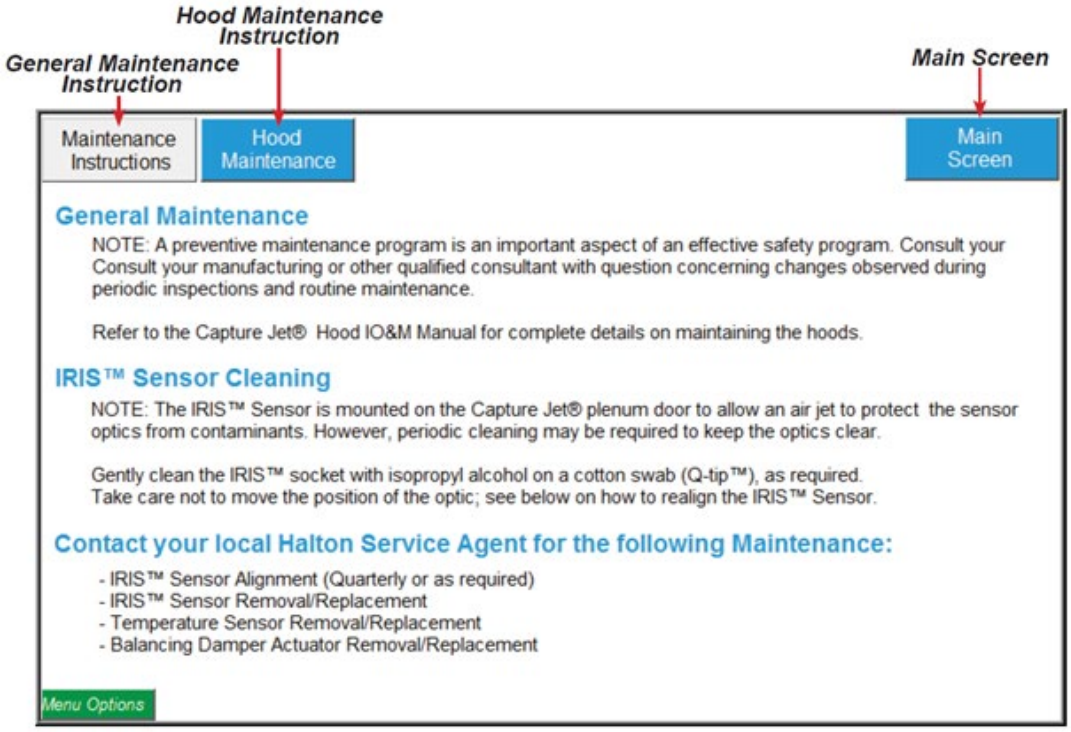
This screen will be used by your service agent only.



If you are a Halton Certified Service Agent that requires a password for the screen above, please contact Halton Service Network at 1 (800) 442-5866 (USA) or 1 (800) 565-2981.

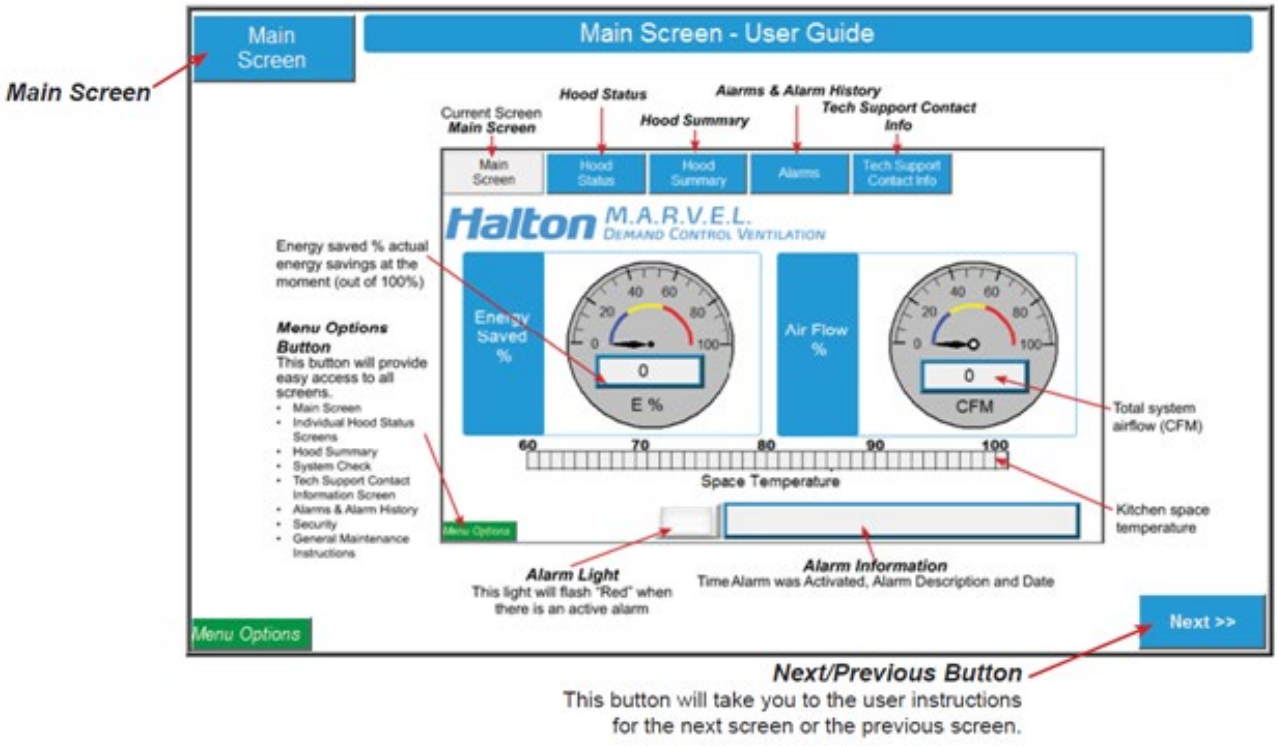
General Maintenance Instructions

These screens will provide general maintenance instructions for your system.



Touch Screen User Guide

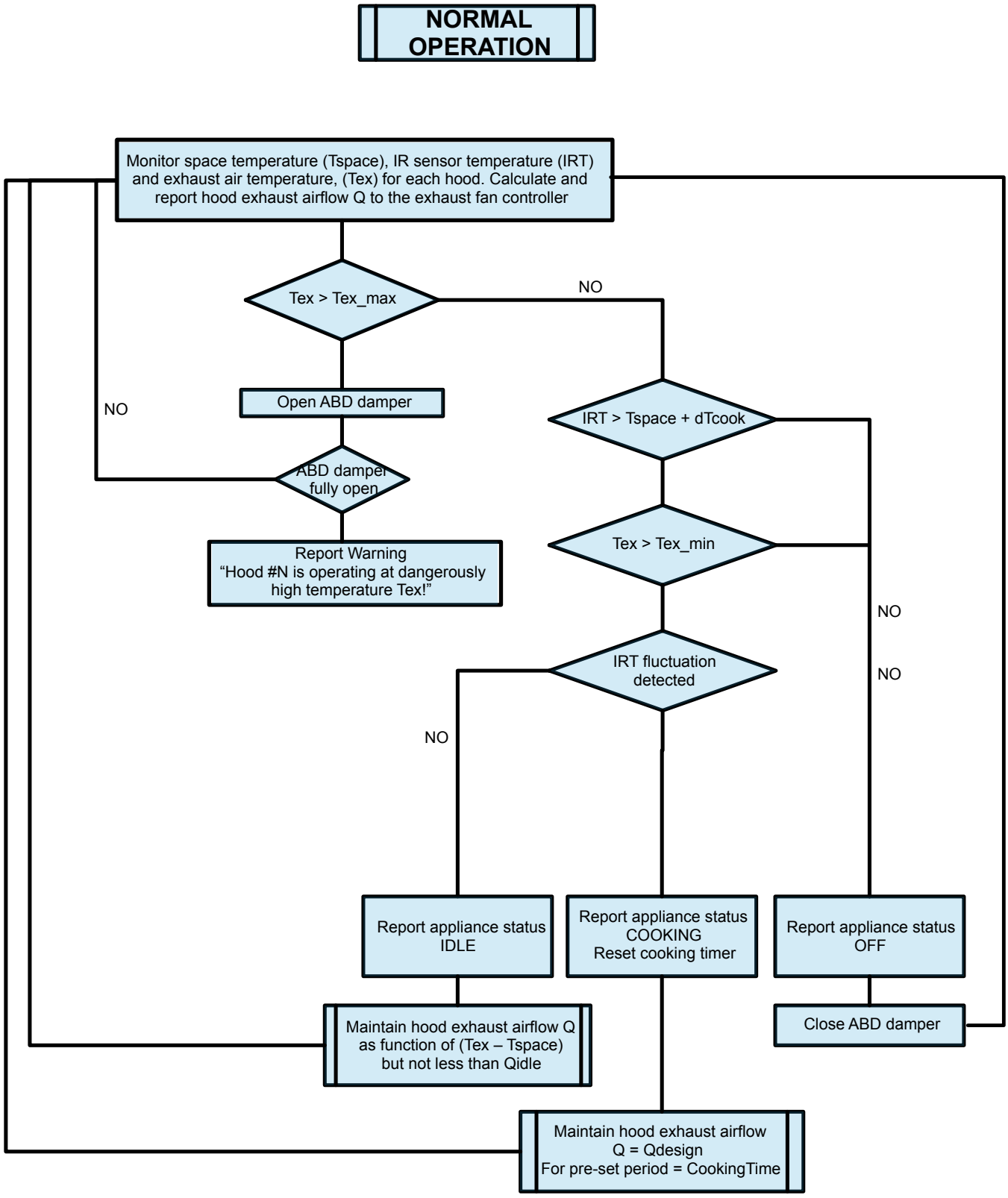
These screens will give an overview of each screen and their functions.



M.A.R.V.E.L. System Operation

NOTE: Refer to the Capture Jet™ Hood IO&M Manual for complete details on operating the hoods.

The following steps ONLY apply to the M.A.R.V.E.L. components (IRIS™ Sensor, MC8 Control Panel, Pressure Transducer and Temperature Sensor).



M.A.R.V.E.L. System Installation

The following installation steps ONLY apply to the M.A.R.V.E.L. components (IRIS™ Sensor, MC8 Control Panel, Pressure Transducer and Temperature Sensor).

Refer to the Capture Jet™ Hood IO&M Manual for complete details on installation of the hoods.

Refer to the Halton engineering drawings for additional details.

Refer to the Halton wiring drawings for configuration details.

Refer to the fan manufacturer's manual for detailed instructions on the fan installation.

It is the responsibility of the installing contractor to see that the system installation is completed in accordance with the project plans and specifications and that it meets all specific requirements of local code officials. The local authority having jurisdiction could over rule some of the installation details written in this manual.

The installation shall be in accordance with NFPA-96. All electrical systems shall be installed following local and national codes.

If questions or complications should arise during the installation of the Halton hood(s) that cannot be solved using the instructions provided, please contact the Halton office at 1-800-442-5866, or (1-800-4-HALTON).

If a problem cannot be correct through verbal or written communication with Halton support, the system can be connected to the Internet for remote access to Halton engineers through the KONTAR-Konsole™ Commissioning and Diagnostic Software Interface.

If the site doesn't have reasonable access to the Internet, a wireless CDMA router can be shipped by Halton to the facility for temporary (or permanent) access.

Check all local codes prior to installation as special requirements may be necessary depending on local building material construction.

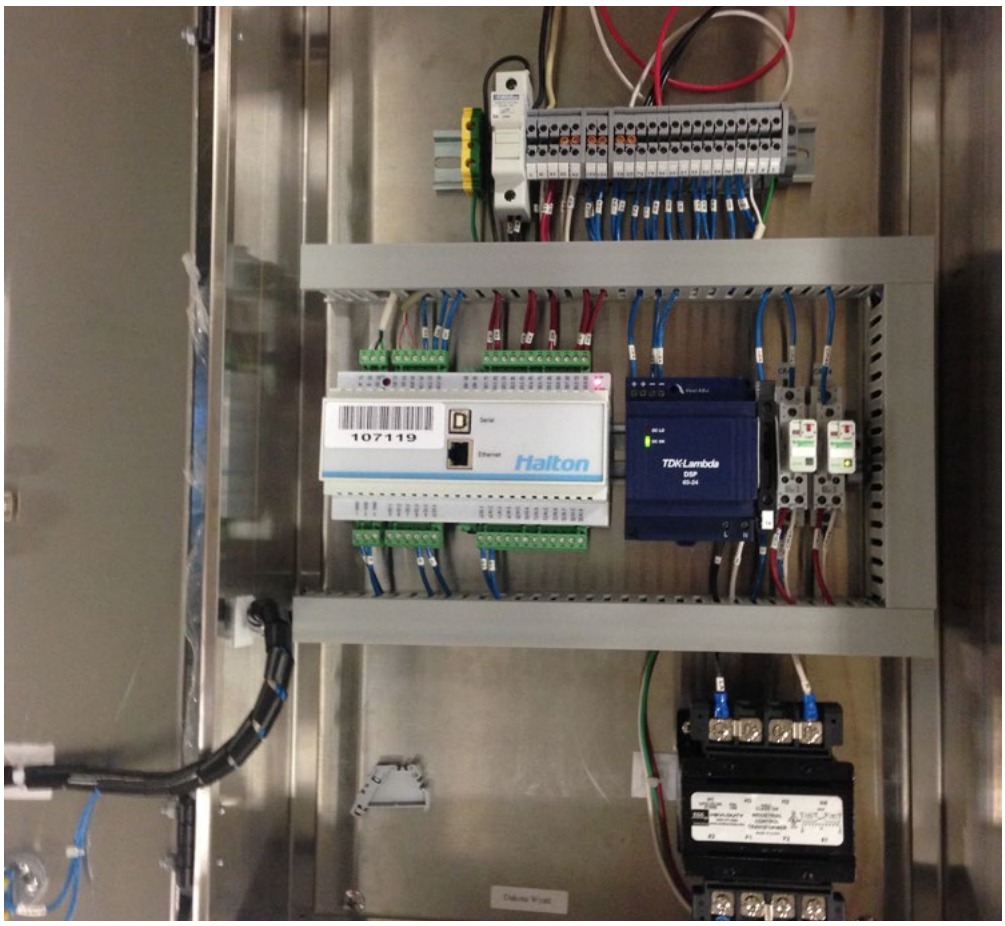
1. Mount the central control panel (for multiple units with a single fan)

NOTE: For all units, there is a pre-mounted control panel behind a cover on the Capture Jet™ plenum

1. The central control panel is supplied with mounting tabs that extend from the back wall up and down and provide at least four points of attachment. The appropriate mounting hardware is to be used depending on the unit size and the type of wall to be attached to.
2. Locate the central control panel at an appropriate mounting height (e.g., access to the control in the front door of the panel).
3. Attach the central control panel using the four mounting holes:
    - For concrete block walls, solid block and brick surfaces: Use sleeve stud anchors (recommended).

      Example:3/8 " dia.- thread:5/16-18; washer OD:7/8 "(Drill size 3/8 ")
    - For Plaster, Wallboard and Plywood: Use sleeve screw anchors(drive or drill style) (recommended).

Example: 1/4" - 20 drill size 7/16"



NOTE: If more than one control panel is used in a M.A.R.V.E.L. system with a single exhaust fan, connect them together to ensure that proper operation of the exhaust fan. Refer to the Halton supplied wiring diagram for details.

2. Make central control panel connections *(for multiple units with a single fan)*

Make the following connections at the central control panel:

a. 120 VAC, 5 amp power to control panel.
b. Space temperature sensor to control panel (2 wires).
c. VFD terminal block to control panel (8 wires shielded).
d. Connection to individual hood (2 wires shielded) (cable provided by Halton).
e. Connection to kitchen fire system (2 wires)
f. Permanent Ethernet connection (if specified).
g. UV or Water Wash control.

3. Connect VFD controller

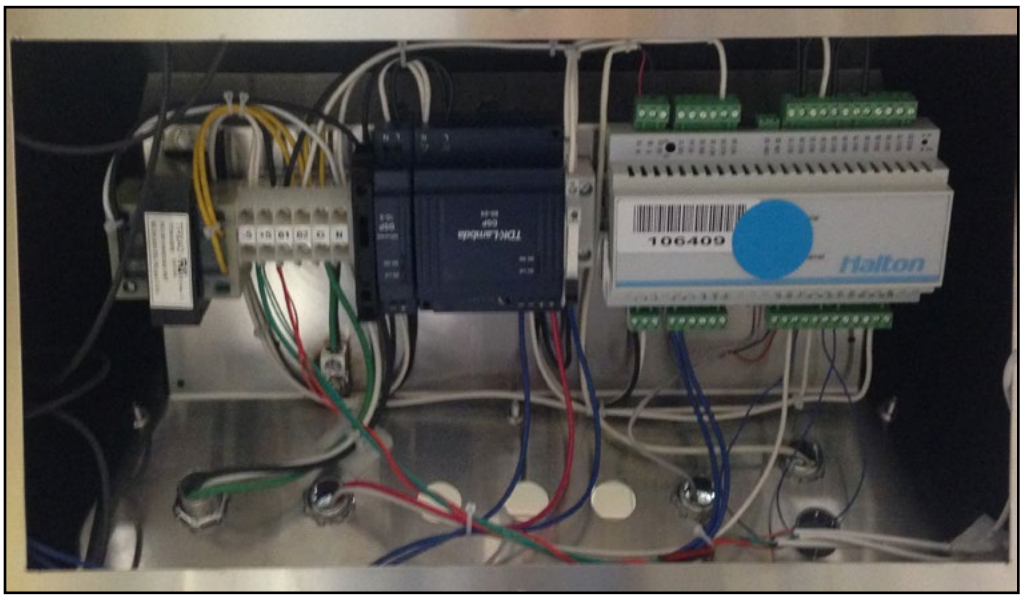
Connect VFD controller as per instructions provided. This includes:

a. Main power connection for the fan motor.
b. Connection to central control panel.

4. Connect hood control panel to central control panel *(for multiple units with a single fan)*

Using 2 wire shielded cable provided by Halton, connect each unit to the central control panel. This includes:

1. Attach the wire to the terminal block in the box on top of the hood.
2. Run the wire to the central control panel and connect the marked terminal block (identified by hood number)
3. Connections can be also made between hoods with 2 wire shielded cable and connect the hood closest to the control panel to terminals in the panel.



5. Check pressure transducer

1. Check the condition of the pressure transducer tubing on the top of the Capture Jet™ hood. The tubing should be free from kinks.

6. Calibrate the Capture Jet™ exhaust air flows

Calibrate the Capture Jet™ exhaust air flows using the T.A.B.™ (Testing and Balancing Ports).

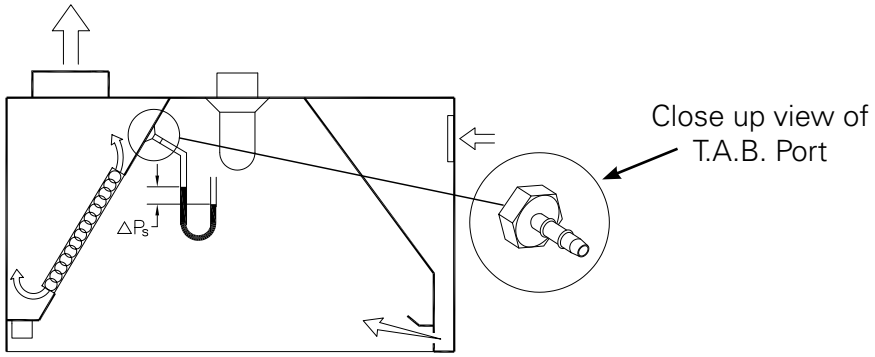
To determine the correct T.A.B. port reading for the exhaust hoods, follow these steps:

1. Ensure that the equipment is operating to create a thermal plume prior to the air balancer.
2. Determine the correct T.A.B. port reading (IWC) based on the Capture Jet™ hood model.

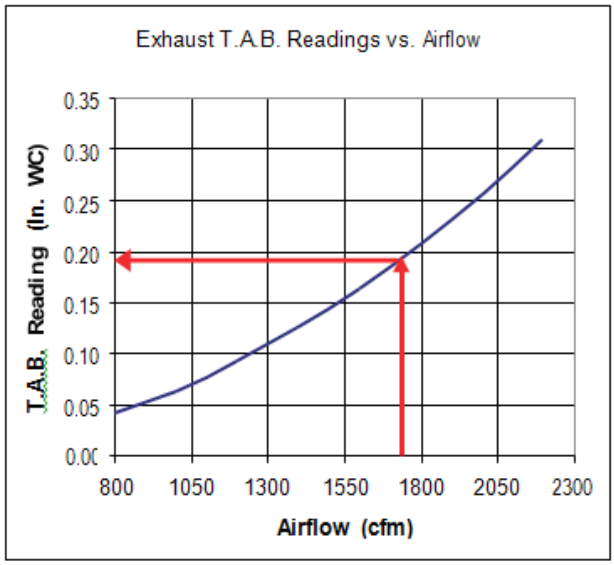
Capture Jet Hood Model	T.A.B. Port Readings Design T.A.B. (inches WC)
KVE/KVC	0.25
KVW	0.25
KVR	0.25
KVL	0.28

"Example Only"

3. Using the T.A.B. Port, take a reading in IWC.



4. Using the table below, confirm the design airflow (e.g., 1700 cfm), based on the T.A.B. Reading (e.g., 0.19 IWC).



"Example Only"

OM-070/092019/rev4/EN

M.A.R.V.E.L. System Maintenance

General

NOTE: A preventive maintenance program is an important aspect of an effective safety program. Consult your manufacturing or other qualified consultant with question concerning changes observed during periodic inspections and routine maintenance.

Refer to the Capture Jet™ Hood IO&M Manual for complete details on maintaining the hoods.

The following maintenance steps ONLY apply to the M.A.R.V.E.L. components (IRIS™ Sensor and Temperature Sensor).

IRIS™ Sensor Cleaning

NOTE: The IRIS™ Sensor is mounted on the Capture Jet™ plenum door to allow an air jet to protect the sensor optics from contaminants. However, periodic cleaning may be required to keep the optics clear.

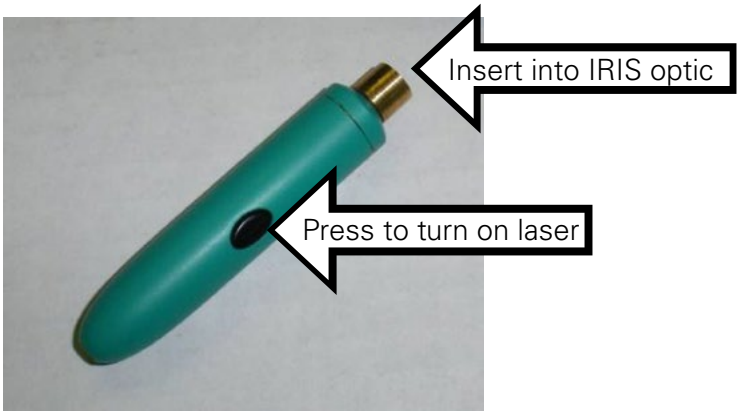
Gently clean the IRIS™ socket with isopropyl alcohol on a cotton swab (Q-tip™), as required.

Take care not to move the position of the optic; see below on how to realign the IRIS™ Sensor.

IRIS™ Sensor Alignment (Quarterly or as required)

To align the IRIS™ Sensor, follow these steps:

1. Insert the Laser Alignment Tool into the socket at the bottom of the IRIS™ sensor.



2. Press the laser button, located on the side of the *Laser Alignment Tool*.

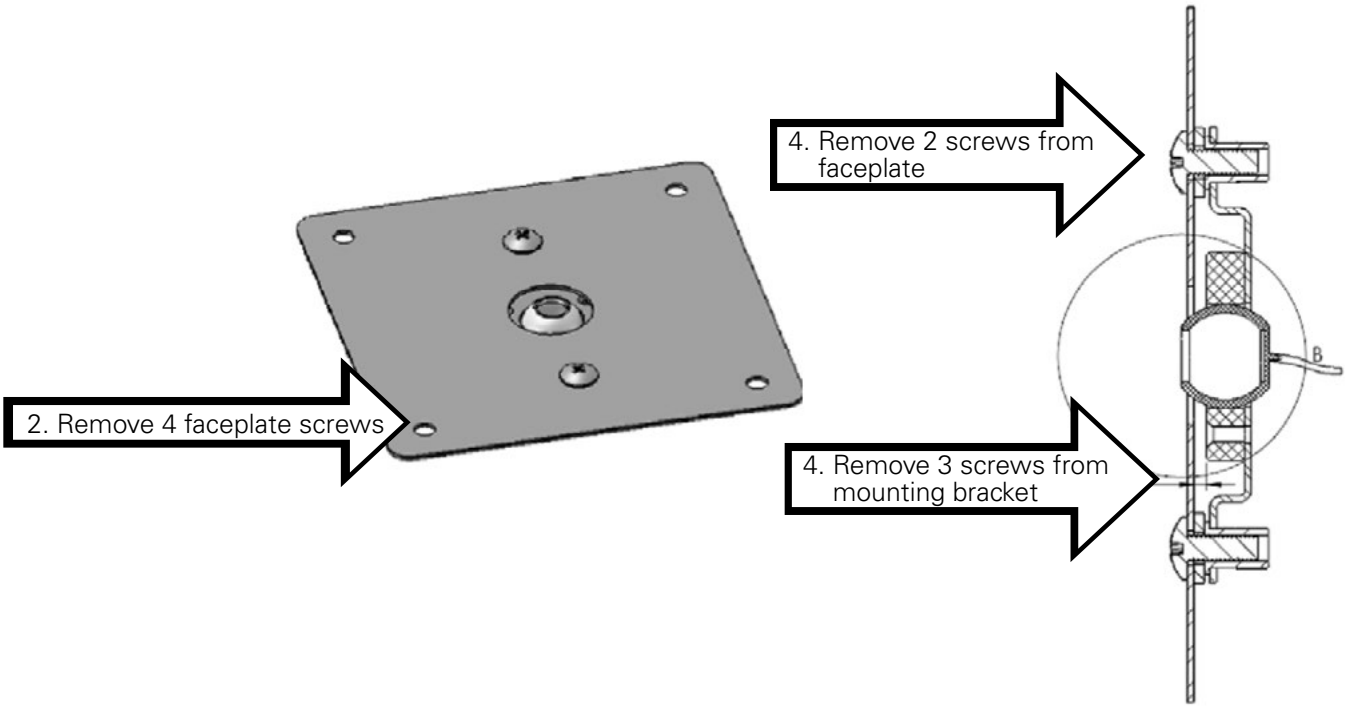
3. Gently move the IRIS™ sensor to position the laser beam point at the center of the cooking surface. ***NOTE:*** The actual field of view for most applications will be 60 degrees.

4. Remove the Laser Alignment Tool.

IRIS™ Sensor Removal/Replacement

To remove the IRIS™ Sensor, follow these steps:

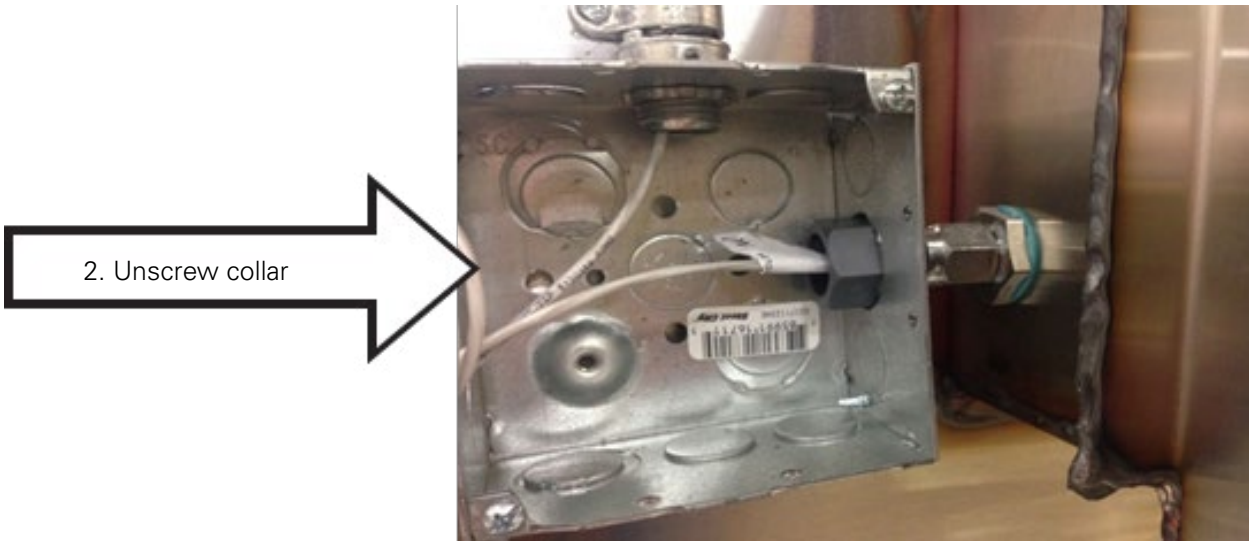
1. *Disconnect the IRIS™ sensor from the terminal block located in the Capture Jet™ hood. Refer to the terminal block diagram on the Halton-supplied wiring diagram for the correct terminations points.*
2. *Remove the face plate of the sensor by removing the 4 face plate screws.*
3. *Lift out the face plate and sensor and gently pull out the sensor wires.*
4. *Remove the sensor bracket from the face plate by removing the 2 screws on the faceplate.*
5. *Remove the sensor from the sensor bracket by removing the 3 screws.*
6. *Reverse the steps when replacing the IRIS™ sensor (Halton Part # 18037).*



Temperature Sensor Removal/Replacement

To remove the temperature sensor located in the hood collar, follow these steps:

1. Disconnect the temperature sensor from the terminal block located in the Capture Jet™ hood. Refer to the terminal block diagram on the Halton-supplied wiring diagram for the correct terminations points.
2. Loosen the compression fitting securing the temperature sensor in the hood collar.



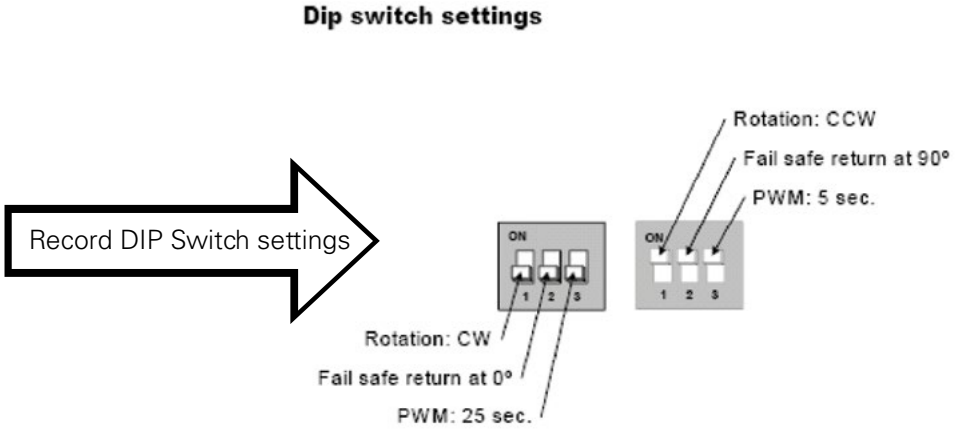
3. *Remove the temperature probe.*
4. *Replace the defective temperature probe with a replacement (Halton Part # 17641)*
5. *Reconnect wiring.*

Balancing Damper Actuator Removal/Replacement

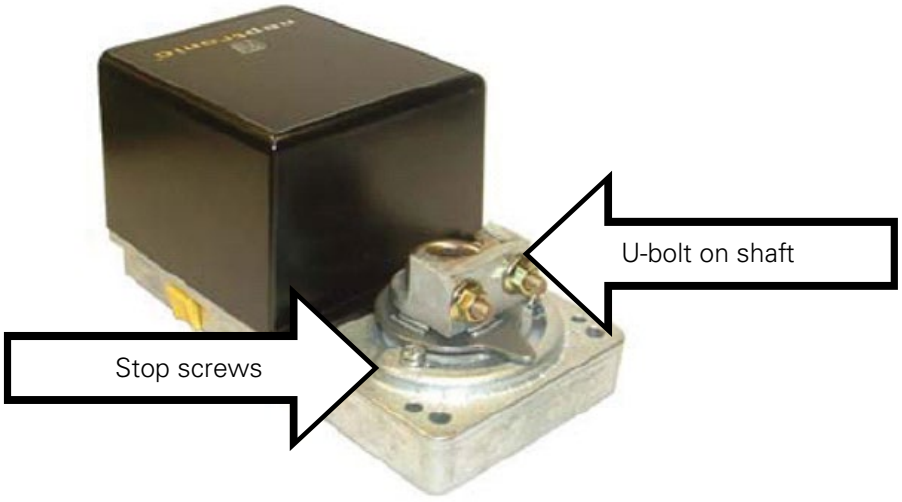
Halton ABD Dampers use two different actuators to move the damper blades, depending on the size of the damper. The Neptronic model BM060(HA1) is used on the smaller ABD dampers, sizes 8" x 8" to 9" x 10". The Belimo model MFX24-MFT is used on the larger ABD dampers, sizes 10" x 10"to 30" x 36".

To remove and replace the Neptronic actuator on the balancing damper, follow these steps:

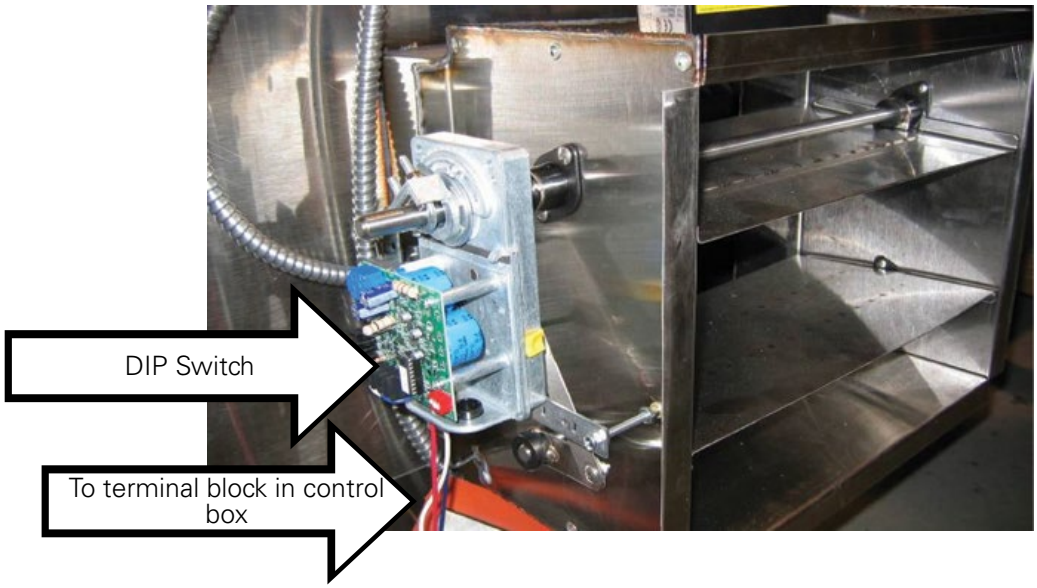
1. *Remove exterior metal cover by removing the 6 mounting screws around the perimeter.*
2. *Remove the actuator cover by removing the 1 screw on the side.*
3. *Disconnect the power to the actuator.*
4. *Record the DIP switch values, located in the red holder on the bottom of the actuator.*



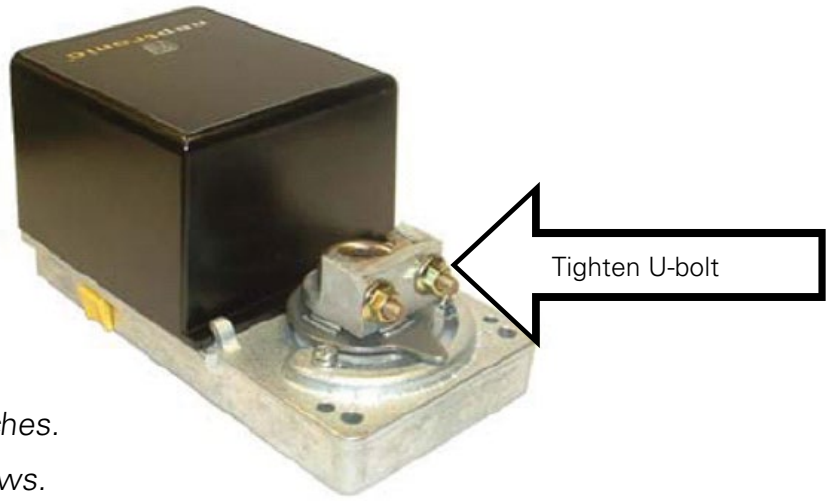
5. *Note the position of the stop screws.*



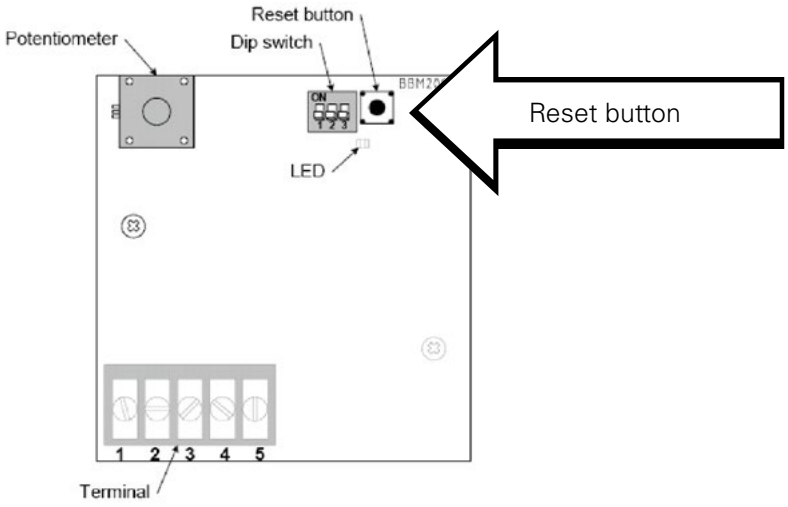
6. *Remove the U-bolt that attaches the actuator to the balancing damper shaft. Refer to the Actuator Specification and Installation instructions with the replacement part.*



Replace with a replacement actuator (Halton Part # 10842). Tighten the U-bolt on the drive shaft.



7. *Reset the DIP switches.*
8. *Reset the stop screws.*
9. *Reconnect the power.*
10. *Calibrate the new actuator by pressing the* ***Reset*** *button. The dampers will open and close.*
11. *Replace the actuator housing and the exterior metal cover as before.*



OM-070/092019/rev4/EN

Balancing Damper Actuator Removal/Replacement - Belimo

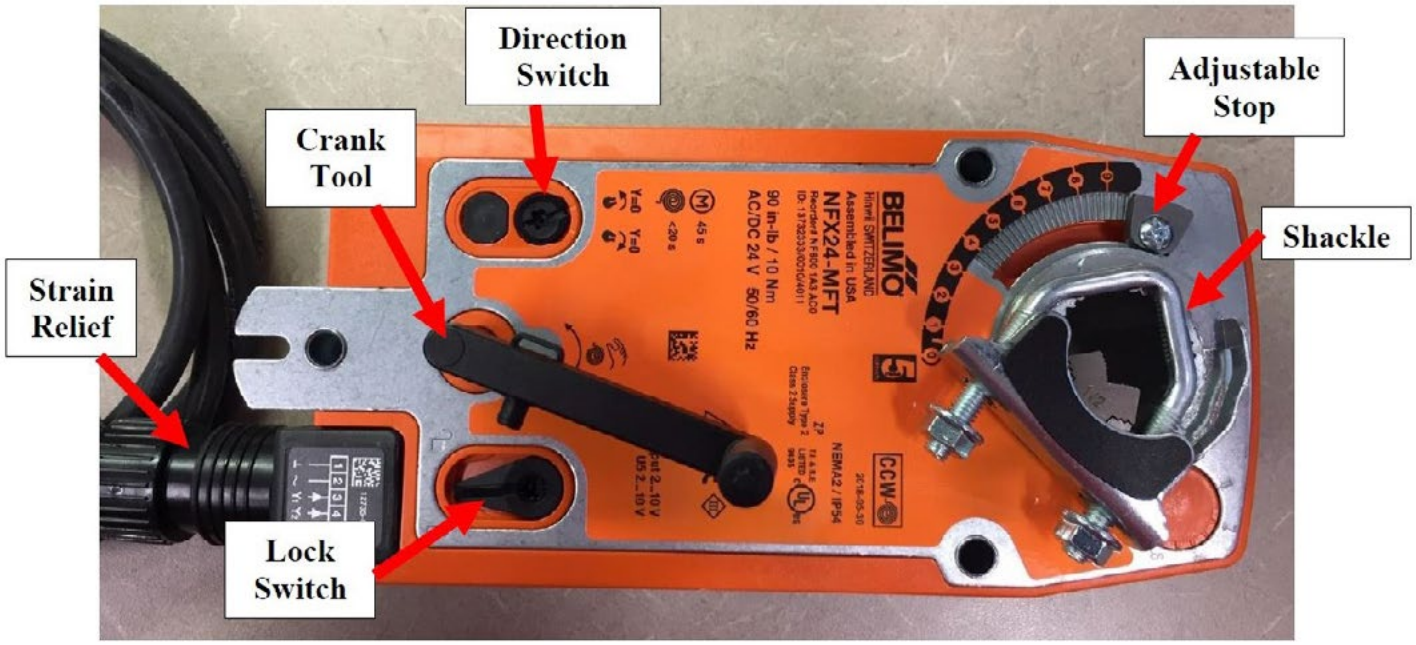
To remove and replace the Belimo actuator on the balancing damper, follow these steps:

Remove exterior metal cover by removing the 6 screws around the perimeter of the cover.

Disconnect the power to the actuator.

The Belimo damper has a wire pigtail attached to it. It wires directly into the hood's onboard PLC except in cases, like dual exhaust collars, when the damper might be too far away from the PLC for the length of the pigtail. In that case a j-box is added to the top of the hood and jumper wires will extend the pigtail from the j-box to the PLC. (The wire colors for the jumpers will not necessarily be consistent. Please take careful note of what color jumper wires are connected to what color pigtail wires before disconnecting the wires in the j-box.)

Remove the U-bolt (shackle in below picture) that attaches the actuator to the balancing damper shaft. Remove the actuator. Refer to the Actuator Specification and Installation instructions with the replacement part.



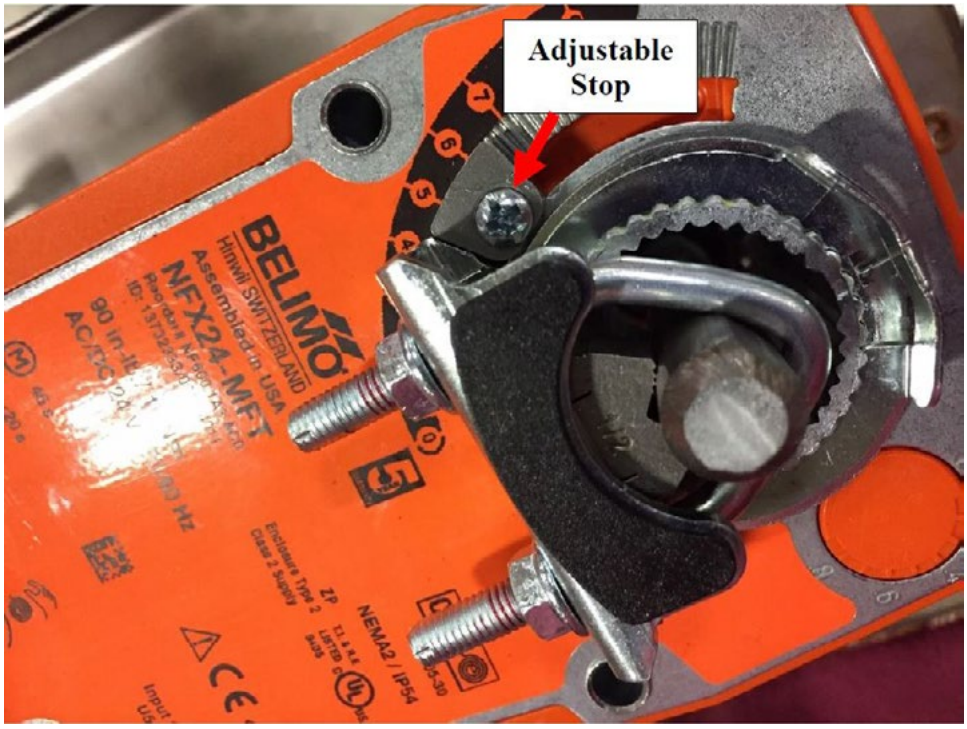
Replace with a replacement Belimo actuator (Halton Part # 10843). Tighten the U-bolt on the drive shaft.

Ensure actuator is attached to damper body. Remove included strain relief from actuator body. Remove the strain relief by pulling the collar of the strain relief away from the actuator and pressing down on the end away from the actuator with a breaking motion. Teeth on the strain relief will pop out of a groove on the rubber casing on the cord. Remove the strain relief from the cord and discard.

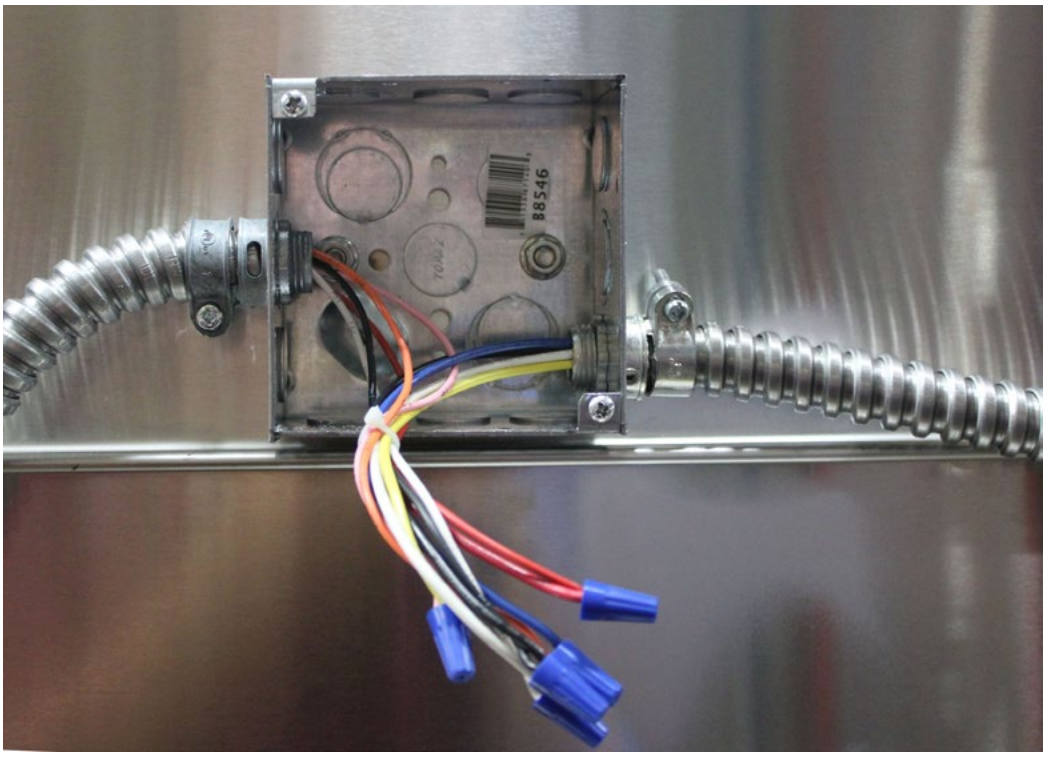
Make sure flat of the axle rod is against the flat of the shackle to prevent shifting.

Using the provided crank tool, close the actuator until the blade tips touch at the top and lock the actuator in this position with the Lock Switch.

Adjust the stop to this location and tighten screw.



Release actuator lock switch. Actuator spring will return damper to the open position. Ensure the blades are in the correct vertical open position



J-box opened to show jumper wires connections.

Thread the actuator wiring pigtail through the grommet in the cover and route the wire through the conduit to the PLC enclosure or the J-box where the disconnections were made.
Reconnect the power.

Replace the exterior metal actuator cover as it was before.

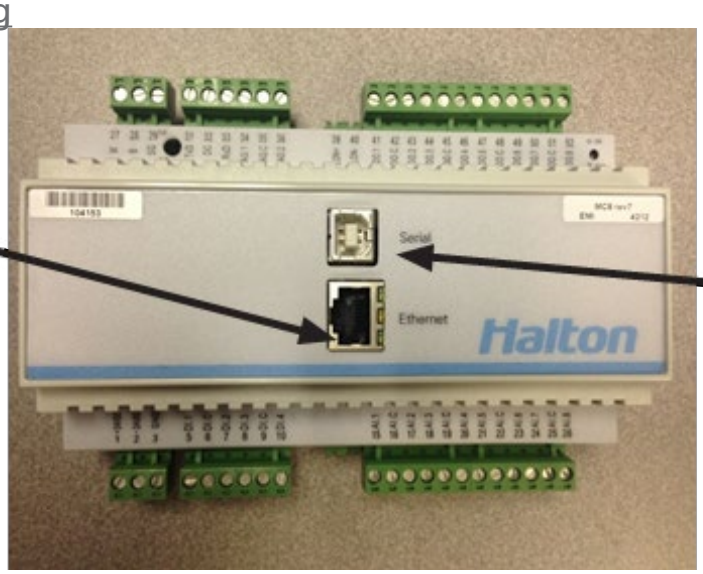
Pressure Transducer Removal/Replacement

To remove the pressure transducer, follow these steps:

1. *Turn off power to transducer.*
2. *Remove covering on pressure transducer mounting bracket.*
3. *Disconnect wires.*
4. *Disconnect ¼" tubing fitting from LOW port on transducer*
5. *Remove side mount screws (2 screws).*
6. *Replace with Halton Part # 18028).*
7. *Reconnect wires and tubing as before. Check that the tubing is not kinked.*

M.A.R.V.E.L. System Monitoring and Support

Types of Monitoring



Type of Mounting	Details
Permanent Ethernet-connection for 24/7 monitoring	• Optional. • Permanent internet monitoring using SCADA graphical interface. • By using a unique password and ID, user can check system status and, depending on access levels, change parameters and alarms.
Temporary Ethernet connection, as required, for support	• Temporary Ethernet connection for startup/ troubleshooting by Halton Technical Support only
Temporary cable to laptop connection, as required, for support	• USB cable connection to laptop pre loaded with KONSOLE™ software for diagnostic support.

Connection to Third Party Devices

- Able to communicate natively to Modbus RTU slave devices over RS232 or RS485.
- Able to communicate via BACnet MSTP, BACnet IP, Modbus RTU as a Slave or JCI N2 protocols via optional gateway.

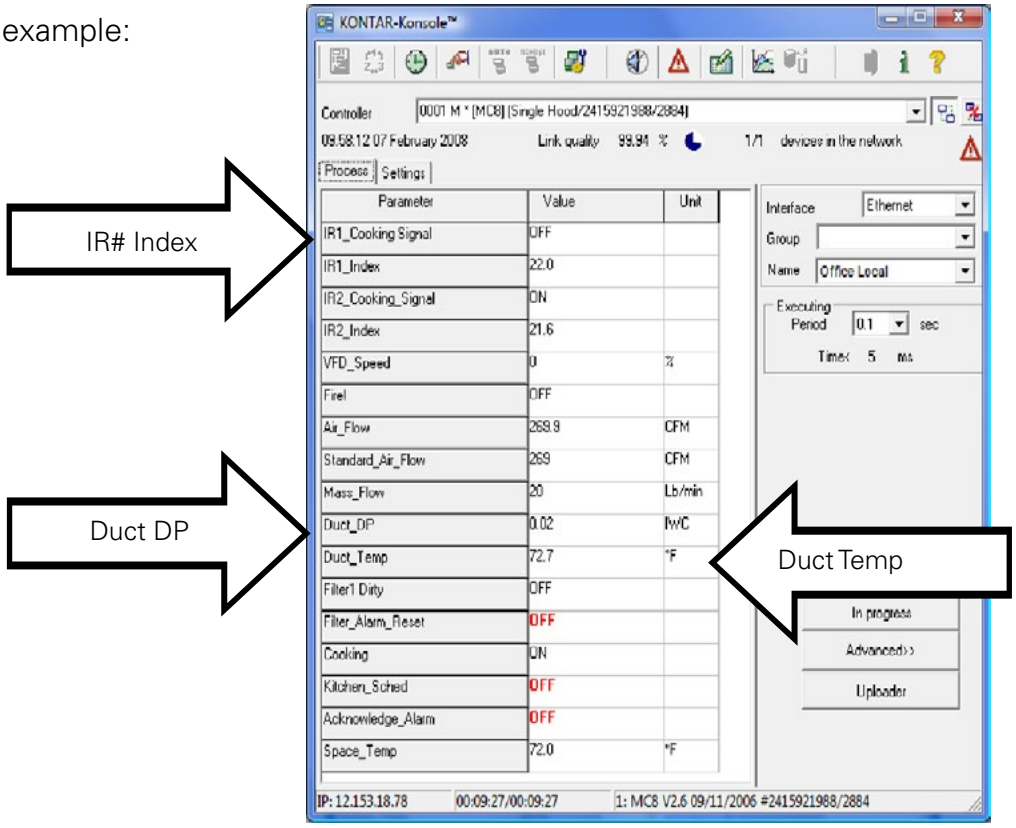
KONTAR-Konsole™ Software

The KONTAR-Konsole™ Commissioning and Diagnostic Software Interface displays set operating parameters and actual values. When accessed and reviewed by a trained Halton technician, support and troubleshooting can be offered.

NOTE: Only Halton- trained technicians should access this software.

For additional details and support with KONTAR-Konsole™ software, use the on-line help from the toolbar.

For example:



Display Field	Recommended Value and Action
IR1_Index IR2_Index, etc	• Appliance OFF - 59 - 80 °F • Appliance ON: > 80 °F • Power supply off: -220 °F ***NOTE:*** if more than 1 IRIS™ sensor, check each IR_Index value. If all values are -220 check that power supply.
Duct_Temp	• Cooking: 50 to 150 °F • Not cooking: ambient room temperature

FAQ's (Frequently Asked Questions)

Problem	Probable Cause	Solution
Laser on Alignment Tool does not work	Battery low	Replace battery. Unscrew end of tool, remove the battery and replace with same type.
Exhaust damper blades do not open or close	Loose set screws	Tighten
	In-operable motor	Replace
No suction at hood	VFD tripped	Check for error code, reset
	Surface and duct temperature sensors not activated	Push override button

M.A.R.V.E.L. Parts List

The following is the recommended parts list for proper care and maintenance of the M.A.R.V.E.L. equipment. Parts indicated with a * should be kept readily on hand, the amount depending on the number of hoods in the system.

NOTE: Contact Halton for information on other replacement parts as required

Part	Halton Part Number
Pressure transducer* (for each hood)	18081
Temperature sensor*	18024
IRIS™ sensor*	18037
Actuator* (for balancing damper) (optional)	16012
MC8 Controller (optional)	18035

Contact Information

United States

Halton Company
101 Industrial Drive
Scottsville, Kentucky
42164

www.haltoncompany.com

Tel: 270-237-5600
Toll Free: 800-442-5866

Fax: 270-237-5700

Canada

Halton Indoor Climate Systems
1021 Brevik Place
Mississauga, Ontario
L4W 3R7

www.haltoncanada.com

Tel: 905-624-0301
Toll Free: 800-565-2981

Fax: 905-624-5547

WARRANTY FORM

This form must be completed and returned to Halton in order for your warranty to be valid.

Job & Location Information:

Job Name: _____

Street Name: _____

City: _____ State: _____ Zip Code: _____

Equipment Start-Up Date: _____ Product Serial Numbers: _____

_____

_____

Contact Information:

Contact Name: _____

Title: _____

Chef, Kitchen Mgr/Facility Mgr/Property Mgr/etc.

Facility Management Company Name (if applicable): _____

Email: _____

Phone Number: _____ Cell Number: _____

Fax completed form to:
Halton Company
Attention: Service Department
Fax: (270) 237-5700

Halton Indoor Climate Systems
Attention: Service Department
Fax: (905) 624-5547

HALTON LIMITED WARRANTY

Halton ("Manufacturer"). Warrants only to its direct purchasers and to no others, that all products manufactured by the Manufacturer shall be free from defect in materials and workmanship for a period of twelve (12) months from the date of the original installation and start-up or eighteen (18) months from date of shipment, whichever occurs first. All products sold but not manufactured by Manufacturer will be warranted for a period of twelve (12) months from date of shipment.

For products manufactured by the Manufacturer we agree to pay any reasonable labor costs necessary to repair or replace, at Manufacturers option, defective parts or materials for a period of twelve (12) months from date of original installation and start-up or eighteen (18) months from date of shipment, whichever occurs first. All labor costs subject hereto shall be performed during standard work hours at straight-time rates.

For products sold but not manufactured by the Manufacturer we agree to pay any reasonable labor costs necessary to repair or replace, at Manufacturers option, defective parts or materials for a period of (90) days from date of original installation and start-up or (12) months from date of shipment, whichever occurs first. All labor costs subject hereto shall be performed during standard work hours at straight time rates.

All warranty claims that include labor requires pre-approval by Halton. Halton, at its discretion, will authorize field warranty work through its own service network or certified third party. No claims for labor charges will be approved for payment if work commences without prior authorization by Halton.

Purchaser shall pay incurred premium labor charge, including overtime, weekends and holidays. Travel time, service charges, miscellaneous tools, material charges, and labor charges resulting from inaccessibility of equipment will not be paid by Manufacturer.

This LIMITED WARRANTY SHALL APPLY ONLY to products that have been installed and maintained in accordance with the installation and Care Instruction Manuals. Purchaser shall be solely responsible for adhering to the instructions and procedures set forth in the said instruction manuals.

This LIMITED WARRANTY SHALL NOT BE APPLICABLE to any damage or defect resulting from fire, flood, freezing or any Act of God, abuse, misuse, accident, neglect or failure to adhere to all instructions set forth in the installation and Care Instruction Manuals. Furthermore, this limited warranty shall not apply to any product that has been altered, unless such alteration has been approved in writing by a duly authorized representative of the manufacturer. In no event shall the manufacturer be liable for any loss, expense, personal injury or consequential damage, of any kind or character, as may result from a defect in material, and/or workmanship, however caused.

EXCEPT AS IS EXPRESSLY SET FORTH IN THIS LIMITED WARRANTY, MANUFACTURER MAKES NO WARRANTY OF MARKETABILITY FOR FITNESS OR ANY PARTICULAR PURPOSE. NEITHER DOES MANUFACTURER MAKE ANY WARRANTY, EXPRESSED OR IMPLIED, WITH RESPECT TO PRODUCTS SOLD BY MANUFACTURER OR AS TO THE USE THEREOF.

Continuous product improvement is a Halton policy, therefore specifications and design are subject to change without notice.

OM-070/052019/rev3/EN

Halton Company
101 Industrial Drive, Scottsville, KY 42164, USA
Phone 270 237 5600 | Fax 270 237 5700
Website: **www.halton.com**

Halton Indoor Climate Systems, Ltd.
1021 Brevik Place, Mississauga, ON L4W 3R7, Canada
Phone 905 624 0301 | Fax 905 624 0301

Halton