price | MECHANICAL

AW-D

Direct Fired Units

Typical Applications

The Price AW-D series provides continuous superior control for maintaining space temperature and highest quality for demanding ventilation applications. The 30:1 turndown will save energy, improve space control, and increase product life for make-up air applications in the commercial and industrial space. The custom flexibility makes the AW-D the perfect solution for replacing aged equipment by fitting directly on existing curbs and ducts.

CONFIGURATION OPTIONS

- **Output range(MBH): 20 – 12,000 MBH**
- **Airflow Range (CFM): 1,000 – 100,000**
- **Turn down: 30:1**
- **Minimum Thermal Efficiency: 92%**

Product Highlights

Gas Fired Make-up air units have become one of the most crucial elements in the design of modern projects. With growing environmental awareness and increasing requirements of the authorities, industry demands the highest comfort with minimum environmental impact possible from HVAC manufacturers.

Price Mechanical's AW-D Series for Direct Fired Gas Make-up air Units are a customized design of the highest standards of quality, safety and sustainability. With Price's deep knowledge & market centric approach, Price Mechanical is committed to provide energy efficient and superior quality products.

There is a huge requirement from the contractors for ready-to-connect customized makeup air systems in the industry to reduce construction times. Our automated production processes and design flexibility allows us to meet short delivery times.

The AW-D Series are well engineered to cut back the initial investment, running costs and maintenance, thereby increasing the total life cycle value of the product.

Make-up air is generally required to replace air exhausted from the building, balance building pressurization and/or to maintain acceptable indoor air quality (IAQ). In many cases all three requirements can be met by a ventilation unit:

- Replacement
- Waste-water treatment plants
- Condominiums & hotels
- Transportation & garages
- Restaurant & kitchens
- Warehousing
- Manufacturing Process
- Paint shops

Unit Type

Direct fired units heat large spaces by burning natural gas or propane directly in the airstream. This method eliminates the heat exchanger and increases the thermal efficiency of the heat transfer. Price Mechanical AW-D units have evolved with the use of ultra-efficient burners allowing a better control over discharge temperature. These systems achieve 100% combustion efficiency and a 92% overall thermal efficiency (8% of the total heat goes into the latent heat of water formed by combustion).

In typical make-up air applications like kitchens and paint booths, large quantities of fresh air is balanced with exhaust airflow.

Price units are designed, tested and CSA certified in accordance with ANSI Z83.4 / CSA3.7, which require levels of combustion products generated by the heater as follows:

- CO shall not exceed 5.0 ppm
- NO_2 less than 0.5 ppm,
- CO_2 less than 4000 ppm

Airflow

The first step in the design process is to establish the required make-up airflow rate (cfm).

- The exhaust airflow rate is established by adding up the exhaust airflow rates from all exhaust fans located within the design space. These can include bathroom exhaust, kitchen exhaust, laundry exhaust, etc.
- Building pressurization is desirable to minimize infiltration that can lead to poor occupant comfort and IAQ issues. Building pressurization calculations can be complex and are best left to the design engineer.
- Providing ventilation air to maintain acceptable indoor air quality is typically based on ASHRAE Standard 62 for commercial spaces.

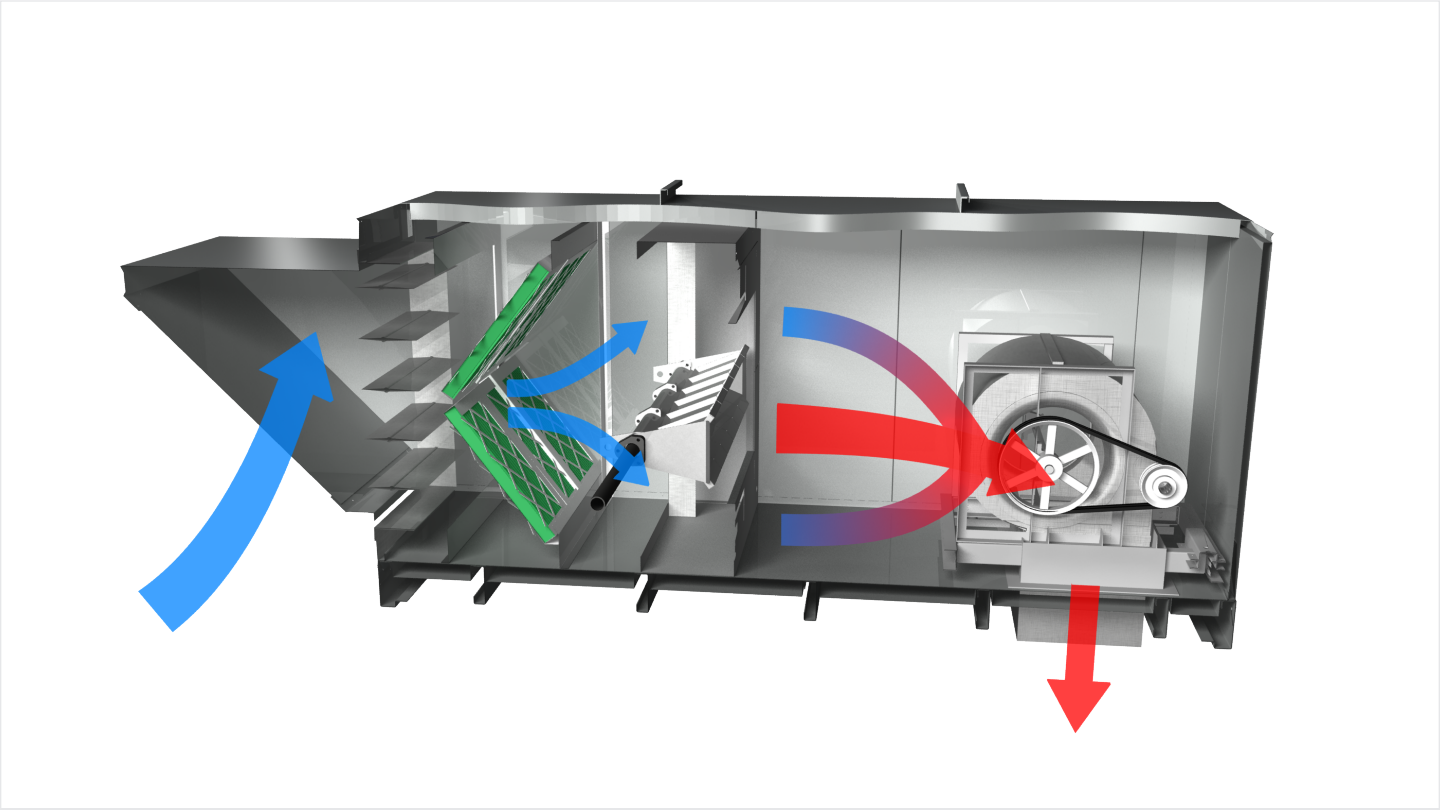


Figure 1: Example of airflow for an Direct Fired Unit

Design

The **heating requirement** is based on the airflow rate and the temperature rise;

Q_{input} = (1.08×Temperature Rise×Airflow Rate) / 0.92

WHERE:

Q_{input} = Required Heat Input, (Btu/hr)

1.08 = A Constant based on the specific properties of moist air at 70°F db and 50% RH, ((Btu·min)/(°F·ft³·hr))

Temperature Rise = Increase of temperature from unit input to output (ΔT, Tout - Tin), (°F)

Airflow Rate = Flow rate of air being heated (CFM), (ft³/min)

0.92 = Thermal efficiency of combustion

The inlet temperature is typically the winter design temperature, and can be determined from weather data in the ASHRAE Fundamentals Handbook. Price units can operate with supply air temperatures down to -40°F (-40°C).

The discharge temperature will depend on the application. In many cases, the design intent is to provide neutral air to the occupied space, so 70 to 75°F is common. The maximum discharge temperature is restricted to 160°F. However, the Temperature Rise (T_{out} – T_{in}) can be up to 120°F for Direct Fired units.

The **fuel requirement** is based on the Heat Input.

Fuel Flow Rate = Q_{input}/HHV_{Fuel}

WHERE:

Fuel Flow Rate = Volumetric Fuel Flow Rate (ft³/hr)

Q_{input} = Required Heat Input, (Btu/hr)

HHV_{Fuel} = Higher Heating Value of the Fuel (Natural gas = 1000 Btu/ft³)

The natural gas flow rate or heat input can be used for sizing gas piping to the unit. It is not recommended that the gas pipe connection size be used to size the piping. The pipe size will depend on the pressure loss of the field piping, the gas flow rate and the available gas inlet pressure.

Capacity Control

AW-Ds provide a fully modulating 30:1 turn down ratio. Providing this high of turndown and a fully modulating system, the unit will provide precise temperature control to the space which results in the highest quality IAQ and comfort. This smooth operation also maximizes the life of the equipment in lieu of constantly staging valves and stopping and starting fans. The modulation is achieved by the 2 main components:

a. Controlling the fuel gas flow through the valve
b. Setting and adjusting profile plates to maintain proper velocities across the burner

The discharge air temperature sensor will control the gas valve through the controller to provide precise discharge air temperature control.

The higher turndown allows the unit to operate at a lower temperature rise and minimizes the cycling of the burner system and maintains a constant discharge air temperature control.

For example a make-up air unit with a design temperature rise of 100°F and 10:1 turndown can operate down to 10°F rise before the unit will cycle on and off to meet the heating load; whereas a 30:1 turndown can operate down to a 3.3°F.

Gas Burners

Price Mechanical AW-Ds use 2 stage combustion burners which lower CO and NO2 emissions. These burner sections are available in cast iron, aluminum or nickel plated with diverging stainless steel baffle plates.

The burners are located in a drawthrough airflow configuration. The profile plates establish uniform air velocities across the burner. Typical velocity required across the burner is 2850 fpm, in order to avoid incomplete combustion and high level of waste gases. These burners can operate in the range of 1500 to 3500 fpm. Side plates are used to adjust velocities across the burner. For VAV applications, modulating dampers will be used to maintain the appropriate air velocity over the burner. The air modulation on Price direct fired equipment is limited to 50% of design airflow.

Price offers flexibility in configuration of different burner sections of 6" and 12", thereby meeting the required dimensions and capacity while directly fitting into.

Altitude

Altitude will impact the heat capacity of the unit because less dense air has less oxygen for combustion. The capacity of units is based on sea level, and will be acceptable up to 2,000 ft. The unit capacity will be de-rated by 4% for every 1,000 ft. above 2,000 ft. For example, a unit selected for Denver at 5,000 ft. elevation will be de-rated by 12% [4% x (5,000 ft. - 2,000 ft.)/1,000 ft.].

Gas Train

Gas trains are designed to meet strict gas code requirements (please see **Figure 2**). They all have the following basic components:

- **Field Installed Main Manual Gas Shut-Off Valve** – This valve is field installed outside the unit so the gas can be shut off to all components along with the make-up air unit. This is similar to an electrical disconnect switch. For shipping reasons, it cannot be factory installed. While it is a requirement of the gas code and should be installed by the contractor, it is also a good idea to show this detail on the drawings.
- **Main Line Gas Pressure Regulator Valve** – This valve maintains the gas pressure at the make-up air unit within rated parameters.
- **Main Line Automatic Gas Valves** – These are the main shut-off valves that open when heat is required. They are generally two position on-off type. The requirements change depending on the furnace size. Under 1 million Btu/h, two redundant gas valves are acceptable. Gas trains are designed to meet strict gas code requirements. The gas manifold is designed based on the specified pressure ranging from 4.2 to 8 inch w.c. for natural gas & propane gas from 1.6 to 3 inch w.c.
- **Main Line Modulating Valve** – This is the valve that permits modulating heat control. As the unit's controller translates the change in required supply air output temperature, the modulating valve adjusts the fuel flow rate into the burner.
- **Main Line Gas Modulator Regulator Valve** – For capacities over 1000 MBH, the pressure regulator valve and modulating gas valve is replaced with a single modulator regulator (MR) valve which provides dual function of modulation and pressure regulation. These valves use counter spring to keep the valve in closed position despite the downward pull of the negative pressure.
- **Main Firing Manual Shut-Off Valve** – This valve allows a service technician to shut off gas to the burner, but not the pilot burner.
- **Pilot Line Manual Shut-Off Valve** – This valve allows a service technician to shut off gas to the pilot, but not the main burner.
- **Pilot Gas Valve** – The pilot lets a small amount of fuel enter the burner during start up. This fuel is typically ignited with an electronic ignition system. On larger burners, a pilot flame is used to light the main flame. Once the pilot is lit and flame is proven, the main gas valves will open.

The exact design of the gas train will depend on the model and size. For smaller products, some of the components listed above are combined into a single piece.

Fan Selection

Fan selection is based on the required airflow (cfm) and the total static pressure (in. w.c.). The total static pressure is established as follows;

Total Static Pressure (TSP) = External Static Pressure (ESP) + Internal Static Pressure (ISP) (in. w.c.)

The ESP is calculated by the designer based on the airflow rate and duct design. This process is well documented in the ASHRAE handbooks. It should cover all static losses from the discharge of the unit to the space being served.

The ISP is calculated based on pressure drops of the components within the make-up air unit, including filters, dampers, heat exchangers, cabinet losses, etc. These losses are established through testing. Note that Price uses the average filter pressure drop to estimate the ISP. Clean filters will allow slightly more air to pass through, while dirty filters will allow slightly less.

With the TSP and supply airflow established, the fan curves for the available fan models are calculated using the vendor supplied fan selection software. The actual fan selection is a judgment that balances performance, efficiency

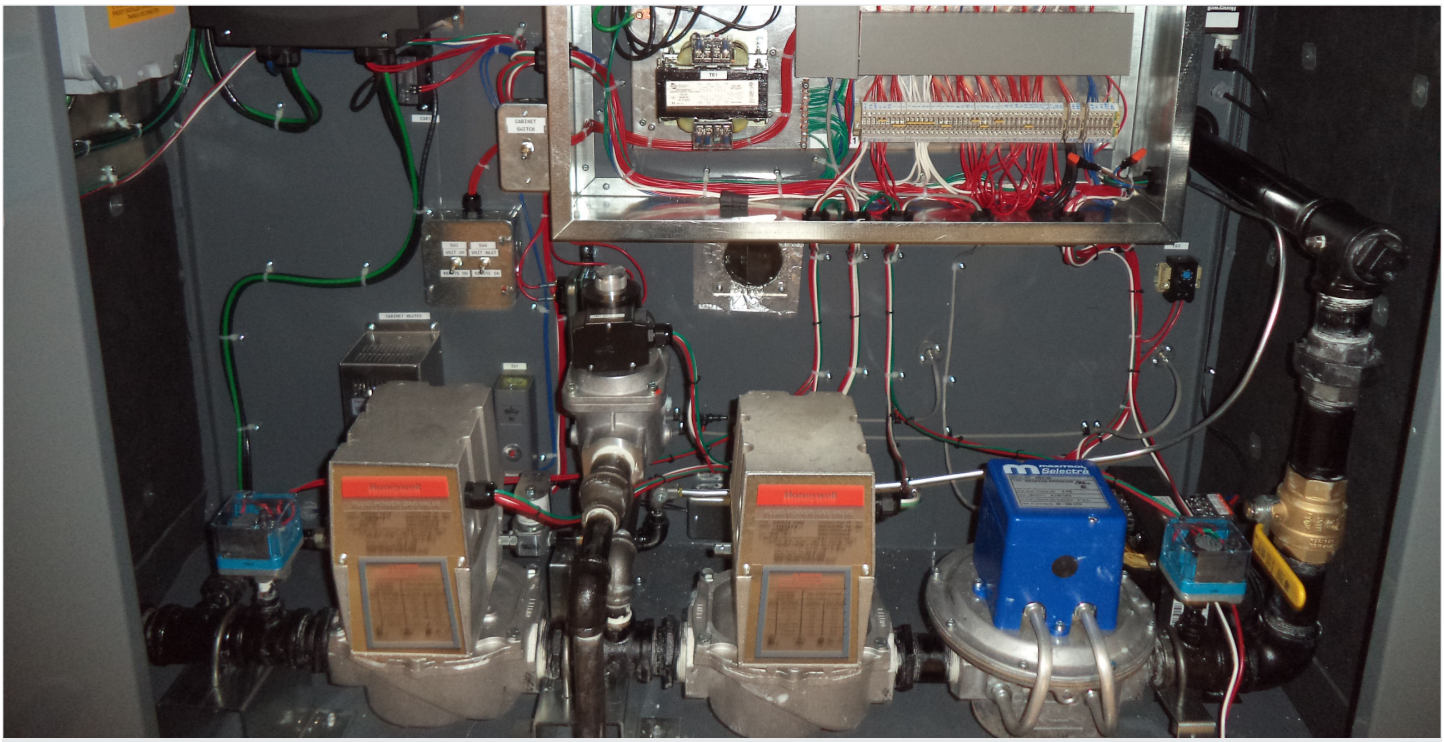


Figure 2: Gas Manifold

and operating position on the fan curve (Figure 4). Standard rubber-in-shear style isolators are provided, with options for 1" or 2" spring isolation as required. Refer to page 12 for typical clearances required.

Controls

Price units come standard with unit mounted controls. Unit controls include;

- Unit On-Off
- Heat Off-Enable
- Supply air temperature set point

A duct mounted temperature sensor is supplied loose for field installation in the ductwork approximately 10 feet from the unit supply air opening. A remote control panel is also available, which can be mounted inside the building for ease of operation.

Unit Placement

Price units can be installed outdoors on a curb, housekeeping pad or sleepers. Designers should ensure there is suitable structural support for the weight of the unit. Supply air connections can be either down flow, up flow, side discharge or end discharge. Units should have enough space around them to allow for proper service, and should avoid having combustible materials too close to the unit. Specific distances are called out on the rating plate, but using a minimum of 12 inches is generally acceptable.

The controls cabinet will require at least 3 feet of access. Access doors can be ordered for either side of the unit (left or right hand). A service distance of 24 inches opposite the main access side is desirable, but the unit can be placed closer to obstructions if necessary.

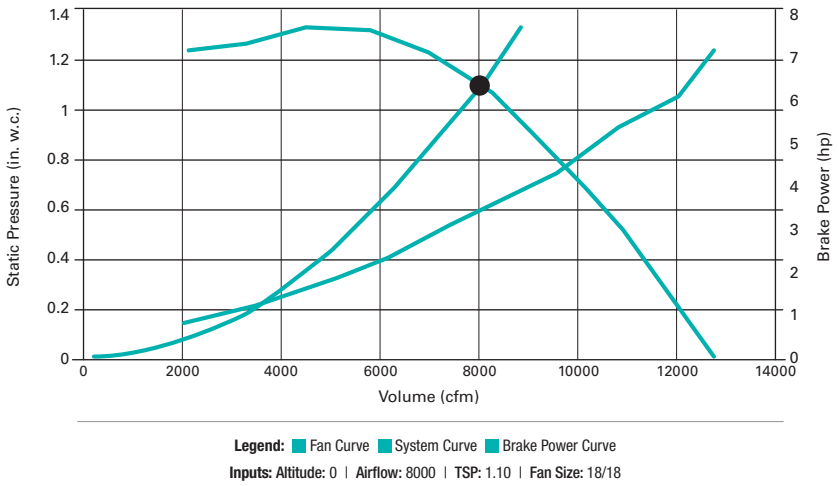
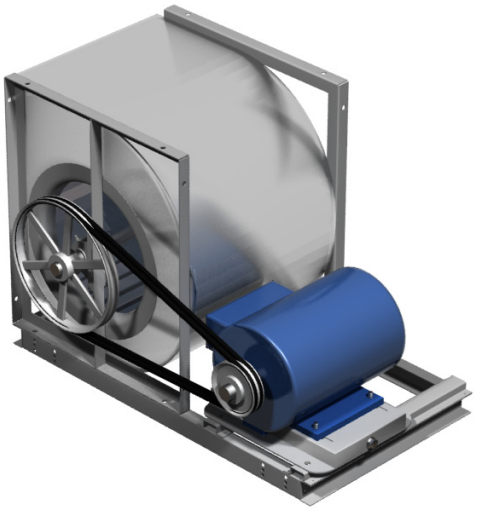
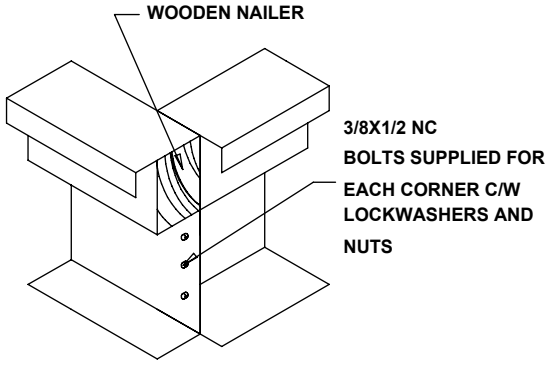


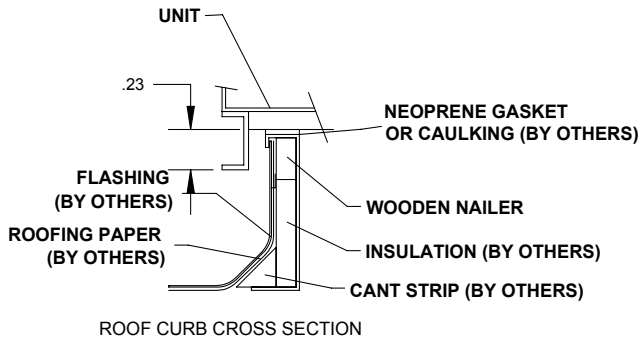
Figure 4: Fan Curve



Example of a Single Fan



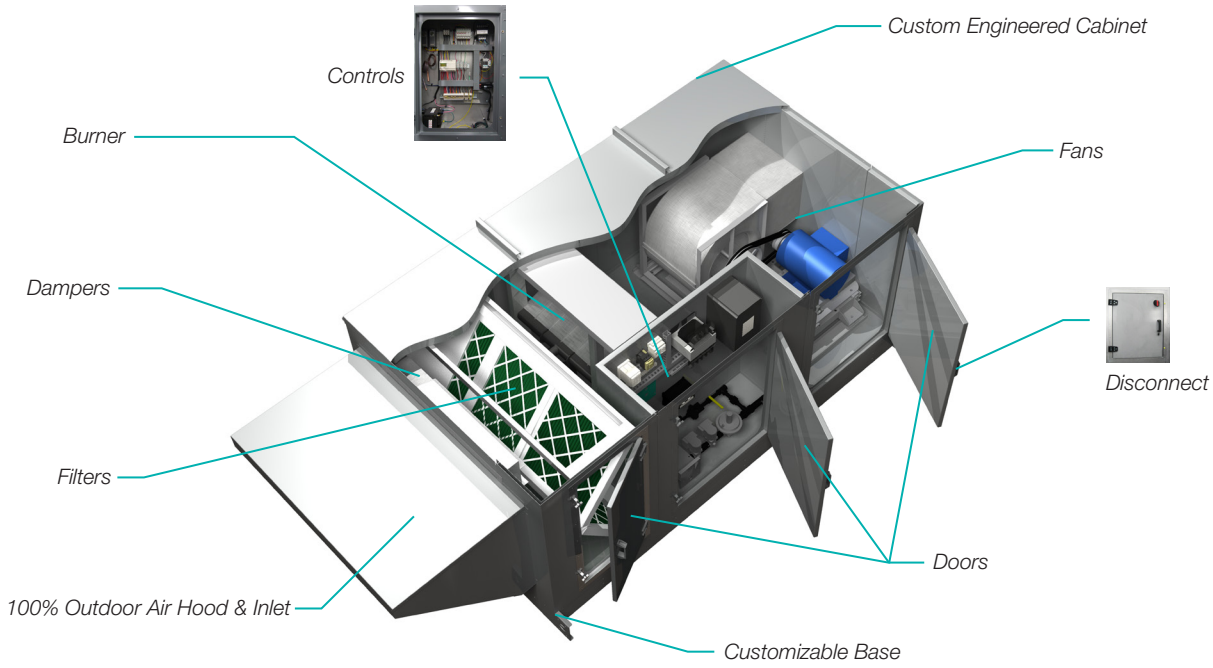
Detail #1: Corner Bolting Assembly



Detail #2: Roof Curb Cross Section

Roof curb detail #1 and #2

Product Features



AW-D Components

100% Outdoor Air Hood and Inlet

- 18 gauge painted galvanized steel
- Half inch expanded metal bird screen
- Motorized two position damper
  - Optional Modulating inlet damper
  - Optional Inlet Louver

Filters

- 2 inch filter rack
- MERV 8, hi-temp and washable media filters available
- MERV 14 Filters available – Contact factory

Fans

- High efficiency forward curved DWDI fans
- Greasable pillow block bearings
- Adjustable motor mount base
- Fan skid mounted on RIS isolators, spring isolation optional

Furnace

- Direct fired burner with stainless steel baffle plates
- 30 to 1 turndown
- Operates down to -40°F ambient
- Single point piping connection
- CSA certified for Canada and USA

Cabinet – 1 inch standard designs available

- 18 gauge painted galvanized steel single wall construction
  - Panel seams are turned inward for clean appearance
  - 1 inch (2 inch optional),, 1 ½ lb. density glass fiber insulation (pinned and glued)
- 20 gauge painted galvanized steel casing with 22 gauge liner
  - 1 inch foam injected panel (2 inch option available)
  - Offers lower leakage than glass fiber insulation
  - Increased rigidity
  - 1 inch (2 inch option available), 1 ½ lb. density glass fiber insulation in heat exchanger section

Dampers

- Triple-vee roll formed galvanized steel blades
- Optional low leak aluminum airfoil or insulated airfoil dampers

Doors

- Double walled construction designed with similar construction to unit cabinet
  - Either 1 inch, 1½ lb. density glass fiber insulation or 1 inch foam injected panels
- Hinged doors supplied for fan, filter, and controls sections

Controls

- Standalone temperature controls
- Optional DDC controls can be integrated into building automation system

Disconnect

- Non-fused and fused disconnect available
- Single point power connection

Base

- 6” Formed Steel base frame
- 4” and 6” Structural Steel base frame

Product Options

Fan Isolation

Fans used in Price MUA units come standard with Rubber in Shear (RIS) isolation. Price offers 1 or 2 inch deflection spring isolation for applications where sound and vibration issues are of concern.

Motor Types

The supply fan motor can be upgraded from high efficiency Open Drip Proof (ODP) to high efficiency Total Enclosed Fan Cooled (TEFC) for improved reliability.

Louvers

For a cleaner appearance, louvers are available to replace the outdoor air hood. The louvers are constructed of either galvanneal steel or aluminum, and include rain gutters in each blade to channel away rain and reduce entrainment.

Top Inlet Mushroom Hood

Where an end wall outdoor air inlet is not convenient, a top mounted mushroom hood is available. The hood is designed to minimize entrainment and includes a ½ inch expanded metal bird screen.

FM and GAP Style Gas Train

For customers who require additional quality and ruggedness, Price MUA units can utilize FM Style (Factory Mutual) and GAP (formerly IRI) style components.

Remote Control Panel

For ease of operation, a remote control panel is available. The panel includes on-off, heat enable and supply air temperature set point control. A service switch is located in the unit control cabinet to improve serviceability by allowing local override during servicing. DDC controls can include a wall mounted room controller upon request.

Additional Options: timeclock, panel-mounted controller, and additional monitoring lights.

Dampers

Low leakage aluminum airfoil dampers are available. The improved leakage rate reduces infiltration and heat loss during periods when the unit is shut down. The low leak rating is accomplished by rubber blade and jamb seals and a stiffer blade profile. For even better performance, the blades can be insulated with expanded polyurethane foam, that further reduces heat loss during shut down periods.

Filters

Price MUA units include a 2 inch filter rack. Metal filters, high temperature filters and replaceable media filters with removable frames are all available for improved indoor air quality, 4 inch MERV 14 secondary filters can be installed for added filtration.

Integral DX Cooling

For applications where cooling is as important as heating, Price offers integral DX cooling. Price offers integrated air cooled DX cooling options from 5 tons up to 130 tons, and integral water cooled DX cooling options up to 65 tons.

Filter Gauges

To improve maintenance, magnehelic, digihelic and photohelic filter gauges are available.

Roof Curbs

Roof curbs are an excellent way to install Price MUA units on a roof, particularly for downflow applications. Price curbs are designed to fit perfectly with our units, and include wood nailer strips to tie in the roofing membrane. Price curbs also have internal support rails to hold field supplied flanged duct collars for fast and easy installation. The curbs can be shipped in advance of the units with the duct collars installed prior to unit delivery.

Supply Fan Variable Frequency Drives (VFDs)

VFDs can help reduce electrical and gas consumption during periods when the full outdoor air ventilation rate is not required.

Chilled Water Cooling

Where cooling is required and chilled water is available, Price can provide chilled water coils. The coils will be mounted over a drain pan.

DDC Controls

Integrating HVAC equipment into a building automation system can allow remote control, quick recognition of issues and improved control for performance and savings. Price units can be supplied with BACnet connectivity when used in conjunction with DDC controls.

Performance Data

Single Fan Configuration

Model Number	Airflow (cfm)	Fan Size	Discharge Velocity (fpm)	Brake Horsepower (BHP) ESP (inches w.c.)						Temperature Rise Capacity (MBH)						
				0.25	0.50	0.75	1.00	1.25	1.50	60	70	80	90	100	110	120
AW-D-1-10	1,600	TFC 9 / 7	2,446	1.01	1.1	1.19	1.29	1.39	1.48	114	133	152	170	189	208	227
AW-D-1-10	1,800	TFC 9 / 7	2,752	1.24	1.34	1.45	1.55	1.66	1.77	128	149	170	192	213	234	255
AW-D-1-10	2,000	TFC 9 / 9	2,381	1.11	1.23	1.34	1.46	1.58	1.71	142	166	189	213	236	260	284
AW-D-1-12	2,500	TFC 9 / 9	2,976	1.63	1.76	1.89	2.04	2.18	2.33	177	207	236	266	295	325	354
AW-D-1-12	2,700	VFC-11	1,924	1.47	1.65	1.87	2.1	2.34	2.58	192	224	255	287	319	351	383
AW-D-1-12	3,000	VFC-11	2,138	1.71	1.89	2.08	2.29	2.53	2.79	213	248	284	319	354	390	425
AW-D-1-12	3,500	VFC-11	2,495	2.2	2.4	2.6	2.81	3.02	3.25	248	290	331	372	413	455	496
AW-D-1-12	4,000	VFC-11	2,851	2.82	3.04	3.26	3.48	3.71	3.94	284	331	378	425	472	520	567
AW-D-1-15	4,500	VFC-12	2,561	2.46	2.71	2.97	3.23	3.51	3.79	319	372	425	478	531	585	638
AW-D-1-15	5,000	VFC-12	2,846	2.96	3.21	3.48	3.75	4.04	4.33	354	413	472	531	590	649	708
AW-D-1-15	5,500	VFC-14	2,490	2.93	3.24	3.56	3.89	4.24	4.6	390	455	520	585	649	714	779
AW-D-1-15	6,000	VFC-14	2,716	3.37	3.69	4.02	4.37	4.72	5.1	425	496	567	638	708	779	850
AW-D-1-15	6,500	VFC-16	2,349	3.34	3.72	4.13	4.54	4.97	5.41	461	537	614	691	767	844	921
AW-D-1-15	7,000	VFC-16	2,530	3.73	4.12	4.53	4.96	5.41	5.86	496	579	661	744	826	909	992
AW-D-1-18	8,000	VFC-18	2,296	3.91	4.32	4.75	5.19	5.66	6.17	567	661	756	850	944	1039	1133
AW-D-1-18	9,000	VFC-18	2,582	4.75	5.18	5.63	6.09	6.57	7.06	638	744	850	956	1062	1169	1275
AW-D-1-18	10,000	VFC-18	2,869	5.74	6.21	6.68	7.17	7.67	8.18	708	826	944	1062	1180	1298	1416
AW-D-1-20	13,000	VFC-20	2,967	7.82	8.42	9.03	9.65	10.29	10.93	921	1074	1228	1381	1534	1688	1841
AW-D-1-22	15,000	VFC-22	2,726	8.38	9.1	9.81	10.57	11.33	12.09	1062	1239	1416	1593	1770	1947	2124
AW-D-1-22	17,000	VFC-25	2,462	8.74	9.59	10.44	11.35	12.27	13.21	1204	1405	1605	1806	2006	2207	2408
AW-D-1-22	18,000	VFC-25	2,606	9.65	10.52	11.41	12.32	13.26	14.22	1275	1487	1700	1912	2124	2337	2549
AW-D-1-25	20,000	VFC-25	2,896	11.71	12.64	13.58	14.55	15.54	16.55	1416	1652	1888	2124	2360	2596	2832
AW-D-1-25	22,000	VFC-25	3,186	14.1	15.11	16.13	17.15	18.18	19.26	1558	1818	2077	2337	2596	2856	3116
AW-D-1-27	25,000	VFC-28	2,880	16.08	17.35	18.67	20.01	21.38	22.81	1770	2065	2360	2655	2950	3245	3540
AW-D-1-30	28,000	VFC-32	2,565	15.1	16.47	17.92	19.48	21.14	22.88	1983	2313	2644	2974	3304	3635	3965
AW-D-1-30	30,000	VFC-32	2,749	17.09	18.5	20	21.52	23.16	24.85	2124	2478	2832	3186	3540	3894	4248
AW-D-1-30	32,000	VFC-32	2,932	19.38	20.82	22.35	23.88	25.51	27.14	2266	2644	3021	3399	3776	4154	4532
AW-D-1-33	35,000	VFC-36	2,547	18.71	20.44	22.27	24.26	26.36	28.55	2478	2891	3304	3717	4130	4543	4956
AW-D-1-40	40,000	VFC-40	2,315	20.32	22.45	24.78	27.25	29.78	32.35	2832	3304	3776	4248	4720	5192	5664
AW-D-1-40	45,000	VFC-40	2,604	24.83	26.99	29.26	31.66	34.24	36.96	3186	3717	4248	4779	5310	5841	6372
AW-D-1-40	50,000	VFC-40	2,894	30.27	32.56	34.9	37.33	39.85	42.48	3540	4130	4720	5310	5900	6490	7080

Twin Fan Configuration

Model Number	Airflow (cfm)	Fan Size	Discharge Velocity (fpm)	Brake Horsepower (BHP) ESP (inches w.c.)						Temperature Rise Capacity (MBH)						
				0.25	0.50	0.75	1.00	1.25	1.50	60	70	80	90	100	110	120
AW-D-2-18	17,000	VFC-2-18	2,439	9.26	10.18	11.11	12.08	13.09	14.15	1204	1405	1605	1806	2006	2207	2408
AW-D-2-18	18,000	VFC-2-18	2,582	10.2	11.14	12.11	13.1	14.12	15.18	1275	1487	1700	1912	2124	2337	2549
AW-D-2-18	20,000	VFC-2-18	2,869	12.34	13.34	14.37	15.42	16.49	17.59	1416	1652	1888	2124	2360	2596	2832
AW-D-2-20	22,000	VFC-2-20	2,511	12.39	13.54	14.73	15.95	17.2	18.5	1558	1818	2077	2337	2596	2856	3116
AW-D-2-22	25,000	VFC-2-22	2,271	13.22	14.59	16.01	17.49	19.05	20.72	1770	2065	2360	2655	2950	3245	3540
AW-D-2-22	28,000	VFC-2-22	2,544	15.95	17.4	18.9	20.44	22.02	23.66	1983	2313	2644	2974	3304	3635	3965
AW-D-2-25	30,000	VFC-2-25	2,172	15.42	17.12	18.89	20.77	22.79	24.94	2124	2478	2832	3186	3540	3894	4248
AW-D-2-25	32,000	VFC-2-25	2,317	17.04	18.78	20.58	22.46	24.43	26.52	2266	2644	3021	3399	3776	4154	4532
AW-D-2-25	35,000	VFC-2-25	2,534	19.76	21.59	23.48	25.41	27.4	29.47	2478	2891	3304	3717	4130	4543	4956
AW-D-2-25	40,000	VFC-2-25	2,896	25.18	27.18	29.21	31.28	33.41	35.58	2832	3304	3776	4248	4720	5192	5664
AW-D-2-27	45,000	VFC-2-28	2,592	28.49	31.08	33.76	36.55	39.46	42.55	3186	3717	4248	4779	5310	5841	6372
AW-D-2-27	50,000	VFC-2-32	2,290	26.93	29.9	33.11	36.48	39.92	43.35	3540	4130	4720	5310	5900	6490	7080
AW-D-2-30	52,500	VFC-2-32	2,405	29.09	32.02	35.2	38.6	42.14	45.75	3717	4337	4956	5576	6195	6815	7434
AW-D-2-33	55,000	VFC-2-32	2,519	31.46	34.4	37.52	40.9	44.48	48.18	3894	4543	5192	5841	6490	7139	7788
AW-D-2-33	60,000	VFC-2-32	2,749	36.79	39.82	42.97	46.26	49.75	53.48	4248	4956	5664	6372	7080	7788	8496
AW-D-2-36	65,000	VFC-2-32	2,978	42.9	46.08	49.34	52.69	56.17	59.79	4602	5369	6136	6903	7670	8437	9204
AW-D-2-36	70,000	VFC-2-36	2,547	40.2	43.99	47.9	52.18	56.6	*	4956	5782	6608	7434	8260	9086	9912
AW-D-2-36	75,000	VFC-2-36	2,728	45.52	49.33	53.3	57.47	61.91	*	5310	6195	7080	7965	8850	9735	10620
AW-D-2-36	80,000	VFC-2-36	2,910	51.34	55.48	59.46	63.66	*	*	5664	6608	7552	8496	9440	10384	11328
AW-D-2-40	85,000	VFC-2-40	2,460	48.28	52.86	57.75	63.03	68.61	*	6018	7021	8024	9027	10030	11033	12036
AW-D-2-40	90,000	VFC-2-40	2,604	53.38	58.03	62.9	68.06	73.61	*	6372	7434	8496	9558	10620	11682	12744
AW-D-2-40	95,000	VFC-2-40	2,749	58.98	63.75	68.68	73.83	*	*	6726	7847	8968	10089	11210	12331	13452
AW-D-2-40	100,000	VFC-2-40	2,894	65.07	70	75.04	80.25	*	*	7080	8260	9440	10620	11800	12980	14160

*Consult your Price representative for an available selection.

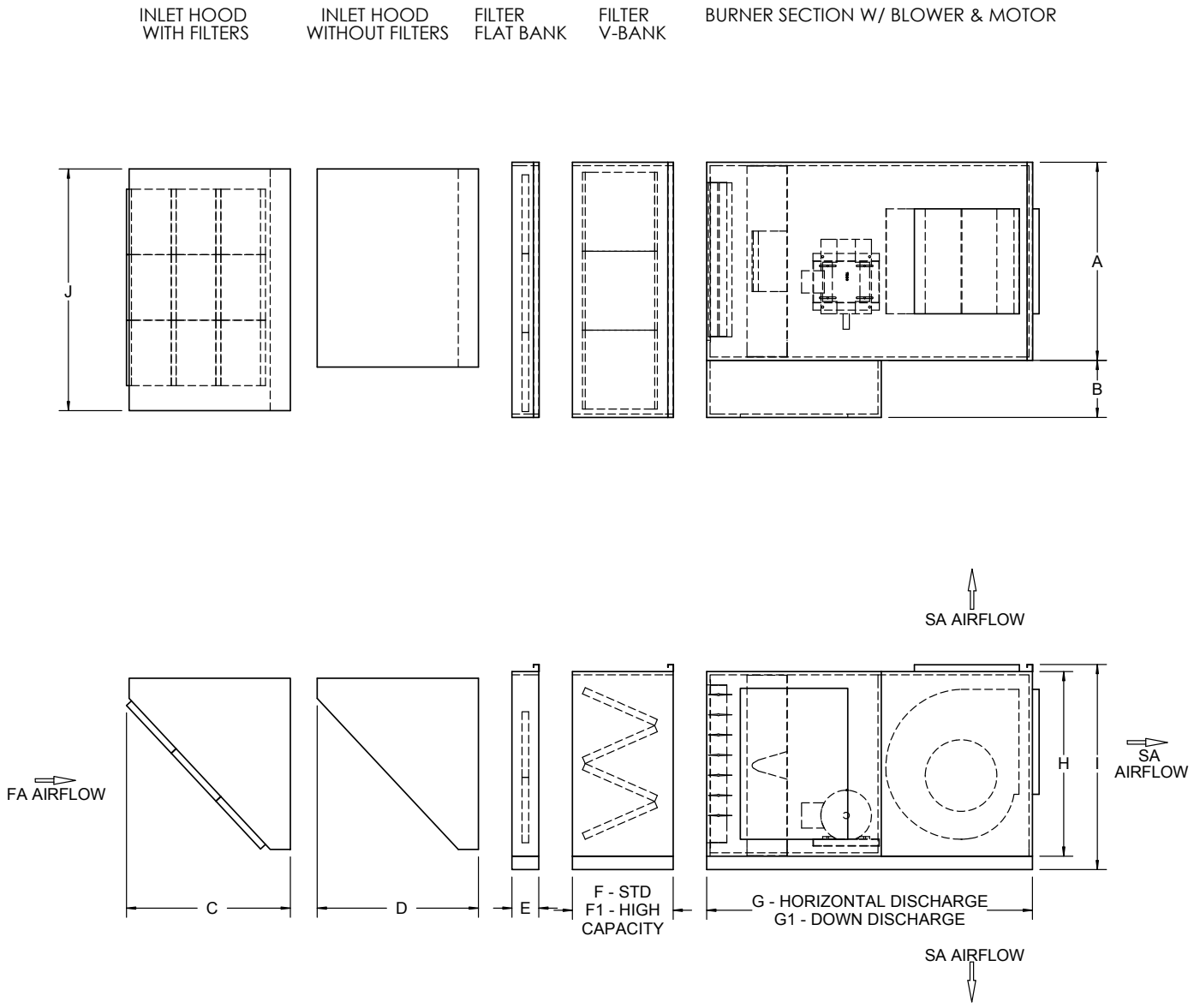
Standard Unit Construction

Price offers many options to customize the unit to fit each application's requirements. These options may impact performance, dimensions and weight. The following tables describe standard construction options used for the dimensional data within this catalog. For more information about available options or to further customize Price AW-D units, consult your local Price representative.

- 100% Outside air c/w inlet hood and bird-screen
- Constant air volume (CAV)
- Standard Controls
  - Unit complete with internal wiring, starters, control transformer, low limit, relays, safeties & actuators
  - Standalone temperature controls
- Standard control panel wiring
- Automatic low limit
- Automatic season switch (ambient temperature control)
- 2" MERV 8 filters
- 1" Fiberglass single wall construction (18ga casing, insulation pinned and glued)
- 90°F Temperature rise (range from 60°F - 120°F)
- 7-14 in. w.c. gas pressure
- Gas train weather housing
- Motorized inlet damper with 2 position damper actuator
- Forward curved supply-air fan
- ODP high efficiency motor
- Internal rubber-in-shear fan isolation
- Hinged access doors on filter, fan and controls sections. Removable lift out doors on all other sections
- Horizontal discharge
- Non-fused disconnect
- Discharge air temperature sensor (shipped loose)
- 16" High non-insulated roof curb
- Units larger than 102" in width are split for shipping
- Catalogue drawings indicate Right Hand Configuration
- CSA approved design

Dimensional Data and Accessories

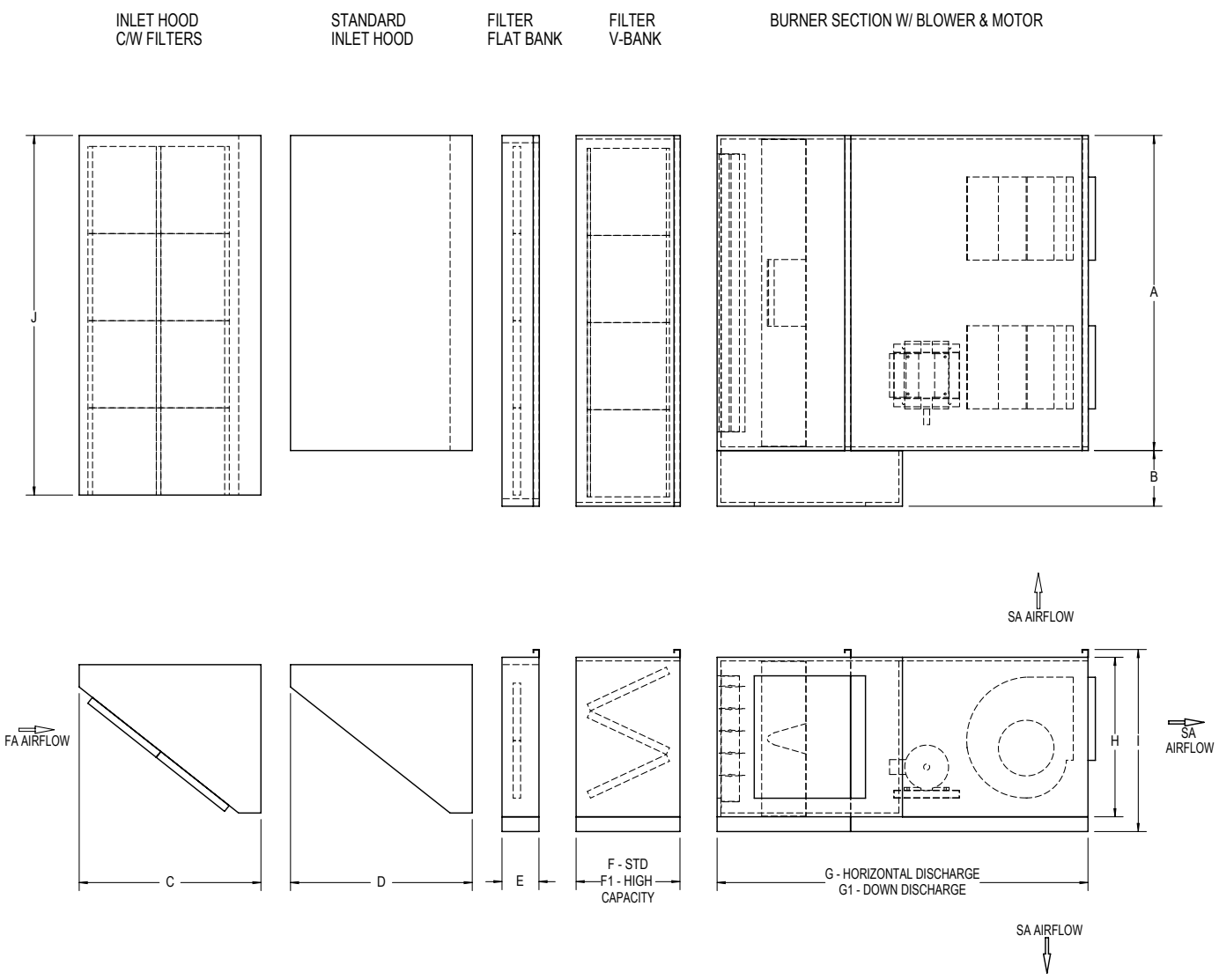
Single Fan Configuration



Model #	Dimensions (inches)												Gas Inlet Size (NPT)		Turn Down	Weight (LBS)
	A	B	C	D	E	F	F1	G	G1	H	I	J	7-14" wc	1-5 psi		
AW-D-1-10	27	13	23	23	8	8	10	67	70	26	32	34	0.75	0.5-0.75	30:1	730
AW-D-1-12	32	13	25	25	8	23	25	79	83	28	34	42	0.75-1	0.5-1	30:1	986
AW-D-1-15	42	15	34	34	8	23	34	82	86	30	36	52	1-1.25	0.75-1	30:1	1304
AW-D-1-18	46	15	42	30	8	24	26	86	91	35	41	52	1-1.25	1	30:1	1596
AW-D-1-20	51	17	52	37	8	25	27	92	98	43	49	52	1-1.5	1-1.25	30:1	2107
AW-D-1-22	57	17	58	58	8	24	26	94	101	45	51	61	1.25-2	1-1.5	30:1	2495
AW-D-1-25	63	17	66	66	8	29	30	105	113	52	58	61	1.5-2.5	1-2	30:1	3069
AW-D-1-27	70	17	66	66	8	29	26	115	124	56	62	76	1.5-2.5	1.25-2	30:1	3468
AW-D-1-30	78	17	50	50	8	29	26	118	127	62	68	76	2-2.5	1.25-2	30:1	3835
AW-D-1-33	87	19	59	59	8	29	31	126	135	69	75	81	2-2.5	1.5-2	30:1	4659
AW-D-1-40	101	19	72	72	8	32	34	139	151	90	96	116	2 - NA	1.5-2.5	30:1	5953

Dimensional Data and Accessories

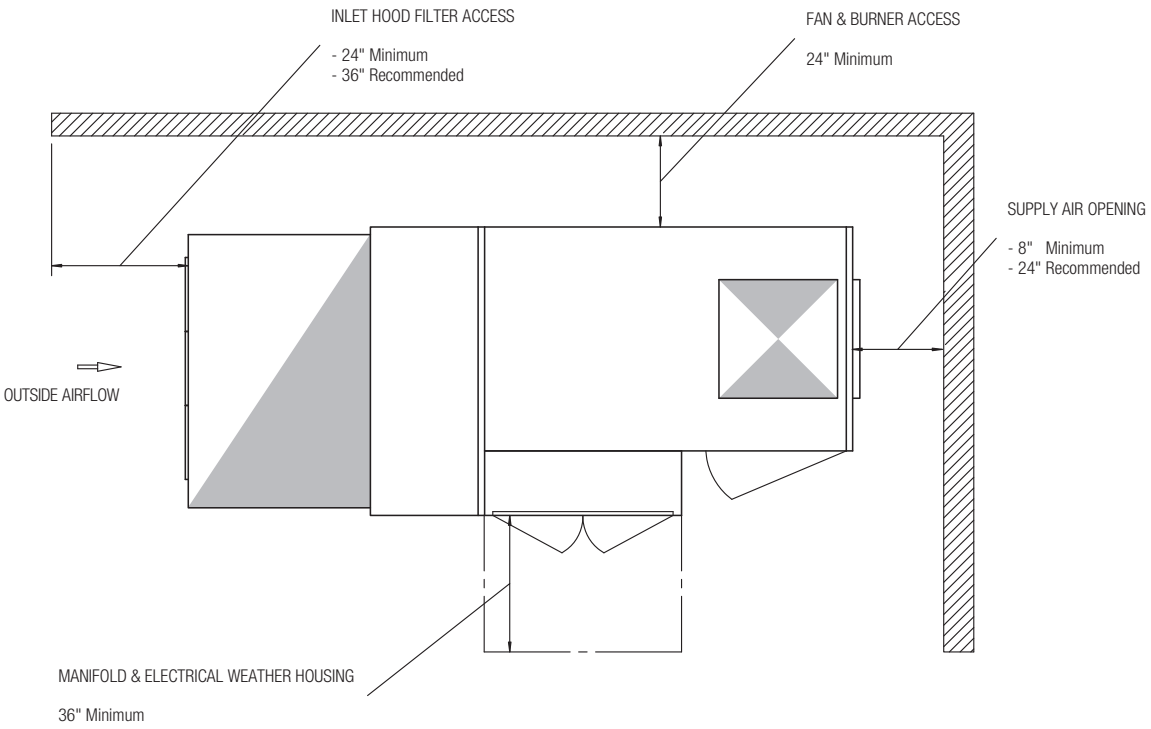
Twin Fan Configuration



Model #	Dimensions (inches)												Gas Inlet Size (NPT)		Turn Down	Weight (LBS)
	A	B	C	D	E (Max Airflow)	F	F1	G	G1	H	I	J	7-14" wc	1-5 psi		
AW-D-2-18	86	17	42	42	8 (8,000 cfm)	28	26	92	97	36	42	92	1.25- 2	1-1.5	30:1	2758
AW-D-2-20	95	17	49	49	8 (13,500 cfm)	28	31	101	107	43	49	100	1.25- 2.5	1-2	30:1	3231
AW-D-2-22	107	17	65	65	8 (15,000 cfm)	28	27	105	112	46	52	111	1.5- 2.5	1.25-2	30:1	4026
AW-D-2-25	119	19	40	40	8 (22,000 cfm)	28	31	107	115	52	58	120	2-3	1.5-2	30:1	5167
AW-D-2-27	133	19	51	51	8 (24,000 cfm)	26	31	112	121	55	61	140	NA	2-2.5	30:1	6039
AW-D-2-30	149	19	49	49	8 (32,500 cfm)	31	27	120	129	65	71	140	NA	2-2.5	30:1	6812
AW-D-2-33	149	19	59	59	8 (32,500 cfm)	26	31	127	137	73	81	140	NA	2-2.5	30:1	7589
AW-D-2-36	167	19	59	59	8 (45,000 cfm)	29	31	127	137	75	83	172	NA	2-3	30:1	8652
AW-D-2-40	186	24	70	70	8 (51,000 cfm)	36	36	160	170	84	92	206	NA	2.5-NA	30:1	10957

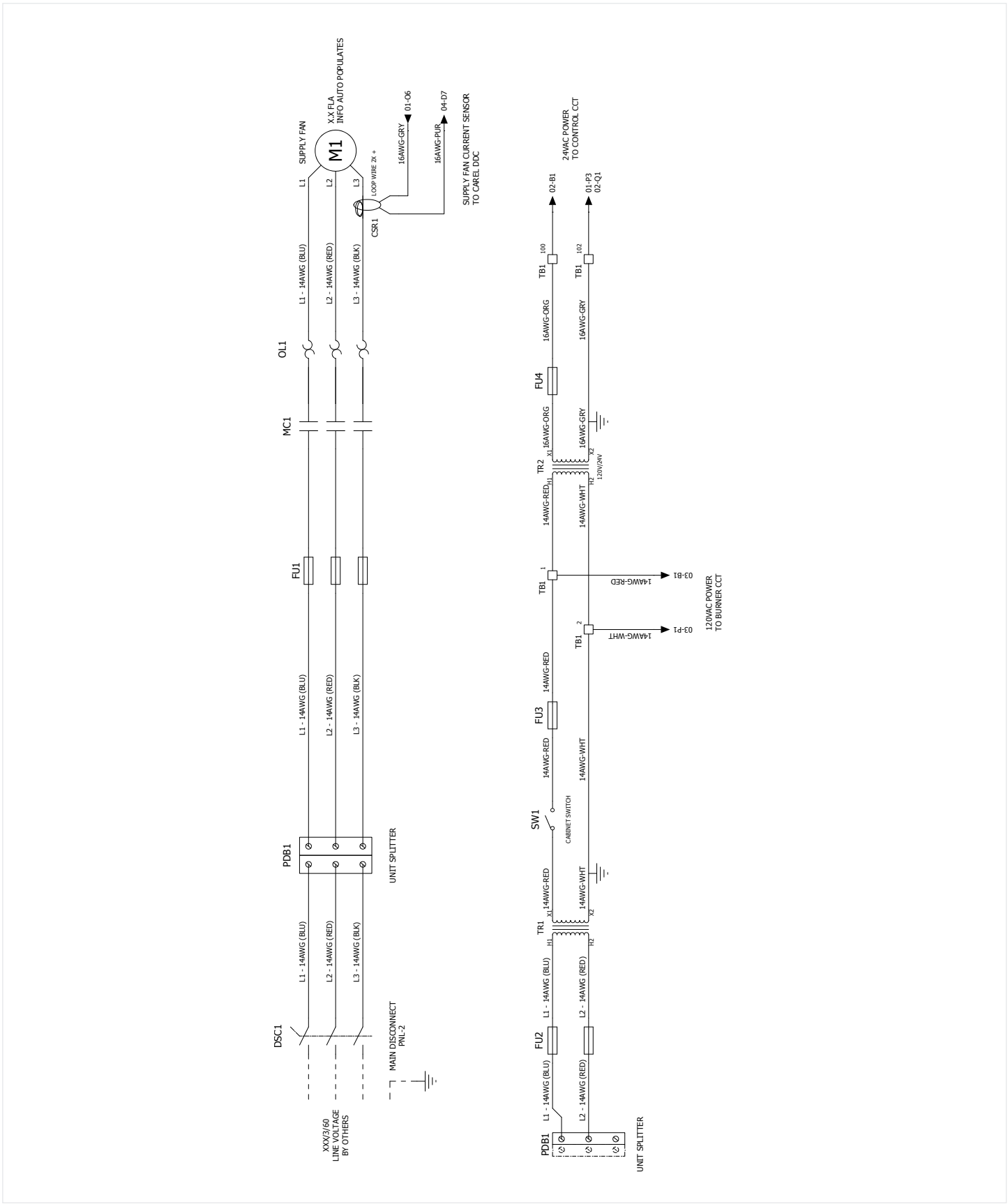
Clearance Data

Typical Unit Clearances for AW-D Units



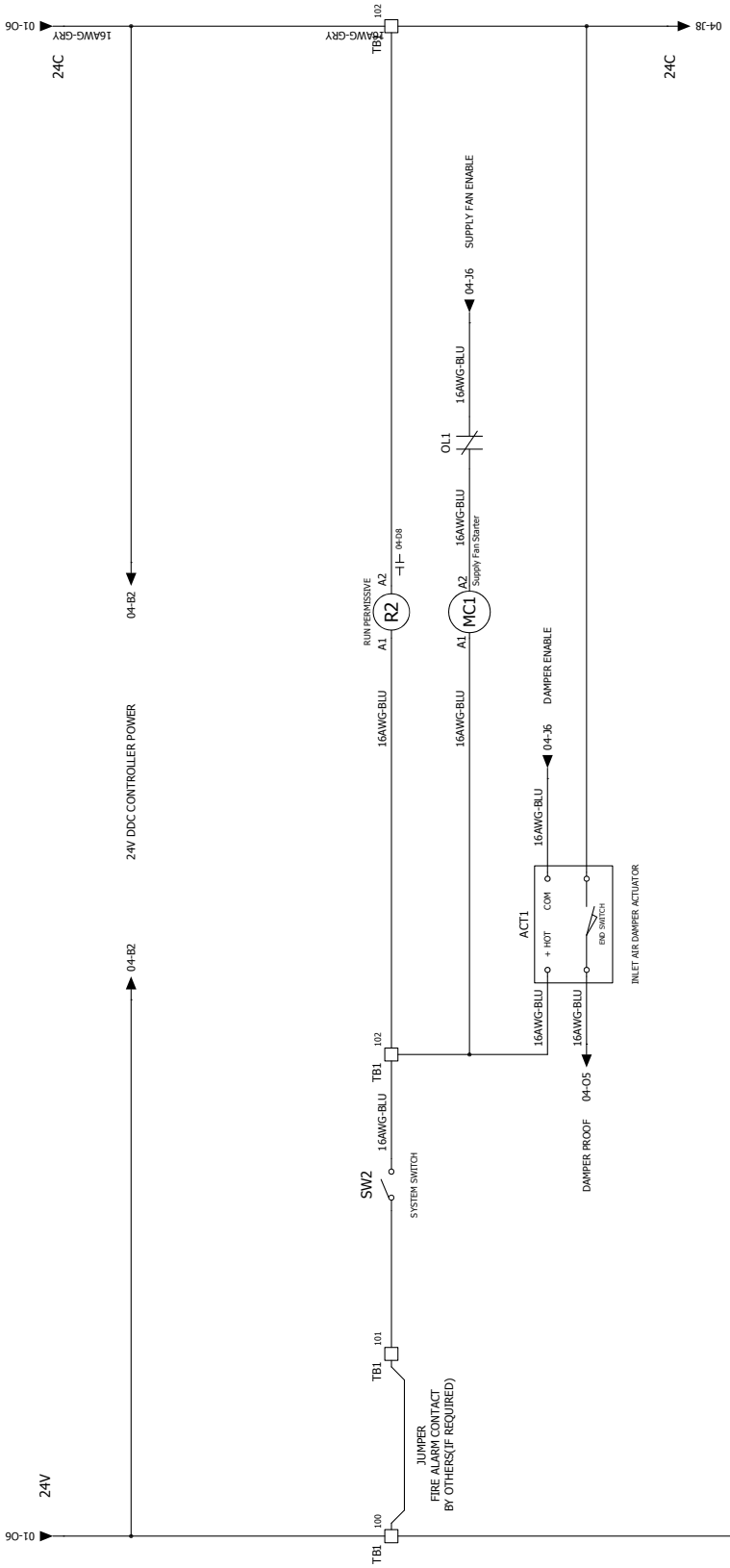
Wiring Schematics

Schematic typical for constant volume and discharge air control



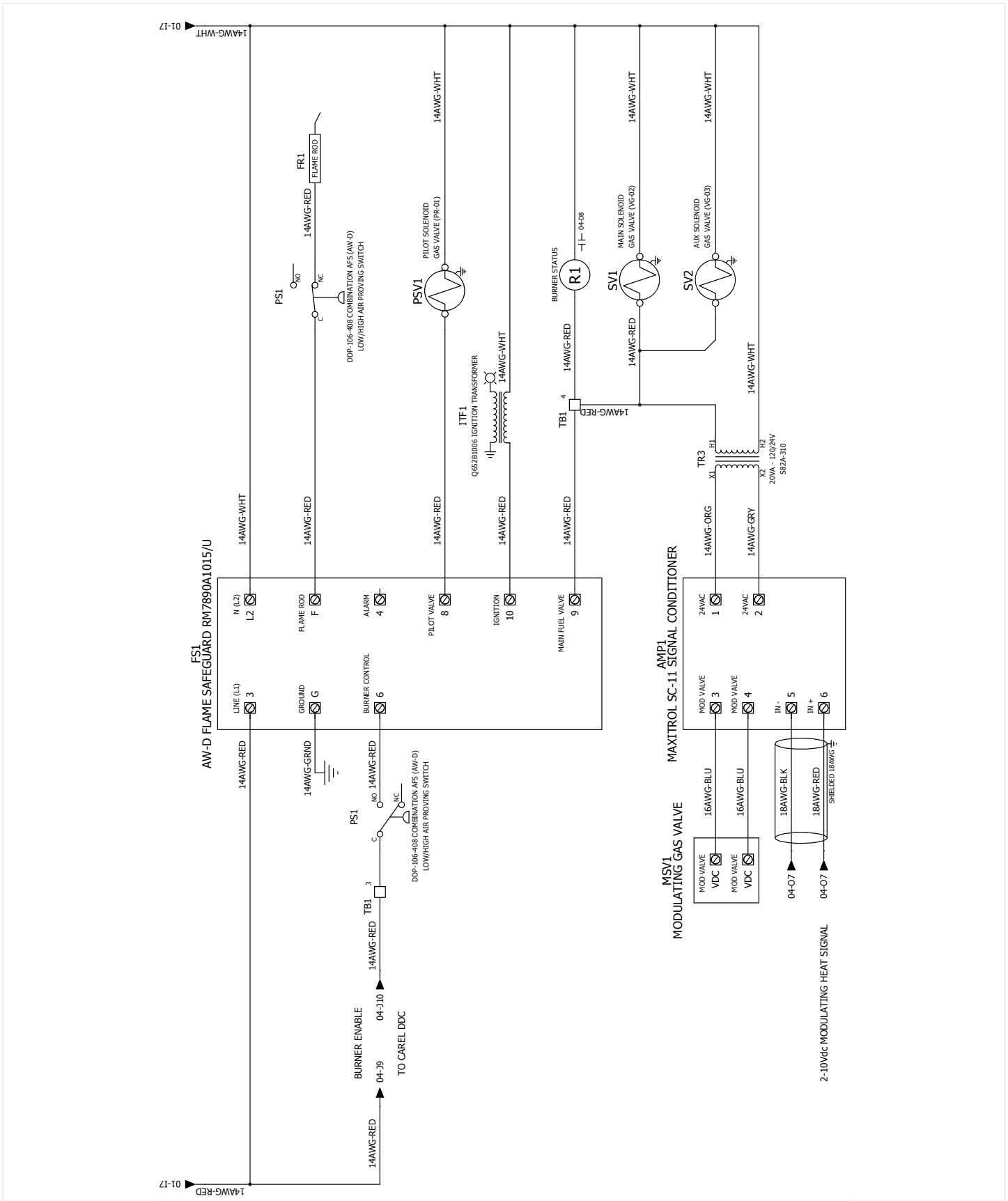
Wiring Schematics

Schematic typical for constant volume and discharge air control



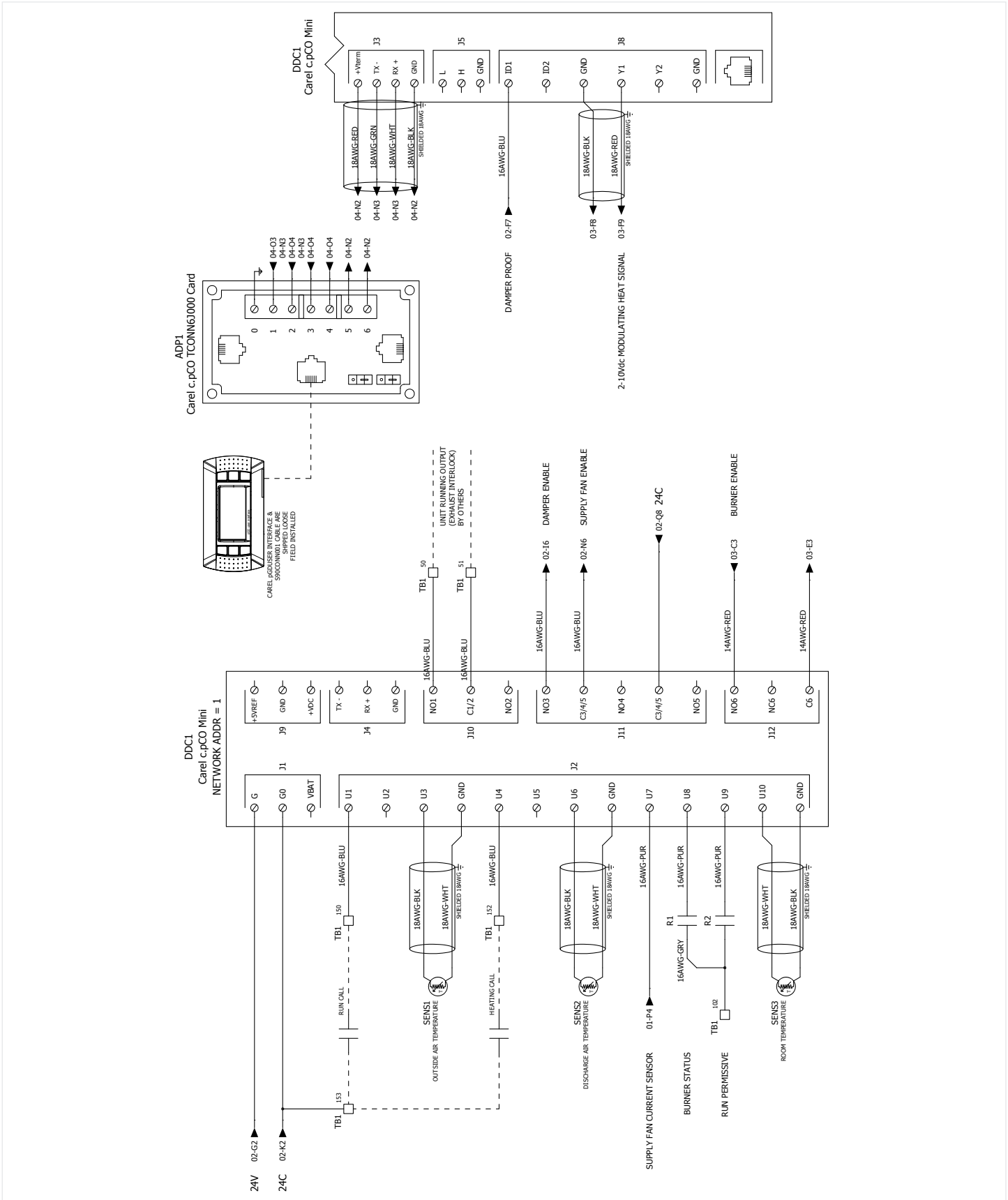
Wiring Schematics

Schematic typical for constant volume and discharge air control



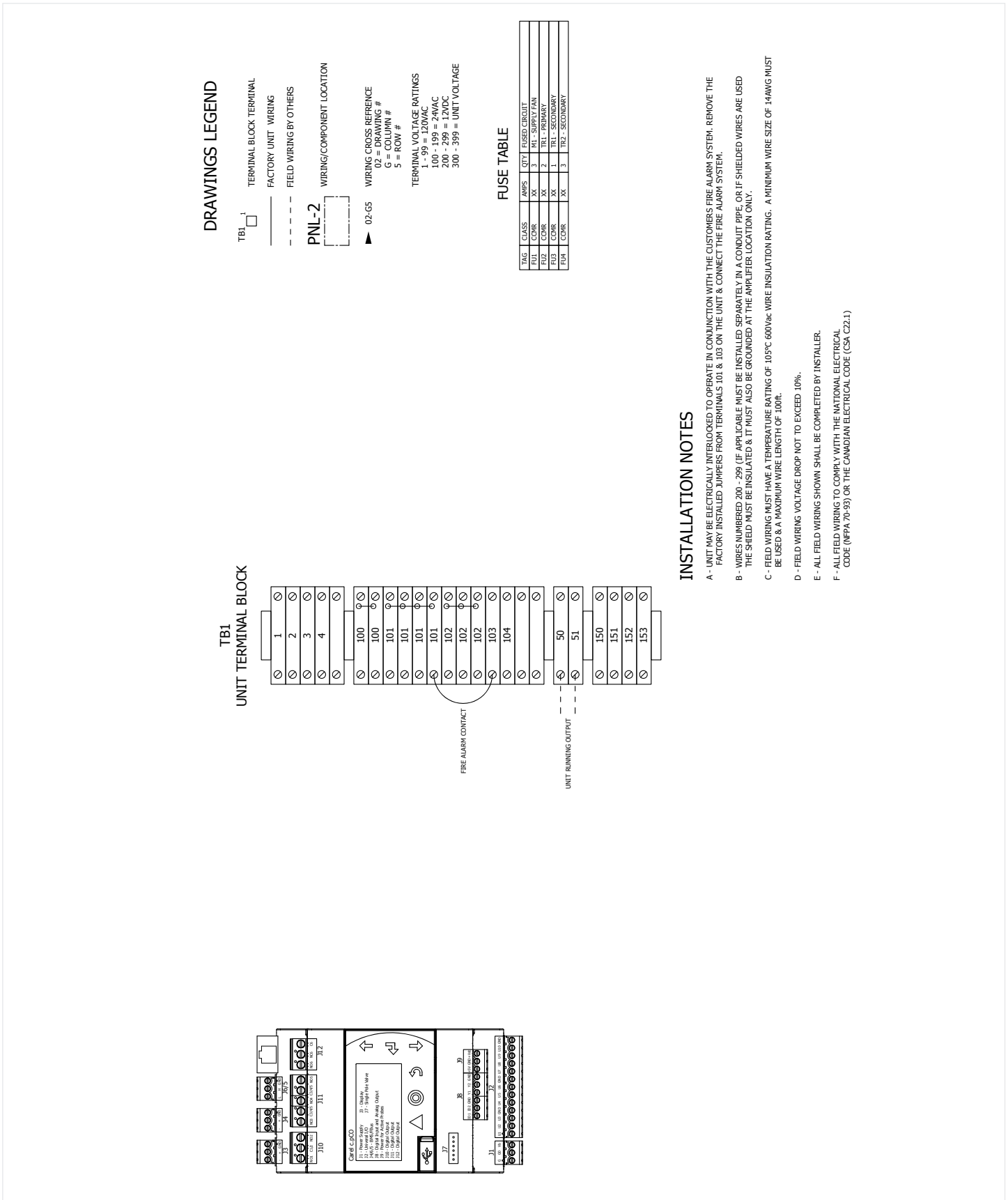
Wiring Schematics

Schematic typical for constant volume and discharge air control



Wiring Schematics

Schematic typical for constant volume and discharge air control



Sequence of Operations

System Switch “ON”

The fresh air dampers open fully and once the damper end switch makes, the supply fan starts and runs continuously and the exhaust fan interlock is closed (dry contact).

Unit starts and stops when commanded by network signal. Discharge temperature is driven by the network signal. The BMS may command a discharge air temperature setpoint that is variable between 50°F and 90°F.

Economizer Operation

The Economizer is enabled whenever the unit is ON. The unit will operate in purely Economizer Mode when the discharge air temperature deadband is achievable without heating or cooling.

If the discharge temperature deviates away from the discharge air temperature setpoint by more than ±3°F (adjustable) for a period of 2 minutes (adjustable), the unit will enter either Mechanical Cooling or Heating Modes (if equipped).

Heating Operation

Heating Mode is enabled when the Economizer cannot maintain a discharge air temperature of at least 3°F (adjustable) below the discharge air temperature setpoint for a period of 2 minutes (adjustable) or if the Heating Call is set to ON.

Once the discharge air temperature PID has been below 1% for a period of 1 minute (adjustable) and/or the heating call is turned off, the unit will transition into Economizer mode if the air entering the burner (outside air) is above 40°F.

Once there is proof of the supply fan, the gas valve opens to the lowest setting and ignites. After ignition, the burner modulates to maintain the discharge air temperature as set by the room temperature reset controls.

Ignition is always started at low fire. Modulation of the burner begins after the gas valve has been open for 10 seconds.

Shutdown is immediate, when run command or contact is opened, or a fault occurs.

System Switch “OFF”

The unit is inoperative. The fresh air damper is closed, and exhaust fan interlock opens.

Additional Controls

Exhaust Interlock

The proof signal from the external exhaust unit is used to signal the start of the (supply) unit. Loss or failure of this proof will stop the (supply) unit.

It is intended that the external exhaust unit will be started first and the (supply) unit starts as soon as the exhaust unit proves. In the event of an internal fault of the (supply) unit, the unit status contact will open and disable the external exhaust unit.

Reverse Exhaust Interlock

The signal from the external exhaust unit must prove within 3 minutes of the (supply) unit starting up. Upon failure of the exhaust unit proving, loss of proof, or a fault within the (supply) unit, the unit status relay will open and the unit will shut down. A restart or reset of the unit is required to unlatch this faulted state and restart the unit.

It is intended that the external exhaust unit will be started concurrently with the (supply) unit and that the external exhaust unit will be disabled by the opening of the (supply) unit status contact.

Automatic Low Limit

If the discharge air temperature falls below the low limit threshold of 40°F, the unit shuts down. A 7 minute time delay on unit start-up allows for a cold start.

Automatic High Limit

If the discharge air temperature ever goes above the high limit threshold of 150°F, the unit shuts down. A manual reset is required to restart the unit.

Note:
the control set-points listed in this document are
Factory defaults and may have been changed by others
During field installation or start-up.

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