



## V-Series Option Descriptions

### *Construction and Model Options*

#### **Cabinet and Frame**

The V-Series is constructed using an extruded aluminum tube frame and rigid channel base. The casing is an 18 gauge aluminized or galvanized non-corrosive sheet that is attached to this tubular structural framework. All exterior casing seams are 100% weather-tight, and all interior and exterior surfaces are cleaned of oil and grease. The exterior may be painted using a high-quality catalyzed primer coat and a finish coat of machine enamel with rust inhibitors. The finish coat color may be chosen by the owner. Access door panels are fully gasketed, positive latching lift-out panels with rustproof handles and hardware. All interior surfaces of the unit, including the access panels, are lined with 1" thick, 1.5 pound density foil-face fiberglass insulation that complies with UL standard 181 for erosion and NFPA 90A for fire resistance. The insulation is held in place with adhesive. The V-Series comes standard with internal fan and motor vibration isolation. Vibration isolators consist of a molded neoprene rubber isolation element, and include a flexible gasket connection between the fan housing discharge and the unit supply air opening. All units are prepiped, prewired, and 100% tested prior to shipment.

The V-Series is ETL certified and complies with ANSI Z83.4 and Z83.18, the national standards for direct fired heating equipment.

#### **Direct-Fired Burner**

The direct-fired burner is either a Maxon model NP1LE or NP2LE, Midco model HMA2, or an Eclipse model Ah-MA. The burner is specifically designed to burn natural or propane gas below the maximum non-contaminating levels required by OSHA and the ACGIH. Each burner has non-clogging, stainless steel baffles attached to a corrosion resistant cast aluminum gas supply section with non-moving parts. Burners are capable of 30:1 turndown ratio and are designed for 100% thermal efficiency for the life of the equipment. The outdoor air velocity across the burner will be constant and at an air velocity necessary for ANSI certification.

The burner pilot system is either Direct Spark Ignition or Interrupted Piloted Ignition. The Direct Spark Ignition system consists of an ignition module, spark igniter, and flame rod to verify burner low fire ignition before allowing the gas valve to fully open. The Interrupted Piloted Ignition system consists of a high voltage ignition transformer, spark igniter, and UV scanner. This proves the pilot is lit before allowing the gas valve to fully open. The system contains a pilot line gas regulator, gas valve, and 3/8" OD tin-lined copper tubing.

## Supply Fan

The supply fan is a double-width, double-inlet, centrifugal design, belt-driven for the required air capacity. The fan motor is 1750 rpm, has a standard NEMA frame, and is either Open Drip Proof (ODP) or Totally Enclosed Fan Cooled (TEFC). All fans have ball bearings and are designed for a minimum of L10 life of 100,000. All motors are premium efficiency motors, mounted on an adjustable slide base with a single or double adjustment screw. The motor has a 1.15 service factor, suitable for continuous service at 120 degrees F ambient temperature, and will be factory wired for the specified voltage. The blower, motor, and drive set are factory tested to ensure the specified air delivery at the design total static pressure.

The fan shaft is connected to the motor by a V-belt drive, designed for a capacity 30% above the motor nameplate horsepower. The shaft is a turned, ground, and polished solid shaft, and contains a protective coating to minimize oxidation.

## Variable Volume: “V” Option

The variable volume option is available for units supplying 100% OA. The “V” option allows for precise air control, as it controls the fan speed and can reduce the supply air volume from 100% to a minimum of 35%. This air volume control is achieved using a variety of methods, which include two-speed motors, variable frequency drives (VFD), or motorized dampers. “V” option units can be controlled via a manual potentiometer, or a building pressure switch. The manual potentiometer, as the name implies, manually positions the VFD or opposed blade discharge damper to reduce the unit airflow down to a pre-set minimum volume, not going below 35%. The unit will either operate at this volume, or at 100% full volume. This option, as well as the building pressure control switch, includes an opposed blade burner profile damper that is controlled by a differential pressure switch to ensure that proper air velocity is maintained across the burner profile.

The building pressure switch allows for automatic control of the volume control discharge and profile dampers. A diaphragm pressure switch, mounted on the heater housing, is used to sense a positive space pressure, in either the room or the ductwork. The unit modulates between the lower limit and 100% full volume based on building pressure requirements. Included with this option is a .01-0.2” W.C. pressure setting range (factory set at .01”) with a .02-.03” null. Variable amounts of outdoor air are brought into the space to satisfy the pressure set point. 10 feet of pressure sensing tubing is provided for field installation by others.

## *Mechanical Options and Accessories*

### **Evaporative Cooling**

The evaporative cooling option is available with water recirculation (EVR) and without (EVN). EVR models provide maximum cooling and humidity utilizing a pump and closed-loop, water recirculating system. EVN models provide similar cooling, but without water recirculation, reducing up-front costs, offering a simplified design, and lower maintenance. All evaporative coolers feature fully welded construction with heavy gauge stainless steel water reservoirs, and 6" thick Munters CELdek® evaporative media sized for 600 FPM maximum face velocity. 12" or 18" thick CELdek® and GLASdek® is also available. A thermostat controlled automatic fill and drain kit is a recommended option. All coolers are pre-piped, pre-wired, and fully factory tested prior to shipment. When used in conjunction with a direct fired heater, control is accomplished through two switches on the remote control panel. A fan on/off switch controls fan operation, which a heat/vent/cool switch allows for heating, ventilation with untempered air, or ventilation with cooled air. A variety of options are available for evaporative cooling; consult the factory for application assistance.

### **Mechanical Cooling**

*Direct expansion (DX)* evaporator coils offer single, dual, or quad circuits to ensure precise control of cooling capacity on AbsolutAire units. Interlaced circuiting as well as face or run control options ensure uniform refrigerant distribution over the face of the coil. Wide fin spacing is available to reduce frost buildup on low-temperature applications.

There are many options available with DX coils. These include special coil coatings, such as heresite, phenolic, or electrofin; special coil construction, such as copper fins, stainless steel, thicker fins or tubes; and many other features to meet requirements. The standard DX coil consists of a minimum 0.0060" thick aluminum fin and 0.02" copper tube.

*Chilled water (CW)* cooling coils use refrigeration equipment to provide cold water, which is then pumped through coils in the unit to cool and dehumidify the air stream. These coils are usually available in a range of sizes and circulating selection to optimize heat-transfer capacities. The design and selection process ensures easy cleaning for lasting performance. Glycol is often used as a component in the cooling fluid.

Both DX and CW coil sections and options include 1" thermafiber insulation, an aluminized steel interior floor liner on horizontal models, and a 14-gauge stainless steel drain pan. All coil controls, condensers, and valves are either field provided and installed by others, or by AbsolutAire as a packaged system.

### **Heating Coils**

*Steam, hot water (HW), or electric resistance coils* can be used to preheat the air for the direct gas fired burner, or sized to replace it. They can also be supplied as a "reheat" feature on a heating, cooling, and humidity control packaged system.

### **Insulation**

Insulation may be added to any part of the unit, including the base cabinet, filter section, options section, or curb. Insulation helps with sound attenuation and reduces condensation on indoor units and those with coil sections. The V-Series comes standard with 1" foil-faced insulation, but additional options include 1" thick, 1.5 pound density, neoprene coated fiberglass, glued and pin welded to the interior walls of the unit or 1" or 2" thick double wall construction. The insulation complies to UL standard 181 for erosion and NFPA 90A for fire resistance. All exposed edges will be coated to eliminate erosion.

## Paint Options

The exterior and interior may be painted using a high-quality catalyzed primer coat and a finish coat of machine enamel with rust inhibitors. The finish coat color may be chosen by the owner. All interior walls, the roof, and floor of the base unit cabinet are cleaned, primed, and painted. Our standard paint is Sherwin Williams KEM 400 industrial enamel.

*Epoxy paint* is another option for interior and exterior paint. This optional paint upgrade involves a primer and two-part epoxy to coat the entire interior, exterior, or both.

*Heresite* and *phenolic* paint coatings are also available.

## Motorized Inlet and Discharge Dampers

A damper will minimize the amount of air going through the unit when it is turned off. These optional 16-gauge galvanized parallel blade dampers are available on 100% OA units and are located on the inlet or discharge side of the unit. They are opened and closed using a two-position direct shaft coupled Electric Actuator. An end switch will prevent fan and burner operation before the damper is fully opened. Spring return and low-leak damper options with blade and jam seals, are available. Aluminum or stainless steel construction is also available.

## Inlet Hood

The inlet hood minimizes the ingestion of moisture into the unit, and is therefore highly recommended on all outdoor units. A framed wall mount inlet hood can be used in lieu of wall louvers for indoor, wall-mounted units. All hoods are welded, sealed, and weather-resistant, and can be equipped with a rain shield, birdscreen, and/or filters. A rain shield is a hood extension that is added to the hood to reduce moisture ingestion from wind-driven snow or rain. Birdscreen is ½" x ½" spaced 16-gauge wire that is added to the hood to aid in the reduction of ingestion of leaves, cottonwood, seeds, etc. Inlet hoods can be equipped with 1" or 2" cleanable, removable aluminum filters. The filters are accessible from the face of the hood.

## Side Access Filter Section

This filter section is accessed from the control side of the unit, and is usually mounted on the outdoor air inlet end. Filter options include 1" or 2" aluminum filters, or a variety of disposable filter options. Filters are arranged in a v-bank configuration with rigid slide rails. MERV 7 or 8 filters are standard. Up to MERV 17 (HEPA) filters are available, for application on the unit inlet or discharge, or both locations.

## External Vibration Isolation

Indoor, suspended units hang from building support steel. Rubber in-shear *suspension isolators*, sized for the weight of the unit, can be provided mounted in a rectangular steel housing. Hangar rod and/or unit support rails are normally field provided by others.

## 3-Way Single or Double Deflection Discharge Diffusers

A 3-way discharge diffuser is a rigid, welded discharge head which provides 180-degree air distribution. A single deflection diffuser is equipped with horizontal blades only, while a double deflection diffuser has horizontal and vertical adjustment blades. These discharge heads are commonly used on upright and indoor, suspended models.

## 4-Way Single or Double Deflection Discharge Diffusers

Like the 3-way discharge diffuser, but provides 360-degree air distribution and includes an insulated floor for sound absorption. These discharge heads are commonly used on rooftop, down discharge models or indoor, upright (up discharge) models.

## Splash Plate

A splash plate is a reinforced, flat, aluminized steel metal plate that is field installed below the discharge opening of horizontal models to prevent the supply air from blasting straight down on individuals inside the facility being served. The air is blown down, but then deflected horizontally in all directions (not adjustable) Threaded rod hangers are used to secure the plate to the roof structure, and are field provided by others.

## 48" Duct for Supply Air

This 48" long duct is constructed of 18-gauge aluminized steel. The duct has flanges for field connection to the unit supply air opening. Insulation, either 1" Thermafiber or 1" foil-faced, is an available option.

## Safety Screen

This is an expanded metal screen with a frame that is installed over the supply or discharge opening of the unit. Field installation by others may be required.

## Belt Guard

A belt guard, painted OSHA yellow, protects service personnel from moving belts while inside the fan cabinet. Provision is made for RPM readings without needing to remove the guard assembly.

## Flat Roof Curbs

Flat roof curbs are reinforced, 20" high supports for roof-mounted units. *Flat, full roof curbs* support the entire perimeter of the unit, while *flat duct curbs* only support the discharge end of the unit. Duct curbs include two adjustable legs and feet to support the inlet end of the unit. Both full and duct curbs ship either knocked down or fully assembled, and can be equipped with optional insulation and wood nailers.

A *flat, common roof curb* is also 20" high is usually used in kitchen ventilation applications. These curbs allow the exhaust and supply ductwork to occupy one common roof opening. The curbs ship fully-assembled and are designed for mounting the supply fan section of the unit, and a separate exhaust fan (provided by others). The curb ensures that a 10' distance is maintained between the inlet of the unit, and the discharge of the exhaust fan per most code requirements. Two adjustable legs are also included to support the inlet end of the unit.

## Pitched Roof Curbs

Pitched roof curbs are designed to keep units flat when mounted on a pitched roof. They are 20" high and are built based on the pitch of the roof and location of the unit on the roof. The curb can support a unit installed either parallel or perpendicular to the roof ridgeline. Pitched curbs, like the flat curbs above, can be full or duct curbs. A *full, pitched roof curb* supports the entire perimeter of the unit, while a *pitched duct curb* only supports the discharge end of the unit. Two adjustable legs are included to support the inlet end of the unit. Optional insulation and wood nailers can also be provided.

The construction of *all* roof curbs is based on the size and/or options of the unit it supports. Consult the factory to determine if the curb is 14, 16, 18, or 20-gauge, and if it is aluminized or galvanized.

## *Electrical Controls, Options, and Accessories*

### **Remote Control Panel**

This NEMA 5 or NEMA 4X Polycarbonate enclosure includes a summer-off-winter switch (keyed switch also available), and 3 standard circuit analyzer lights: Fan On, Burner On, and Burner Alarm. Additional analyzer lights are provided when a Low Temperature Alarm, Dirty Filter Light, or Time Clock is present. A space temperature or unoccupied space temperature dial may also be added. The panel is (24/120v) and is to be interconnected to the unit in the field by others.

### **Maxitrol Series 14 Discharge Temperature Control**

Discharge temperatures are monitored and controlled by a thermistor located in the discharge of the unit. The thermistor will modulate the gas valve to maintain the selected discharge air temperature. An adjustable temperature dial is located either at the remote control panel, or at the unit.

### **Maxitrol Series 44 Space Temperature Control**

This is a temperature control system with a sensing thermistor at the remote control panel, located in the heated space. The thermistor senses and controls the room temperature by modulating the gas valve to maintain the desired space temperature. A thermistor is also mounted in the discharge air stream of the unit to control the minimum and maximum discharge air temperature.

### **Remote Flame Reset**

If a loss of flame occurs or if the pilot cannot be verified at an initial startup, this flame relay will lock out and must be manually reset at the unit control panel. This is included as standard and adds a flame relay reset button on the remote control panel for reset convenience.

### **Low Temperature Limit**

This optional solid-state sensor is used to sense the discharge air temperature. If the temperature falls below the low set point (field adjusted) for five minutes, the unit will shut down, and if applicable, the outside air dampers will close. This switch is located in the main control panel, but can be reset by turning the remote panel summer/off/winter switch to the off position and then turning it back on. An automatic by-pass timer is provided for start-up purposes.

### **Mild Weather Stat**

This optional thermostat will disable the burner if the entering outdoor air temperature rises above the mild weather thermostat set point. The burner will re-ignite when the outdoor air temperature falls below the set point, plus a differential temperature (user adjustable). The thermostat is located in the main electrical enclosure.

### **Clogged Filter Indicator/Alarm**

This differential pressure switch is installed to sense the pressure drop across the filters. Pressure drop adjustment range is 0.2" W.C. to 1.0" W.C. When the pressure set point is exceeded, the indicator light on the remote control panel is illuminated and/or the alarm will sound.

## Magnehelic Gauge

This Dwyer device will monitor building pressure or differential pressure across the filter bank. The gauge is 4" in diameter and can be located on the remote control panel, at the unit, or shipped loose in a separate panel for installation in the field.

## Photohelic Switch and Gauge

This Dwyer photohelic air pressure gauge with relay outputs is used to monitor as well as control building pressure. It can also monitor filter loading and can be used in place of a clogged filter witch and light. The gauge is approximately 4" in diameter and can be installed on the remote control panel, on the unit, or shipped loose in a separate panel for field installation.

## Smoke Detector (shipped loose)

This is an ionization smoke detector shipped loose, to be installed by others. Electrical interlocks are provided at the main electrical panel terminal strip. If smoke is detected, the device will shut down the heater and close the damper(s).

## Burner Alarm Horn

This audible alarm horn is mounted on the exterior of the remote panel. If the burner locks out, the alarm will sound. A silence alarm button is located at the remote panel to quiet the alarm and illuminate the burner lockout light until the flame relay can be reset at the remote or main control panel.

## Programmable and Mechanical Time Clocks

The *programmable time clock* is an electronic 7-day, 24-hour digital display electronic timer, installed in the remote panel, with battery backup. This option allows automatic on/off control, as well as other time-specific functions throughout the day.

The *mechanical time clock* is an electronic timer installed in the remote panel. It allows the unit to be turned on or off at different times throughout the day. Unlike the programmable time clock, this option does not allow the selection of different sequences for different days of the week.

Both time clocks require the inclusion of the deluxe remote control panel.

## Deluxe Remote Control Panel

The deluxe remote panel includes a locking cover, a summer/off/winter switch, and indicator lights for power, fan, burner, and burner lock out. Additional indicator lights are available at an added cost.

## Room Override Control

This separate thermostat is located on the remote control panel to override the set discharge temperature on the dial. This allows the discharge air to be delivered to the space at a higher temperature in the event that the space temperature is below the desired set point. The maximum discharge temperature is normally 130 degrees. The room override function is field adjustable and can only be used with the Maxitrol 14 temperature controls located at the remote control panel.

## **Cycled Night Set Back**

This thermostat will turn the unit on when the room temperature falls below the room thermostat set point plus a selected differential (adjustable from 3 degrees F to 12 degrees F). The heater will then turn off when the room thermostat reaches the set point. The adjustable cycle stat is located in the remote control panel. This option cannot be used on units above 15 HP without the inclusion of an added cost timing circuit to protect the supply fan motor. This option also requires the inclusion of the deluxe remote control panel.

## **Continuous Night Setback**

This is used with Maxitrol 44 space temperature controls. This option includes an additional selector for a second temperature (i.e. unoccupied) to be selected as an alternate to the primary temperature (i.e. occupied). Selection between the two temperature selectors is accomplished with either an occupied/unoccupied toggle switch or a time clock. The toggle switch or time clock are located at the remote panel, and require the inclusion of the deluxe remote control panel.

## **Pre-Purge Timer**

This timer is standard with an ETL, FM, and IRI gas manifold. The control delays ignition of the burner in order to purge the unit cabinet of possible residual gas. All units have as standard a pre-purge timer of ten seconds, but this timer is adjustable up to sixty seconds.

## **UV Flame Detection**

This electronic sensor is standard on all piloted ignition systems to ensure that the pilot and main burner have been proven, and to monitor the flame during normal burner operation.

## **Three Phase Power Monitor**

This monitor interrupts the main power to the unit when it detects any loss of phase, phase reversal, or low voltage on any or all power legs. Power is automatically restored when the problem is corrected.

## **120V GFI Outlet**

This option provides a 120-volt ground fault convenience outlet on the main control panel. If the ground fault is tripped, it must be manually reset. If this outlet is powered by others, a separate 120-volt power source must be brought to the unit. Power for the outlet can also be supplied by AAI in the form of a factory installed transformer. This transformer is powered from the line side of the main disconnect switch.

## **Fused Disconnect Switch**

A fused disconnect switch of proper amperage can be provided in lieu of the standard non-fused disconnect switch. The fused disconnect switch is NEMA 3R rated and is located next to the main electrical control panel. Fusing is factory installed and tested prior to shipment.

## **Interlocking Relay**

Allows the unit to energize a control for an outside device, or allows an outside device to control a specific unit function. This relay also allows for remote status indication or exhaust fan interlocking.

### **Exhaust Fan Motor Starter**

This magnetic exhaust fan motor starter is factory wired with overload and short circuit protection as required by NEC. Advise quantity, horsepower, voltage, and phase at the time of order.

### **Exhaust Fan Motor Contactor**

This is an auxiliary contactor that is provided for exhaust fans. Short circuit and overload protection is provided by others. Advise quantity, horsepower, voltage, and phase at the time of order.

### **Exhaust Fan VFD**

A variable frequency drive (VFD) is mounted in the remote or main control panel to adjust the speed of the exhaust fan (provided by others). This option can be used in conjunction with a pressure differential switch, manual potentiometer, or 2-speed operation (high/low). Outdoor units include an electro-statically controlled heater for the VFD. The exhaust fan HP and voltage must be provided in order to price the exhaust fan VFD.

### **UVC Section with UVC Lights**

UVC lights and light fixtures are installed in an area or section downstream of cooling coils or filters. The UVC lights will minimize the growth and distribution of algae and other airborne microorganisms into the occupied space. The UVC lights are powered with a provided control transformer and include access door interlock switches that turn the UVC lights off when the access door(s) are open.

### **DDC Control System**

The standard LX-1 DDC system comes with a programmable logic controller and sufficient I/O capabilities to allow for complete control of the unit. Single or multiple units can be controlled by a personal computer when the units are wired into a network or connected together via a twisted pair. A single programmable control station (smart stat) is also an available option for user interface with the unit(s). The system can be upgraded to allow for complete web access or to have Bacnet and/or Lon protocols resident on the controller. All software and programming are provided by AbsolutAire and include all windows style graphic interfaces when for use with a PC or the web access option.

## *Gas Control Options and Accessories*

### **IRI Gas Manifold**

In addition to the FM gas manifold that comes standard on the V-Series, there is also the option of upgrading to IRI insurance requirements.

An *IRI* gas manifold is built in accordance with the requirements of Industrial Risk Insurers.

### **High Gas Pressure Regulator**

When the inlet gas pressure is in excess of the maximum allowable pressure shown on the unit rating plate (14" W.C. up to 1,100 MBH and 5 PSI over 1,100 MBH), the pressure must be reduced. This full lock-up regulator, with internal relief, is provided to adjust the gas pressure so that it falls below the maximum for the unit. The regulator is normally shipped loose, for field installation by others.

### **High and Low Gas Pressure Switches**

These manual reset safety switches are provided to disable power to the flame relay if gas pressures above or below the user-selected set points are detected. This option is standard with all IRI gas manifolds, and with all FM manifolds with burners rather 2,500 MBH and higher.

### **Natural/LP Changeover Switch**

This switch allows for changeover from either natural gas to propane without needing to change the burner high-fire gas pressure settings. Both gas pressure settings must be adjusted at the time of initial field start up. The switch is located on the main control panel of the unit and requires Maxitrol Series 14 or 44 electronic temperature controls.

### **CO, CO<sub>2</sub>, NO<sub>2</sub>, & NO<sub>x</sub> Detectors**

These detectors have dual relay outputs and are installed on the remote panel to monitor the space being heated. If any of these gas concentrations exceed the set point, an alarm condition is created that allows for control of unit functions and/or other ventilation equipment such as damper positioning, unit shut down, exhaust mode enabling, etc. This option requires the deluxe remote panel option.