

Halton Make-Up Air Solutions

Introducing Halton's line of make-up air units, specifically designed for professional kitchens.





Introducing Halton's line of make-up air units, specifically designed to meet the requirements of professional kitchens. Air quality, balance, and comfort can be rapidly compromised if a correct balance between replacement air and exhaust is not maintained at all times, and in each area of the kitchen. Halton makeup air units provide a high level of air quality inside the kitchen and work hand-in-hand with Halton PolluStop, pollution control units and the Halton SafeGuard airflow optimization system.

Importance of balanced kitchen

In the commercial kitchen, air is exhausted through the hood to remove convective heat and effluent. This exhaust air exits the building, creating a pressure difference between the inside of the building and the outside. Uncontrolled, it will create drafts and wasted energy. Make-up air units return air to the space to maintain space balance in a controlled way. If the building has an equal amounts of air coming into it as it does leaving it, we are balanced.

A commercial kitchen should have slightly less air being supplied to it compared to the other spaces. This ensures air moves into the kitchen from other spaces and keeps odors contained to the food preparation area. If there is a significant difference in the air being removed from the kitchen versus the air coming back in, we can start to have significant issues. In an extreme case, we

can create a backdraft condition for gas appliances, where the gas is pulled into the room and not through the burner or flue. In less extreme cases, the pressure differential pulls air in from the doors and windows and cracks in the building façade - anywhere it can get the replacement air.

Space neutral design philosophy

Halton recommends a space neutral approach to cooling in commercial kitchen spaces. Unlike other occupied spaces where the off coil temperature is 55°-57°F, space neutral off coil temperature of 65°-71°F is recommended. The objective is to eliminate moisture and condensation issues in the kitchen. Other designs, which Halton does not advocate, have off coil temperatures as high as 85°F. While this may save cooling tonnage, it does have the potential to propagate mold and other humidity issues.

MUA

Make Up Air Units

Gas Heating

DG

Direct Gas Fired with Halton FlameCore

IF

Indirect Gas Fired

Cooling

X

DX Cooling

V

Evaporative Cooling

Alternate Heating & Cooling

C

Hydronic

HP

Heat Pump

Heat Recovery Option

H

Heat Recovery

Cooling Only Option

XCO

DX Cooling Only

VCO

Evaporative Cooling Only

Standard Construction Features

CASING

All Halton MUA's are constructed of G90 galvanized steel, which provides excellent weather and corrosion resistance throughout the units life. Powder Coating is also available for aesthetics and additional corrosion resistance.

BURNER MODULE

The Burner Module shall have a 20 ga. G90 galvanized steel exterior shell, 14 ga. G90 galvanized steel base frame, burner supports, and lifting lugs. The module construction shall be suitable for outdoor installation. The Burner Module shall have a direct gas power burner and mixing plate, that allows for unlimited air turn down and requires no additional field commissioning. The module shall include an integral controls cabinet with a factory-installed main electrical power disconnect and an optional factory-mounted exterior weatherproof junction box for main power connection. The module shall include removable access doors with hinges and gasket seals to allow access to the control cabinet and burner.

Option: The Burner Module shall have 1" insulation covered with an interior steel shell.

Option: The Burner Module shall have a motorized intake air damper with leakage rates complying with ASHRAE 90.1.

BURNER

The burner shall be a direct fired power burner with dedicated combustion air fan or indirect-fired modulating or two stage combustion burner constructed of cast aluminum burner sections with stainless steel burner plates and an efficiency of 92% for Direct and 81% for Indirect. The Direct Gas Burner capacity up to 1400 mbh and Indirect Gas Burner capacity up to 1800 mbh with a maximum temperature rise of 110°F. The burner gas train shall have ports for optional factory or field installed gas pressure gauges and/or gas pressure switches.

FAN MODULE

The Fan Module shall have a 20 ga. G90 galvanized steel exterior shell, 14 ga. G90 galvanized steel base frame, blower supports, and lifting lugs. The module construction shall be suitable for outdoor installation. The module shall include at least one removable access door with hinges and gasket seals to allow access to the blower. The module shall have a discharge opening on either the end or bottom of the module.

Option: The module shall include a factory mounted junction box on the bottom exterior for main power connection from the inside of a roof curb.

Option: The Blower Module shall have 1" insulation covered with an interior steel shell.

Standard Construction Features

FAN

The Fan shall be either an EC motor direct drive fan or direct driven backward curved airfoil plenum fan. The Blower shall be AMCA certified, shall be installed on neoprene isolators and shall be powered by a listed or recognized electric ODP or TEFC motor with rolled steel or cast iron construction.

The EC Motor Driven fan shall be provided with a potentiometer to adjust airflow on constant volume applications. For Variable volume applications the EC motor shall be driven by Haltons Supply air algorithm in conjunction with a Demand Controlled Kitchen Ventilation (DCKV) system.

The Fan for a variable airflow unit shall have a pressure port for measuring airflow rate. The blower motor for a variable airflow unit shall be controlled by either a factory installed or externally supplied and installed VFD.

Option: Blower seismic isolators
EC (upto 10HP) or VFD Driven

VIBRATION ISOLATION DETAIL

Halton MUA units are equipped with vibration reducing fan isolators. These isolators separate the motor frame from the unit dampening vibrations and therefore reducing overall fan and vibration induced noise. The isolators are made of high dampening neoprene rubber and come standard on all MUA units.

ACCESS PANELS

Double walled and insulated hinged doors provide easy access to the internal systems of the unit.

CONTROL DETAILS

The unit shall have either a unit mounted means of call for heat and cooling and/or start/stop or connections for a remote mounted call for heat and cooling and/or start/stop. For heating, the unit shall have an RTC Solutions control system to provide automatic control of the Burner to maintain the desired discharge air temperature set by either unit mounted, remote, or space temperature controller means. For cooling, the unit shall have a Halton control system to provide automatic control of the condensing unit compressors to maintain the desired discharge air temperature. Also, the cooling control system shall provide automatic evaporator freeze protection and compressor protection.

Optionally, the unit shall have gas heat freeze stat controls.

Clearance to Combustible Materials

The unit shall be listed to 0 inches of clearance to combustible materials, without Burner and Blower module insulation. 0 inches of clearance to combustible materials on the top and bottom of the Burner and Blower modules and a minimum of 1 inch of clearance to combustible materials on the inlet end of the Burner module and discharge end of the blower module.

Units shall be capable of variable volume control with Halton SafeGuard.

Options and Accessories

INTAKE HOOD

A unit for outdoor installation can be provided with a factory built intake hood constructed of 20 ga. G90 galvanized steel with birdscreen and removeable, washable 2" aluminum mesh filters.

FILTER OPTIONS

The unit is available with an inlet Filter section constructed of 20 ga. G90 galvanized steel with replaceable MERV 8 filters. Higher filtration grades are available upon request.

GRAVITY DAMPER SECTION

The unit shall be provided with a gravity intake damper section constructed of 20 ga. G90 galvanized steel.

ROOF CURB

The unit is available with a factory provided roof curb. The factory provided roof curb is constructed of 18 ga. aluminized steel with optional insulation and/or wood nailer.

INLET DAMPER

Halton MUA units can be equipped with a low leakage rate automatic damper. Less than 3CFM/ft² at 1.0" H₂O. The automated damper closes when the unit is inactive to reduce backdrafts and outside air from leaking through the MUA to the space.

SPECIAL COATING

The Burner module, Blower module, Intake Hood, Filter section, and Gravity Damper section exterior shall be pre-treated and fully powder coated with thermoset polyester paint.

SPEED CONTROL

A VFD or Motor starter can be used to control fan speed. For variable volume units and units used in conjunction with a M.A.R.V.E.L. system a VFD is required to achieve matching turndowns.

MOTOR OPTIONS

Optionally TEFC and Cast Iron frame motors can be used for additional motor protection and durability.

GAS PRESSURE REGULATOR

A gas pressure regulator can be equipped on the MUA unit to ensure proper inlet gas pressure is achieved.

SEISMIC BLOWER ISOLATORS

For areas with potential seismic activity Halton MUA units are optionally equipped with seismic rated vibration reducing fan isolators. These isolators are made of heavy-duty springs that isolate the motor and blower from any external vibrations while also dampening noise from the fan itself.

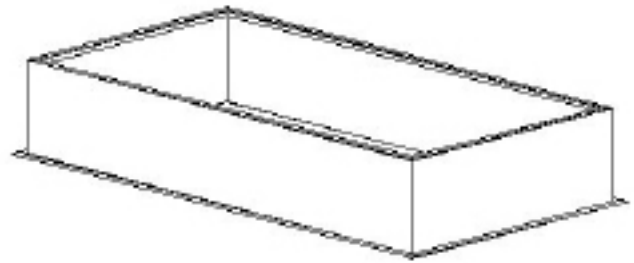
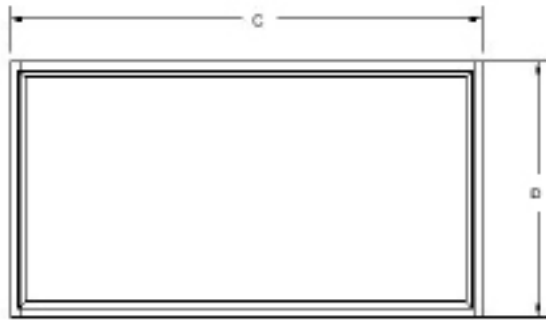
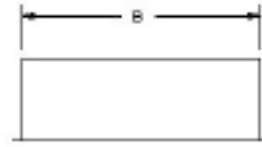
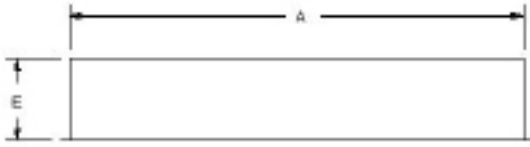
TURN DOWN SECTION (FOR MUA-IF UNITS)

As an option a turn down section shall be provided for down discharge units. The turn down section shall be made of 20ga G90 galvanized steel. A 20ga G90 galvanized collar inside and integral to the cabinet of the turndown section shall be provided to connect to existing ductwork.

Roof Curbs

ROOF CURBS FOR DIRECT AND INDIRECT UNITS

Custom roof curb designs and sizes are available upon request. Please consult factory.



Direct Gas Fired Units (DG) with Halton FlameCore

Halton's line of Direct Gas Fired with Halton's FlameCore make up air units provide superior design flexibility, offering a variety of cooling and heat recovery options. The units are ETL listed to ANSI Z83.4/CSA 3.7 for indoor and outdoor use. The units are available for constant flow or designed to be used with Halton SafeGuard variable flow controls. The burner module is high quality galvanized frame and supports Haltons FlameCore option which allows for unlimited air turndown to pair with DCKV systems . The wide range of capacities and construction make them ideally suited for heating in any climate.

MUA-DG

Direct Gas Fired Only with FlameCore

- DX Cooling Capacities from 1,800 CFM to 13,000 CFM
60335-2-40 Certified for R454b
- Remote Condensers up to 20 tons
- Up to 16000 CFM for Heating Only Units
- Evaporative Cooling
- Hydronic Heating & Cooling
- Heat Recovery Option



Model	Heating Type	Cooling Type	Heat Reclaim Option
MUA-DG	Direct Gas Fired Only		YES (DGH)
MUA-DGX	Direct Gas Fired	DX	YES (DGXH)
MUA-DGV	Direct Gas Fired	Evaporative	YES (DGVH)
MUA-DGC	Direct Gas Fired	Hydronic Heating & Cooling	

Performance Data

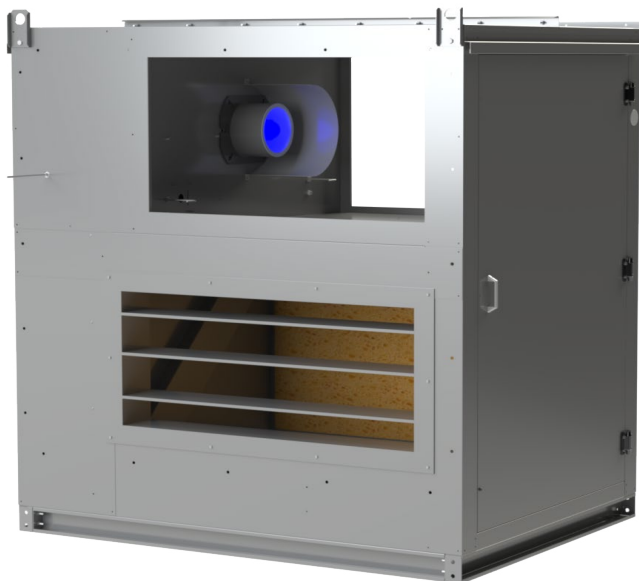
Model	Airflow Ranges (CFM)	Max. Temp. Rise	Max. Heat Input (Btu/hr)	Voltage				HP	
MUA-DG-3000	Up to 3,000	110	356,400	115,208, 230	/	1	/	60	0.25 - 15
MUA-DG-5000	Up to 5,000		594,400						
MUA-DG-8000	Up to 8,000		950,400						
MUA-DG-13000	Up to 13,000	97	1,364,800	208,230 460,575	/	3	/	60	
MUA-DG-16000	Up to 16,000	79	1,364,800						

Halton FlameCore - Direct Fired Power Burner

Reliable and Efficient Solution for Heating Make-Up Air

The Halton FlameCore is designed to simplify commissioning and maximize operational performance in commercial kitchen ventilation.

- **No Profile Plate Adjustments Required:** The system's static architecture eliminates the need for manual calibration, streamlining setup and reducing installation time.
- **Fully Static Design:** With no moving components such as dampers or profile plates, FlameCore minimizes mechanical failure points and lowers long-term maintenance demands.
- **Beyond Traditional DCKV Limitations:** Unlike conventional demand-controlled kitchen ventilation systems constrained by a 50% turndown ratio, Halton's FlameCore enables full-range modulation—unlocking greater energy savings and improved thermal performance.



The Halton FlameCore integrates seamlessly with Halton's control platform, offering mechanical engineers a robust, low-maintenance solution that delivers consistent results across diverse operating conditions.

Features

- Direct Drive, Plenum Fan
- Rolled Steel, ODP Blower motor
- EC Fan
- Motorized intake damper
- Unit Mounted Discharge Temp. Controls
- Remote Start/Stop
- Constant volume
- Unit mounted Non-Fused Disconnect
- Neoprene Fan Isolators
- End or Bottom discharge
- 1" Insulation, double wall
- Heavy Duty Hinged Doors
- G90 Galvanized, unpainted

Options Available

- TEFC Blower Motor (Rolled Steel or Cast Iron)
- Intake Hood w/ 2" Alum. Mesh Filters & Bird Screen
- MERV 8 Dust Filters
- Gravity Intake Damper
- Remote DAT (Discharge Air Temp.)
- Freeze Stat
- Variable Volume (Halton provides VFD)
- Seismic Blower Isolators
- Roof Curb (Optional Insulation & Nailer)
- Uninsulated
- Gas Pressure Gauges
- High and Low Gas Pressure Switches
- Gas Regulator (Field Installed)
- Special Coating
- 30% Air Turndown
- Pair with Halton's SafeGuard System for remote monitoring

Temperature Control



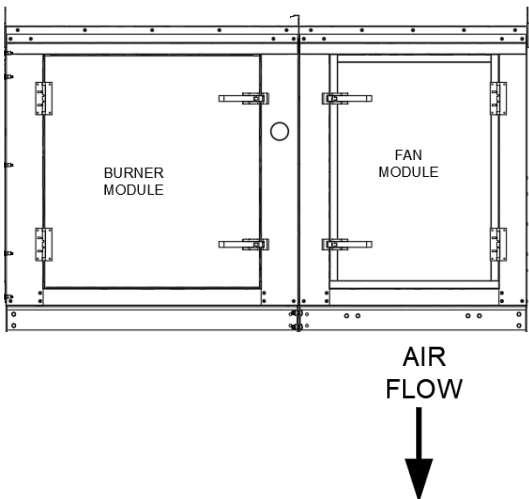
UNITOUCH TOUCH SCREEN CONTROLLER

Used to control DAT on Direct and Indirect Fired MUA, as well to control Cooling (DX / Evaporative Cooling) setpoints as well. All in one module, controls heating, cooling, as well as heat reclaim functionality and utilizes Halton controls platform for more effective heating and cooling control. Can be unit mount or remote mounted.

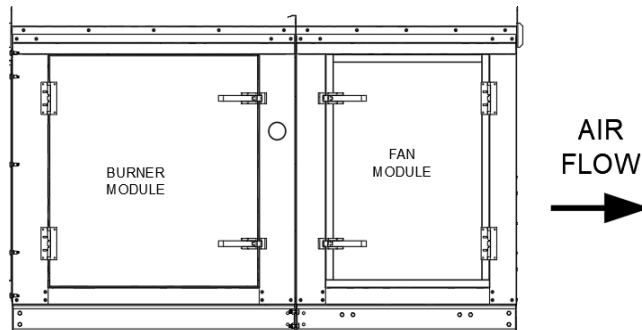
Discharge Options

Direct Fired Units are available with down or horizontal discharge.

DOWN DISCHARGE

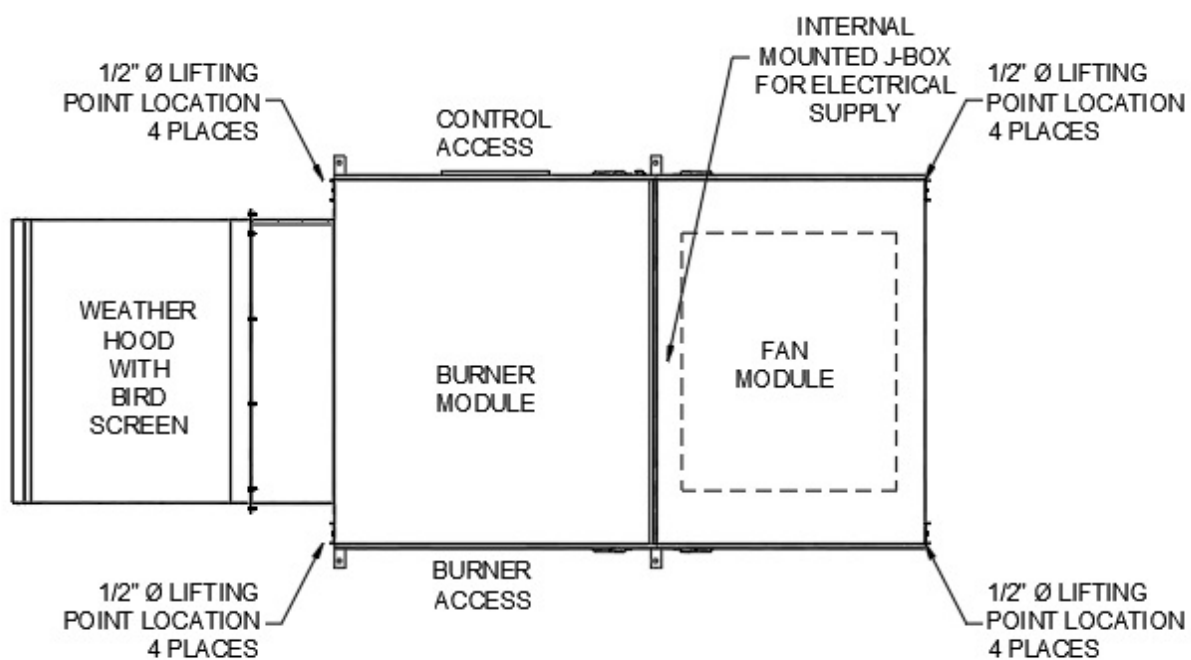
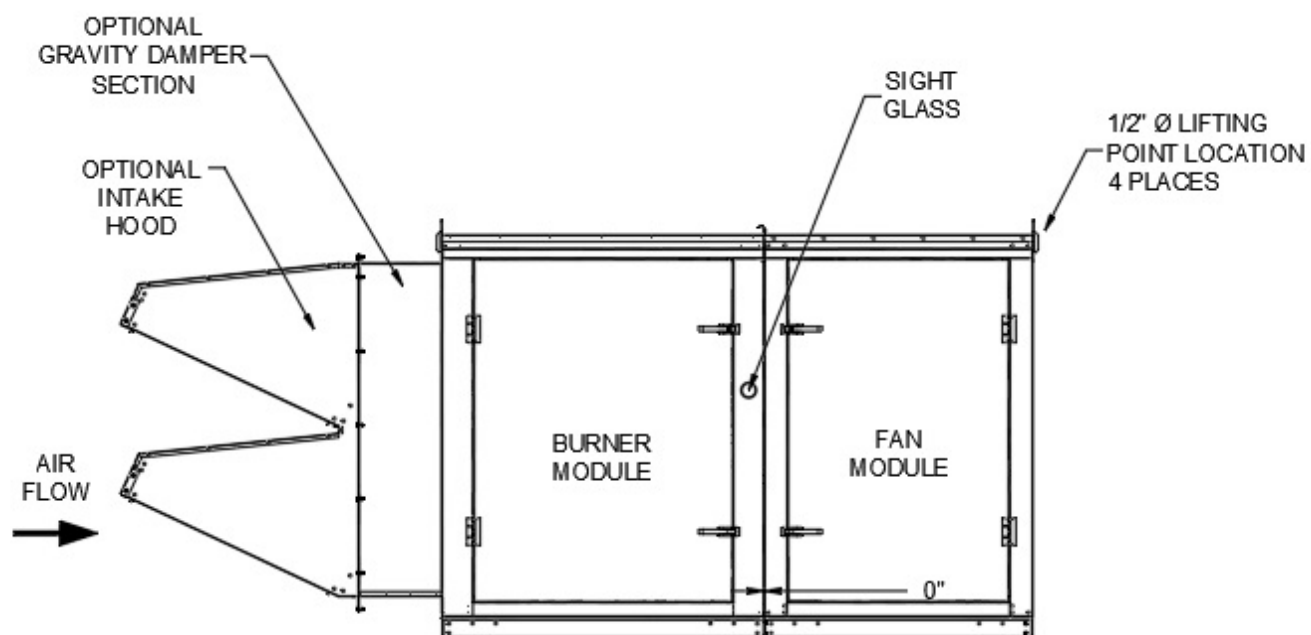


HORIZONTAL DISCHARGE

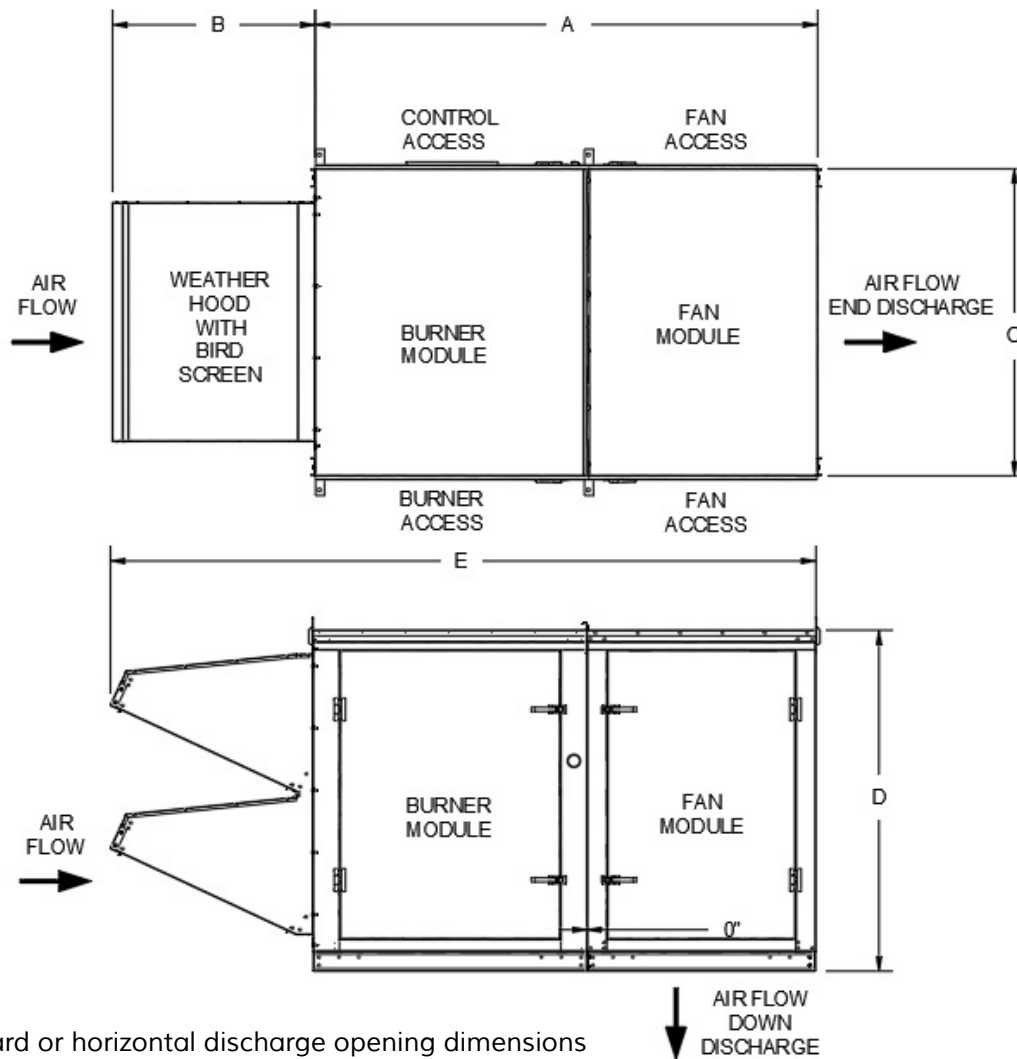


Components - MUA-DG

HEAT ONLY UNIT COMPONENTS



Dimension - MUA-DG



Note: Downward or horizontal discharge opening dimensions will depend on the fan type and size selected. Please refer to the job-specific submittal drawings for these dimensions.

Model	(A)		(B)		(C)		(D)		(E)		Length of Optional MERV 8 ² indoor filter module		Weights*
	Length		Intake Hood Length		Width		Height		Overall Length				
	Inch	mm	Inch	mm	Inch	mm	Inch	mm	Inch	mm	Inch	mm	lbs / kg
MUA-DG-3000	66.50	1689.1	24.25	616.95	34	864	50	1270	90.75	2305.05	31.25	793.75	838 / 380
MUA-DG-5000	76.50	1943.1	35.10	891.54	39	991	60	1524	111.60	2834.64	27.25	692.15	982 / 445
MUA-DG-8000	88.50	2247.9	37.65	956.31	54	1372	60	1524	126.15	3204.21	28.25	717.55	1422 / 645
MUA-DG-13000	105.50	2679.7	45.00	1143	58	1473	75	1905	150.50	3822.70	30.25	768.35	2048 / 929
MUA-DG-16000	114.50	2908.3	49.30	1252.22	58	1473	75	1905	163.80	4160.52	31.25	793.75	2338 / 1061

Weights and Dimensions are subject to change, please consult factory.

²MERV 8 filter module for indoor units only. MERV 8 filters installed in intake hood on outdoor units.

* Actual weights and length could change based upon specific unit selection - please refer to submittal drawing. Optional HRU is not included in the above dimensions and weights, please consult factory.

Indirect Gas Fired Units (IF)

Halton's line of Indirect Gas Fired make up air units provide superior design flexibility, offering a variety of cooling and heat recovery options. The units are ETL listed to ANSI Z83.8/CSA 2.6 for indoor and outdoor use. The units are available for constant flow or designed to be used with Halton SafeGuard variable flow controls. The burner module is high quality galvanized frame and supports. The wide range of capacities and construction, make them ideally suited for heating in any climate.

MUA-IF Indirect Gas Fired

- DX Cooling Capacities from 1,800 CFM to 13,000 CFM
60335-2-40 Certified for R454b
- Remote Condensing Units up from 6 to 25 tons
- Evaporative Cooling
- Hydronic Heating & Cooling
- Heat Recovery Option



Model	Heating Type	Cooling Type	Heat Reclaim Option
MUA-IF	Indirect Gas Only		YES (IFH)
MUA-IFX	Indirect Gas	DX	YES (IFXH)
MUA-IFV	Indirect Gas	Evaporative	YES (IFVH)
MUA-IFC	Indirect Gas	Hydronic Heating & Cooling	YES (IFC)

Performance Data

Model	Airflow Ranges (CFM)	Max. Temp. Rise	Max. Heat Input (Btu/hr)	Voltage				HP	
MUA-IF-1800	Up to 1,800	100	250,000	115,208, 230	/	1	/	60	0.5-20HP
MUA-IF-2800	Up to 2,800		425,000						
MUA-IF-4600	Up to 4,600		625,000						
MUA-IF-8500	Up to 8,500		1,200,000	208,230 460,575	/	3	/	60	
MUA-IF-12600	Up to 12,600		1,800,000						

Features

- EC Fan
- Rolled Steel, ODP Blower motor
- Motorized intake damper
- Unit Mounted Halton Discharge Air Temp. Controls
- Unit Mounted Call for Heat
- Remote Start/Stop
- Constant volume
- Unit mounted Non-Fused Disconnect
- Neoprene Fan Isolators
- End or Bottom discharge
- 1" Insulation, double wall
- G90 Galvanized, unpainted
- Heavy Duty Hinged Doors
- 10:1 Gas Turn Down

Options Available

- Direct Drive, Plenum Fan
- TEFC Blower Motor (Rolled Steel or Cast Iron)
- Intake Hood w/ 2" Alum. Mesh Filters & Bird Screen
- MERV 8 Dust Filters
- Remote DAT (Discharge Air Temp.)
- Freeze Stat
- Variable Volume (Halton provides VFD)
- Heat Recovery (HRU) Module
- Up to 30:1 Gas Turn Down
- Air Turn Down up to 30:1
- Seismic Blower Isolators
- Roof Curb (Optional Insulation & Nailer)
- Gas Regulator (Field Installed)
- Special Coil Coating
- Pair with Halton's SafeGuard System for remote monitoring

Temperature Control



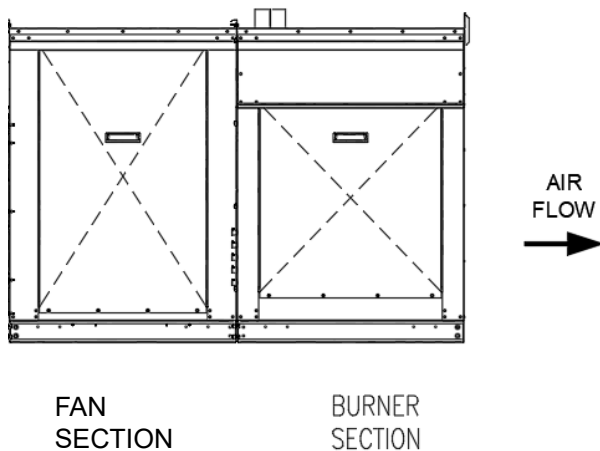
UNITOUCH TOUCH SCREEN CONTROLLER

Used to control DAT on Indirect Fired MUA, as well to control Cooling (DX / Evaporative Cooling) setpoints as well. All in one module, controls heating, cooling, as well as heat reclaim functionality and utilizes Halton controls platform for more effective heating and cooling control. Can be unit mount or remote mounted.

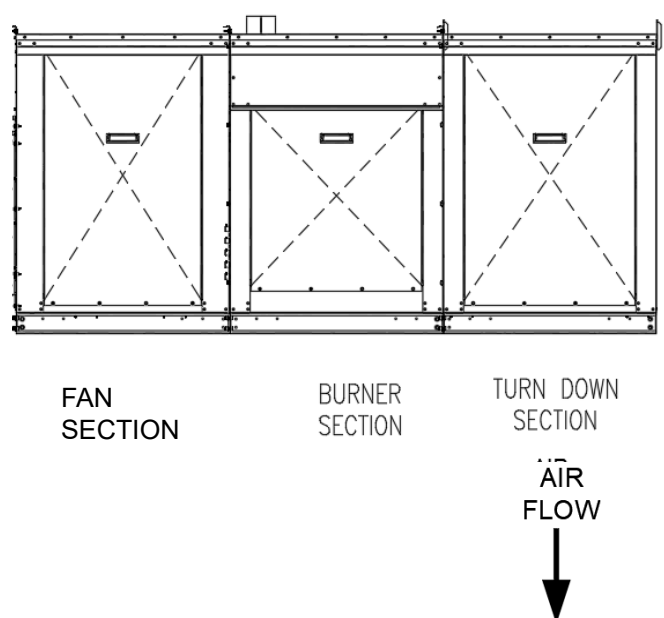
Discharge Options

Indirect Fired Units are available with down or horizontal discharge.

HORIZONTAL DISCHARGE

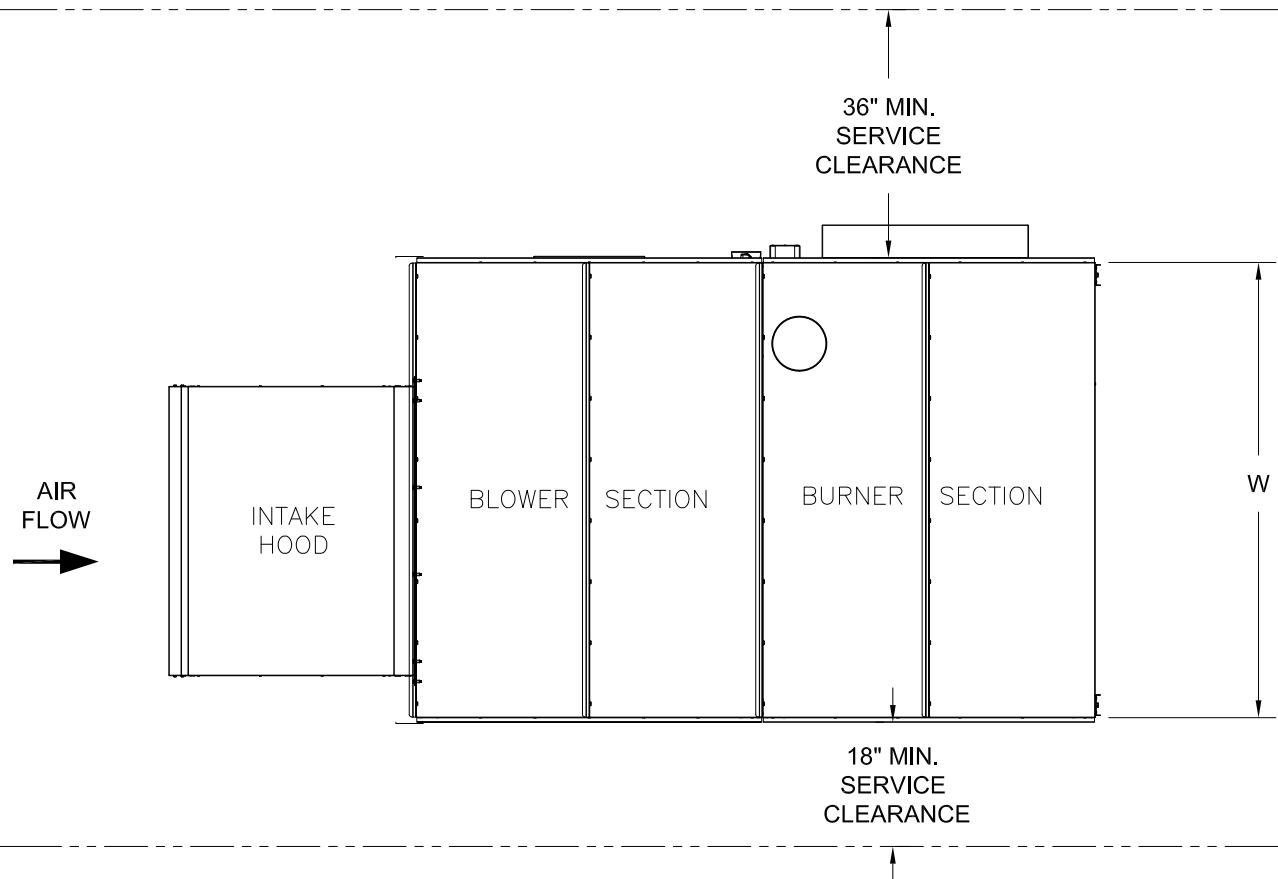
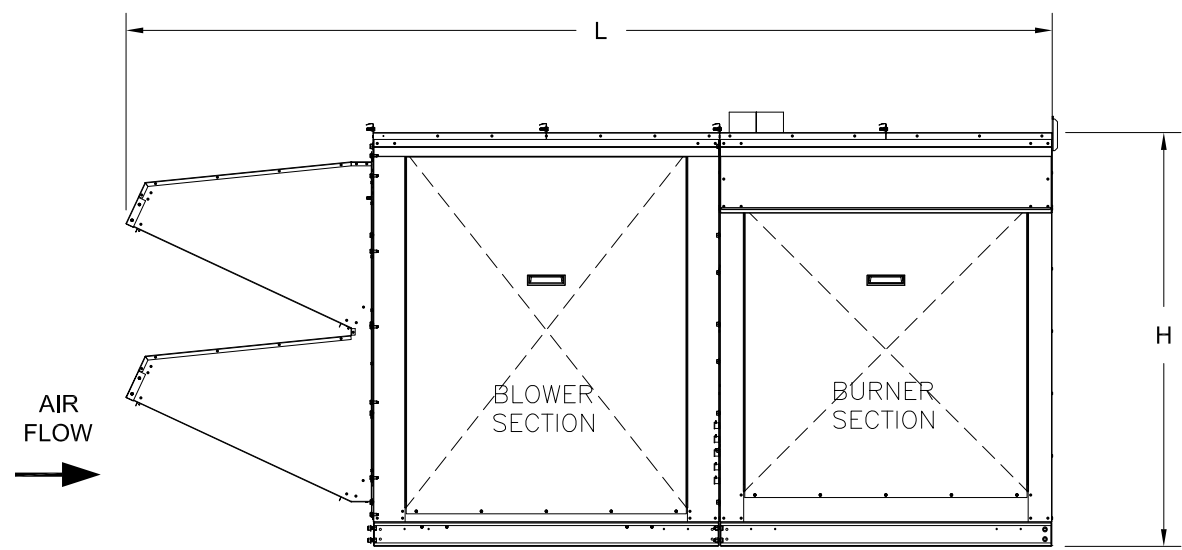


DOWN DISCHARGE

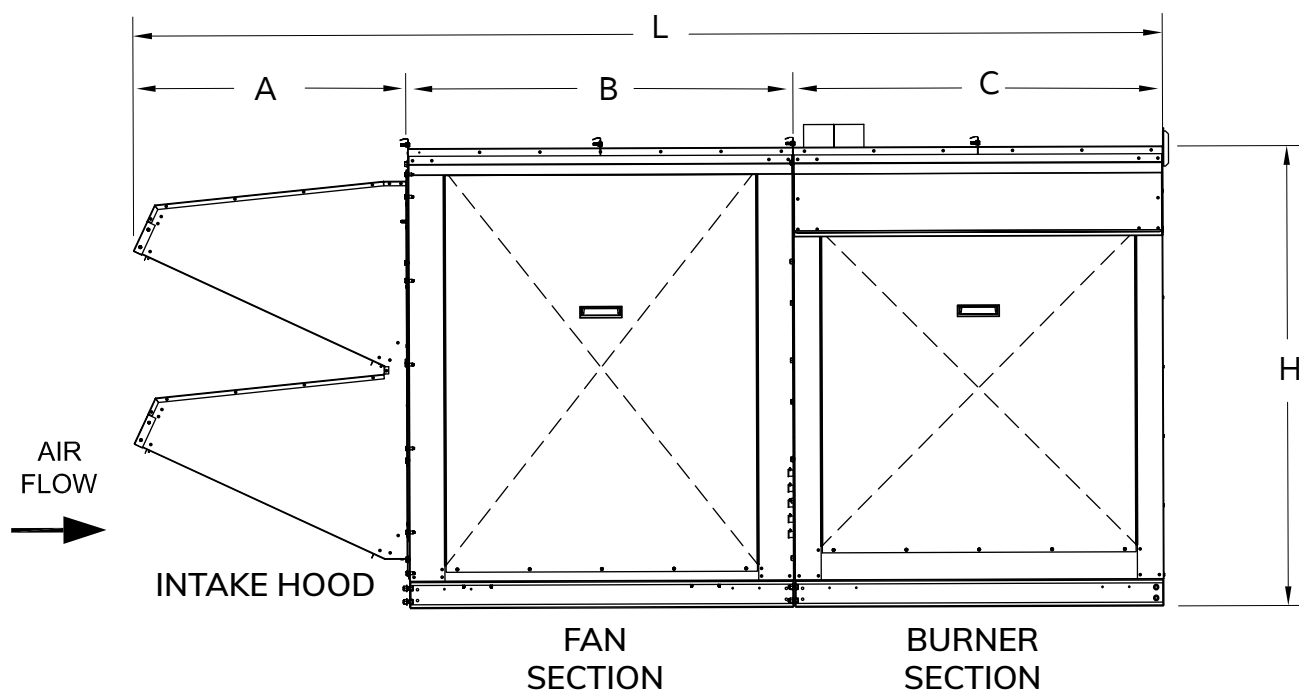


Components for MUA-IF

MUA-IF HEAT ONLY UNIT COMPONENTS



Dimensions of MUA-IF



	Intake Hood (A)		Fan (B) Direct Drive		Burner (C)		Turn Down*	
	Inch	mm	Inch	mm	Inch	mm	Inch	mm
MUA-IF-1800-100M	24.82	630.43	36.25	920.75	36.25	920.75	36.25	920.75
MUA-IF-1800-175M	24.82	630.43	36.25	920.75	36.25	920.75	36.25	920.75
MUA-IF-1800-250M	24.82	630.43	36.25	920.75	36.25	920.75	36.25	920.75
MUA-IF-2800-250M	24.25	615.95	38.25	971.55	36.25	920.75	36.25	920.75
MUA-IF-2800-175M	24.25	615.95	38.25	971.55	36.25	920.75	36.25	920.75
MUA-IF-2800-250M-175S	24.25	615.95	38.25	971.55	36.25	920.75	36.25	920.75
MUA-IF-4600-375M-250S	35.10	891.54	42.25	1073.15	36.25	920.75	36.25	920.75
MUA-IF-4600-375M	35.10	891.54	42.25	1073.15	36.25	920.75	36.25	920.75
MUA-IF-4600-250M	35.10	891.54	42.25	1073.15	36.25	920.75	36.25	920.75
MUA-IF-8500-600M-600S	37.65	956.31	50.25	1276.35	48.25	1225.55	36.25	920.75
MUA-IF-8500-600M	37.65	956.31	50.25	1276.35	48.25	1225.55	36.25	920.75
MUA-IF-12600-600M-600S-600s	45.00	1143.00	52.25	1327.15	48.25	1225.55	36.25	920.75
MUA-IF-12600-600M-600S	45.00	1143.00	52.25	1327.15	48.25	1225.55	36.25	920.75
MUA-IF-12600-600M	45.00	1143.00	52.25	1327.15	48.25	1225.55	36.25	920.75

Weights and Dimensions are subject to change, please consult factory.

* Turn down required for down discharge

Dimensions of MUA-IF

	Width (W)		Height (H)		*Length (L) Heat Only	
	Inch	mm	Inch	mm	Inch	mm
MUA-IF-1800-100M	44	1118	50	1270	72.5	1841.5
MUA-IF-1800-175M	44	1118	50	1270	72.5	1841.5
MUA-IF-1800-250M	44	1118	50	1270	72.5	1841.5
MUA-IF-2800-250M	44	1118	50	1270	74.5	1892.3
MUA-IF-2800-175M	44	1118	50	1270	74.5	1892.3
MUA-IF-2800-250M-175S	44	1118	50	1270	74.5	1892.3
MUA-IF-4600-375M-250S	44	1118	60	1524	78.5	1993.9
MUA-IF-4600-375M	44	1118	60	1524	78.5	1993.9
MUA-IF-4600-250M	44	1118	60	1524	78.5	1993.9
MUA-IF-8500-600M-600S	66	1676	60	1524	98.5	2501.9
MUA-IF-8500-600M	66	1676	60	1524	98.5	2501.9
MUA-IF-12600-600M-600S-600s	66	1676	75	1905	100.5	2552.7
MUA-IF-12600-600M-600S	66	1676	75	1905	100.5	2552.7
MUA-IF-12600-600M	66	1676	75	1905	100.5	2552.7

Weights and Dimensions are subject to change, please consult factory.

* Actual weights and length could change based upon specific unit selection - please refer to submittal drawing.

Additional Heating & Cooling Options

X - DX Cooling

V - Evaporative Cooling

C - Hydronic Heating & Cooling

H - Heat Recovery

and Cooling Units Only

XCO - DX Cooling Only

VCO - Evaporative Cooling Only

DX Cooling (X) or (XCO)

DX cooling and heat pump units now utilize low GWP refrigerant R454B. All DX cooling and HP units meet 60335-2-40 with Refrigerant leak detection and leak mitigation systems.

Consult Halton for more details on the transition to the new refrigerant.



CONSTRUCTION

The DX Cooling Module shall have a 20 ga. G90 galvanized steel exterior shell, 14 ga. G90 galvanized steel base and stainless steel DX cooling coil supports. The module shall have 1" insulation covered with an interior steel shell. The module construction shall be suitable for outdoor installation. The module shall have an integral stainless steel drain pan constructed to meet ASHRAE 62.1 and an external stainless steel condensate drain

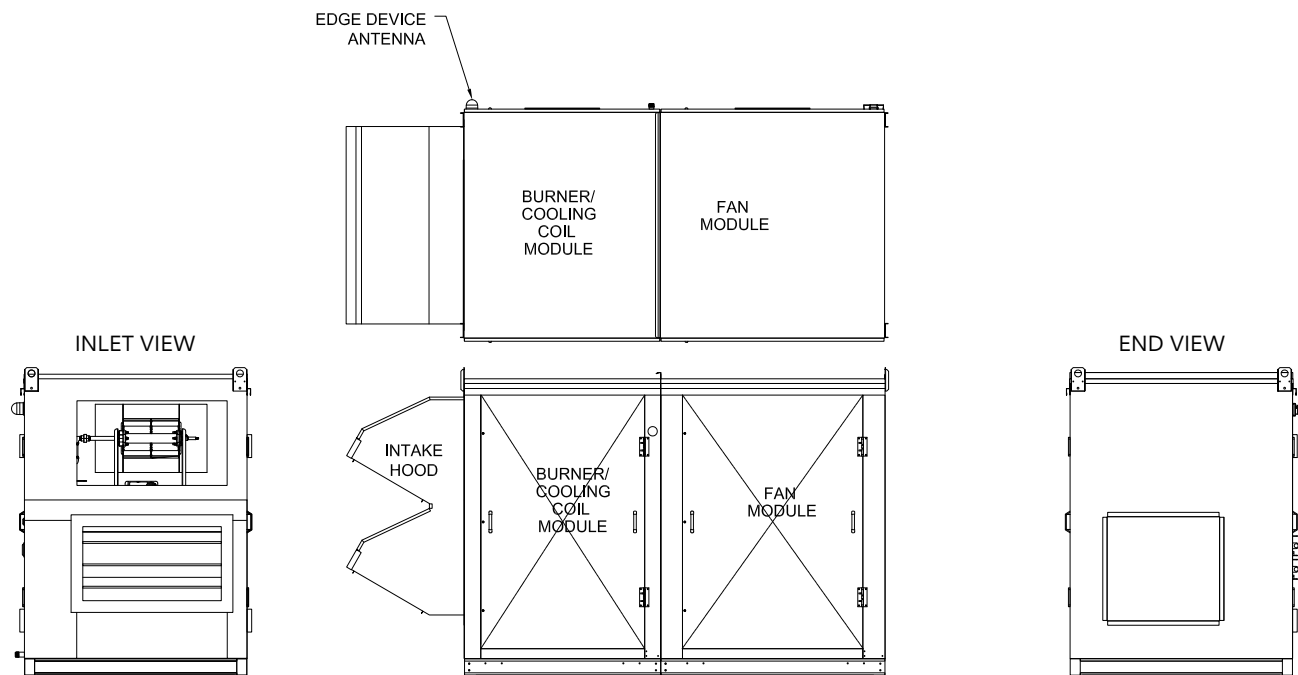
connection. For units specified as a remote split system, the DX Cooling Module shall have grommets openings for field installed refrigerant piping. The module shall include insulated, removable access doors with hinges and gasket seals to allow access for field installation of refrigerant piping and service and maintenance of the DX cooling coil and refrigeration system components.

TECHNICAL SPECIFICATION

Unit Size	Voltages	Cooling Stages	Net Weight (lbs.)	Width		Height		Length	
				inch	mm	inch	mm	inch	mm
6	208/230V, 460/480V, 575V	2	318	39.88	1012.83	48.75	1238.25	48.38	1228.73
7.5		2	364	39.88	1012.83	48.75	1238.25	48.38	1228.73
10		2 or 7	472	60.13	1527.18	48.75	1238.25	43.63	1108.08
12.5		2	554	60.13	1527.18	48.75	1238.25	43.63	1108.08
15		2	794	60.13	1527.18	48.75	1238.25	88.75	2254.25
20		2 or 7	851	60.13	1527.18	48.75	1238.25	88.75	2254.25
25		2	853	46	1168.40	50.75	1289.05	93.25	2368.55

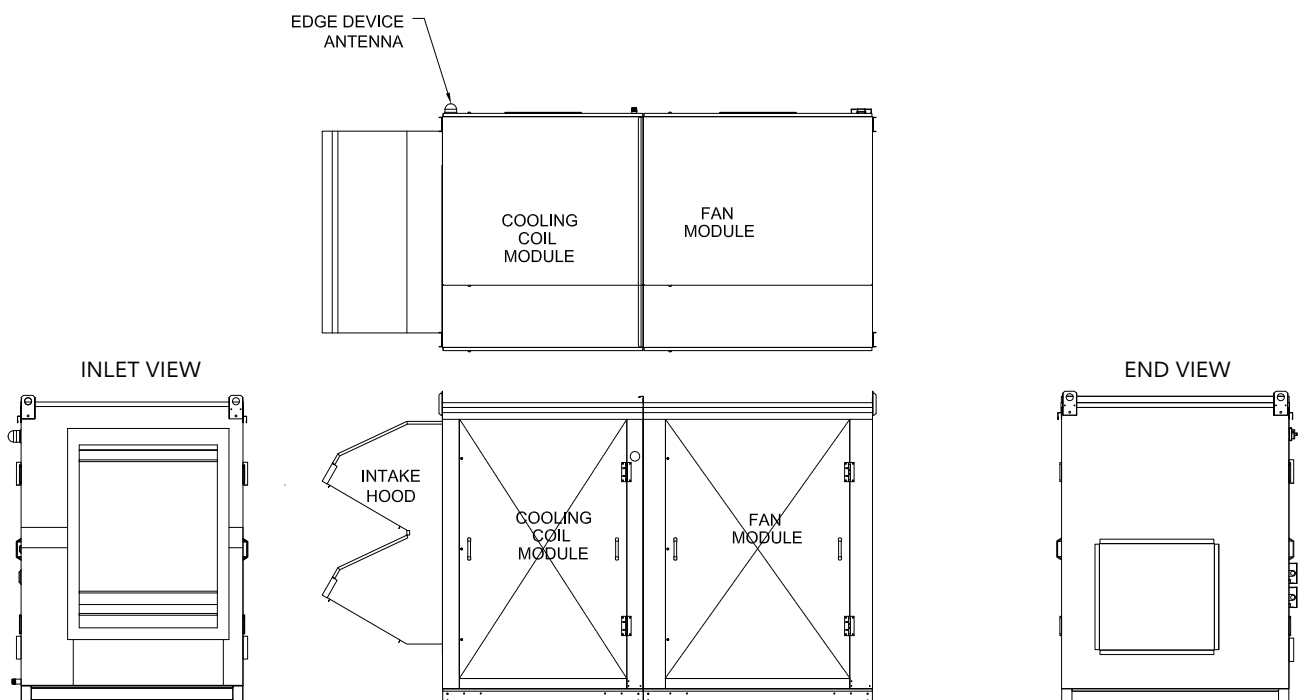
Components for MUA-DGX

MUA-DGX REMOTE CONDENSER UNIT COMPONENTS & MUA-IFX REMOTE CONDENSER UNIT COMPONENTS



Components for MUA-IFX

MUA-XCO REMOTE CONDENSER UNIT COMPONENTS



Evaporative Cooling

(V) or (VCO)

The Evaporative cooling section is an optional module of the make-up air system. It provides an alternative means of air-cooling to refrigerant based systems and can be employed to various climates. The system is designed and configured for direct evaporative cooling.

Direct evaporative cooling is most cost-effective for hot and dry climates. Typically, the system is limited to climates with outdoor wet bulb temperature equals 78 degF or lower. The evaporative section provides cooling adiabatically by evaporating water directly in the airstream lowering the air dry-bulb temperature and increasing the moisture content of air. The cooling effectiveness is determined by a ratio of temperature drop of air dry-bulb temperature to the maximum cooling equals to the difference between the dry- and wet-bulb temperatures of the air. At steady state the temperature of the water reaches the temperature of the entering air wet-bulb temperature.



CONSTRUCTION

The module construction is liquid-tight and houses the media, pre-piped plumbing for field connection, circulating pump, float valve, and may incorporate metering and monitoring devices. The external housing of the evaporative system can be either single or insulated double-wall construction. The pre-piped plumbing network is terminated on the outside of the module that facilitates field connection for water supply and drainage with solenoid valves control.

WATER SUPPLY

The water supply is controlled by normally closed solenoid valve that becomes energized when a signal is received from the controller calling for makeup fresh water to maintain sump level. The water level in the sump is maintained via a signal from an electronic level switch. Water is circulated by a sump pump through a spray manifold that keeps the evaporative pads saturated. The spray is engaged on-demand by either the room thermostat or the discharge temperature setpoints.

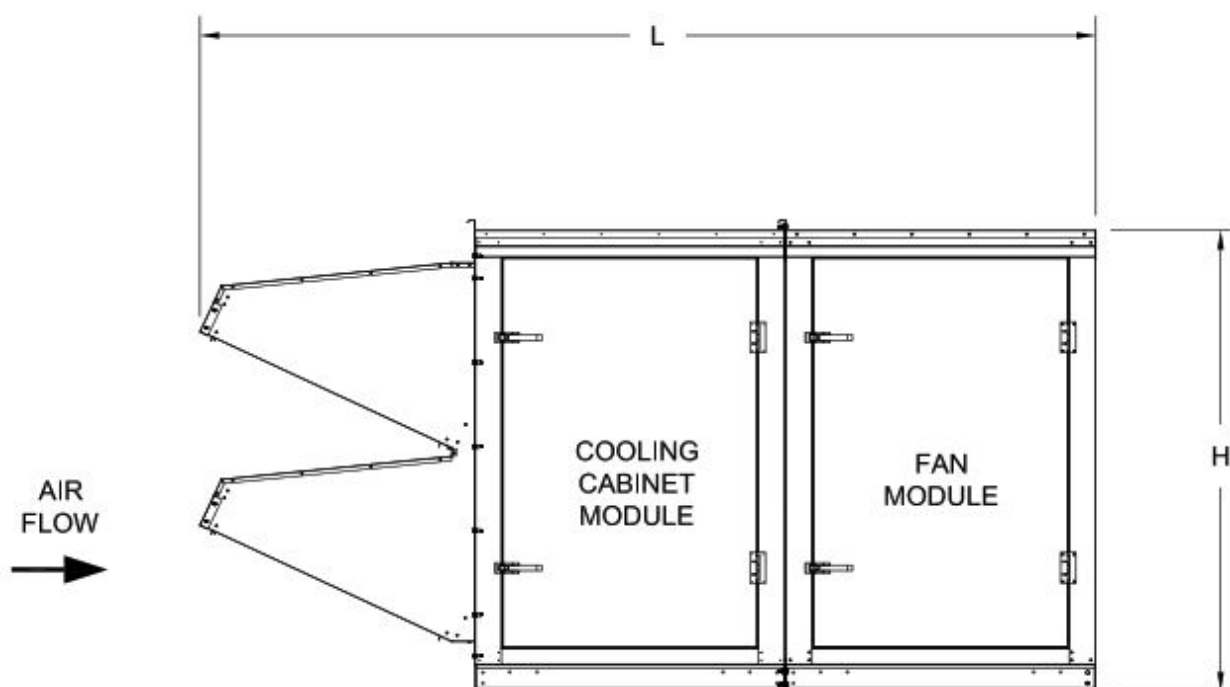
The water supply and drainage are controlled by a PLC controller that energizes the solenoid valves and circulating pump and executes a ladder logic algorithm based on cooling demand and acceptable humidity level. At startup and during operation, the PLC controller performs continuous system checks for safety in operation while protecting the pads and plumbing from icing/freezing conditions and safeguarding the pump.

Evaporative Cooling (V) or (VCO)

TECHNICAL SPECIFICATIONS

Cabinet Size	Length		Spray, gph	Min Req'd pump head, ft
	inch	mm		
1800	40.25	1022.35	181	10.36
2800	40.25	1022.35	228	11.24
4600	40.25	1022.35	276	13.20
8500	40.25	1022.35	418	17.57
12600	40.25	1022.35	456	20.48

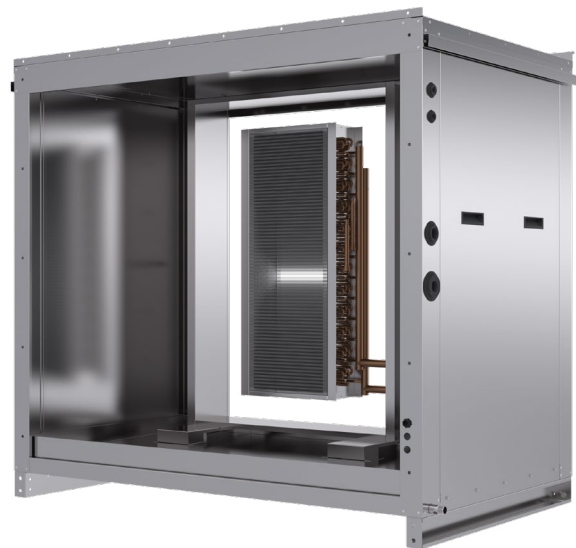
Components for Evaporative Cooling Only (VCO)



Hydronic Heating & Cooling (C)

Hydronic heating and cooling modules are available for all configurations of Halton MUA units. The hot and chilled water modules use existing building water systems such a boiler, chiller or energy recovery device to transfer heat to or from the Make-up air stream. Hydronic heating and cooling can be used as a primary heating or cooling source. It can also be used to supplement gas heat, dx cooling or heat pump systems.

Controls can be configured to suit many configurations. The Halton MUA unit can provide BMS data to control external valves, pumps or solenoids. Optionally the unit can provide pump speed references for demand based hydronic heating or cooling as well as I/O for various load management and freeze protection methods.



CONSTRUCTION

The module contains a coil, drain pan and optional coil bypass for freeze protection. The hot and chilled water coils are constructed with copper tubing, aluminum fins and galvanized steel frame. Both modules have threaded NPT headers for ease of installation into any existing water loop system. The 304 stainless steel drain pan collects any water carryover and lets it drain outside of the unit via a p-trap.

TECHNICAL SPECIFICATION

CHILLED WATER

Max Airflow	Standard Dry Weight (lbs)	Standard Filled Weight (lbs)	Total Cooling (MBH)	Standard Water Pressure Drop (ft of H2O)	Standard Air Pressure Drop (inH2O)	Supply and Return Connection Size (MPT)
1800	89	113	73.4	1.7	2.21	2
2800	115	151	111	2	2.17	2
4600	178	237	152	1.5	1.45	2
8500	305	418	267	2.1	1.3	2
12600	466	643	256.1	2	1.52	2

*Based on Entering 95F DB/74F WB Air, 45F 20% Water/PG @ 20GPM

Hydronic Heating & Cooling (C)

TECHNICAL SPECIFICATION

HOT WATER

Max Airflow	Max Dry Weight (lbs)	Max Filled Weight (lbs)	Max Heat Output (MBH)	Max Water Pressure Drop (ft of H2O)	Max Air Pressure Drop (inH2O)	Supply and Return Connection Size (MPT)
1800	89	112	198	1.2	1.6	2
2800	115	150	301	1.5	1.58	2
4600	178	235	461	1.1	1.45	2
8500	305	416	737	1.5	1.49	2
12600	466	640	901	1.1	1.48	2

*Based on Entering 55F DB Air, 180F 20% Water/PG @ 20GPM

Dimensions - Hydronic Heating & Cooling (C)

Max Airflow	Length		Max Coil Height		Max Coil Width		Max Coil Depth	
	inch	mm	inch	mm	inch	mm	inch	mm
1800	40.25	1022.35	37	939.8	9	228.6	12	304.8
2800	40.25	1022.35	37.5	952.5	14	355.6	12	304.8
4600	40.25	1022.35	48	1219.2	19	482.6	12	304.8
8500	40.25	1022.35	48	1219.2	34	863.6	12	304.8
12600	40.25	1022.35	63	1600.2	38	965.2	12	304.8

Heat Recovery (H)

The heat recovery section is an optional module of the make-up air system (MUA). It is used to pre-heat make up air using a water coil.

Heat Recovery Units (HRU) utilize Halton PolluStop (PST) pollution control units to recover heat from the exhaust airstream and transfer it to the cooler air in the MUA unit. It can do this through a water coil in both PST and MUA units. The coil in the PST collects heat from the exhaust air and a pump in the MUA unit pumps that warmer water over to the coil in the MUA unit where it then rejects the heat into the MUA airstream.



Pair	PST Size	MUA Size	Max. MUA Coil CFM	Max. MUA Coil Dry Weight (lb.)	Max. MUA Coil Filled Weight (lb.)	90.1 Coil Air Pressure Drop @ Max. CFM*	Standard Coil Air Pressure Drop @ Max. CFM**
1	3000	2800	2800	152	196	1.03	0.65
N/A	4000	2800	N/A	N/A	N/A	N/A	N/A
2	4000	4600	3600	219	289	0.48	0.36
3	5000	4600	4600	219	289	0.94	0.65
N/A	6000	4600	N/A	N/A	N/A	N/A	N/A
4	6000	8500	5400	297	390	0.32	0.25
5	8000	8500	7200	362	490	0.54	0.4
6	10000	8500	8500	362	490	0.77	0.57
7	10000	12600	9000	441	588	0.67	0.5
8	12000	12600	10800	441	588	1.04	0.83

* - Coil pressure drop shown based on winter design condition of -15°F



Make Up Air Units Model Numbers

Direct Gas-Fired Units with Halton FlameCore

Model	Heating Type	Cooling Type	Heat Reclaim Option
MUA-DG	Direct Gas Fired Only		YES (DGH)
MUA-DGX	Direct Gas Fired	DX	YES (DGXH)
MUA-DGV	Direct Gas Fired	Evaporative	YES (DGVH)
MUA-DGC	Direct Gas Fired	Hydronic Heating & Cooling	YES (DGC)

Indirect Gas-Fired Units

Model	Heating Type	Cooling Type	Heat Reclaim Option
MUA-IF	Indirect Gas Only		YES (IFH)
MUA-IFX	Indirect Gas	DX	YES (IFXH)
MUA-IFV	Indirect Gas	Evaporative	YES (IFVH)
MUA-IFC	Indirect Gas	Hydronic Heating & Cooling	YES (IFC)

DX Cooling Only

Model	Heating Type	Cooling Type
MUA-XCO	None	DX

Evaporative Cooling Only

Model	Heating Type	Cooling Type
MUA-VCO	None	Evaporative

ABOUT US

Halton Group is the global technology leader in indoor air solutions for demanding spaces. The company develops and provides solutions for commercial and public premises, healthcare institutions and laboratories, professional kitchens and restaurants as well as energy production environments and marine vessels. Halton's mission is to provide its end-users with safe, comfortable, and productive indoor environments that are energy-efficient and comply with sustainable principles.

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