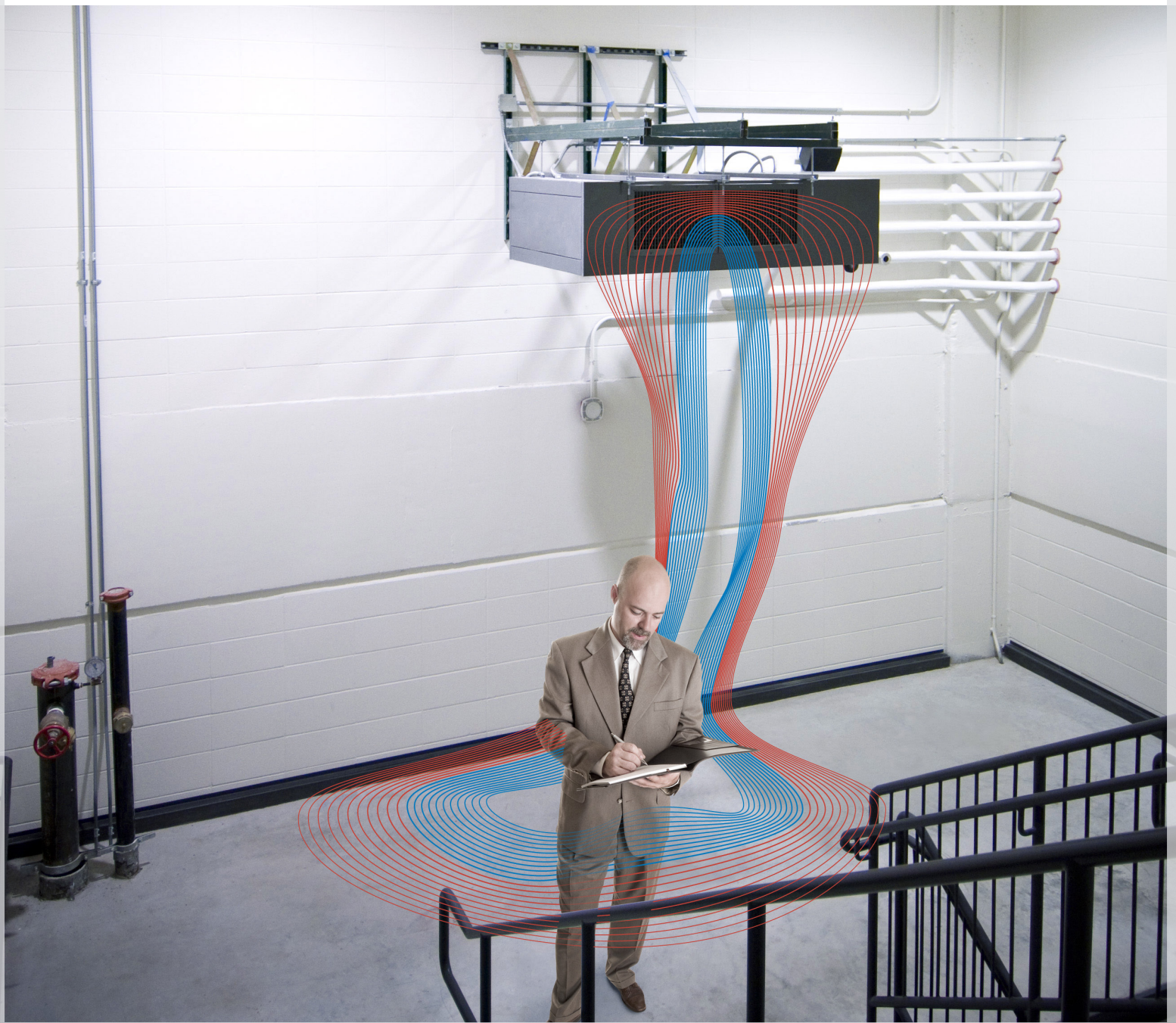


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# High Capacity Fan Coils

Catalog







Zehnder decorative radiators



Heating and cooling ceiling systems



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# Versatility and style combined with cooling and heating efficiency

With more than 50 years experience in the design and manufacture of hydronic heating and cooling systems, Zehnder understands your need for efficient heating/cooling equipment that will complement the décor. Zehnder Fan Coil Units offer the latest in attractive design and are engineered to provide years of reliable operation and energy-efficient comfort.

Zehnder Fan Coils are installed in new building construction, renovated offices, residential complexes and educational institutions across North America. Zehnder Fan Coil products stand out of the crowd based on their unique heavy-duty construction and custom applications capability. All Zehnder Fan Coils are the result of years of research on the latest hydronic coil and fan technology available. Designed for permanent balance and strength for years of trouble free performance. Custom hand-built solutions for retrofit and replacement are part of our everyday life.

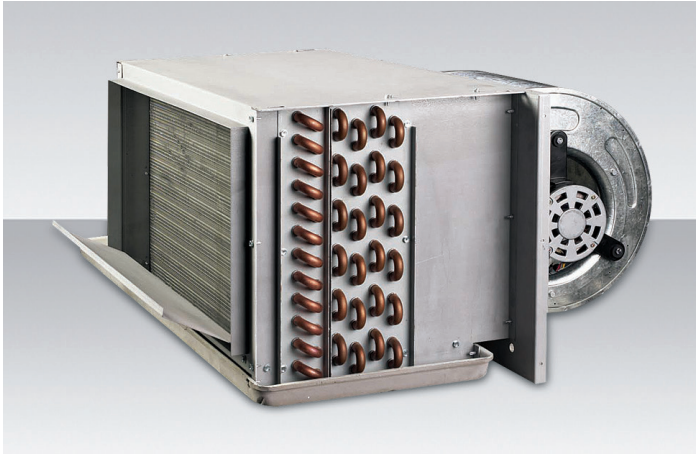
Zehnder Fan Coils are available in a wide range of models and air flow arrangements to satisfy the demands of your heating and cooling specifications. In addition to this, Zehnder experts are able to help with complex specification plans through our competent sales team who can visit the site if requested.

“If you can draw it, we can build it.”

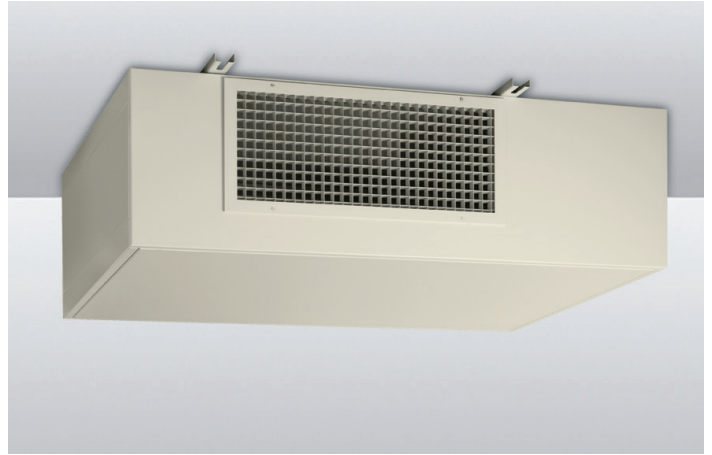
<b>Models and arrangements</b>	<b>2</b>
<b>Features</b>	<b>4</b>
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<b>Ratings</b>	<b>7</b>
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# Fan coil models and airflow arrangements

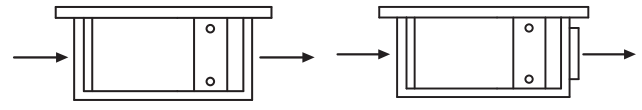
## Direct drive models



**FDH: Direct drive hideaway, horizontal**  
FDH-600 shown

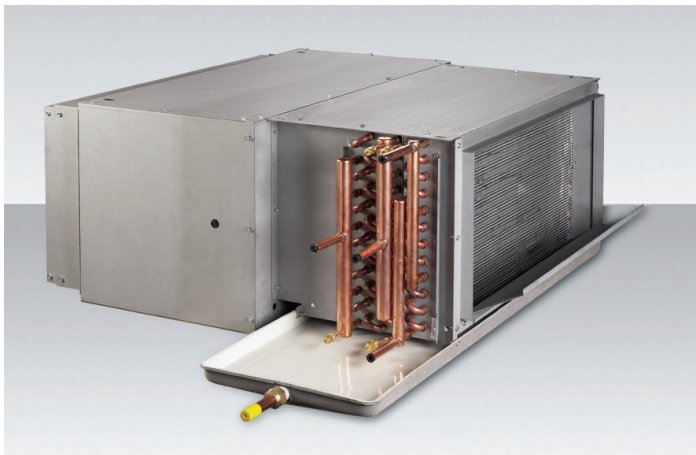


**FDC: Direct drive ceiling, horizontal**  
FDC-630 shown, FDC-640 available

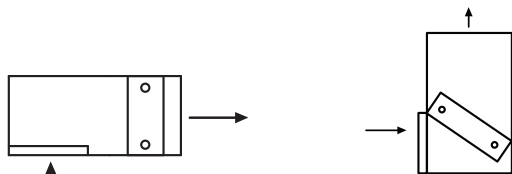


FDC-630

FDC-640



**FDHP: Direct drive hideaway with plenum, horizontal**  
FDHP-620 shown, FDHP-610 available

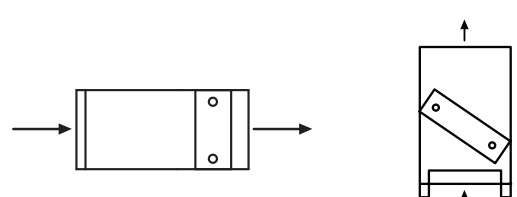


FDHP-610

FDHP-620



**FDV: Direct drive, vertical**  
FDV-800 shown, FDV-810 available

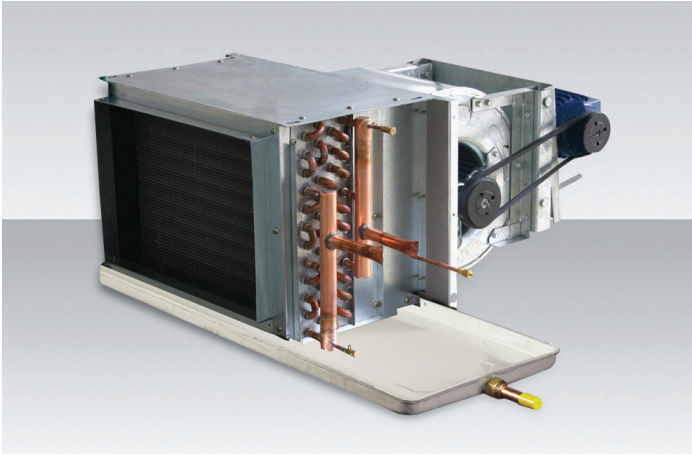


FDV-800

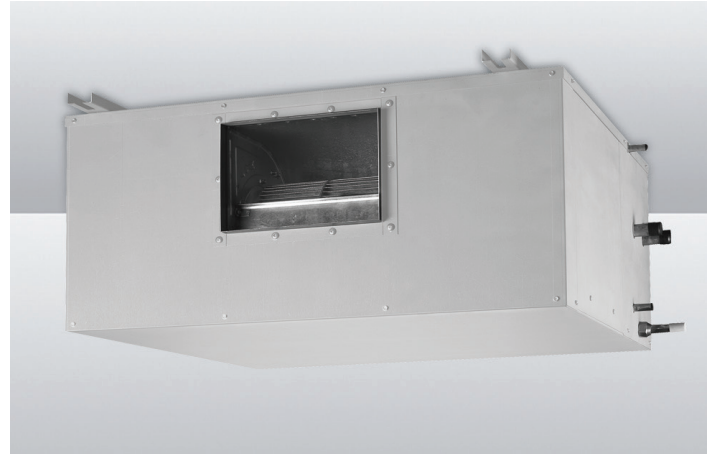
FDV-810

# Fan coil models and airflow arrangements

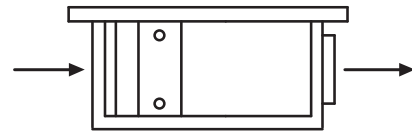
## Belt drive models



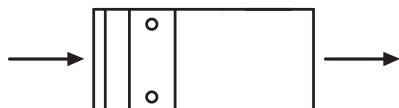
**FBH: Belt drive hideaway**  
FBH-700 shown



**FBC: Belt drive ceiling**  
FBC-720 shown



**FBHP: Belt drive hideaway with plenum**  
FBHP-710 shown



# Features

## A: Cooling coil

### Standard 4 row or 6 row high capacity

- Sturdy, mechanically-bonded copper/aluminum coil with 12 fins per inch and 1/2" nominal tubes.
- High BTU capacity with low noise.
- Coil assemblies tested for a maximum of 300 psig working pressure.
- Manual air vent.

## B: Heating coil

### Optional 1 row or 2 row high capacity

- Sturdy, mechanically-bonded copper/aluminum coil with 12 fins per inch and 1/2" nominal tubes.
- Coil assemblies tested for a maximum of 300 psig working pressure.
- Mounted in reheat position.
- Steam heating available.
- Manual air vent.

## C: Speed control (not shown)

- Three-speed fan switch allows speed selection for comfort control and is shipped loose. (Direct drive units only.)

## D: Blower fan housing

- Provides excellent CFM output per unit size.
- Aluminum wheel and Galvanized steel housing.

## E: Direct drive motor

- Motors are permanent split capacitor for extended, reliable motor life, low operating cost and quiet operation.
- Integral thermal overload protection.
- Multispeed motors achieve a wide range of CFM delivered.
- Standard motor 120V/60/1.

## F: Belt drive motor & drive

(Horizontal units only)

- Standard belt duty, 1200 and 1800 RPM, open drip-proof.
- Adjustable motor mount for easy belt adjustment and maintenance.
- Variable pitch motor sheave.
- Available in 120V/60/1, 208V/60/1, 230V/60/1, 208V/60/3, 230V/60/3 and 460V/60/3. 3-phase motors require thermal overload protection, by others.

## G: Cabinet construction

- Hideaway units made of heavy gauge galvanized corrosion resistant steel with flanged outlet for duct connection.
- Heavy duty panels protect against impact with tamper-resistant quarter-turn fasteners included as standard. (Ceiling exposed units only.)
- Fully insulated with 1/2" fiberglass insulation to dampen sound and provide thermal efficiency.

## H: Finish (not shown)

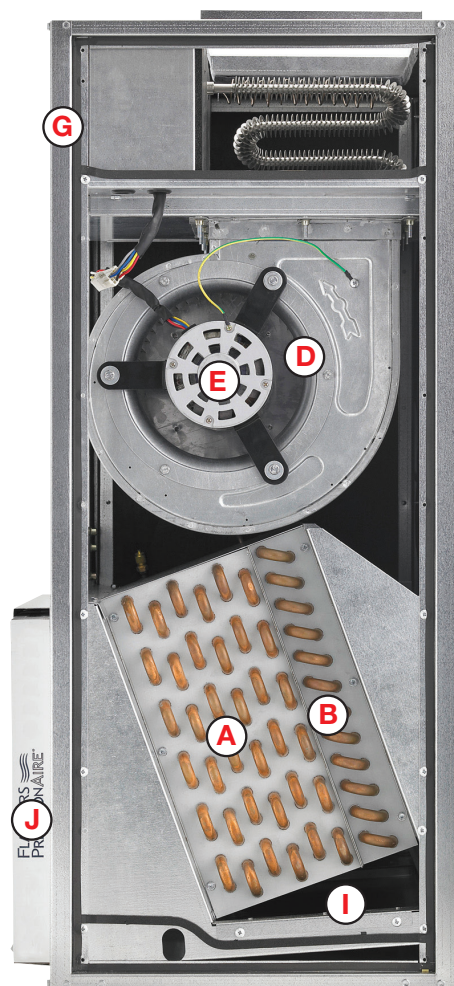
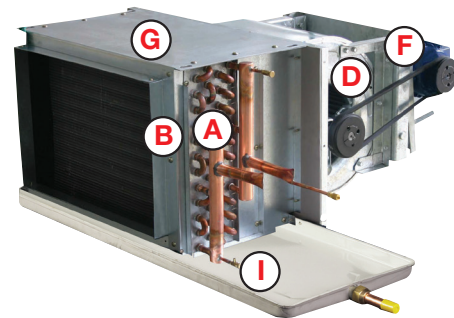
- Attractive ivory epoxy powder coating is standard. (Ceiling Exposed units only).
- Additional colors are available. Please furnish a color chip for custom color.

## I: Drain pan

- Made of 18-gauge, galvanized corrosion resistant steel with epoxy powder coat finish.
- Positively sloped to ensure proper drainage and maximize protection against microbial growth.
- Fully insulated.

## J: Filter

- Two-inch disposable synthetic fiber, MERV 8, pleated media slides easily into filter track.





# Options and accessory equipment

## Factory assembled options

### Cabinet

Complete 14 gauge cabinet construction available for heavy-duty applications. (Ceiling exposed units only.)

#### ■ Insulation

- ◆ 1/2" foil faced fiberglass insulation
- ◆ 1/2" closed cell insulation

#### ■ Double wall

Vertical units can have a 20 gauge galvanized skin on the inside of the unit for easier cleaning and greater IAQ.

#### ■ Double deflection grille

Aluminum construction with independent vertical and horizontal louvers to allow full adjustment of airflow in either direction (FDC units only).

### Color

#### ■ Ceiling exposed units only

All Zehnder Rittling fan coil units come with an ivory powder paint finish. Additional standard colors are available. Furnish a color chip for custom color.

### Coils

#### ■ High capacity chilled water

6 row cooling coil available to provide higher cooling output.

#### ■ Hot water

1 row or 2 row hot water heating coil used in 4-pipe systems, in reheat position.

#### ■ Automatic air vent

In lieu of manual air vent.

### Electric heat

#### ■ Vertical units only

Single stage or intermediate seasonal electric heating. Finned tubular electric heating elements are constructed of nickel-plated steel fins, spirally wound over a heating element located above blower opening. This option also includes grounding terminals, linear limit switch, fusible link(s) and magnetic contactor(s).

Contact the factory for electric heat options for all horizontal models.

### Drain pan

304 stainless steel.

### Motors

#### ■ ECM

Electronically commutated motors (ECM) are high efficiency, programmable, brushless DC motors that utilize a permanent magnetic rotor and built-in inverter. EC motors provide a low operating cost and ultra-quiet operation. A separate 2-10 VDC or 3-speed control card is included. Available for direct drive units only.

#### ■ Motor quick connect

Molex connectors are provided for ease of removal, located at motor.

#### ■ Disconnect switch

1-pole 120V/60/1 (15A),  
2-pole 277V/60/1 (15A),  
2-pole 277V/60/1 (30A),  
2-pole 460V/60/3 (40A) and 3-pole 460V/60/3 (30A). Installed on face of electrical control side of units.

#### ■ Motor starter

120V/60/1 manual reset motor starter with toggle switch and thermal overload protection. Unit can only be restarted by resetting toggle switch. Starter comes with an overload protection set at 125% of full load current. Not available with electric heat. Contact factory for alternate voltages.

#### ■ Level switch

Mounted to the horizontal drain pan. 120V or 24V power. De-energizes fan upon rising water level.

### Leveling legs

Leveling legs are available to adjust pitch on uneven floors (vertical units only).

### Filters

Contact the factory for higher efficiency or washable filters.

# Options and accessory equipment

## Controls

Control packages are only available with direct drive units. See pages 50-55 for more information.

### ■ Valve control by air temperature

Remote mounted thermostat monitors air temperature in the space for heating and cooling applications. When the temperature rises above set point during cooling and drops below set point during heating, the cooling or heating valve will open. When the space temperature is satisfied, the valve will close. The blower runs continuously based on three-speed switch positions. A remote temperature sensor is offered with all thermostat options for remote mounting in space or in return air stream.

### ■ Fan control by air temperature

Remote mounted thermostat monitors air temperature in the space for heating and cooling applications. When the temperature rises above setpoint during cooling and drops below set point during heating, the cooling or heating valve will open and the fan will turn on. When the space temperature is satisfied, the valve will close, and the fan will turn off. A remote temperature sensor is offered with all thermostat options for remote mounting in space or in return air stream.

### ■ Valve control by water temperature

Changeover switch monitors the temperature of the water leaving the coil. It will delay opening the cooling/heating valve until a predetermined water temperature is reached.

## Thermostats

Electronic, non-digital  
Providing on/off control for low voltage and line voltage control of valves, relays and fan motors.

Digital, non-programmable  
Providing on/off and modulating control for low voltage and line voltage control of valves, relays and fan motors.

Includes backlit display.

Digital, 7- day programmable  
Providing on/off and modulating control for low voltage control of valves, relays and fan motors. Includes backlit display.

## Valve packages

Shipped loose for field installation. See pages 45-49 for more information.

## Field assembled accessories

### Auxiliary drain pan

To collect condensate from valve packages and piping. Horizontal units only. Included with factory provided valve packages at no charge.

## Horizontal direct drive standard ratings

Table A

Unit size		06	08	12	16	20
Certified cooling ratings (4 row main coil)	Total MBH	20.2	24.5	37.4	51.6	63.2
	Sensible MBH	16.6	20.0	29.6	40.6	51.9
	GPM	4.0	4.8	7.6	10.3	13.0
	PD, ft. of H <sub>2</sub> O	5.7	8.6	18.5	19.5	13.3
Certified cooling ratings (6 row high capacity coil)	Total MBH	26.0	31.6	44.6	67.8	80.9
	Sensible MBH	19.4	23.1	32.4	49.4	60.5
	GPM	5.2	6.4	9.0	13.7	16.4
	PD, ft. of H <sub>2</sub> O	7.2	11.2	7.2	14.4	8.9
Heating capacity (optional 1 row reheat coil)	MBH	20.1	25.5	37.5	54.7	66.1
	GPM	1.4	1.7	2.5	3.7	4.4
	PD, ft. of H <sub>2</sub> O	0.6	1.0	2.3	5.3	2.6
Heating capacity (Optional 2 row reheat coil)	MBH	39.2	47.5	66.6	98.5	120.4
	GPM	2.7	3.2	4.5	6.7	8.2
	PD, ft. of H <sub>2</sub> O	3.3	5.0	5.0	11.5	6.8
CFM	High	850	1080	1450	2000	2700
	Medium	700	850	1240	1800	2500
	Low	600	700	1000	1460	2100
Coil	FPI	12	12	12	12	12
	Face area, ft <sup>2</sup>	1.73	2.06	3.03	4.11	4.93
Blower	Quantity	1	1	1	2	2
	Diameter	8.8"	8.8"	8.8"	8.8"	8.8"
	Width	9.9"	9.9"	9.9"	9.9"	9.9"
Filter	Number	1	1	1	1	2
	Length, in.	21.0	24.2	33.4	43.9	24.2
	Width, in.	15.5	15.5	15.5	15.5	15.5
	Thickness, in.	2	2	2	2	2
Shipping weight, lbs.	Standard coil ceiling	160	190	225	300	380
	High capacity coil ceiling	170	205	245	320	410
	Standard coil with plenum	135	150	180	240	290
	High capacity coil with plenum	145	165	200	260	320
	Standard coil without plenum	90	100	115	160	180
	High capacity coil without plenum	100	115	135	180	210

## Notes:

- Airflow under dry conditions. Inlet air 70-80 °F DB and 0.0" ESP for FDHP model with 4-row coil.
- Cooling capacity based on inlet air 80 °F DB, 67 °F WB, 45 °F entering water, 55 °F leaving water, high fan speed, 0.0" ESP.
- Heating capacity based on inlet air 70 °F DB, 180 °F entering water, 150 °F leaving water, high fan speed, 0.0" ESP.
- All direct drive units supplied with replaceable filter with the exception of model FDH.
- Model FDC filters are (filter width is 11-11/16") by (06: 13-11/16", 08: 17-11/16", 12: 27-11/16", 16 & 20: (2) 17-11/16") length.
- AHRI certified for sizes 06, 08, and 12. Larger sizes exceed the maximum airflow rate in AHRI 440 and are therefore not certified.



## Vertical direct drive standard ratings

Table B

Unit size		06	08	10	12	14	16	18	20
Certified cooling ratings (4 row main coil)	Total MBH	20.1	23.9	24.7	32.8	51.6	56.1	61.2	63.2
	Sensible MBH	14.7	17.1	20.2	24.3	40.8	46.3	49.9	52.0
	GPM	4.1	5.1	5.0	6.8	10.5	11.4	12.4	13.0
	PD, ft. of H <sub>2</sub> O	5.9	6.8	9.3	15.1	19.5	22.9	12.1	13.3
Certified cooling ratings (6 Row high capacity coil)	Total MBH	27.4	31.6	33.9	47.4	67.8	74.9	80.7	83.8
	Sensible MBH	21.0	22.3	25.8	35.5	49.0	56.1	60.2	62.9
	GPM	5.6	6.6	6.8	9.8	13.7	15.1	16.4	17.2
	PD, ft. of H <sub>2</sub> O	8.1	11.0	12.5	8.5	14.6	17.4	9.0	9.8
Heating capacity (optional 1 row reheat coil)	MBH	20.7	24.2	25.8	36.0	53.3	58.4	64.7	66.7
	GPM	1.4	1.5	1.7	2.4	3.6	3.9	4.3	4.5
	PD, ft. of H <sub>2</sub> O	0.7	0.8	1.0	2.2	5.1	6.0	2.5	2.6
Heating capacity (optional 2 row reheat coil)	MBH	41.4	47.4	50.6	64.7	96.5	107.5	119.5	123.8
	GPM	2.8	3.2	3.4	4.4	6.5	7.3	8.1	8.4
	PD, ft. of H <sub>2</sub> O	3.7	5.0	5.6	4.7	11.1	13.6	6.7	7.1
CFM	High	910	1150	1300	1520	1960	2440	2540	2725
	Medium	650	940	1200	1250	1520	1960	2050	2550
	Low	500	750	1090	770	1250	1525	1660	2050
Coil	FPI	12	12	12	12	12	12	12	12
	Face area, ft <sub>2</sub>	1.73	2.06	2.06	3.03	4.11	4.11	4.93	4.93
Blower	Quantity	1	1	1	1	2	2	2	2
	Diameter	8.8"	8.8"	8.8"	9.8"	8.8"	8.8"	9.8"	9.8"
	Width	9.9"	9.9"	9.9"	9.9"	9.9"	9.9"	9.9"	9.9"
Filter (FDV-800)	Number	1	1	1	1	1	1	1	1
	Length, in.	21.0	24.2	24.2	33.4	43.9	43.9	52.0	52.0
	Width, in.	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5
	Thickness, in.	2	2	2	2	2	2	2	2
Filter (FDV-810)	Number	1	1	1	1	2	2	2	2
	Length, in.	21.0	24.2	24.2	33.4	21.0	21.0	24.2	24.2
	Width, in.	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5
	Thickness, in.	2	2	2	2	2	2	2	2
Shipping weight, lbs.	Standard coil	160	180	180	230	300	300	370	370
	High capacity coil	170	195	195	250	320	320	400	400

## Notes:

- Airflow under dry conditions. Inlet air 70-80 °F DB and 0.0" ESP.
- Cooling capacity based on inlet air 80 °F DB, 67 °F WB, 45 °F entering water, 55 °F leaving water, high fan speed, 0.0" ESP.
- Heating capacity based on inlet air 70 °F DB, 180 °F entering water, 150 °F leaving water, high fan speed, 0.0" ESP.
- All units supplied with replaceable filter.
- AHRI certified for sizes 06, 08, 10 and 12. Larger sizes exceed the maximum airflow rate in AHRI 440 and are therefore not certified.



# Horizontal belt drive standard ratings

**Table C**

Unit size		08	12	16	20	30					
<b>Cooling ratings (4 row main coil)</b>	Total MBH	21.6	23.0	36.6	38.7	49.5	53.4	57.6	61.2	91.5	95.7
	Sensible MBH	17.0	18.6	27.2	29.0	36.5	40.0	43.9	47.3	67.8	71.4
	GPM	4.3	4.6	7.3	7.8	9.9	10.7	11.6	12.3	18.3	19.1
	PD, ft. of H <sub>2</sub> O	3.1	3.4	3.9	4.4	4.0	4.7	2.5	2.8	6.0	6.5
<b>Heating capacity (4 row main coil)</b>	MBH	80.0	86.8	118.9	125.6	159.8	173.3	191.8	204.7	294.4	307.8
	GPM	7.6	8.2	11.2	11.9	15.1	16.4	18.2	19.4	27.9	29.1
	PD, ft. of H <sub>2</sub> O	9.0	10.6	8.9	9.9	9.0	10.5	5.9	6.7	13.4	14.6
<b>Cooling ratings (6 row high capacity coil)</b>	Total MBH	30.8	33.8	45.7	48.8	61.4	67.7	78.5	84.9	121.2	127.9
	Sensible MBH	20.8	22.9	30.9	33.1	41.4	45.9	52.5	57.0	80.1	84.7
	GPM	6.2	6.8	9.2	9.8	12.3	13.6	15.8	17.1	24.2	25.5
	PD, ft. of H <sub>2</sub> O	2.8	3.4	2.8	3.2	2.8	3.4	4.5	5.2	10.2	11.3
<b>Heating capacity (6 row high capacity coil)</b>	MBH	91.7	99.9	136.4	144.5	183.2	199.5	231.0	247.6	352.0	368.9
	GPM	8.7	9.5	12.9	13.7	17.3	18.9	21.8	23.4	33.3	34.9
	PD, ft. of H <sub>2</sub> O	5.4	6.4	5.3	5.9	5.4	6.3	8.4	9.6	18.8	20.6
<b>Heating capacity (optional 1 row reheat coil)</b>	MBH	20.4	21.7	34.1	35.6	49.1	52.3	57.4	60.4	90.0	93.2
	GPM	1.3	1.4	2.1	2.2	3.1	3.3	3.6	3.8	5.7	5.9
	PD, ft. of H <sub>2</sub> O	1.2	1.3	3.1	3.3	6.2	7.0	3.8	4.2	9.1	9.7
<b>Heating capacity (optional 2 row reheat coil)</b>	MBH	40.9	43.9	60.5	63.5	85.7	92.0	103.6	109.7	150.4	156.3
	GPM	2.6	2.8	3.8	4.0	5.4	5.8	6.5	6.9	9.5	9.9
	PD, ft. of H <sub>2</sub> O	4.3	5.0	4.2	4.6	8.2	9.4	6.8	7.6	6.4	6.9
<b>CFM</b>		800	900	1200	1300	1600	1800	2000	2200	3000	3200
<b>Coil</b>	FPI	12	12	12	12	12	12	12	12	12	12
	Face area, ft <sup>2</sup>	2.06	3.03	4.11	4.93	7.09					
<b>Blower</b>	Quantity	1	1	2	2	2	2	2	2	2	2
	Diameter	8.8"	8.8"	8.8"	8.8"	8.8"	8.8"	8.8"	8.8"	8.8"	8.8"
	Width	9.9"	9.9"	9.9"	9.9"	9.9"	9.9"	9.9"	9.9"	9.9"	9.9"
<b>Filter</b>	Number	1	1	1	1	2	2	2	2	2	2
	Length, in.	24.2	33.4	43.9	43.9	24.2	24.2	24.2	24.2	33.4	33.4
	Width, in.	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5	15.5
	Thickness, in.	2	2	2	2	2	2	2	2	2	2
<b>Shipping weight, lbs.</b>	Standard coil ceiling	205	235	315	315	410	410	410	410	510	510
	High capacity coil ceiling	220	255	335	335	440	440	440	440	550	550
	Standard coil with plenum	155	190	260	260	320	320	320	320	385	385
	High capacity coil with plenum	175	210	280	280	350	350	350	350	425	425
	Standard coil without plenum	110	130	175	175	200	200	200	200	230	230
	High capacity coil without plenum	120	150	200	200	230	230	230	230	270	270

**Notes:**

- Cooling capacity based on inlet air 80 °F DB, 67 °F WB, 45 °F entering water, 55 °F leaving water.
- Heating capacity based on inlet air 70 °F DB, 180 °F entering water, 150 °F leaving water.
- All belt drive units supplied with replaceable filter with the exception of model FBH.



## Belt drive motor data

Table D

Size	Rated voltage	HP		Amps	Blower RPM	Frame
08	115V/208-230V/1Ph	Low	1/2	8.5/4.7/4.3	1072-1455	NEMA 56
		High	3/4	11.0/6.1/5.5		
	208-230V, 460V/3Ph	Low	1/2	2.2/2.0/1.0		
		High	3/4	3.1/2.8/1.4		
12	115V/208-230V/1Ph	Low	1/2	8.5/4.7/4.3	1120-1520	NEMA 56
		High	3/4	11.0/6.1/5.5		
	208-230V, 460V/3Ph	Low	1/2	2.2/2.0/1.0		
		High	3/4	3.1/2.8/1.4		
16	115V/208-230V/1Ph	Low	1/2	8.5/4.7/4.3	1200-1629	NEMA 56
		High	1	14.0/7.7/7.0		
	208-230V, 460V/3Ph	Low	1/2	2.2/2.0/1.0		
		High	1	3.3/3.3/1.65		
20	115V/208-230V/1Ph	Low	3/4	11.0/6.1/5.5	1200-1629	NEMA 56
		High	1-1/2	21.0/11.6/10.5		NEMA 56H
	208-230V, 460V/3Ph	Low	3/4	3.1/2.8/1.4		NEMA 56
		High	1-1/2	5.5/5.0/2.5		NEMA 56
			2	6.9/6.2/3.1		NEMA 56H
		30	115V/208-230V/1Ph	Low		1
High	1-1/2			21.0/11.6/10.5	NEMA 56H	
208-230V, 460V/3Ph	Low		1	3.3/3.3/1.65	NEMA 56	
	High		1-1/2	5.5/5.0/2.5	NEMA 56	
			2	6.9/6.2/3.1	NEMA 56H	

**Note:**

- 3-phase motors require thermal overload protection, by others.

# Direct drive motor data

**Table E**

Size	Rated voltage (V/Hz/Ph)	RPM			Motor type	HP	Power (W)	FLA
		High	Medium	Low				
06	120/60/1	960	800	700	PSC	1/5	240	2.4
					ECM	3/4	175	3.0
	208-230/60/1	1050	850	650	PSC	1/5	260	1.5
					ECM	1/4	190	2.3
	277/60/1	1075	925	850	PSC	1/4	270	1.3
					ECM	1/4	190	1.7
08	120/60/1	1080	900	850	PSC	1/5	325	3.6
					ECM	3/4	250	4.4
	208-230/60/1	1030	830	630	PSC	1/5	300	1.5
					ECM	3/4	270	3.4
	277/60/1	1075	925	850	PSC	1/4	290	1.3
					ECM	3/4	265	2.5
10	120/60/1	1100	970	725	PSC	2/5	400	3.8
					ECM	3/4	260	5.8
	208-230/60/1	1050	850	650	PSC	2/5	760	4.0
					ECM	3/4	440	4.5
	277/60/1	1075	975	875	PSC	1/3	440	1.9
					ECM	3/4	280	3.3
12	120/60/1	1100	970	725	PSC	2/5	500	4.5
					ECM	3/4	375	6.1
	208-230/60/1	1050	850	650	PSC	2/5	790	4.0
					ECM	3/4	640	4.7
	277/60/1	1075	975	875	PSC	1/3	460	1.9
					ECM	3/4	400	3.5
14	120/60/1	950	800	650	PSC	1/2	530	4.9
					ECM	3/4	315	7.5
	208-230/60/1	1000	800	600	PSC	1/2	550	3.5
					ECM	3/4	325	5.8
	277/60/1	1075	950	850	PSC	1/2	465	2.2
					ECM	3/4	335	4.7
16	120/60/1	1100	875	725	PSC	1/2	675	5.8
					ECM	3/4	430	8.6
	208-230/60/1	1000	800	600	PSC	1/2	590	3.5
					ECM	3/4	375	6.1
	277/60/1	1075	950	850	PSC	1/2	490	2.2
					ECM	3/4	325	4.9
18	120/60/1	1075	875	725	PSC	2/3	730	6.3
					ECM	3/4	560	9.3
	208-230/60/1	1050	850	650	PSC	5/8	910	5.0
					ECM	3/4	700	6.5
	277/60/1	1075	950	850	PSC	1/2	500	2.2
					ECM	3/4	390	5.3
20	120/60/1	1075	1000	900	PSC	2/3	815	6.9
					ECM	3/4	660	9.6
	208-230/60/1	1050	850	650	PSC	5/8	1015	5.0
					ECM	3/4	830	6.8
	277/60/1	1075	950	850	PSC	1/2	560	2.2
					ECM	3/4	475	5.5

- Note:**
- Standard motor is 120V/60HZ/1PH PSC
  - Power is measured at 0.05" ESP
  - EC motor nameplate amperage indicates the motor hardware peak amperage while the motor full load amperage (FLA) is limited by the motor's factory programmed operating range, programmed specifically for each unit size. The programmed operating range is generally only a portion of the motor hardware full potential resulting in the motor FLA being lower than the nameplate FLA. Motor FLA will be reflected on the Fan Coil serial tag and should be used when sizing building electrical requirements.

# Octave band sound power ratings

## Horizontal models

Unit Size	Motor Speed	CFM	Octave Bands							
			2	3	4	5	6	7	8	
			Center Frequency (Hz)							
			125	250	500	1000	2000	4000	8000	
06	High	700	69.4	68.7	59.9	58.9	52.9	48.1	40.8	
	Medium	600	67.7	65.3	58.1	55.9	50.9	45.8	38.0	
	Low	525	66.0	62.8	56.3	53.4	48.3	42.6	34.1	
08	High	875	71.4	69.4	60.2	58.0	54.1	50.0	42.6	
	Medium	725	70.3	65.9	58.1	55.7	51.9	47.3	39.4	
	Low	600	69.0	63.4	55.8	53.0	439.0	43.6	35.1	
12	High	1225	76.2	71.4	62.2	60.9	58.2	55.2	47.7	
	Medium	1050	74.4	68.9	60.0	58.7	55.9	52.2	44.4	
	Low	925	72.9	66.1	57.7	56.3	53.0	48.5	41.0	
16	High	1625	74.4	68.8	63.1	60.3	56.5	52.6	44.8	
	Medium	1450	80.5	66.9	61.6	58.8	54.9	50.3	42.2	
	Low	1175	77.2	64.0	60.0	59.8	53.1	46.2	37.7	
20	High	2125	74.3	69.2	62.8	61.7	58.0	54.6	48.1	
	Medium	2000	71.1	63.5	58.3	55.3	51.1	46.6	38.4	
	Low	1750	67.0	58.8	54.6	50.0	44.9	38.8	29.2	

**Notes**

- The method used in conducting this test was based on the AHRI Standard 260-2008 "Sound Rating of Ducted Indoor Air Moving And Conditioning Equipment" and was conducted by an independent third party.
- Standard PSC and EC motor(s)
- Free inlet, casing radiated at 0.25" ESP
- Models FDH, FDHP, FDC

## Vertical models

Unit Size	Motor Speed	CFM	Octave Bands							
			2	3	4	5	6	7	8	
			Center Frequency (Hz)							
			125	250	500	1000	2000	4000	8000	
06	High	750	66.4	56.7	48.4	44.0	41.0	33.8	24.9	
	Medium	550	63.7	53.1	45.4	40.5	36.2	26.4	22.8	
	Low	425	59.5	49.6	43.9	39.1	31.2	22.3	22.7	
08	High	975	68.6	64.4	51.6	49.0	43.5	36.8	28.0	
	Medium	825	66.4	57.2	48.8	45.4	39.9	32.2	24.2	
	Low	700	62.7	52.9	44.5	40.3	34.2	25.3	22.7	
10	High	1000	76.2	66.6	59.4	53.7	47.1	39.9	33.2	
	Medium	875	73.4	63.1	53.3	48.7	43.2	36.2	28.8	
	Low	800	73.1	61.8	53.0	47.6	42.0	34.9	27.7	
12	High	1350	77.4	64.5	54.8	51.2	47.1	41.3	34.7	
	Medium	1075	75.5	61.6	53.1	49.5	46.0	41.0	36.5	
	Low	700	74.3	56.8	48.5	43.2	39.0	32.3	25.9	
14	High	1600	72.3	64.0	55.8	51.4	47.2	41.6	33.4	
	Medium	1250	72.6	62.0	54.0	49.7	45.2	39.1	30.6	
	Low	1000	70.6	59.8	52.0	48.1	43.2	37.6	30.7	
16	High	2000	72.6	63.9	55.5	50.6	45.8	40.3	31.8	
	Medium	1600	70.9	62.1	53.6	48.7	43.8	38.2	29.8	
	Low	1250	69.0	59.4	51.4	46.1	41.0	34.7	25.2	
18	High	2250	77.0	66.7	54.8	50.2	45.7	41.0	31.5	
	Medium	1825	74.5	64.6	52.4	47.9	42.9	38.1	28.1	
	Low	1475	72.9	61.6	50.4	44.9	39.8	34.6	24.9	
20	High	2400	78.5	68.9	56.5	51.8	47.2	42.8	34.5	
	Medium	2250	77.6	67.8	55.5	50.9	46.2	41.7	33.2	
	Low	1825	76.0	64.8	53.4	48.1	43.3	38.2	30.4	

**Notes**

- The method used in conducting this test was based on the ARI Standard 260-2008 "Sound Rating of Ducted Indoor Air Moving And Conditioning Equipment" and was conducted by an independent third party.
- Free inlet, casing radiated at 0.25" ESP
- Model FDV



# Valve packages general data

## Field mounted valve packages

Zehnder Rittling High Capacity Fan Coil units have standard valve packages available as a factory-built assembly and field-installed option for the main cooling coil and optional heating coil. All valve packages are manufactured within strict tolerances and are hydrostatically tested for leaks. Valve packages are shipped loose for field assembly to ensure a leak free system as factory mounted valve packages often become damaged during shipment. All horizontal unit cooling piping and components are located directly above the drain pan to allow condensate to be captured and properly drained. Insulation of the factory valve package is not required. However, all field connections downstream of the valve package should be insulated to prevent condensation from missing the drain pan. Vertical units will require the valve packages to be properly insulated in the field to eliminate condensation.

### ■ Valve package components

Zehnder Rittling valve packages consist of a variety of components and selection of each combination is dependent upon the application. The following sections provide a detailed description of each of the components. Following this section are additional schematic illustrations and mechanical specifications and photos.

### ■ Piping system/placement

Valve packages are available for two or four-pipe systems with left and/or right hand connections. The heating and cooling connections can be located on the same or opposite sides of the unit in four-pipe systems. All coil connections are left hand as standard unless specified differently.

### ■ Interconnecting piping

Interconnecting piping refers to the copper piping which is attached to the coil connections and to which all other components (i.e. control valves, ball valves, circuit setters, etc.) are attached. Piping is 1/2" or 3/4" nominal copper.

### ■ Deluxe or basic packages

The basic valve package includes only the main components of the valve package (i.e. interconnecting piping, control valves, and end valves).

The deluxe valve packages also include unions at the coil connections and a strainer on the supply water pipe along with the basic components.

All valve package components are solder end connections.

### ■ Unions

The unions are forged brass construction and close with a minimum amount of effort. Used for quick connect and disconnect of valve package components to minimize required field labor during servicing of the unit.

### ■ Strainer

The Y-type strainer body is constructed of brass with a 16 mesh 304 stainless steel screen. Used for removal of small particles from the water supply pipe during normal system operation. The strainer helps protect the coil and minimizes the chance of control valves clogging. Screens should be regularly removed and cleaned as part of a routine maintenance schedule.

### ■ Balance valves

The valve body is constructed of bronze and is used to balance hydronic circuits.

## End valves

Each basic and deluxe valve package includes a ball valve for supply water pipe and one of the following end valves on the return water pipe; ball valve, manual circuit setter, or automatic circuit setter. These valves serve as the field connection points on all of the Zehnder Rittling valve packages. Consult factory for inclusion of other types of valves as end valves.

### ■ Ball valves

Ball valves, also known as end valves, allow the unit to be cut off for servicing purposes. They have a low resistance to water flow, operate easily, and are often used for water balancing. These valves have a compact handle that rotates 90 degrees to a fully open position.

The valve body is forged brass and the ball is polished brass with virgin Teflon seats and seals. Ball valves are available as end valves on both the supply and return water pipes.

# Valve packages general data

## ■ Manual circuit setter

A manual circuit setter, also known as manual flow control valve, acts as both a flow setting device and a stop valve, taking the place of a ball valve. This valve allows water flow through the fan coil unit and can be set quickly and accurately. The manual circuit setter includes two measuring ports in the valve body to be used for pressure drop measurements during system balancing. This pressure drop can be compared to factory supplied curves showing the corresponding flow rate. This valve has a handwheel with memory feature including a locking feature for tamper-proof setting.

## ■ Automatic circuit setter

An automatic circuit setter is an automatic flow control device that includes a ball valve cast in the valve body and is located on the return water pipe. The automatic circuit setter consists of a stainless steel/brass flow cartridge and a contoured orifice plate. As the pressure drop increases, the flow cartridge will move into the contoured orifice plate to decrease the flow. This flexing action provides a constant flow, independent of pressure (2-80 psi), makes it difficult to clog and resistant to cavitation damage. This valve sets flow through the coil without any action required by a system balancer. The automatic circuit setter includes two measuring ports in the valve body to be used for pressure drop and temperature measurements.

## Control valves

Valve packages are available with or without control valves.

## ■ 2-way on/off valves

These valves are normally closed to the coil as standard and will isolate the coil during a loss of power. Normally open valves are also available upon request. Upon response to a signal from the controller, the valve will be either fully open or fully closed. These valves are located in the water supply pipe and have a  $C_v$  of 3.5, and close off  $\Delta P$  of 25 psi. A means of relieving head pressure must be accounted for when two-way valves are selected, most notably when used in combination with automatic changeover.

## ■ 3-way on/off valves

These valves are normally closed to the coil as standard and will isolate the coil during a loss of power. Normally open configurations are simply achieved by turning the valve around. Upon response to a signal from the controller, the valve will be either fully open, allowing full flow to the coil, or fully closed, diverting full flow to the bypass line. All 3-way valve configurations include a balance fitting in the bypass line to allow proper flow balancing. These valves are located in the water supply pipe and have a  $C_v$  of 4.0, and close off  $\Delta P$  of 25 psi.

## ■ 2-way modulating valves

These 24V valves modulate the flow of water (0-100%) through the coil in response to a signal from the controller and are normally closed to the coil as standard. Normally open valves are also available upon request. All modulating valves are three-wire floating equal percentage valves, designed for precise temperature control. All valves feature a magnetic clutch to extend

the life of the motor and gear train, manual operating lever/position indicator facilitates field setup, and easy to use lever terminal blocks. These valves are located in the water supply pipe, have a  $C_v$  of 4.0, and close off  $\Delta P$  of 20 psi. A means of relieving pump head pressure must be accounted for when two-way valves are selected, most notably when used in combination with automatic changeover.

## ■ 3-way modulating valves

These 24V valves modulate the flow of water (0-100%) through the coil in response to a signal from the controller and are normally closed to the coil as standard. Normally open configurations are simply achieved by turning the valve around. 3-way valves allow the water supply from the water supply pipe to mix with bypass water from the bypass line. This mixture exits through the supply water pipe to the coil. All modulating valves are three-wire floating equal percentage valves, designed for precise temperature control. All valves feature a magnetic clutch to extend the life of the motor and gear train, manual operating lever/position indicator facilitates field setup, and easy to use lever terminal blocks. These valves are located in the water supply pipe, have a  $C_v$  of 4.0, and close off  $\Delta P$  of 20 psi.

Please contact Zehnder Rittling regarding any special valve requirements including high close-off pressure control valves, hose kits, additional P/T ports, customer supplied valves, etc.

# Basic valve packages



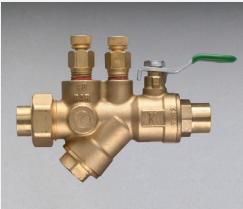




Pre-assembled packages, shipped loose for field mounting						
Control valve	Basic		Circuit setter		Automatic circuit setter	
None	<b>V-B1</b> Ball valve on return Ball valve on supply		<b>V-B2</b> Manual circuit setter on return Ball valve on supply		<b>V-B3</b> Auto circuit setter and ball valve on return Ball valve on supply	
	<b>2-way on/off</b>	<b>V-B4E</b> Ball valve on return 2-way electric valve and ball valve on supply		<b>V-B5E</b> Manual circuit setter on return 2-way electric valve and ball valve on supply		<b>V-B6E</b> Auto circuit setter and ball valve on return 2-way electric valve and ball valve on supply
<b>2-way modulating</b>	<b>V-B4M</b> Ball valve on return 2-way electric valve and ball valve on supply		<b>V-B5M</b> Manual circuit setter on return 2-way electric valve and ball valve on supply		<b>V-B6M</b> Auto circuit setter and ball valve on return 2-way electric valve and ball valve on supply	
<b>3-way on/off</b>	<b>V-B7E</b> Ball valve on return Balance fitting in bypass 3-way electric valve and ball valve on supply		<b>V-B8E</b> Manual circuit setter on return Balance fitting in bypass 3-way electric valve and ball valve on supply		<b>V-B9E</b> Auto circuit setter and ball valve on return Balance fitting in bypass 3-way electric valve and ball valve on supply	
<b>3-way modulating</b>	<b>V-B7M</b> Ball valve on return Balance fitting in bypass 3-way electric valve and ball valve on supply		<b>V-B8M</b> Manual circuit setter on return Balance fitting in bypass 3-way electric valve and ball valve on supply		<b>V-B9M</b> Auto circuit setter and ball valve on return Balance fitting in bypass 3-way electric valve and ball valve on supply	

# Deluxe valve packages

Pre-assembled packages, shipped loose for field mounting						
Control valve	Basic		Circuit setter		Automatic circuit setter	
None	<b>V-D1</b> Ball valve and union on return Ball valve, union and strainer on supply		<b>V-D2</b> Manual circuit setter and union on return Ball valve, union and strainer on supply		<b>V-D3</b> Auto circuit setter, union and ball valve on return Ball valve, union and strainer on supply	
	<b>V-D4E</b> Ball valve and union on return 2-way electric valve, ball valve, union and strainer on supply		<b>V-D5E</b> Manual circuit setter and union on return 2-way electric valve, ball valve, union and strainer on supply		<b>V-D6E</b> Auto circuit setter, union and ball valve on return 2-way electric valve, ball valve, union and strainer on supply	
2-way on/off	<b>V-D4M</b> Ball valve and union on return 2-way electric valve, ball valve, union and strainer on supply		<b>V-D5M</b> Manual circuit setter and union on return 2-way electric valve, ball valve, union and strainer on supply		<b>V-D6M</b> Auto circuit setter, union, and ball valve on return 2-way electric valve, ball valve, union and strainer on supply	
	<b>V-D7E</b> Ball valve and union on return Balance fitting in bypass 3-way electric valve, ball valve, union and strainer on supply		<b>V-D8E</b> Manual circuit setter and union on return Balance fitting in bypass 3-way electric valve, ball valve, union and strainer on supply		<b>V-D9E</b> Auto circuit setter, union and ball valve on return Balance fitting in bypass 3-way electric valve, ball valve, union and strainer on supply	
2-way modulating	<b>V-D7M</b> Ball valve and union on return Balance fitting in bypass 3-way electric valve, ball valve, union and strainer on supply		<b>V-D8M</b> Manual circuit setter and union on return Balance fitting in bypass 3-way electric valve, ball valve, union and strainer on supply		<b>V-D9M</b> Auto circuit setter, union and ball valve on return Balance fitting in bypass 3-way electric valve, ball valve, union and strainer on supply	
	<b>V-D7M</b> Ball valve and union on return Balance fitting in bypass 3-way electric valve, ball valve, union and strainer on supply		<b>V-D8M</b> Manual circuit setter and union on return Balance fitting in bypass 3-way electric valve, ball valve, union and strainer on supply		<b>V-D9M</b> Auto circuit setter, union and ball valve on return Balance fitting in bypass 3-way electric valve, ball valve, union and strainer on supply	
3-way on/off	<b>V-D7E</b> Ball valve and union on return Balance fitting in bypass 3-way electric valve, ball valve, union and strainer on supply		<b>V-D8E</b> Manual circuit setter and union on return Balance fitting in bypass 3-way electric valve, ball valve, union and strainer on supply		<b>V-D9E</b> Auto circuit setter, union and ball valve on return Balance fitting in bypass 3-way electric valve, ball valve, union and strainer on supply	
	<b>V-D7M</b> Ball valve and union on return Balance fitting in bypass 3-way electric valve, ball valve, union and strainer on supply		<b>V-D8M</b> Manual circuit setter and union on return Balance fitting in bypass 3-way electric valve, ball valve, union and strainer on supply		<b>V-D9M</b> Auto circuit setter, union and ball valve on return Balance fitting in bypass 3-way electric valve, ball valve, union and strainer on supply	
3-way modulating	<b>V-D7M</b> Ball valve and union on return Balance fitting in bypass 3-way electric valve, ball valve, union and strainer on supply		<b>V-D8M</b> Manual circuit setter and union on return Balance fitting in bypass 3-way electric valve, ball valve, union and strainer on supply		<b>V-D9M</b> Auto circuit setter, union and ball valve on return Balance fitting in bypass 3-way electric valve, ball valve, union and strainer on supply	
	<b>V-D7M</b> Ball valve and union on return Balance fitting in bypass 3-way electric valve, ball valve, union and strainer on supply		<b>V-D8M</b> Manual circuit setter and union on return Balance fitting in bypass 3-way electric valve, ball valve, union and strainer on supply		<b>V-D9M</b> Auto circuit setter, union and ball valve on return Balance fitting in bypass 3-way electric valve, ball valve, union and strainer on supply	

# Valve packages components

## Mechanical specifications

Component	Part	Material	Temperature	Working pressure
<b>Union</b> 	Nut	Forged brass	325 °F maximum	600 psi
	Body			
<b>Balance valve</b> 	Body	Bronze	220 °F maximum	300 psi
	O-ring	EPDM		
<b>Automatic circuit setter and ball valve</b> 	Body	Forged brass	325 °F maximum	600 psi
	Ball	Brass/chrome plated		
	Flow cartridge	Stainless steel/brass		
	Seals	Viton		
	Ball seal	PTFE		
<b>Manual circuit setter</b> 	Body	Bronze	250 °F maximum	200 psi
	Ball	Brass		
	Seat rings	Glass and carbon filled TFE		
	O-ring	EPDM		
<b>Ball valve</b> 	Body	Forged brass	325 °F maximum	600 psi
	Ball	Brass/chrome plated		
	Seat	PTFE		
	Stem	Brass		
	Seals	Viton		
<b>Strainer and ball valve with union</b> 	Body	Forged brass	325 °F maximum	600 psi
	Ball	Brass/chrome plated		
	Seat	PTFE		
	Stem	Brass		
	Seals	Viton		
	Screen	304 stainless steel (20 mesh)		
<b>Control valve</b> 	Body	Forged brass	200 °F maximum	300 psi
	Stem	Nickel plated/chrome plated brass		
	Seat	Brass		
	Paddle/plug	On/off: Buna N Modulating: High temperature thermoplastic/rubber		
	Actuator	On/off: stainless steel base plate, aluminum cove Modulating: high temperature plastic		

# 120 Volt control packages

## Electronic on-off valve/thermostat

### Two pipe control: fan cycled or fan/valve cycled, direct drive only

Zehnder provides a control system that includes a thermostat, control board with relays, manually operated three-speed fan switch, relay(s), thermostat and changeover switch (when required). For fan cycle operation, the thermostat cycles the fan from the selected speed to off. No control valve is provided in this operation. For fan/valve cycle operation, the thermostat cycles the fan and control valve. The fan runs intermittently unless the speed control switch is in the off position. Valve is not included in the control package price.

Package number	Thermostat description	Fan motor speed switch location	Changeover switch
2F0D	On/off system switch and three-speed fan control but no changeover	Wall mounted, integral to thermostat	No
2F0F	Manual changeover, heat/off/cool system switch and three-speed fan control	Wall mounted, integral to thermostat	Yes
2F0H	Auto changeover, on/off system switch and three-speed fan control	Wall mounted, integral to thermostat	Yes

#### Notes:

- A means of relieving pump head pressure must be accounted for when two-way valves are used with an automatic thermostat package.
- The fan cycles with demand for heating or cooling, but if the system switch is off, the fan is off.

### Two pipe control: valve cycled direct drive only

Zehnder provides a control system that includes a thermostat, control board, manually operated three-speed fan switch and changeover switch (when required). The thermostat cycles the electric control valve. The fan runs continuously. Valve is not included in the control package price.

Package number	Thermostat description	Fan motor speed switch location	Changeover switch
2V0D	On/off system switch and three-speed fan control but no changeover	Wall mounted, integral to thermostat	No
2V0F	Manual changeover, heat/off/cool system switch and three-speed fan control	Wall mounted, integral to thermostat	Yes
2V0H	Auto changeover, on/off system switch and three-speed fan control	Wall mounted, integral to thermostat	Yes

#### Notes:

- A means of relieving pump head pressure must be accounted for when two-way valves are used with an automatic thermostat package.
- The fan runs continuously, but if the system switch is off, the fan is off.

# 120 Volt control packages

## Electronic on-off valve/thermostat

### Four pipe control: fan cycled or fan/valve cycled, direct drive only

Zehnder provides a control system that includes a thermostat, control board with relays and manually operated three-speed fan switch. For fan cycle operation, the thermostat cycles the fan from the selected speed to off. No control valve is provided in this operation. For fan/valve cycle operation, the thermostat cycles the fan and control valve. The fan runs intermittently unless the speed control switch is in the off position. Valves are not included in the control package price.

Package number	Thermostat description	Fan motor speed switch location
4F0C	On/off system switch and 120V three-speed fan control, auto changeover	Wall mounted, integral to thermostat
4F0E	Manual changeover, heat/off/cool system switch and 120V three-speed fan control	Wall mounted, integral to thermostat

**Notes:**

- A means of relieving pump head pressure must be accounted for when two-way valves are used with an automatic thermostat package.
- The fan cycles with demand for heating or cooling, but if the system switch is off, the fan is off.

### Four pipe control: valve cycled, direct drive only

Zehnder provides a control system that includes a thermostat, control board and manually operated three-speed fan switch. The thermostat cycles the electric control valve. The fan runs continuously. Valves are not included in the control package price.

Package number	Thermostat description	Fan motor speed switch location
4V0C	Auto changeover, on/off system switch and 120V three-speed fan control	Wall mounted, integral to thermostat
4V0E	Manual changeover, heat/off/cool system switch and 120V three-speed fan control	Wall mounted, integral to thermostat

**Notes:**

- The fan runs continuously, but if the system switch is off, the fan is off.
- A means of relieving pump head pressure must be accounted for when two-way valves are used with an automatic thermostat package.

## 24 Volt control packages

### Electronic on-off valve/thermostat

#### Two-pipe control: fan cycled or fan/valve cycled, direct drive only

Zehnder provides a control system that includes a factory supplied and installed 120V-24V, 40VA control transformer, manually operated three-speed fan switch, relay(s), thermostat and changeover switch (when required). For fan cycle operation, the thermostat cycles the fan from the selected speed to off. No control valve is provided in this operation. For fan/valve cycle operation, the thermostat cycles the fan and control valve. The fan runs intermittently unless the speed control switch is in the off position. Valve is not included in the control package price.

Package number	Thermostat description	Fan motor speed switch location	Changeover switch
2F4K	On/off system switch and 120V three-speed fan control but no changeover	Wall mounted, integral to thermostat	No
2F4M	Manual changeover, heat/off/cool system switch and 120V three-speed fan control	Wall mounted, integral to thermostat	Yes
2F4P	Auto changeover, on/off system switch and 120V three-speed fan control	Wall mounted, integral to thermostat	Yes

#### Notes:

- A means of relieving pump head pressure must be accounted for when two-way valves are used with an automatic thermostat package.
- The fan cycles with demand for heating or cooling, but if the system switch is off, the fan is off.
- Available with EC motors.

#### Two pipe control: valve cycled, direct drive only

Zehnder provides a control system that includes a factory supplied and installed 120V-24V, 40VA control transformer, manually operated three-speed fan switch, thermostat and changeover switch (when required). The thermostat cycles the electric control valve. The fan runs continuously. Valve is not included in the control package price.

Package number	Thermostat description	Fan motor speed switch location	Changeover switch
2V4D	On/off system switch and 120V three-speed fan control but no changeover	Wall mounted, integral to thermostat	No
2V4F	Manual changeover, heat/off/cool system switch and 120V three-speed fan control	Wall mounted, integral to thermostat	Yes
2V4H	Auto changeover, on/off system switch and 120V three-speed fan control	Wall mounted, integral to thermostat	Yes

#### Notes:

- A means of relieving pump head pressure must be accounted for when two-way valves are used with an automatic thermostat package.
- The fan runs continuously, but if the system switch is off, the fan is off.
- Available with EC motors.



# 24 Volt control packages

## Electronic on-off valve/thermostat

### Four pipe control: fan cycled or fan/valve cycled, direct drive only

Zehnder provides a control system that includes a factory supplied and installed 120V-24V, 40VA control transformer, manually operated three-speed fan switch, relay(s) and thermostat. For fan cycle operation, the thermostat cycles the fan from the selected speed to off. No control valve is provided in this operation. For fan/valve cycle operation, the thermostat cycles the fan and control valve. The fan runs intermittently unless the speed control switch is in the off position. Valves are not included in the control package price.

Package number	Thermostat description	Fan motor speed switch location
4F4G	Auto changeover, on/off system switch and 120V three-speed fan control	Wall mounted, integral to thermostat
4F4J	Manual changeover, heat/off/cool system switch and 120V three-speed fan control	Wall mounted, integral to thermostat

**Notes:**

- A means of relieving pump head pressure must be accounted for when two-way valves are used with an automatic thermostat package.
- The fan cycles with demand for heating or cooling, but if the system switch is off, the fan is off.
- Available with EC motors.

### Four pipe control: valve cycled, direct drive only

Zehnder provides a control system that includes a factory supplied and installed 120V-24V, 40VA control transformer, manually operated three-speed fan switch and thermostat. The thermostat cycles the electric control valve. The fan runs continuously. Valves are not included in the control package price.

Package Number	Thermostat Description	Fan Motor Speed Switch Location
4V4C	Auto changeover, on/off system switch and 120V three-speed fan control	Wall mounted, integral to thermostat
4V4E	Manual changeover, heat/off/cool system switch and 120V three-speed fan control	Wall mounted, integral to thermostat

**Notes:**

- A means of relieving pump head pressure must be accounted for when two-way valves are used with an automatic thermostat package.
- The fan runs continuously, but if the system switch is off, the fan is off.
- Available with EC motors.

# 24 Volt line voltage control packages

## Electronic on-off valve/thermostat

### Two pipe control: fan cycled or fan/valve cycled, direct drive only

Zehnder provides a control system that includes a factory supplied and installed 208V/230V/277V-24V, 50VA control transformer, manually operated three-speed fan switch, relay(s), thermostat and changeover switch (when required). The thermostat cycles the electric control valve. The fan runs continuously. Valve is not included in the control package price.

Package number	Thermostat description	Fan motor speed switch location	Changeover switch
2FHD	On/off system switch and 208V/230V/277V three-speed fan control but no changeover	Wall mounted, integral to thermostat	No
2FHF	Manual changeover, heat/off/cool system switch and 208V/230V/277V three-speed fan control	Wall mounted, integral to thermostat	Yes
2FHH	Auto changeover, on/off system switch and 208V/230V/277V three-speed fan control	Wall mounted, integral to thermostat	Yes

#### Notes:

- A means of relieving pump head pressure must be accounted for when two-way valves are used with an automatic thermostat package.
- The fan cycles with demand for heating or cooling, but if the system switch is off, the fan is off.

### Two pipe control: valve cycled direct drive only

Zehnder provides a control system that includes a factory supplied and installed 208V/230V/277V-24V, 50VA control transformer, manually operated three-speed fan switch, relay(s), thermostat and changeover switch (when required). The thermostat cycles the electric control valve. The fan runs continuously. Valve is not included in the control package price.

Package number	Thermostat description	Fan motor speed switch location	Changeover switch
2VHD	On/off system switch and 208V/230V/277V three-speed fan control but no changeover	Wall mounted, integral to thermostat	No
2VHF	Manual changeover, heat/off/cool system switch and 208V/230V/277V three-speed fan control	Wall mounted, integral to thermostat	Yes
2VHH	Auto changeover, on/off system switch and 208V/230V/277V three-speed fan control	Wall mounted, integral to thermostat	Yes

#### Notes:

- A means of relieving pump head pressure must be accounted for when two-way valves are used with an automatic thermostat package.
- The fan runs continuously, but if the system switch is off, the fan is off.

# 24 Volt line voltage control packages

## Electronic on-off valve/thermostat

### Four pipe control: fan cycled or fan/valve cycled, direct drive only

Zehnder provides a control system that includes a factory supplied and installed 208V/230V/277V-24V, 50VA control transformer, manually operated three-speed fan switch, relay(s) and thermostat. For fan cycle operation, the thermostat cycles the fan from the selected speed to off. No control valve is provided in this operation. For fan/valve cycle operation, the thermostat cycles the fan and control valve. The fan runs intermittently unless the speed control switch is in the off position. Valves are not included in the control package price.

Package number	Thermostat description	Fan motor speed switch location
4FHC	Auto changeover, on/off system switch and 208V/230V/277V three-speed fan control	Wall mounted, integral to thermostat
4FHE	Manual changeover, heat/off/cool system switch and 208V/230V/277V three-speed fan control	Wall mounted, integral to thermostat

**Notes:**

- A means of relieving pump head pressure must be accounted for when two-way valves are used with an automatic thermostat package.
- The fan cycles with demand for heating or cooling, but if the system switch is off, the fan is off.

### Four pipe control: valve cycled, direct drive only

Zehnder provides a control system that includes a factory supplied and installed 208V/230V/277V-24V, 50VA control transformer, manually operated three-speed fan switch, relay(s) and thermostat. The thermostat cycles the electric control valve. The fan runs continuously. Valves are not included in the control package price.

Package Number	Thermostat Description	Fan Motor Speed Switch Location
4VHC	Auto changeover, on/off system switch and 208V/230V/277V three-speed fan control	Wall mounted, integral to thermostat
4VHE	Manual changeover, heat/off/cool system switch and 208V/230V/277V three-speed fan control	Wall mounted, integral to thermostat

**Notes:**

- A means of relieving pump head pressure must be accounted for when two-way valves are used with an automatic thermostat package.
- The fan runs continuously, but if the system switch is off, the fan is off.

## Electric heat

Available for vertical units only, the electric heating elements are located in the reheat position. They are located in such a way as to prevent stratification and air bypass for optimum heating efficiency. The electric heating elements are situated above the fan discharge. This prevents access by room occupants.

### Cabinets

The fan coil unit is fully insulated to ensure safe, low surface temperatures.

### Motors

120V/60/1 permanent split capacitor motors are standard. A three-speed motor switch is also provided as a standard.

### Magnetic contactor

The magnetic contactor is furnished to break all ungrounded conductors. The contactor is located in the electrical control box pre-mounted and wired.

### Field wiring terminals

Field wiring terminals provide a means to easily connect with a single power source. These are suitable for copper wire and are sized in accordance with National Electrical Code.

### Grounding

Ring type grounding terminals are provided for each power source.

### Control systems

There are four two-pipe cooling with electric heat control systems available. Each of these is described in detail on pages 26-29.

### ■ Total electric heat

Manual cool/heat changeover.

### ■ Total electric heat

Automatic cool/heat changeover.

### ■ Intermediate season electric heat

Automatic changeover.

### ■ Total electric heat

Automatic changeover, field supplied thermostat.

## Electric heat element selection

### Example selection at 0.2" ESP

**Example** Unit size 14 (1672 CFM), and a sensible heating loss of 22,000 BTU/hr. Determine the required heating element kW using 230V incoming voltage.

**Step 1** Determine the room sensible heat loss, in BTU/hr. In this example, the sensible heat loss is 22,000 BTU/hr.

**Step 2** Determine the air temperature rise for the unit size selected. Generally, the unit is selected based on cooling requirements. The CFM for each unit size is listed in Table B on page 8. Then correct for static pressure using Table P on page 42 (1900 CFM x .88 = 1672 CFM). Use the formula below to determine the air temperature rise.

$$\Delta T = \frac{\text{BTU/hr}}{\text{CFM} \times 1.085} \quad \Delta T = \frac{22000}{1672 \times 1.085} \quad \Delta T = 12.1 \text{ } ^\circ\text{F required}$$

**Step 3** Determine kW and number of heating elements based on air temperature rise required from Electric Heating capacities Table on page 62.

**Answer** Based on 12.1 °F temperature rise required, use a 7.0 kW heater element with 230V incoming voltage.

# Electric heating element construction

## 1: Mounting

The electric heating elements are mounted directly to the control to allow the electric heat to be removed after the motor/fan assembly has been slid out. Motor quick connects are provided to allow the assembly to be easily removed for servicing.

## 2: Heating elements

The electric heating element(s) have been designed to handle total electric heating and intermediate seasonal heating requirements. Electric heating elements are designed for 60 hertz/1 phase - 120, 208, 230 and 277 supply voltages.

Finned tubular electric heating elements are constructed of nickel-plated steel fins, spirally wound over a heating element that is metallurgically bonded by furnace brazing. They have a maximum operating temperature of 1850 °F.

## 3: Coil terminals

Coil terminals are constructed of nickel-plated steel with epoxy end seal.

## 4: Linear limit switch

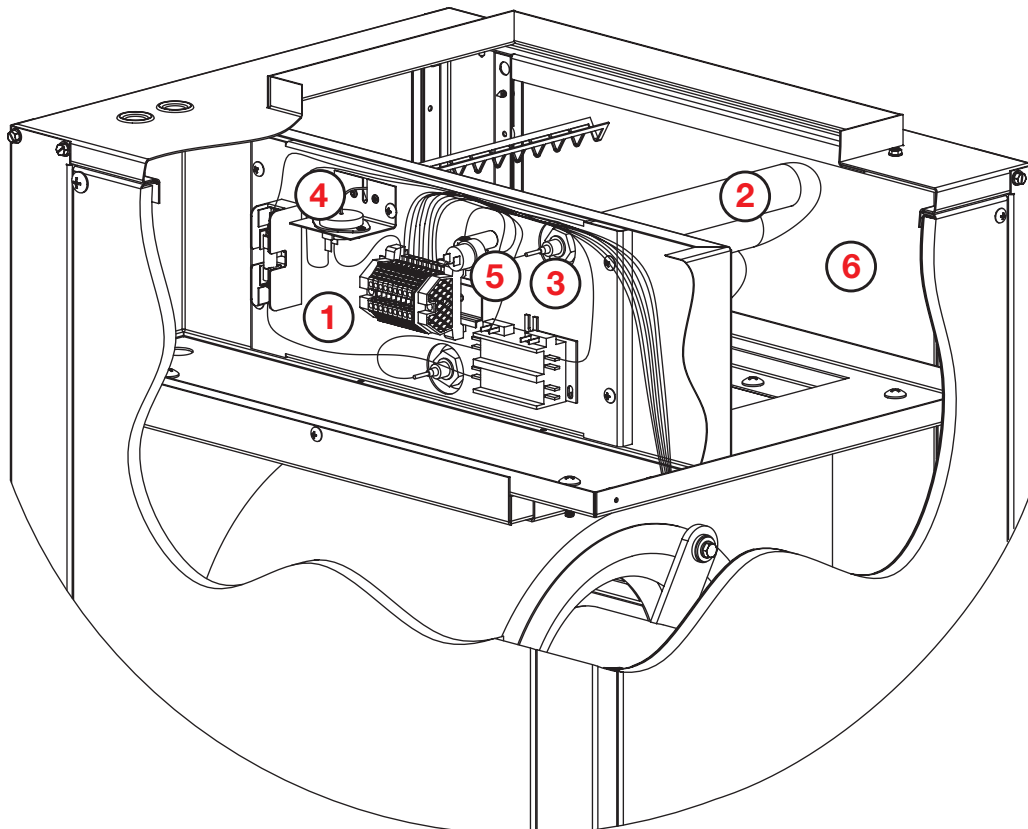
The linear limit switch is an automatic reset thermally operated safety device used as the primary safety protection. The switch operates using a long capillary tube which extends the length of the electric heating element. If the capillary senses an excessive temperature (factory preset) at any point, the electric element is de-energized. The break temperature is non-adjustable. The switch automatically re-energizes the electric heating element after the temperature falls to an acceptable range. The electric heating element will be de-energized if the capillary tube is damaged or ruptured.

## 5: Fusible link

The fusible link is used as a secondary safety protection device. The cutoffs are manually replaceable with a non-conductive thermal pellet holding spring loaded contacts closed. When a preset temperature is exceeded the pellet will melt, allowing the contacts to open and break the circuit. These cutoffs are installed in the power lines of each electric heating element and open in case of failure of the primary safety device.

## 6: Insulation

High density fiberglass insulation prevents heat from being transmitted to the back of the unit casing.



# Electric heat control packages

Zehnder Rittling provides a control system that includes a thermostat with changeover control, manually operated three-speed fan switch, contactor, fuse holder with fuses, field wiring terminals and motor quick connect. The contactor, fuse holder with fuses and field wiring terminals are all pre-mounted and pre-wired to a sub panel installed in the control box. The motor quick connect allows easy removal of the blower plate and easy access to the electric heating assembly for servicing.

## Chilled water cooling, single stage electric heating

### Manual changeover, vertical high capacity only

#### Cooling cycle

The manual Cool-Heat switch is in the Cool position.

When the space temperature rises to the thermostat set point, the thermostat opens the electric cooling water valve until the space temperature is satisfied. (The cooling water valve is not included.)

#### Heating cycle

The manual Cool-Heat switch is in the Heat position. When the space temperature falls to the thermostat set point, the thermostat energizes the electric heating element until the space temperature is satisfied.

#### Fan operation

A manual fan switch with high, medium and low speeds is integral to the thermostat and controls the fan speed and the thermostat. The fan motor and thermostat are energized in any fan speed position and run continuously. The switch in the "off" position de-energizes the fan and thermostat, closing the electric cooling water valve and breaking the electric heating circuit.

#### Thermostat

All factory supplied thermostats are pre-wired.

Package number	Component voltage			Fan motor speed switch location	Changeover switch location
	Power supply and electric heating element	Thermostatic valve controls	Motor		
EWMA	120	120	120	Integral to thermostat	Mounted on thermostat
EWMD	120	24	120		
EWME	208		208		
EWMH	230		230		
EWMF	277		277		

#### Notes:

- The heating element, high temperature linear limit switch, and fusible link are not included. See electric heating element pricing.
- High voltage motors need to be ordered separately.

# Electric heat control packages

Zehnder Rittling provides a control system that includes a thermostat, manually operated three-speed fan switch, contactor, fuse holder with fuses, field wiring terminals and motor quick connect. The contactor, fuse holder with fuses and field wiring terminals are all pre-mounted and pre-wired to a sub panel installed in the control box. The motor quick connect allows easy removal of the blower plate and easy access to the electric heating assembly for servicing.

## Chilled water cooling, single stage electric heating

**Automatic changeover on space temperature. Vertical high capacity only**

### ■ Cooling cycle

When the space temperature rises to thermostat set point, the thermostat opens the electric chilled water valve until the space temperature is satisfied. The thermostat includes a center dead band which allows the cooling water valve to close and prevent energizing of the electric heating element. (The cooling water valve is not included.)

### ■ Heating cycle

When the space temperature falls to the thermostat set point, the thermostat energizes the electric heating element until the space temperature is satisfied. The thermostat includes a center dead band which allows the electric heating element to de-energize and prevents the cooling water valve from opening.

### ■ Fan operation

A manual fan switch with high, medium and low speeds is integral to the thermostat and controls the fan speed and the thermostat. The fan motor and thermostat are energized in any fan speed position and run continuously. The switch in the “off” position de-energizes the fan and thermostat, closing the electric cooling water valve and breaking the electric heating circuit.

### ■ Thermostat

All factory supplied thermostats are pre-wired.

Package number	Component voltage			Fan motor speed switch location	Changeover switch location
	Power supply and electric heating element	Thermostatic valve controls	Motor		
EWAA	120	120	120	Integral to thermostat	None, uses thermostat dead band
EWAD	120	24	120		
EWAE	208		208		
EWAP	230		230		
EWAF	277		277		

#### Notes:

- The heating element, high temperature linear limit switch, and fusible link are not included. See electric heating element pricing.
- High voltage motors need to be ordered separately.

# Electric heat control packages

Zehnder Rittling provides a control system that includes a thermostat, manually operated three-speed fan switch, changeover switch, contactor, fuse holder with fuses, field wiring terminals and motor quick connect. The contactor, fuse holder with fuses and field wiring terminals are all pre-mounted and pre-wired to a sub panel installed in the control box. The motor quick connect allows easy removal of the blower plate and easy access to the electric heating assembly for servicing.

## Chilled water cooling, hot water heating, intermediate season electric heating

**Automatic changeover on supply water temperature. Vertical high capacity only**

### Cooling cycle

When the space temperature rises to thermostat set point, the thermostat opens the electric cooling water valve until the space temperature is satisfied. The thermostat includes a center dead band which allows the cooling water valve to close and prevent energizing of the electric heating element. (The cooling water valve is not included.) When the space temperature falls to the thermostat set point, the thermostat energizes the electric heating element until the space temperature is satisfied. The thermostat includes a center dead band to allow both the cooling water valve and the electric heating element to be de-energized when the space temperature is satisfied. A changeover switch is provided on the cold water supply piping to automatically maintain the cooling cycle when chilled water is present.

### Heating cycle

When the space temperature falls to the thermostat set point, the thermostat energizes the electric heating element until the space temperature is satisfied. The electric heating element is locked out. A changeover switch is provided on the hot water supply piping to automatically maintain the heating cycle when hot water is present.

### Fan operation

A manual fan switch with high, medium and low speeds is integral to the thermostat and controls the fan speed and the thermostat. The fan motor and thermostat are energized in any fan speed position and run continuously. The switch in the “off” position de-energizes the fan and thermostat, closing the electric water valve and breaking the electric heating circuit.

### Thermostat

All factory supplied thermostats are pre-wired.

Package number	Component voltage			Fan motor speed switch location	Changeover switch location
	Power supply and electric heating element	Thermostatic valve controls	Motor		
EWAG	120	120	120	Integral to thermostat	Changeover switch(es) installed on supply line
EWAK	120	24	120		
EWAL	208		208		
EWAR	230		230		
EWAM	277		277		

#### Notes:

- The heating element, high temperature linear limit switch, and fusible link are not included. See electric heating element pricing.
- High voltage motors need to be ordered separately.



# Electric heat control packages

Zehnder Rittling provides a control system that includes contactor(s), fuse holder with fuses, field wiring terminals and an electrical block-off plate. The contactor(s), fuse holder with fuses and field wiring terminals are all pre-mounted and pre-wired to a sub panel installed in the control box of the fan coil.

## Chilled water cooling, single stage electric heating

**Field furnished thermostat. Vertical high capacity only**

### Cooling cycle

On a call for cooling the electric cooling water valve will open. The fan operates continuously. The cooling water valve is not included.

### Heating cycle

On a call for heating the electric heating elements are energized. The fan operates continuously.

### Fan operation

A manual fan switch with high, medium and low speeds is integral to the thermostat and controls the fan speed and the thermostat. The fan motor(s) and thermostat are energized in any fan speed position and run continuously. The switch in the “off” position de-energizes the fan and thermostat, closing the electric cooling water valve and breaking the electric heating circuit.

### Thermostat

Field supplied for wall mounting.

Package number	Component voltage			Fan motor speed switch location	Changeover switch location
	Power supply and electric heating element	Thermostatic valve controls	Motor		
ECSA	120	120	120	Field supplied	Field supplied and mounted
ECSE	120	24	120		
ECSB	208		208		
ECSD	230		230		
ECSC	277		277		

#### Notes:

- The heating element, high temperature linear limit switch, and fusible link are not included. See electric heating element pricing.
- High voltage motors need to be ordered separately.

## Electric heat capacities

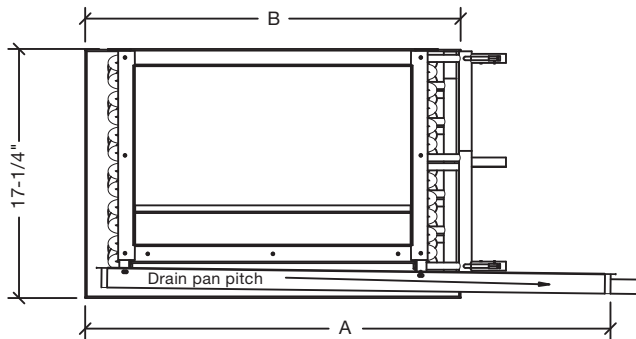
Table F

Unit size	120V/60/1					208V/60/1					230V/60/1					277V/60/1				
	No. of elements	kW	MBH	Temp rise	Amps	No. of elements	kW	MBH	Temp rise	Amps	No. of elements	kW	MBH	Temp rise	Amps	No. of elements	kW	MBH	Temp rise	Amps
06	1	1.0	3.4	3.8	8.3	1	1.0	3.4	3.8	4.8	1	1.0	3.4	3.8	4.3	1	1.5	5.1	5.6	5.4
	1	1.5	5.1	5.6	12.5	1	1.5	5.1	5.6	7.2	1	1.5	5.1	5.6	6.5	1	1.9	6.5	7.1	6.9
	1	1.9	6.5	7.1	15.8	1	2.2	7.5	8.3	10.6	1	1.9	6.5	7.1	8.3	1	2.2	7.5	8.3	7.9
	1	3.0	10.2	11.3	25.0	1	3.0	10.2	11.3	14.4	1	3.0	10.2	11.3	13.0	1	3.0	10.2	11.3	10.8
						1	4.0	13.6	15.0	19.2	1	4.0	13.6	15.0	17.4	1	4.0	13.6	15.0	14.4
						1	5.0	17.1	18.8	24.0	1	5.0	17.1	18.8	21.7	1	5.0	17.1	18.8	18.1
08	1	1.0	3.4	3.3	8.3	1	3.0	10.2	10.0	14.4	1	4.0	13.6	13.3	17.4	1	4.0	13.6	13.3	14.4
	1	1.5	5.1	5.0	12.5	1	4.0	13.6	13.3	19.2	1	5.0	17.1	16.6	21.7	1	5.0	17.1	16.6	18.1
	1	1.9	6.5	6.3	15.8	1	5.0	17.1	16.6	24.0	2	6.0	20.5	19.9	26.1	2	6.0	20.5	19.9	21.7
	1	3.0	10.2	10.0	25.0	2	6.0	20.5	19.9	28.8	2	7.0	23.9	23.3	30.4	2	7.0	23.9	23.3	25.3
						2	7.0	23.9	23.3	33.7	2	8.0	27.3	26.6	34.8	2	8.0	27.3	26.6	28.9
						2	8.0	27.3	26.6	38.5						2	9.0	30.7	29.9	32.5
10	1	1.0	3.4	2.9	8.3	1	4.0	13.6	11.8	19.2	1	5.0	17.1	14.7	21.7	1	5.0	17.1	14.7	18.1
	1	1.5	5.1	4.4	12.5	1	5.0	17.1	14.7	24.0	2	6.0	20.5	17.7	26.1	2	6.0	20.5	17.7	21.7
	1	1.9	6.5	5.6	15.8	2	6.0	20.5	17.7	28.8	2	7.0	23.9	20.6	30.4	2	7.0	23.9	20.6	25.3
	1	3.0	10.2	8.8	25.0	2	7.0	23.9	20.6	33.7	2	8.0	27.3	23.6	34.8	2	8.0	27.3	23.6	28.9
						2	8.0	27.3	23.6	38.5						2	9.0	30.7	26.5	32.5
																2	10.0	34.1	29.5	36.1
12	1	1.5	5.1	3.5	12.5	1	4.0	13.6	9.3	19.2	1	5.0	17.1	11.6	21.7	1	5.0	17.1	11.6	18.1
	1	1.9	6.5	4.4	15.8	1	5.0	17.1	11.6	24.0	2	6.0	20.5	13.9	26.1	2	6.0	20.5	13.9	21.7
	1	3.0	10.2	7.0	25.0	2	6.0	20.5	13.9	28.8	2	7.0	23.9	16.2	30.4	2	7.0	23.9	16.2	25.3
						2	7.0	23.9	16.2	33.7	2	8.0	27.3	18.5	34.8	2	8.0	27.3	18.5	28.9
						2	8.0	27.3	18.5	38.5						2	9.0	30.7	20.9	32.5
																2	10.0	34.1	23.2	36.1
14	1	1.5	5.1	2.8	12.5	1	5.0	17.1	9.4	24.0	1	5.0	17.1	9.4	21.7	1	5.0	17.1	9.4	18.1
	1	1.9	6.5	3.6	15.8	2	6.0	20.5	11.3	28.8	2	6.0	20.5	11.3	26.1	2	6.0	20.5	11.3	21.7
	1	3.0	10.2	5.6	25.0	2	7.0	23.9	13.2	33.7	2	7.0	23.9	13.2	30.4	2	7.0	23.9	13.2	25.3
						2	8.0	27.3	15.0	38.5	2	8.0	27.3	15.0	34.8	2	8.0	27.3	15.0	28.9
											2	9.0	30.7	16.9	39.1	2	9.0	30.7	16.9	32.5
																2	10.0	34.1	18.8	36.1
16	1	1.5	5.1	2.4	12.5	1	5.0	17.1	8.2	24.0	1	5.0	17.1	8.2	21.7	1	5.0	17.1	8.2	18.1
	1	1.9	6.5	3.1	15.8	2	6.0	20.5	9.8	28.8	2	6.0	20.5	9.8	26.1	2	6.0	20.5	9.8	21.7
	1	3.0	10.2	4.9	25.0	2	7.0	23.9	11.4	33.7	2	7.0	23.9	11.4	30.4	2	7.0	23.9	11.4	25.3
						2	8.0	27.3	13.1	38.5	2	8.0	27.3	13.1	34.8	2	8.0	27.3	13.1	28.9
											2	9.0	30.7	14.7	39.1	2	9.0	30.7	14.7	32.5
																2	10.0	34.1	16.3	36.1
18	1	1.5	5.1	2.1	12.5	1	5.0	17.1	7.1	24.0	1	5.0	17.1	7.1	21.7	1	5.0	17.1	7.1	18.1
	1	1.9	6.5	2.7	15.8	2	6.0	20.5	8.6	28.8	2	6.0	20.5	8.6	26.1	2	6.0	20.5	8.6	21.7
	1	3.0	10.2	4.3	25.0	2	7.0	23.9	10.0	33.7	2	7.0	23.9	10.0	30.4	2	7.0	23.9	10.0	25.3
						2	8.0	27.3	11.4	38.5	2	8.0	27.3	11.4	34.8	2	8.0	27.3	11.4	28.9
											2	9.0	30.7	12.8	39.1	2	9.0	30.7	12.8	32.5
																2	10.0	34.1	14.3	36.1
20	1	1.5	5.1	2.0	12.5	1	5.0	17.1	6.5	24.0	1	5.0	17.1	6.5	21.7	1	5.0	17.1	6.5	18.1
	1	1.9	6.5	2.5	15.8	2	6.0	20.5	7.8	28.8	2	6.0	20.5	7.8	26.1	2	6.0	20.5	7.8	21.7
	1	3.0	10.2	3.9	25.0	2	7.0	23.9	9.1	33.7	2	7.0	23.9	9.1	30.4	2	7.0	23.9	9.1	25.3
						2	8.0	27.3	10.4	38.5	2	8.0	27.3	10.4	34.8	2	8.0	27.3	10.4	28.9
											2	9.0	30.7	11.7	39.1	2	9.0	30.7	11.7	32.5
																2	10.0	34.1	13.0	36.1

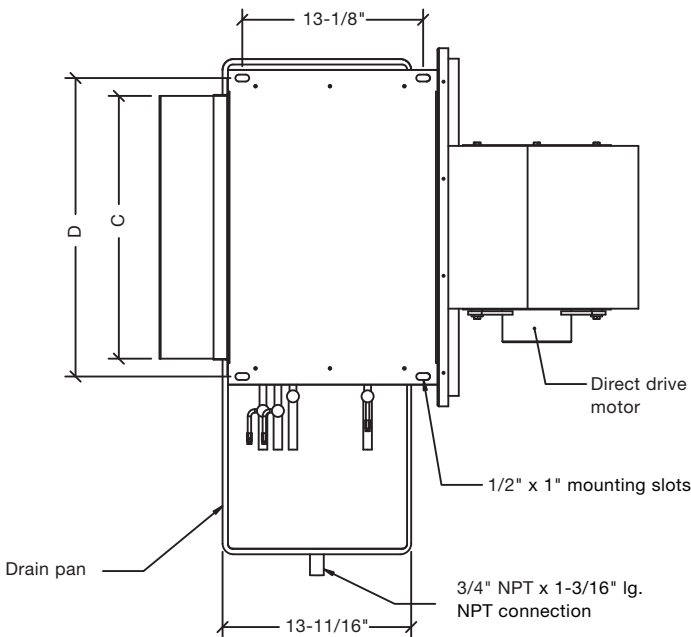
# Dimensions and data

## Model FDH

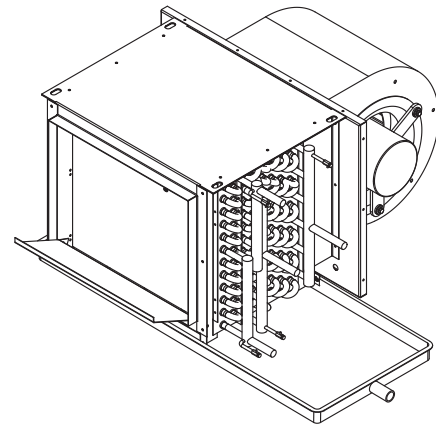
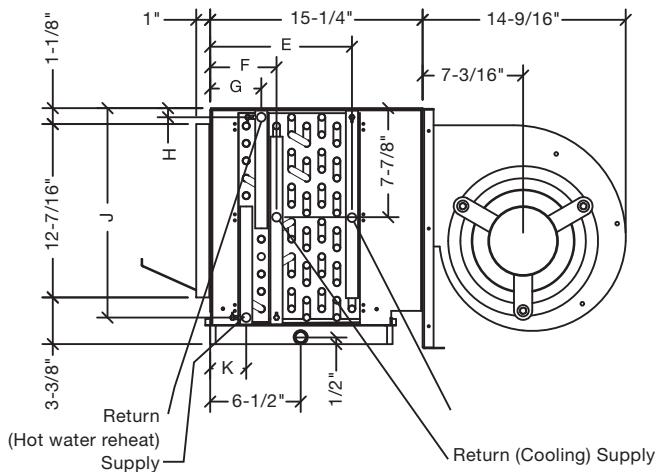
Front view



Top view



Side view



Dimensional data				
Unit size	A	B	C	D
06	33-1/14	22-13/16	16-1/16	18-1/2
08	36-3/8	26	19-1/4	21-5/8
12	45-5/8	35-1/4	28-1/2	30-7/8
16	56-1/16	45-11/16	38-15/16	41-5/16
20	63-15/16	53-9/16	46-13/16	49-3/16

Coil connection locations						
Coil	E	F	G	H	J	K
4 Row	5-13/16	2-9/16	N/A	N/A	N/A	N/A
6 Row	7-15/16	2-9/16	N/A	N/A	N/A	N/A
4/1 Row	6-7/8	3-5/8	2-1/2	1-1/4	15	2-1/2
4/2 Row	8	4-3/4	3-5/8	5/8	15	2-9/16
6/1 Row	9	3-5/8	2-1/2	1-1/4	15	2-1/2
6/2 Row	10-1/8	4-3/4	3-5/8	5/8	15	2-9/16

Coil connection sizes (nominal)					
Coil	06	08	12	16	20
1 Row	1/2	1/2	1/2	1/2	3/4
2 Row	1/2	1/2	1/2	1/2	3/4
4 Row	1/2	1/2	3/4	3/4	3/4
6 Row	1/2	1/2	3/4	1	1

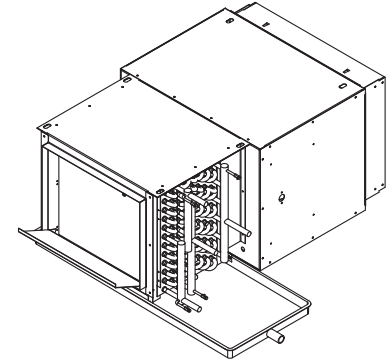
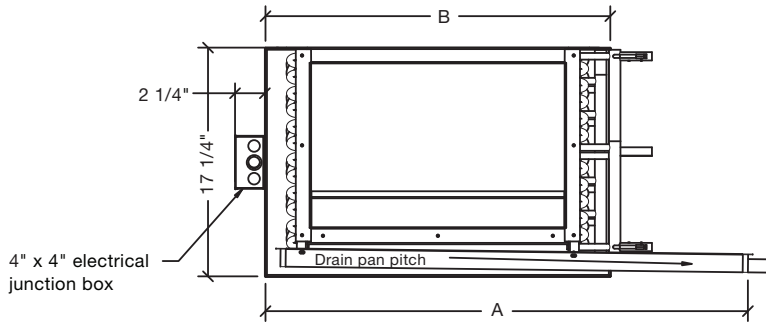
**Notes:**

- Right hand piping connections shown, left hand opposite as standard. Piping hand determined when facing the air outlet.
- Electrical opposite piping.
- All listed dimensions are approximate and are subject to change without notice. Modifications to the product specifications must be accepted by Zehnder at its base office.

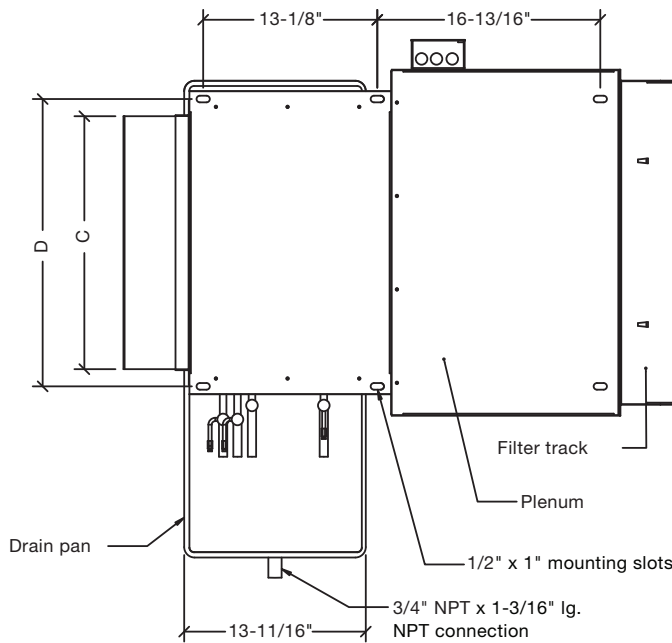
# Dimensions and data

# Model FDHP

Front view



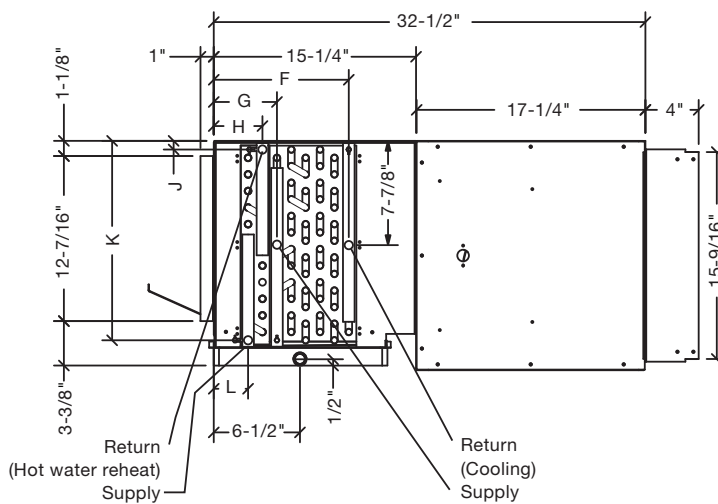
Top view



Dimensional data					
Unit size	A	B	C	D	E
06	33-1/4	22-13/16	16-1/16	18-1/2	21-5/16
08	36-3/8	26	19-1/4	21-5/8	24-7/16
12	45-5/8	35-1/4	28-1/2	30-7/8	33-11/16
16	56-1/16	45-11/16	38-15/16	41-5/16	44-1/8
20	63-15/16	53-9/16	46-13/16	49-3/16	52

Coil connection locations						
Coil	F	G	H	J	K	L
4 Row	5-13/16	2-9/16	N/A	N/A	N/A	N/A
6 Row	7-15/16	2-9/16	N/A	N/A	N/A	N/A
4/1 Row	6-7/8	3-5/8	2-1/2	1-1/4	15	2-1/2
4/2 Row	8	4-3/4	3-5/8	5/8	15	2-9/16
6/1 Row	9	3-5/8	2-1/2	1-1/4	15	2-1/2
6/2 Row	10-1/8	4-3/4	3-5/8	5/8	15	2-9/16

Side view

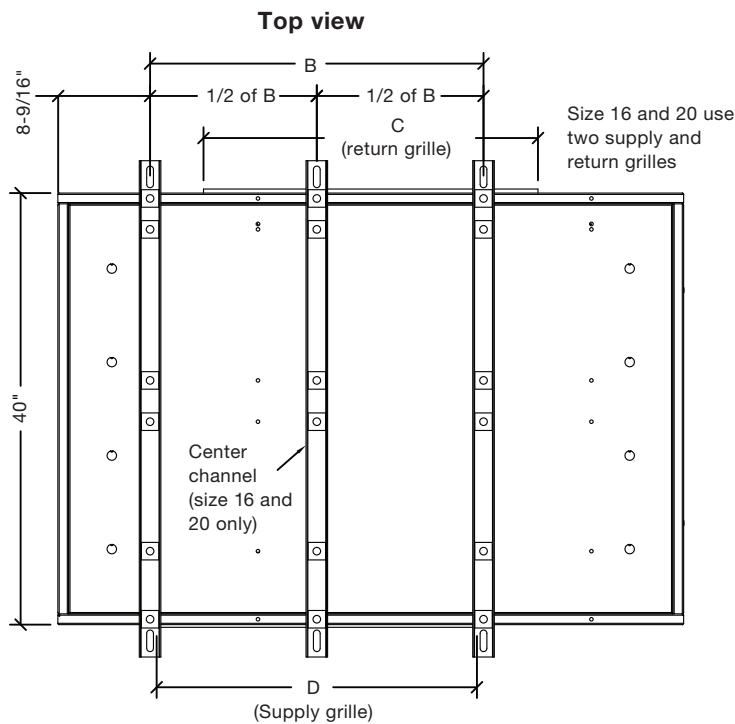
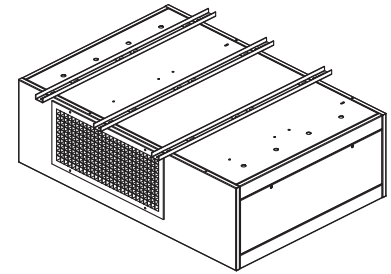
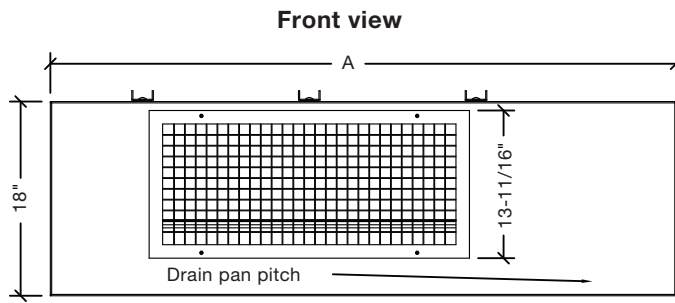


Coil connection sizes (nominal)					
Coil	06	08	12	16	20
1 Row	1/2	1/2	1/2	1/2	3/4
2 Row	1/2	1/2	1/2	1/2	3/4
4 Row	1/2	1/2	3/4	3/4	3/4
6 Row	1/2	1/2	3/4	1	1

- Notes:**
- Right hand piping connections shown, left hand opposite as standard. Piping hand determined when facing the air outlet.
  - Electrical opposite piping.
  - All listed dimensions are approximate and are subject to change without notice. Modifications to the product specifications must be accepted by Zehnder at its base office.

# Dimensions and data

# Model FDC

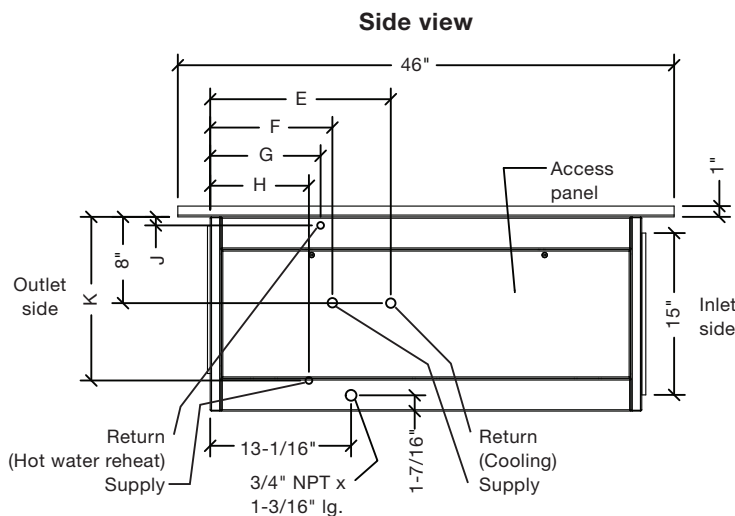


### Dimensional data

Unit size	A	B	C	D
06	45-5/8	18-1/2	17	18
08	48-3/4	21-11/16	21	20
12	58	30-15/16	31	30
16	68-7/16	41-3/8	45-1/8	40
20	76-5/16	49-1/4	45-1/8	48

### Coil connection locations

Coil	E	F	G	H	J	K
4 Row	12-7/16	9-3/16	N/A	N/A	N/A	N/A
6 Row	14-9/16	9-3/16	N/A	N/A	N/A	N/A
4/1 Row	13-1/2	10-1/4	9-1/8	9-1/8	1-3/8	15-1/8
4/2 Row	14-5/8	11-3/8	10-1/4	9-3/16	3/4	15-1/8
6/1 Row	15-5/8	10-1/4	9-1/8	9-1/8	1-3/8	15-1/8
6/2 Row	16-3/4	11-3/8	10-1/4	9-3/16	3/4	15-1/8



### Coil connection sizes (nominal)

Coil	06	08	12	16	20
1 Row	1/2	1/2	1/2	1/2	3/4
2 Row	1/2	1/2	1/2	1/2	3/4
4 Row	1/2	1/2	3/4	3/4	3/4
6 Row	1/2	1/2	3/4	1	1

### Notes:

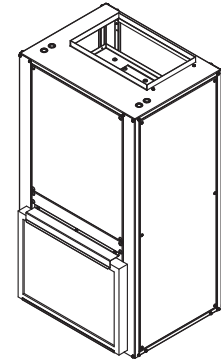
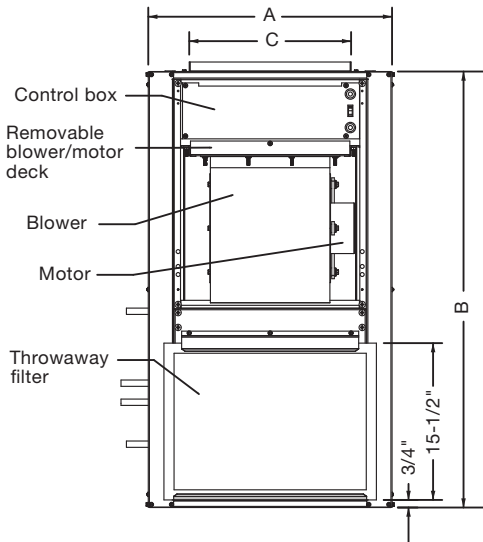
- Right hand piping connections shown, left hand opposite as standard. Piping hand determined when facing the air outlet.
- All listed dimensions are approximate and are subject to change without notice. Modifications to the product specifications must be accepted by Zehnder at its base office.

# Dimensions and data

# Model FDV-800

## Front view

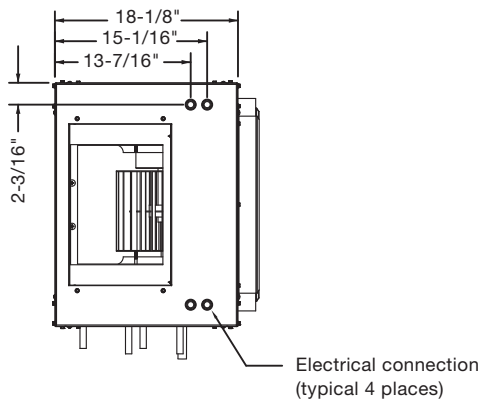
(Single blower unit, less front access panel)



### Dimensional data

Unit size	A	B	C
06	24-1/8	43-1/8	16
08 & 10	27-1/4	43-1/8	19-1/8
12	36-1/2	44-5/8	28-3/8
14 & 16	46-15/16	43-1/8	38-13/16
18 & 20	54-13/16	44-5/8	46-11/16

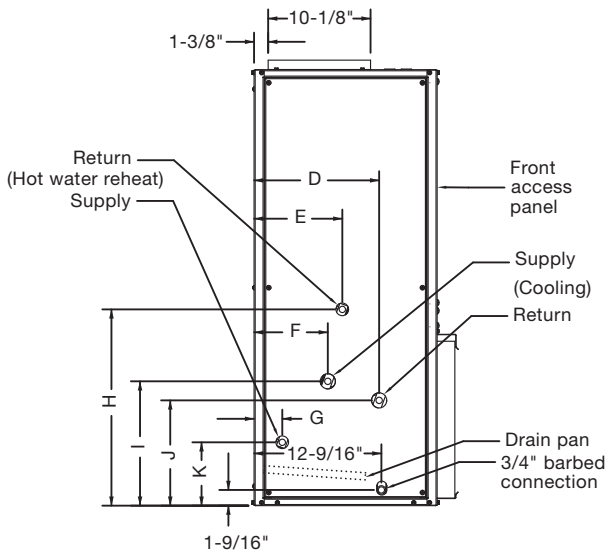
## Top view



### Coil connection locations

Coil	D	E	F	G	H	I	J	K
4 Row	12-7/16	N/A	9-3/8	N/A	N/A	11-1/2	10-3/8	N/A
6 Row	12-3/8	N/A	7-5/16	N/A	N/A	12-5/16	10-7/16	N/A
4/1 Row	12-7/16	10-5/8	9-3/8	5-15/16	18-1/16	11-1/2	10-3/8	5-1/8
4/2 Row	12-7/16	10-13/16	9-3/8	4-7/8	18-5/8	11-1/2	10-3/8	5-1/2
6/1 Row	12-3/8	8-1/2	7-5/16	3-13/16	18-13/16	12-5/16	10-7/16	5-7/8
6/2 Row	12-3/8	8-3/4	7-5/16	2-13/16	19-3/8	12-5/16	10-7/16	6-1/4

## Side view



### Coil connection sizes (nominal)

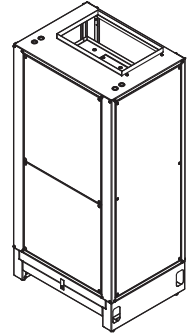
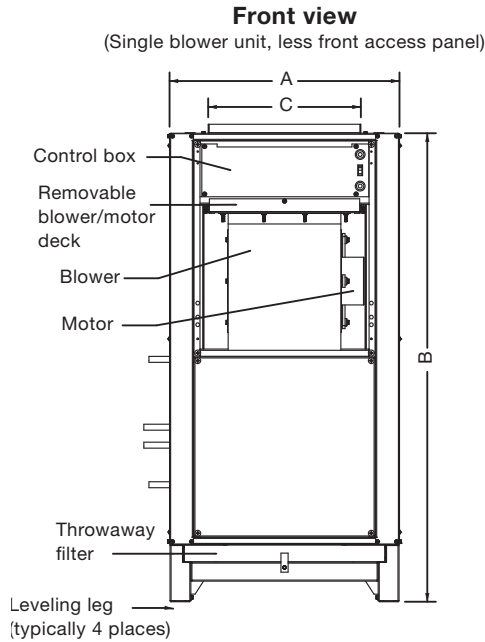
Coil	06	08 & 10	12	14 & 16	18 & 20
1 Row	1/2	1/2	1/2	1/2	3/4
2 Row	1/2	1/2	1/2	1/2	3/4
4 Row	1/2	1/2	3/4	3/4	3/4
6 Row	1/2	1/2	3/4	1	1

### Notes:

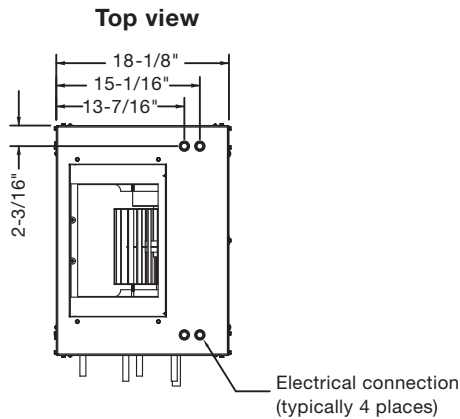
- Left hand piping connections shown. Piping hand determined when facing the air outlet.
- All listed dimensions are approximate and are subject to change without notice. Modifications to the product specifications must be accepted by Zehnder at its base office.

# Dimensions and data

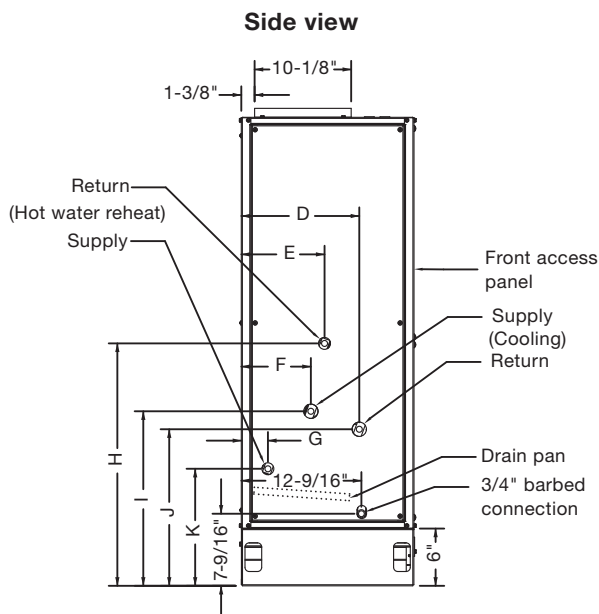
# Model FDV-810



Dimensional data			
Unit size	A	B	C
06	24-1/8	49-1/8	16
08 & 10	27-1/4	49-1/8	19-1/8
12	36-1/2	50-5/8	28-3/8
14 & 16	46-15/16	49-1/8	38-13/16
18 & 20	54-13/16	50-5/8	46-11/16



Coil connection locations								
Coil	D	E	F	G	H	I	J	K
4 Row	12-7/16	N/A	9-3/8	N/A	N/A	17-1/2	16-3/8	N/A
6 Row	12-3/8	N/A	7-5/16	N/A	N/A	18-5/16	16-7/16	N/A
4/1 Row	12-7/16	10-5/8	9-3/8	5-15/16	24-1/16	17-1/2	16-3/8	11-1/8
4/2 Row	12-7/16	10-13/16	9-3/8	4-7/8	24-5/8	17-1/2	16-3/8	11-1/2
6/1 Row	12-3/8	8-1/2	7-5/16	3-13/16	24-13/16	18-5/16	16-7/16	11-7/8
6/2 Row	12-3/8	8-3/4	7-5/16	2-13/16	25-3/8	18-5/16	16-7/16	12-1/4



Coil Connection Sizes (Nominal)					
Coil	06	08 & 10	12	14 & 16	18 & 20
1 Row	1/2	1/2	1/2	1/2	3/4
2 Row	1/2	1/2	1/2	1/2	3/4
4 Row	1/2	1/2	3/4	3/4	3/4
6 Row	1/2	1/2	3/4	1	1

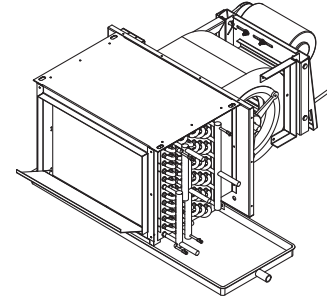
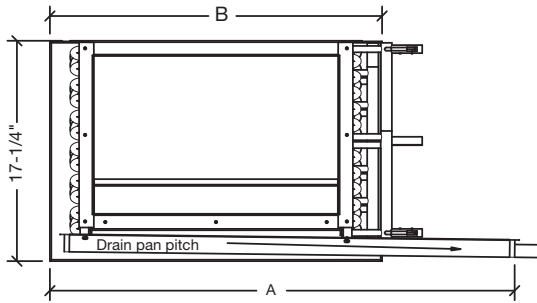
**Notes:**

- Left hand piping connections shown. Piping hand determined when facing the air outlet.
- All listed dimensions are approximate and are subject to change without notice. Modifications to the product specifications must be accepted by Zehnder at its base office.

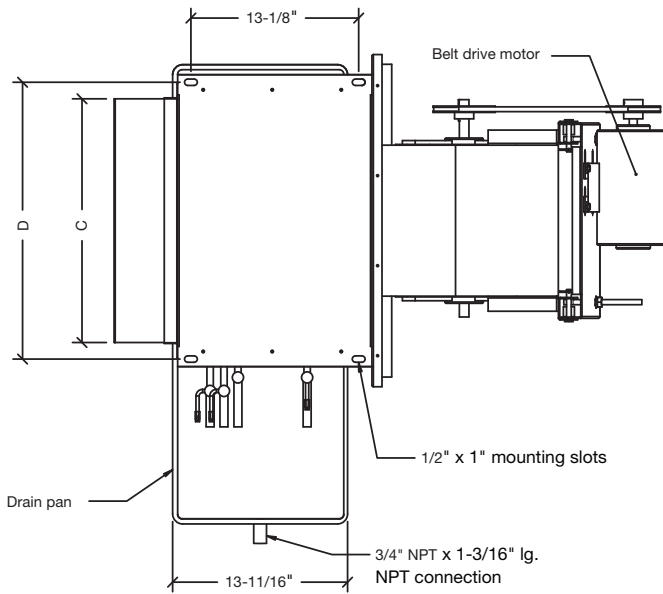
# Dimensions and data

# Model FBH

Front view



Top view



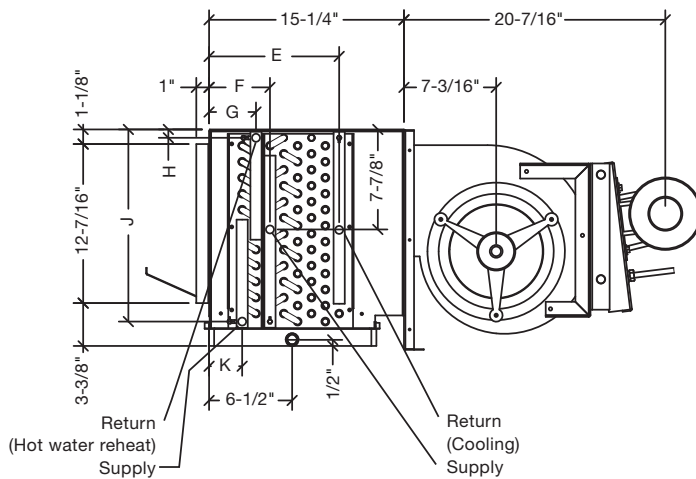
Dimensional data

Unit size	A	B	C	D
08	36-3/8	26	19-1/4	21-5/8
12	45-5/8	35-1/4	28-1/2	30-7/8
16	56-1/16	45-11/16	38-15/16	41-5/16
20	63-15/16	53-9/16	46-13/16	49-3/16
30	83-5/8	73-1/4	66-1/2	68-7/8

Coil connection locations

Coil	E	F	G	H	J	K
4 Row	5-13/16	2-9/16	N/A	N/A	N/A	N/A
6 Row	7-15/16	2-9/16	N/A	N/A	N/A	N/A
4/1 Row	6-7/8	3-5/8	2-1/2	1-1/4	15	2-1/2
4/2 Row	8	4-3/4	3-5/8	5/8	15	2-9/16
6/1 Row	9	3-5/8	2-1/2	1-1/4	15	2-1/2
6/2 Row	10-1/8	4-3/4	3-5/8	5/8	15	2-9/16

Side view



Coil connection sizes (nominal)

Coil	08	12	16	20	30
1 Row	1/2	1/2	1/2	3/4	3/4
2 Row	1/2	1/2	1/2	3/4	3/4
4 Row	1/2	3/4	3/4	3/4	3/4
6 Row	1/2	3/4	1	1	1

**Notes:**

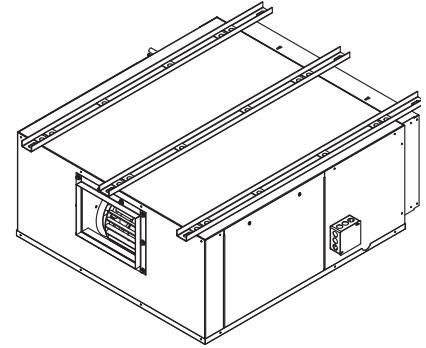
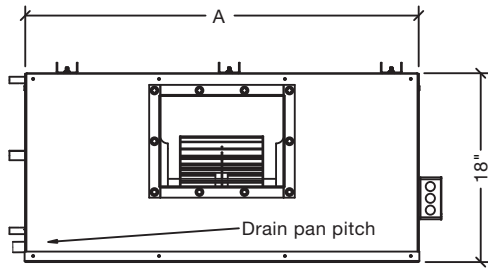
- Right hand piping connections shown, left hand opposite as standard. Piping hand determined when facing the air outlet.
- Electrical opposite piping.
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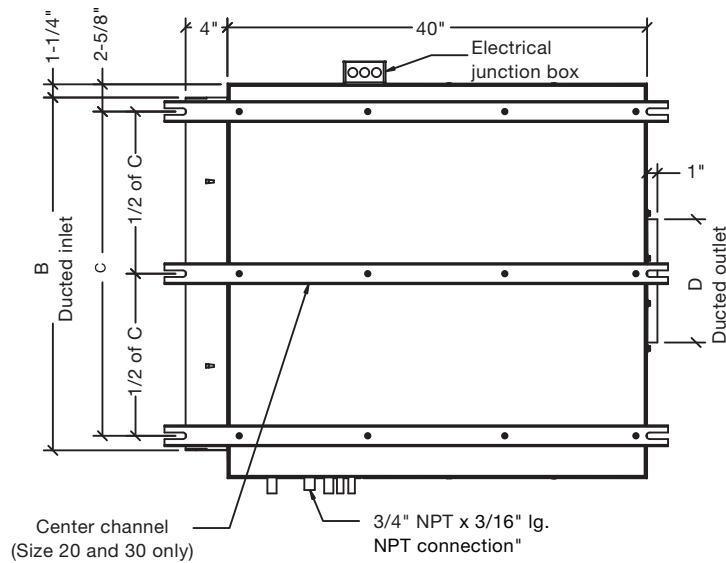
# Dimensions and data

# Model FBHP

Front view



Top view



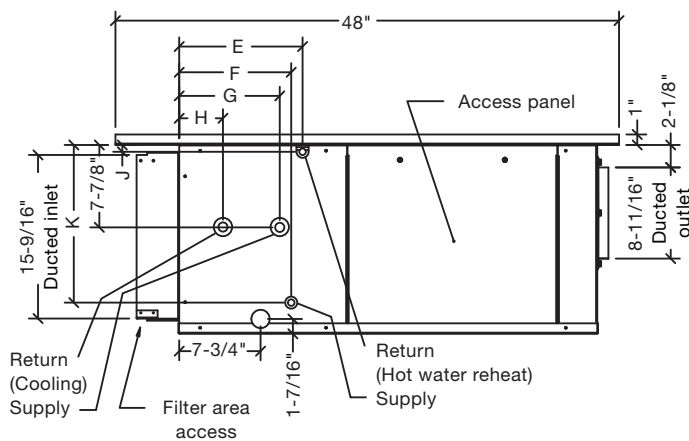
Dimensional data

Unit size	A	B	C	D
08	34-1/2	24-7/16	21-11/16	11-7/8
12	37-5/8	33-11/16	30-15/16	11-7/8
16	47-7/8	44-1/8	41-3/8	34
20	57-3/8	52	49-1/4	34
30	84-7/8	71-11/16	69	34

Coil connection locations

Coil	E	F	G	H	J	K
4 Row	N/A	N/A	11-13/16	8-9/16	N/A	N/A
6 Row	N/A	N/A	11-3/4	6-3/8	N/A	N/A
4/1 Row	11-3/4	11-3/4	10-5/8	7-3/8	5/8	14-3/8
4/2 Row	11-3/4	10-11/16	9-9/16	6-5/16	5/8	15
6/1 Row	11-3/4	11-3/4	10-11/16	5-1/4	5/8	14-3/8
6/2 Row	11-3/4	10-11/16	9-9/16	4-3/16	5/8	15

Side view



Coil connection sizes (nominal)

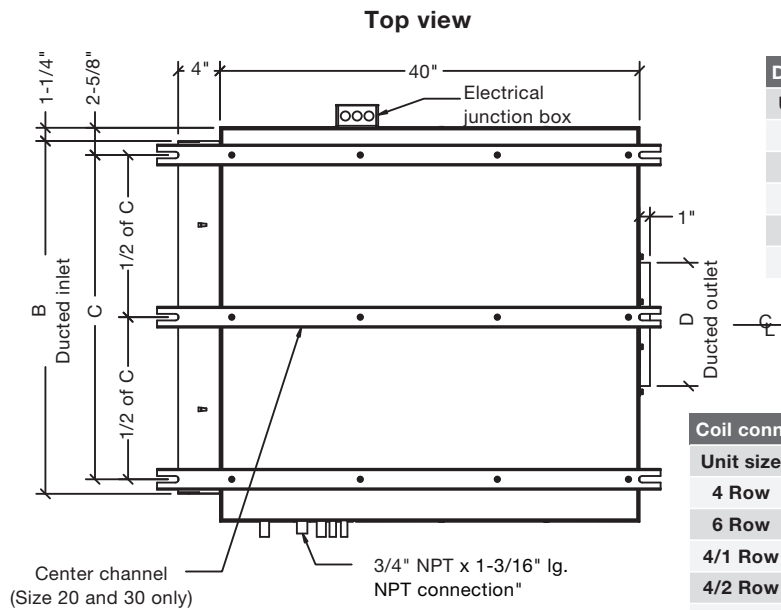
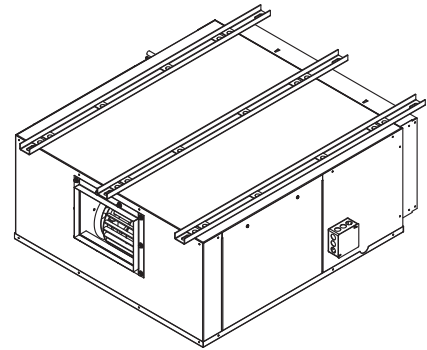
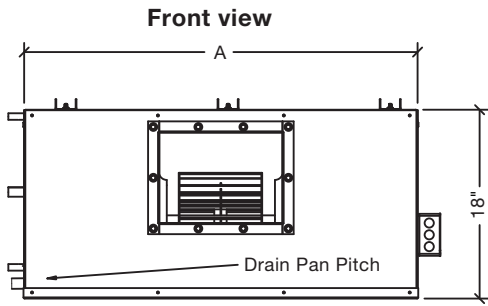
Coil	08	12	16	20	30
1 Row	1/2	1/2	1/2	3/4	3/4
2 Row	1/2	1/2	1/2	3/4	3/4
4 Row	1/2	3/4	3/4	3/4	3/4
6 Row	1/2	3/4	1	1	1

**Notes:**

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- Electrical opposite piping.
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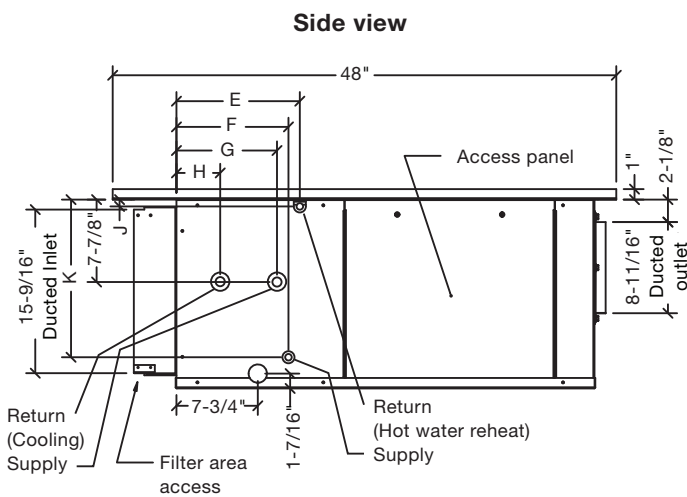
# Dimensions and data

# Model FBC



Dimensional data				
Unit size	A	B	C	D
08	34-1/4	24-7/16	21-11/16	11-7/8
12	37-5/8	33-11/16	30-15/16	11-7/8
16	47-7/8	44-1/8	41-3/8	34
20	57-3/8	52	49-1/4	34
30	84-7/8	71-11/16	69	34

Coil connection locations						
Unit size	E	F	G	H	J	K
4 Row	N/A	N/A	11-13/16	8-9/16	N/A	N/A
6 Row	N/A	N/A	11-3/4	6-3/8	N/A	N/A
4/1 Row	11-3/4	11-3/4	10-5/8	7-3/8	5/8	14-3/8
4/2 Row	11-3/4	10-11/16	9-9/16	6-5/16	5/8	15
6/1 Row	11-3/4	11-3/4	10-11/16	5-1/4	5/8	14-3/8
6/2 Row	11-3/4	10-11/16	9-9/16	4-3/16	5/8	15



Coil connection sizes (nominal)					
Unit size	08	12	16	20	30
1 Row	1/2	1/2	1/2	3/4	3/4
2 Row	1/2	1/2	1/2	3/4	3/4
4 Row	1/2	3/4	3/4	3/4	3/4
6 Row	1/2	3/4	1	1	1

- Notes:**
- Left hand piping connections shown. Piping hand determined when facing the air outlet.
  - Electrical opposite piping.
  - All listed dimensions are approximate and are subject to change without notice. Modifications to the product specifications must be accepted by Zehnder Rittling at its base office.

# Mechanical specifications

## General

Furnish and install Horizontal Direct Drive High Capacity Fan Coil Units where indicated on the plans and in the specifications, with required mounting components and accessories. All units shall be capable of meeting or exceeding the scheduled capacities for cooling, heating and air delivery. Units shall be ETL certified for the United States and Canada in compliance with UL/ANSI Standard 1995 and CSA C22.2 No. 236-95, and where applicable, be certified as complying with ARI Standard 440-2008.

## Construction

Hideaway cabinet panels (FDHP, FDH) shall be fabricated of 18-gauge galvanized steel panels. All exposed units (FDC) shall have exterior panels fabricated of not less than 16-gauge cold rolled steel [14-gauge steel]. The fully removable side access panels with rigid, tabbed bottom for easy installation and removal shall be secured in place with tamper-proof allen-head quarter turn fasteners to allow for easy access for service including safety chain(s). Exposed bottom panel (FDC) shall be removable when side panels are removed for increased accessibility.

All plenum panels shall be insulated with 1/2" thick 2 lb density matt-faced fiberglass [1/2" thick foil faced fiberglass with scrim and taped edges to prevent any fibers from reaching the airstream] [1/2" thick elastomeric closed cell foam insulation]. Hideaway coil section (FDHP, FDH) shall be insulated with 1/4" thick elastomeric closed cell foam insulation. Insulation shall conform to NFPA 90A for fire, smoke and melting, and comply with a 25/50 Flame Spread and Smoke Developed Index per ASTM E-84 or UL 723. Additionally, insulation shall

comply with Antimicrobial Performance Rating of 0, no observed growth, per ASTM G-21.

Exposed units shall include an aluminum cube core discharge grille [architectural aluminum double deflection discharge grille] and a hinged aluminum cube core filter return grille with a powder coated paint finish to match cabinet color. Liquid coat paint shall not be acceptable.

All ducted units shall have a minimum 1" duct collar on the return and/or discharge.

## Painted finish

All painted cabinet exterior panels shall be finished with a standard ivory epoxy powder coat paint. Optional colors can be selected from the Zehnder Rittling Color Chart. Liquid coat paint shall not be acceptable. Custom colors are also available with the submission of a color chip for color match.

## Sound

Units shall have published sound power level data tested in accordance with ARI Standard 350 for non-ducted units or ARI Standard 260 for ducted units.

## Power

Units shall not exceed scheduled power consumption.

## Fan and motor

Unit fan shall be dynamically balanced, forward curved, DWDI centrifugal type constructed of galvanized steel for corrosion resistance. Motors shall be permanent split-capacitor [electronically commutated high efficiency, programmable brushless DC], totally enclosed, tap wound for 3-speed, permanently lubricated

## Horizontal Direct Drive Models FDC, FDHP and FDH

sleeve bearing, type with automatic reset integral thermal overload protection. Shaded pole motors are not acceptable. Single speed motors are not acceptable. Prior to shipping, all motors shall be assembled, factory tested and installed in the unit. [The motor shall have a quick connect to allow service and removal without the need for tools.]

## Drain pan

Primary condensate drain pans shall be single wall, 18-gauge epoxy powder coat painted, galvanized steel for corrosion resistance and extend under the entire coil section. Drain pans shall be of one piece construction and be positively sloped in 2 directions for condensate removal. Drain pan access that requires removal of coils is not acceptable.

The primary drain pan shall be externally insulated with elastomeric closed cell foam insulation. The insulation shall carry no more than a 25/50 Flame Spread and Smoke Developed Rating per ASTM E-84 and UL 723 and an Antimicrobial Performance Rating of 0, no observed growth, per ASTM G-21. Internally sprayed insulation will not be acceptable.

- Option: Provide a primary drain pan constructed entirely of 20-gauge stainless steel for superior corrosion resistance.
- Option: Provide a condensate level switch to prevent unit from operating if the drain becomes blocked.
- Option: Provide a condensate pump with GFCI to continuously remove up to 5.0 gph.

# Mechanical specifications

## Coils

All cooling and heating coils shall optimize rows to meet the specified capacity. Coils shall have ½" OD seamless copper tubes and shall be mechanically expanded to provide an efficient, permanent bond between the tube and aluminum fin. Minimum copper tube thickness shall be 0.016".

Fins shall have high efficiency aluminum surface optimized for heat transfer, air pressure drop and carryover. Minimum fin thickness shall be 0.0045". Lanced fins shall not be acceptable.

All coils shall be tested at 350 PSIG air pressure under water, and rated for a maximum 300 PSIG working pressure at 200°F. Coils shall be circuited for counter flow to maximize unit efficiency.

All water coils shall be designed to connect with ½" nominal pipe connections.

Coil casing shall be fabricated from galvanized steel [stainless steel].

Heating coils shall be furnished in the re-heat position.

Steam coils shall be standard single tube steam type suitable for temperatures above 35°F and 15 PSIG steam pressure.

All water coils shall be provided with a manual air vent [automatic air vent] fitting to allow for coil venting.

## Filters

Units (FDC, FDHP) shall be furnished with a minimum 2" pleated MERV 7 filter. Filters shall be tight fitting to prevent air bypass.

## Electrical

Units shall be furnished with single point power connection. Provide an electrical control board for motor and other electrical terminations using spade connectors.

- Option: Provide 24 VAC fan relays with 40 VA transformer as integral part of control board. Fan relays designed to operate in conjunction with factory provided [field provided] 24 V thermostat. Fan relays designed to accept 120, 208, 220, 230, or 277 V input power.
- Relays shall operate with generic non-digital [digital, non-programmable] [digital, programmable] thermostat designed to control up to three independently energized fan speeds.
- Option: Provide a service disconnect switch to isolate power from the unit during maintenance.
- Option: Provide a manual motor starter to provide overload protection for the motor.

Primary internal wiring and testing shall be conducted at the factory. All units shall be shipped with wiring diagrams.

## Electric heat

Furnish an electric resistance heating assembly as an integral part of the fan coil unit, with the heating capacity, voltage and kilowatts scheduled.

The heater and unit assembly shall be listed for zero clearance and meet all NEC requirements, and be ETL listed with the unit as an assembly in compliance with UL/ANSI Standard 1995.

All heating elements shall be constructed of nickel chromium resistance wire with a maximum operating temperature of 1850°F.

## Horizontal Direct Drive Models FDC, FDHP and FDH

Electric heating elements shall be located in the reheat position and shall be non-accessible to room occupants. All internal wiring shall be rated for 105°C minimum.

All heaters shall include over temperature protection consisting of an automatic reset primary thermal limit safety switch and back-up secondary thermal limit safety device. All heaters shall be single stage.

Separate fusing is provided for each element for increased protection.

## Piping packages

Provide a standard factory assembled valve piping package to consist of a 2 or 3-way, on/off, motorized electric control valve and two ball isolation valves.

Control valves shall be piped normally closed to the coil. Maximum entering water temperature on the control valve shall be 200°F, and maximum operating pressure shall be 300 PSIG.

- Option: Unions shall be provided to allow easy removal of piping package from unit without the need for brazing or cutting pipe.
- Option: Provide 3-wire floating point modulating control valve (fail-in-place), in lieu of standard 2-position control valve with factory assembled valve piping package.
- Option: Provide proportional 0-10 VDC modulating control valve, in lieu of standard 2-position control valve with factory assembled valve piping package.
- Option: Provide high pressure close-off actuator for 2 or 3-way on/off control valve. Maximum close-off pressure is 75 PSIG.

## Mechanical specifications

- Option: Provide an adjustable flow control device for each piping package.
- Option: Provide a fixed flow control device for each piping package.
- Option: Provide pressure-temperature ports (P/T) for each piping package to allow measurement across the coil.

Piping packages shall be completely factory assembled including interconnecting pipe, factory tested for leaks and shipped loose for field installation.

Units shall be manufactured in accordance with ISO 9001:2008 standards established and maintained by Zehnder Rittling.

## Mechanical specifications

### General

Furnish and install Vertical Direct Drive High Capacity Fan Coil Units where indicated on the plans and in the specifications, with required mounting components and accessories. All units shall be capable of meeting or exceeding the scheduled capacities for cooling, heating and air delivery. Units shall be ETL certified for the United States and Canada in compliance with UL/ANSI Standard 1995 and CSA C22.2 No. 236-95, and where applicable, be certified as complying with ARI Standard 440-2008.

### Construction

Cabinet panels shall be fabricated of 18-gauge galvanized channel formed steel panels. Cabinet design shall include 4 corner posts for superior strength allowing front, back and connection opposing side panels to be removable for service access. [Panels to have interior 24-gauge galvanized steel layer, forming a double wall construction.]

All plenum panels shall be insulated with ½" thick 2 lb density matt-faced fiberglass [½" thick foil faced fiberglass with scrim and taped edges to prevent

any fibers from reaching the airstream] [½" thick elastomeric closed cell foam insulation]. Insulation shall conform to NFPA 90A for fire, smoke and melting, and comply with a 25/50 Flame Spread and Smoke Developed Index per ASTM E-84 or UL 723. Additionally, insulation shall comply with Antimicrobial Performance Rating of 0, no observed growth, per ASTM G-21.

Units shall have a minimum 1" duct collar on the return and/or discharge.

### Sound

Units shall have published sound power level data tested in accordance with ARI Standard 260 for ducted units.

### Power

Units shall not exceed scheduled power consumption.

### Fan and motor

Unit fan shall be dynamically balanced, forward curved, DWDI centrifugal type constructed of galvanized steel for corrosion resistance. Motors shall be permanent split-capacitor [electronically commutated high efficiency, programmable brushless DC], totally enclosed, tap wound

## Vertical Direct Drive: Model FDV

for 3-speed, permanently lubricated sleeve bearing, type with automatic reset integral thermal overload protection. Shaded pole motors are not acceptable. Single speed motors are not acceptable. Prior to shipping, all motors shall be assembled, factory tested and installed in the unit.

The fan/motor assembly shall be constructed of 16-gauge galvanized steel and installed in a z-channel mounting frame for ease of sliding fan/motor deck in and out through the front panel. Each fan/motor assembly shall be fastened by no more than 2 forward facing screws. [The motor shall have a quick connect to allow service and removal without the need for tools.]

### Drain pan

Primary condensate drain pan shall be single wall, 18-gauge epoxy powder coat painted, galvanized steel for corrosion resistance and extend under the entire coil section. Drain pans shall be of one piece construction and be positively sloped in 2 directions for condensate removal.

# Mechanical specifications

Drain pan to be easily removable by sliding out from c-channel and shall be fastened by no more than 2 screws.

Drain pan access that requires the removal of coils is not acceptable.

The primary drain pan shall be externally insulated with elastomeric closed cell foam insulation. The insulation shall carry no more than a 25/50 Flame Spread and Smoke Developed Rating per ASTM E-84 and UL 723 and an Antimicrobial Performance Rating of 0, no observed growth, per ASTM G-21. Internally sprayed insulation will not be acceptable.

- Option: Provide a primary drain pan constructed entirely of 20-gauge stainless steel for superior corrosion resistance.

## Coils

All cooling and heating coils shall optimize rows to meet the specified capacity. Coils shall have ½" OD seamless copper tubes and shall be mechanically expanded to provide an efficient, permanent bond between the tube and aluminum fin. Minimum copper tube thickness shall be 0.016".

Fins shall have high efficiency aluminum surface optimized for heat transfer, air pressure drop and carryover. Minimum fin thickness shall be 0.0045". Lanced fins shall not be acceptable.

All coils shall be tested at 350 PSIG air pressure under water, and rated for a maximum 300 PSIG working pressure at 200°F. Coils shall be circuited for counter flow to maximize unit efficiency.

Coil casing shall be fabricated from galvanized steel [stainless steel].

Heating coils shall be furnished in the re-heat position.

Steam coils shall be standard single tube steam type suitable for temperatures above 35°F and 15 PSIG steam pressure.

All water coils shall be provided with a manual air vent [automatic air vent] fitting to allow for coil venting.

## Filters

Unit shall be furnished with a minimum 2" pleated MERV 7 filter. Filters shall be tight fitting to prevent air bypass.

## Electrical

Units shall be furnished with single point power connection. Provide an electrical control board for motor and other electrical terminations using spade connectors.

- Option: Provide 24 VAC fan relays with 40 VA transformer as integral part of control board. Fan relays designed to operate in conjunction with factory provided [field provided] 24 V thermostat. Fan relays designed to accept 120, 208, 220, 230, or 277 V input power. Relays shall operate with generic non-digital [digital, non-programmable] [digital, programmable] thermostat designed to control up to three independently energized fan speeds.
- Option: Provide a service disconnect switch to isolate power from the unit during maintenance.
- Option: Provide a manual motor starter to provide overload protection for the motor.

## Vertical Direct Drive: Model FDV

Primary internal wiring and testing shall be conducted at the factory. All units shall be shipped with wiring diagrams.

## Electric heat

Furnish an electric resistance heating assembly as an integral part of the fan coil unit, with the heating capacity, voltage and kilowatts scheduled.

The heater and unit assembly shall be listed for zero clearance and meet all NEC requirements, and be ETL listed with the unit as an assembly in compliance with UL/ANSI Standard 1995.

All heating elements shall be finned tubular electric heating elements, constructed of nickel-plated steel fins spirally wound over a heating element, metallurgically bonded by furnace brazing. Coil terminals are constructed of nickel-plated steel with epoxy end seal. Electric heating elements shall be located in the reheat position and shall be non-accessible to room occupants.

Elements terminated with stainless-steel machine-staked terminals secured with stainless-steel hardware.

All heaters shall include over temperature protection consisting of an automatic reset primary thermal limit safety switch and back-up secondary thermal limit safety device. All heaters shall be single stage.

Separate fusing is provided for each element for overcurrent protection.

All internal wiring shall be rated for 105°C minimum.

# Mechanical specifications

## Piping packages

Provide a standard factory assembled valve piping package to consist of a 2 or 3-way, on/off, motorized electric control valve and two ball isolation valves.

Control valves shall be piped normally closed to the coil. Maximum entering water temperature on the control valve shall be 200°F, and maximum operating pressure shall be 300 PSIG.

- Option: Unions shall be provided to allow easy removal of piping package from unit without the need for brazing or cutting pipe.

- Option: Provide 3-wire floating point modulating control valve (fail-in-place), in lieu of standard 2-position control valve with factory assembled valve piping package.
- Option: Provide proportional 0-10 VDC modulating control valve, in lieu of standard 2-position control valve with factory assembled valve piping package.
- Option: Provide high pressure close-off actuator for 2 or 3-way on/off control valve. Maximum close-off pressure is 75 PSIG.
- Option: Provide an adjustable flow control device for each piping package.

## Vertical Direct Drive: Model FDV

- Option: Provide a fixed flow control device for each piping package.
- Option: Provide pressure-temperature ports (P/T) for each piping package to allow measurement across the coil.

Piping packages shall be completely factory assembled including interconnecting pipe, factory tested for leaks and shipped loose for field installation.

Units shall be manufactured in accordance with ISO 9001:2008 standards established and maintained by Zehnder Rittling.

# Mechanical specifications

## General

Furnish and install Horizontal Belt Drive High Capacity Fan Coil Units where indicated on the plans and in the specifications, with required mounting components and accessories. All units shall be capable of meeting or exceeding the scheduled capacities for cooling, heating and air delivery. Units shall be draw-through design (FBC, FBHP) with coils, fans, motor/drive and drain pan completely contained within the unit cabinet. Units shall be ETL certified for the United States and Canada in compliance with UL/ANSI Standard 1995 and CSA C22.2 No. 236-95.

## Construction

All cabinet panels (FBHP, FBH) shall be fabricated of 18-gauge galvanized steel. Exposed cabinet panels shall be fabricated of not less than 18-gauge cold rolled steel. The side access panels have standard slotted head fasteners for quick removal. No coil or

drain piping or electrical connections shall pass through any access panel. The bottom panel should be completely removable to provide extra access to all internal components during maintenance.

All plenum panels shall be insulated with 1/2" thick 2 lb density matt-faced fiberglass [1/2" thick foil faced fiberglass with scrim and taped edges to prevent any fibers from reaching the airstream] [1/2" thick elastomeric closed cell foam insulation]. Insulation shall conform to NFPA 90A for fire, smoke and melting, and comply with a 25/50 Flame Spread and Smoke Developed Index per ASTM E-84 or UL 723. Additionally, insulation shall comply with Antimicrobial Performance Rating of 0, no observed growth, per ASTM G-21.

All ducted units shall have a minimum 1" duct collar on the return and/or discharge.

## Horizontal Belt Drive: Models FBC, FBHP and FBH

### Painted finish

All painted cabinet exterior panels shall be finished with a standard ivory epoxy powder coat paint. Optional colors can be selected from the Zehnder Rittling Color Chart. Liquid coat paint shall not be acceptable. Custom colors are also available with the submission of a color chip for color match.

### Power

Units shall not exceed scheduled power consumption.

### Fan assembly

Unit fan shall be dynamically balanced, forward curved, DWDI centrifugal type constructed of galvanized steel for corrosion resistance. All blower wheels shall have two set screws and shall be mounted on solid steel shafting rotating in ball bearings. All standard blower assemblies shall have resilient mounted cartridge type permanently lubricated ball bearings.

# Mechanical specifications

## Fan motor and drive assembly

All fan motors shall be standard NEMA design motors of the horsepower listed in the equipment schedule. All motors shall be 1750 RPM, 60 hertz permanently lubricated open drip-proof single speed motors rated for continuous duty. All motors shall be reversible rotation type.

Three phase motors shall be “across-the-line” start type in 56 frame size up through two horsepower.

All motors shall be mounted on an adjustable base.

All motor wiring is to be terminated in a junction box, external to the unit casing.

All fan drive assemblies shall include an adjustable pitch motor sheave, a fixed pitch blower sheave, a standard cross section “V-belt” and keyed motor and blower shafts.

Prior to shipping, all motors shall be assembled, factory tested and installed in the unit.

## Drain pan

Primary condensate drain pans shall be single wall, 18-gauge epoxy powder coat painted, galvanized steel for corrosion resistance and extend under the entire coil section. Drain pans shall be of one piece construction and be positively sloped in 2 directions for condensate removal. Drain pan access that requires removal of coils is not acceptable.

The primary drain pan shall be externally insulated with elastomeric closed cell foam insulation. The insulation shall carry no more than

a 25/50 Flame Spread and Smoke Developed Rating per ASTM E-84 and UL 723 and an Antimicrobial Performance Rating of 0, no observed growth, per ASTM G-21. Internally sprayed insulation will not be acceptable.

- Option: Provide a primary drain pan constructed entirely of 20-gauge stainless steel for superior corrosion resistance.
- Option: Provide a condensate level switch to prevent unit from operating if the drain becomes blocked.

## Coils

All cooling and heating coils shall optimize rows to meet the specified capacity. Coils shall have ½" OD seamless copper tubes and shall be mechanically expanded to provide an efficient, permanent bond between the tube and aluminum fin. Minimum copper tube thickness shall be 0.016".

Fins shall have high efficiency aluminum surface optimized for heat transfer, air pressure drop and carryover. Minimum fin thickness shall be 0.0045". Lanced fins shall not be acceptable.

All coils shall be tested at 350 PSIG air pressure under water, and rated for a maximum 300 PSIG working pressure at 200°F. Coils shall be circuited for counter flow to maximize unit efficiency.

Coil casing shall be fabricated from galvanized steel [stainless steel].

Heating coils shall be furnished in the re-heat position.

## Horizontal Belt Drive: Models FBC, FBHP and FBH

All water coils shall be provided with a manual air vent [automatic air vent] fitting to allow for coil venting.

## Filters

Units (FBC, FBHP) shall be furnished with a minimum 2" pleated MERV 8 filter. Filters shall be tight fitting to prevent air bypass.

## Electrical

Units shall be furnished with single point power connection. Provide an electrical junction box for motor and other electrical terminations.

- Option: Provide a service disconnect switch to isolate power from the unit during maintenance.

Primary internal wiring and testing shall be conducted at the factory. All units shall be shipped with wiring diagrams.

## Electric heat

Furnish an electric resistance heating assembly as an integral part of the fan coil unit, with the heating capacity, voltage and kilowatts scheduled in the blow-through configuration.

The heater and unit assembly shall be listed for zero clearance and meet all NEC requirements, and be ETL listed with the unit as an assembly in compliance with UL/ANSI Standard 1995.

All heating elements shall be constructed of nickel chromium resistance wire with a maximum operating temperature of 1850°F. Electric heating elements shall be located in the reheat position and shall be non-accessible to room occupants, once ducted. All internal wiring shall be rated for 105°C minimum.



# Mechanical specifications

All heaters shall include over temperature protection consisting of an automatic reset primary thermal limit safety switch and back-up secondary thermal limit safety device. All heaters shall be single stage.

Separate fusing is provided for each element for increased protection.

## Piping packages

Provide a standard factory assembled valve piping package to consist of a 2 or 3-way, on/off, motorized electric control valve and two ball isolation valves.

Control valves shall be piped normally closed to the coil. Maximum entering water temperature on the control valve shall be 200°F, and maximum operating pressure shall be 300 PSIG.

- Option: Unions shall be provided to allow easy removal of piping package from unit without the need for brazing or cutting pipe.
- Option: Provide 3-wire floating point modulating control valve (fail-in-place), in lieu of standard 2-position control valve with factory assembled valve piping package.
- Option: Provide proportional 0-10 VDC modulating control valve, in lieu of standard 2-position control valve with factory assembled valve piping package.
- Option: Provide high pressure close-off actuator for 2 or 3-way on/off control valve. Maximum close-off pressure is 75 PSIG.
- Option: Provide an adjustable flow control device for each piping package.
- Option: Provide a fixed flow control device for each piping package.
- Option: Provide pressure-temperature ports (P/T) for each piping package to allow measurement across the coil.

## Horizontal Belt Drive: Models FBC, FBHP and FBH

Piping packages shall be completely factory assembled including interconnecting pipe, factory tested for leaks and shipped loose for field installation.

Units shall be manufactured in accordance with ISO 9001:2008 standards established and maintained by Zehnder Rittling.

The brand with the best indoor climate solutions.

## FOUR COMPLEMENTARY PRODUCT LINES

The broad and clearly structured portfolio from the Zehnder Group is split into four product lines. Consequently, we can provide the right product, the perfect system and the matching service for all types of projects - from new builds to renovations, single- or multiple- family homes, as well as commercial projects. This variety ensures that our wealth of experience is continuously expanding, providing tangible added value to our customers on a daily basis.



### Decorative radiators

Our individual decorative radiators for living and bathrooms not only make a home warmer but also more attractive. Created by renowned designers, they impress with excellent functionality.

## NUMBERS THAT SPEAK FOR THEMSELVES

MANUFACTURER OF THE

**1<sup>ST</sup>**

STEEL RADIATOR IN THE WORLD

**121**

YEARS OF INNOVATIVE TRADITION

AROUND

**3,000**

EMPLOYEES

FOUNDED IN

**1895**

REPRESENTED IN COUNTRIES

**19**

**1,800,000**

TONNES OF CO<sub>2</sub> SAVED SINCE 2005

## WARRANTY

Zehnder guarantees its products to be free from defects in material and workmanship for a period of two years from date of shipment from our factory.

Should there be any defects in the good(s), the purchaser should promptly notify Zehnder. Upon receipt of written consent from Zehnder, the purchaser shall return the defective good(s) to the factory for inspection with freight prepaid. If inspection shows the goods to be defective, Zehnder will at its discretion repair or replace the said item(s).

Defects arising from damage due to shipment, improper installation, negligence or misuse by others are not covered by this warranty.



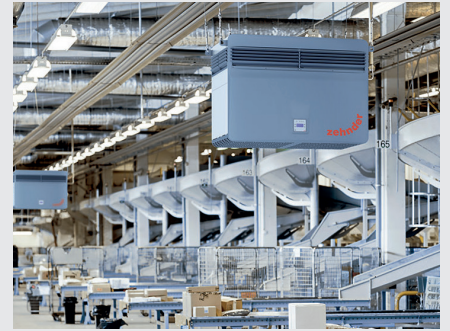
### Comfortable indoor ventilation

Our comfortable indoor ventilation is energy-efficient and provides a healthy indoor climate. It promotes the well-being of the occupants and increases the value of the property.



### Heating and cooling ceiling systems

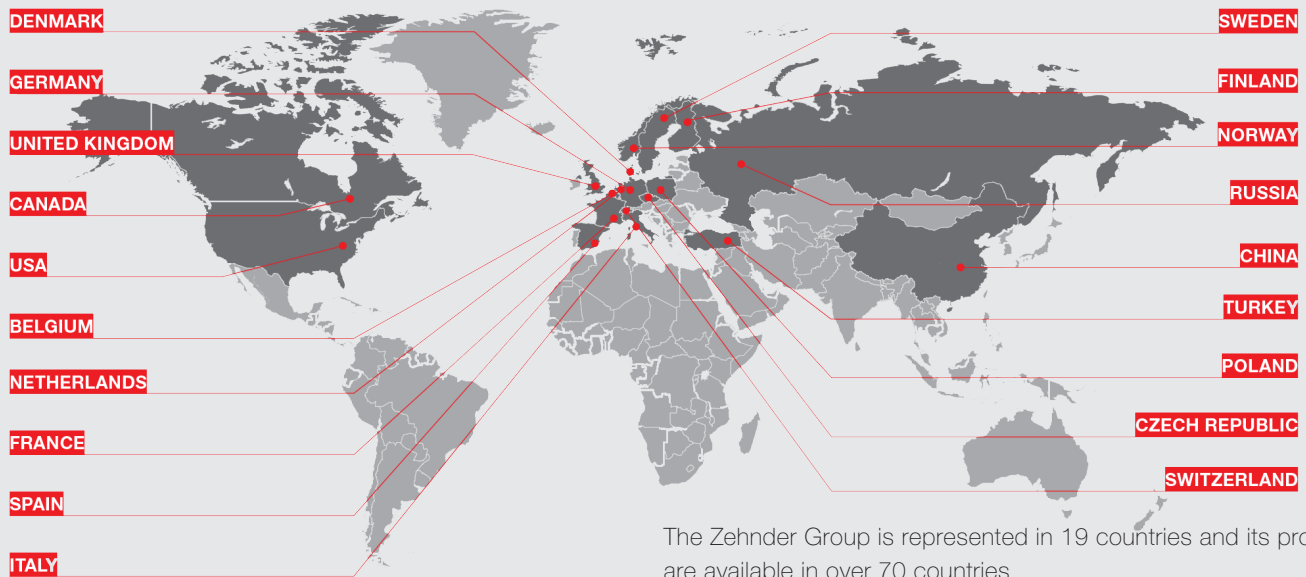
Zehnder heating and cooling ceiling systems are convenient and energy-efficient for heating and cooling. They are perfectly attuned to the relevant environment.



### Clean air solutions

Clean air solutions from Zehnder reduce the level of dust in the air, create a healthier working climate and reduce the amount of cleaning required.

## BEST CLIMATE IN THE WORLD



This warranty is extended only to the original purchaser from Zehnder.

**IMPORTANT:** Approved submittal documentation, specific to each project, supersedes the general guidelines contained within this document.

**zehnder**

The Zehnder brand offers excellent indoor climate solutions within the sectors of decorative radiators, clean air solutions, comfortable indoor ventilation and heating and cooling ceiling systems.

