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# ModuFlex

Adaptive, Comfortable, Sustainable Environments

ModuFlex by Price is an Underfloor Air System Solution that is easy to apply. This system combines the benefits of Raised Access Floor (RAF) and Price's years of occupant comfort experience to provide a tailored solution that achieves a comfortable building environment and maximum flexibility.

# SYSTEM APPLICATIONS

Price ModuFlex is easy to apply and a flexible zone based solution for Underfloor Air Systems. These systems are most commonly applied to commercial office spaces to improve air quality and thermal comfort, while saving energy and reducing utility costs.

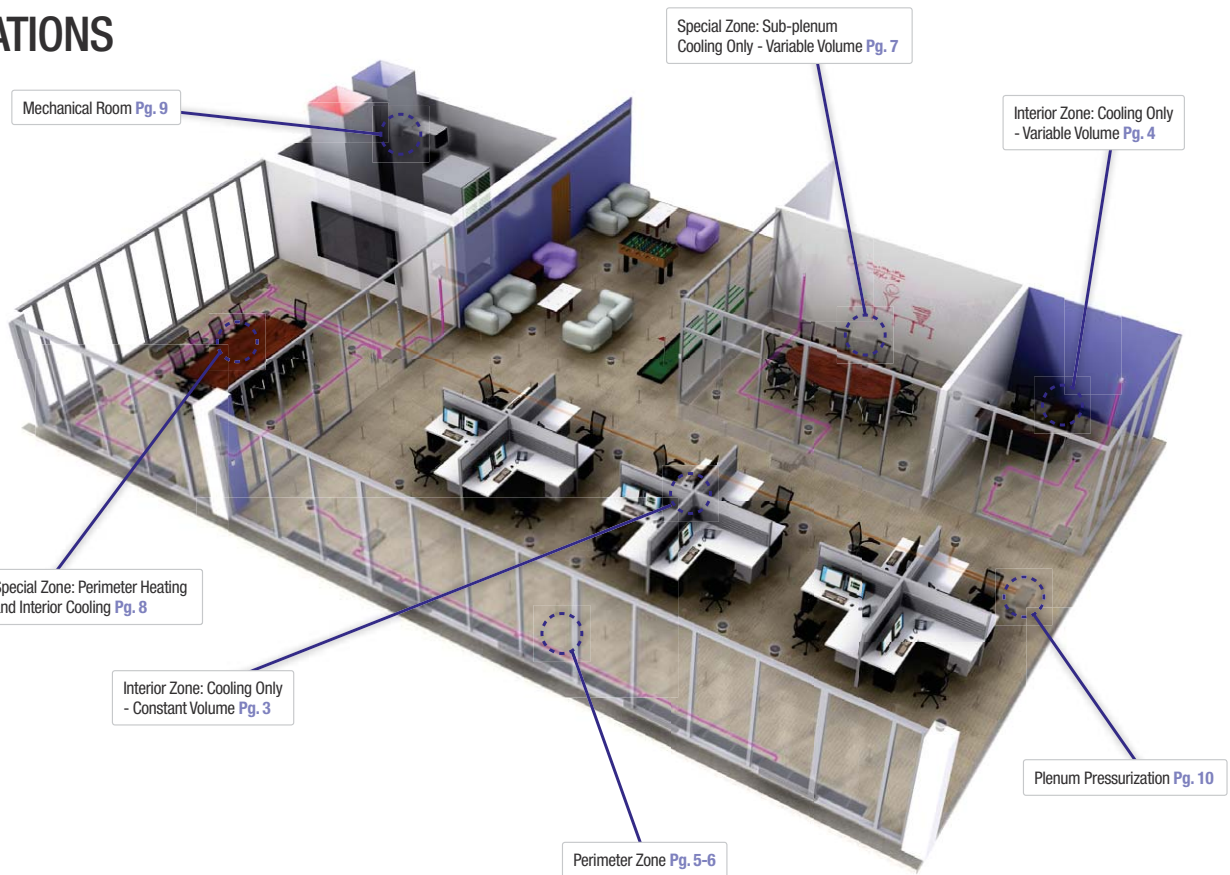
Projects with raised access floors and underfloor air systems typically require flexibility, energy efficiency and improved indoor environmental quality (IEQ); ModuFlex's zone solutions have been strategically designed to provide a modular solution that optimizes energy usage and IEQ.

ModuFlex leverages Price's rigorously tested Underfloor Air Distribution (UFAD) products to ensure occupant comfort, and native BACnet microprocessor controllers to ensure proper control.

Together, these components provide a modular system that is easy to remodel and reconfigure and can communicate with the existing building management system.

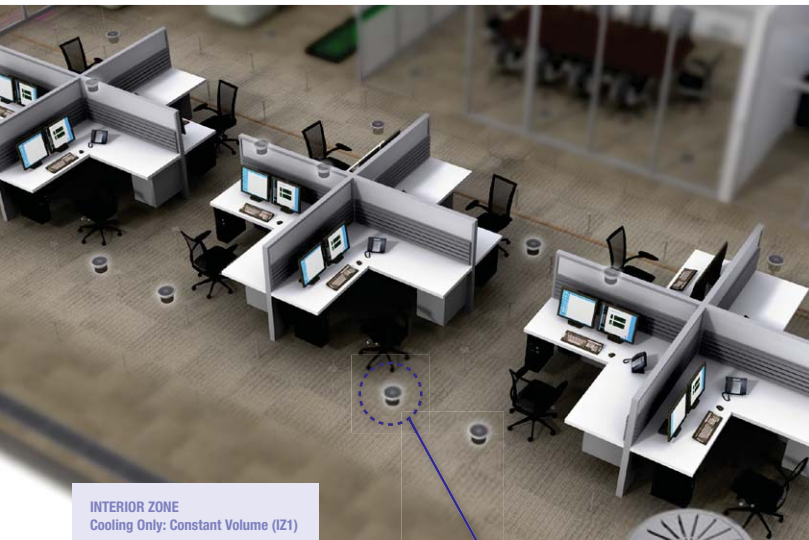
## KEY SYSTEM FEATURES:

- Easy-to-apply zone-based solutions.
- Combines Price's years of occupant comfort experience with cutting edge system controls.
- Thoroughly tested controls for a reliable network integration.
- Modular solution that optimizes energy efficiency and IEQ.
- Ability to customize the solution to fit your unique needs.



## INTERIOR ZONE APPLICATIONS

For most large open spaces with cubicles and open meeting areas, large interior zones may be thought of as having nearly uniform conditions. The whole zone has a relatively stable load during occupied hours and may be treated as such. Loads in the interior zone are predominantly composed of occupant, lighting, and equipment loads. These zones will be supplied air via a common main plenum. These zones typically only require cooling to maintain thermal comfort.

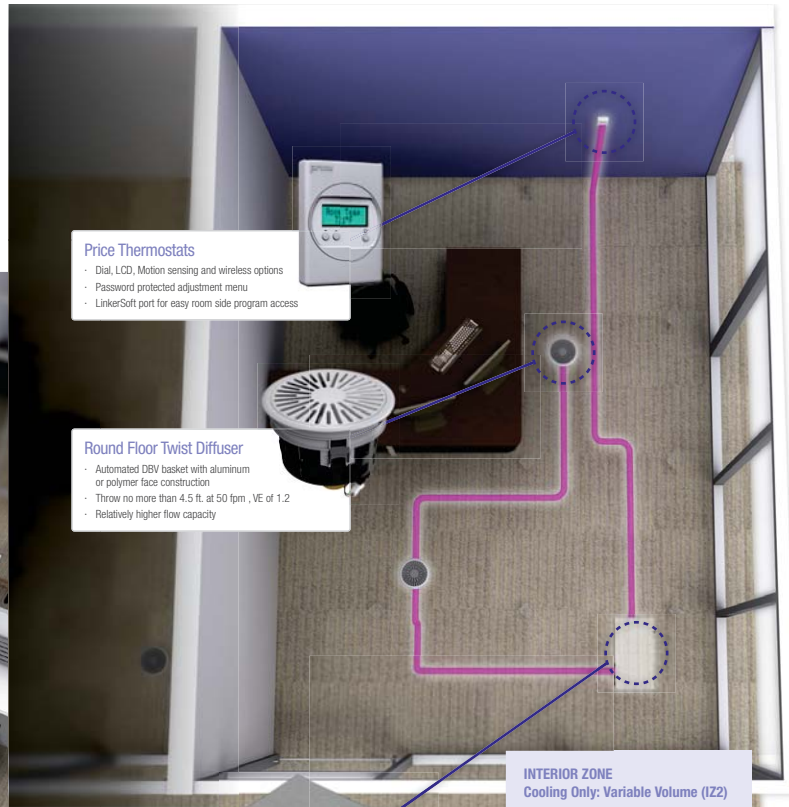


### INTERIOR ZONE Cooling Only: Constant Volume (IZ1)

This control zone is formed using manually adjustable constant volume diffusers with air being supplied from the pressurized floor plenum. Pressure nodes placed strategically throughout the plenum monitor the plenum pressure. The Underfloor Pressure Controller (PCU) maintains desired plenum pressure and airflow through signalling the main fan to modulate or adjust the plenum dampers.

### Round Floor Displacement Diffuser

- Manually adjustable baskets with aluminum or polymer face construction
- Optimal low velocity displacement design, VE of 1.2
- Placement independent of occupant location



### Price Thermostats

- Dial, LCD, Motion sensing and wireless options
- Password protected adjustment menu
- LinkerSoft port for easy room side program access

### Round Floor Twist Diffuser

- Automated DSV basket with aluminum or polymer face construction
- Throw no more than 4.5 ft. at 50 fpm, VE of 1.2
- Relatively higher flow capacity

### Power and Control Module

- UMC3 control board, native BACnet
- Power and control signal transmitter over one cable
- Quick connect cables used to daisy chain units together

### INTERIOR ZONE Cooling Only: Variable Volume (IZ2)

This control zone is formed using variable volume round floor diffusers controlled from the room thermostat. A thermostat monitors the room temperature, while the PCM adjusts the dampers to meet the cooling requirement of the space.



# PERIMETER ZONE APPLICATIONS

These zones are typically more complex than interior zones. Perimeter zones generally have larger and more varying loads and often require auxiliary heat. Using the proper system helps control heating and cooling requirements for the space. The following are the most common applications for conditioning perimeter zones.

## PERIMETER ZONE Trough Heating And Cooling (PZ1)

An efficient mode of conditioning perimeter zones is by placing drop-in plenum heaters within the perimeter grilles to heat and cool. Cooling is handled through variable air dampers in the trough, and heating is used when the thermostat notes a drop in temperature below the set point. This removes the need for ductwork and fan terminals along the perimeter, reducing noise and energy consumption. A thermostat monitors the room temperature, while the PCM adjusts the dampers to meet the space requirements. This minimizes fan energy usage and noise generated by the terminals.

### Natural Convection Heat

Occurs when the plenum damper is closed and room air is heated through natural convection in a heater trough and reintroduced into the space. A thermostat monitors the room temperature, while the PCM adjusts the dampers to meet the cooling requirement of the space.

### Forced Heat

Occurs when plenum air is forced across the heater with the plenum damper open. This is typically only required when high heating capacities are demanded.

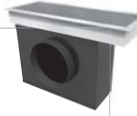
## Wireless Thermostat with Power and Control Module

- Wireless thermostat allows for convenient, wire-free placement in any room, on any surface
- Compatible with Price's Power and Control Module
- Wireless signal receiver mounted easily under any Price round floor product



## Linear Floor Grille Plenum

- LFG-F grille with plenum for underfloor applications
- Duct collars for fan connection
- Drop-in installation

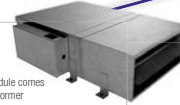


## PERIMETER ZONE Ducted Fan Heating and Cooling (PZ2)

Traditionally, fan terminals have been used to provide variable heating and cooling to the perimeter. The fan terminal is equipped with either a hot water coil or an electric heater. Air is forced through the fan and then introduced into the space through floor grilles. A thermostat monitors the room temperature, while the PCM onboard the fan terminal modulates the fan and heating device to meet the space requirements.

## Modular Fan Powered Terminal with ECM

- Onboard Power and Control Module comes with UMCS controller and transformer
- Electric, hot water and chilled water coils
- Deluxe speed controller available for true RPM feedback

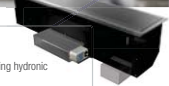


## PERIMETER ZONE Ducted Fan Heating and Plenum Cooling (PZ3)

In areas where plenum cooling can be implemented the LFG-HC has a damper which modulates between cooling and heating positions. In this application, a fan terminal is only required in heating mode. Cooling is provided through the plenum while the fan is off, and heating is provided through the ducted fan terminal with a hot water coil or an electric heater. A thermostat monitors the room temperature, while the PCM onboard the fan terminal modulates the fan space and heating device to meet the space requirements.

## Linear Floor Heater

- Natural convection heat using hydronic or electric coils
- Drop-in installation
- Plenum VAV cooling



## Power and Control Module

- UMCS control board, native BACnet
- Power and control signal transmitted over one cable
- Quick connect cables used to daisy chain units together



## Linear Floor Grille with Internal Damper Plenum

- Damper for switchover between plenum or fan supply
- Drop-in installation
- Duct connection for fan forced heating side



# SPECIAL ZONE APPLICATIONS

Conference rooms, meeting rooms and interior private offices can experience wide load swings due to intermittent occupancy or equipment operation. Interior zones with large swings in occupancy or equipment loads, or those that require smaller individual control zones, can also be thought of as special zones. There are several common options available to address these zones in order to maintain comfort levels in all areas.

**Price Thermostats**

- Dial, LCD, Motion sensing and wireless options
- Password protected adjustment menu
- LinkerSoft port for easy room side program access

**Round Floor Displacement Diffuser**

- Manually adjustable baskets with aluminum or polymer face construction
- Optimal low velocity displacement design, VE of 1.2
- Placement independent of occupant location

**Modular Fan Powered Terminal with ECM**

- Onboard Power and Control Module comes with UMCB controller and transformer
- Electric, hot water and chilled water coils
- Deluxe speed controller available for true RPM feedback

**SPECIAL ZONE Sub-plenum Cooling Only: Variable Volume (SZ1)**

This control zone is formed using fixed damper position round floor diffusers. The pressurized plenum for the space is divided from the rest of the floor plate. This sub-plenum is pressurized by a fan terminal. A thermostat monitors the room temperature and occupancy, while the PCM adjusts the fan to meet the cooling requirement of the space. This strategy is useful for rooms with large temperature swings and higher occupancy, versus smaller break-out style conference spaces.

**Linear Floor Heater**

- Natural convection heat using hydronic or electric coils
- Drop-in installation
- Plenum VAV cooling

**Round Floor Displacement Diffuser**

- Automated DBV basket with aluminum or polymer face construction
- Optimal low velocity displacement design, VE of 1.2
- Placement independent of occupant location

**Power and Control Module**

- UMC3 control board, native BACnet
- Power and control signal transmitted over one cable
- Quick connect cables used to daisy chain units together

**SPECIAL ZONE Perimeter Heating and Interior Cooling (SZ2)**

The cooling for this zone is handled by using variable volume round floor diffusers controlled by the room thermostat. Heat is provided by heating room air through natural convection in a heater trough and reintroducing it into the space. A thermostat monitors the room temperature and occupancy, while the PCM adjusts the dampers or heaters to meet the space requirements.

# PRESSURE CONTROL

Office spaces are one of the more diversely loaded spaces which in underfloor applications can share a common pressurized plenum. Diffusers and grilles for UFAD are selected based on certain floor static pressures. This demands maintaining floor pressurization for proper comfort and system operation.

**PLENUM PRESSURIZATION (PP1)**  
 Price's unique solution provides pressure monitoring and control while maintaining the aesthetics of the space. Pressure nodes that are concealed with the floor diffusers are used to monitor the pressure in the space. Underfloor pressure controllers must be capable of handling very low pressure resolution, on the order of 0.001 in.w.g. or less. Typically common plenum pressure set-points range from as low as 0.05 in.w.g. to 0.08 in.w.g..



**Price Fan Column**

- Localized air handling
- Cooling coils and return air bypass
- Discharge air temperature control

**Relative Pressure Node**

- Sensor is factory mounted on bottom of blank off
- Ultra low pressure operating range
- Concealable under any Price Round Floor Diffuser



**MECHANICAL ROOM (MR1)**

The Price Fan Column is a bottom discharge vertical unit specifically designed for underfloor air systems. It is intended to minimize the mechanical room and air shaft footprint to maximize the usable floor space. Return air will enter the mechanical room at top level and mix, either through a cooling coil or bypass section, with fresh air delivered through outdoor air only risers. Discharge air temperature can be used to modulate the return air cooling. The fan can be modulated to maintain plenum pressure at all load conditions. CO<sub>2</sub> sensors can be used to modulate the fresh air VAV box to provide demand control ventilation.

**Underfloor Pressure Controller**

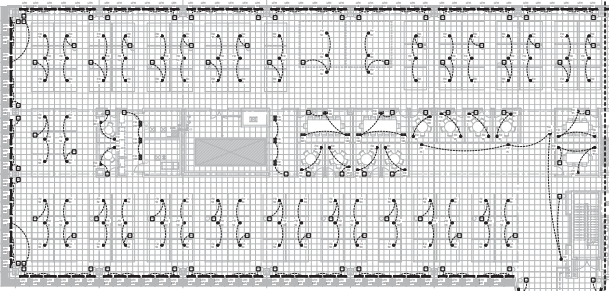
- Constant or variable pressure sequences
- Sends signal to either Variable Frequency Drive (VFD) on fan column, or remote plenum supply dampers
- Ability to receive signals from multiple pressure nodes

# PRICE DESIGN & LAYOUT ASSISTANCE

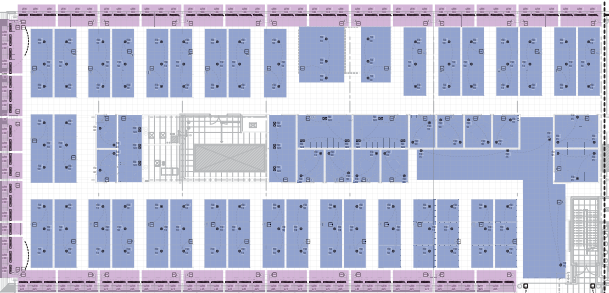
Price ModuFlex solution comes with design assistance. Our experienced team is trained to help with designing and laying out complete underfloor air systems.

- Application support
- Layout assistance
- Detail sheets
- Zone schedule
- Product related performance

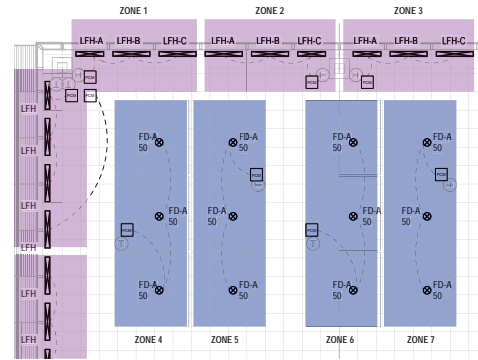
As shown below, an underfloor office layout can be divided into typical control zones.



All blue zones shown will have a typical layout as illustrated under Interior Cooling Only: Variable Volume Zone (IZ2). All purple zones illustrated in will have a typical layout as shown under Perimeter Trough Heating and Cooling Zones (PZ1).



These zones can now be sized and tabulated to provide a detailed zone schedule similar to the illustration below.



Example Zone Schedule

ZONE	# OF UNITS	MARK	LENGTH	COOLING			TYPE OF COIL	TOTAL CAPACITY (MIN)	PIPING CONFIG	EAT	HEATING				S&R OD	DEVICE	GRILLE TYPE	PCM	ZONE TYPE	REMARKS		
				CFM	LAT	HWS					WATER											
											GPM	WPD (FT)	DWT	LMT							ROWS	FIN TYPE
Zone 1	3	LFH-A	2'	150	65	---	9.3	SERIES	70	1	0.75	160	142	2	ALUM	7/8"	PRICE LFH-RCV	15x1000/DH/1 XXC/66	UMC3	Perimeter Trough Heating and Cooling	2 Row Coil Pack	
		LFH-B	4'	150	65	---																
		LFH-C	4'	150	65	---																
Zone 2	3	LFH-A	4'	150	65	---	11.2	SERIES	70	1	0.75	160	138	2	ALUM	7/8"	PRICE LFH-RCV	15x1000/DH/1 XXC/66	UMC3	Perimeter Trough Heating and Cooling	2 Row Coil Pack	
		LFH-B	4'	150	65	---																
		LFH-C	4'	150	65	---																
Zone 3	3	LFH-A	4'	150	65	---	11.2	SERIES	70	1	0.75	160	138	2	ALUM	7/8"	PRICE LFH-RCV	15x1000/DH/1 XXC/66	UMC3	Perimeter Trough Heating and Cooling	2 Row Coil Pack	
		LFH-B	4'	150	65	---																
		LFH-C	4'	150	65	---																
Zone 4, 5, 6, 7	3	FD-A	8'	68	65	---	---	---	---	---	---	---	---	---	---	PRICE DBV	RFTD/RFF/GRY	UMC3	Interior Cooling Only: Variable Volume			

Detail Sheets (available on request) and the Zone Schedule can then be added to the construction documents for effective scope communication and informed bidding process.



# PRICE CONTROLS START-UP SERVICE

Price offers an industry-leading controls start-up service, through which our trained Applications team will travel to the installation site and perform some or all the following valuable services:

- Pre-construction meetings
- Construction site walk-throughs
- Installation examples
- Controls integration assistance
- Help with the commissioning of typical Price UFAD equipment, including functional testing
- On-site product review and troubleshooting
- Training and education for owner, occupants, and maintenance personnel

Using Price's complete UFAD systems in conjunction with our on-site support service is a great way to **ensure absolute confidence in your Price UFAD system.**







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