

Vertical Room Fan Coils

Catalog





Zehnder decorative radiators



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best climate

Heating and cooling ceiling systems



Comfortable indoor ventilation



Clean air solutions

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Versatility and style combine 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 Coils 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.

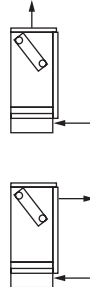
Zehnder Fan Coils are available in a wide range of models and air flow arrangements to satisfy the demands of your heating and cooling specifications. In addition to this, Zehnder experts are able to help with complex specification plans through our competent sales team who can visit the site if requested.

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

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Models and airflow arrangements

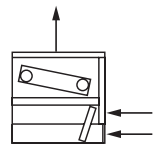
Floor models



FF-200

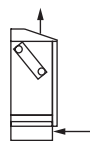
FF-220

FF: Floor
FF-200 shown, FF-220 available



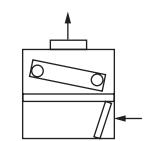
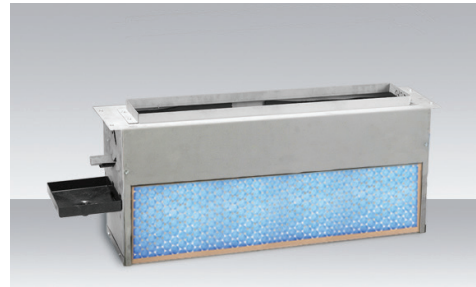
FLF-510

FLF: Low profile
FLF-510



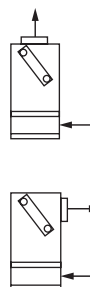
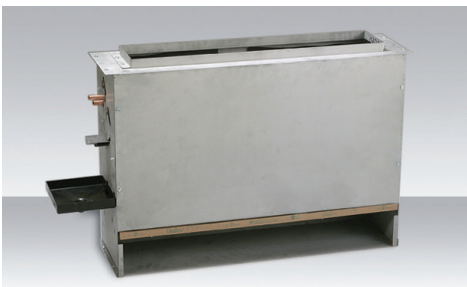
FS-200

FS: Sloped
FS-200



FLH-520

FLH: Low profile hideaway
FLH-520



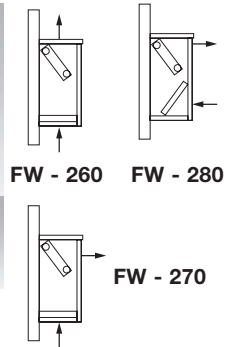
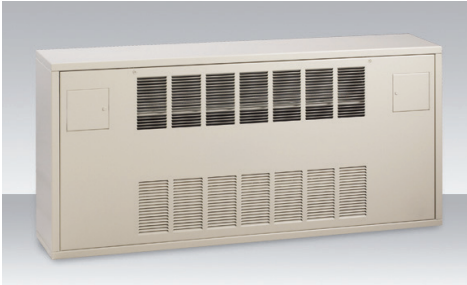
FFH-450

FFH-460

FFH: Floor hideaway
FFH-450 shown, FFH-460 available

Models and airflow arrangements

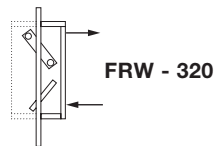
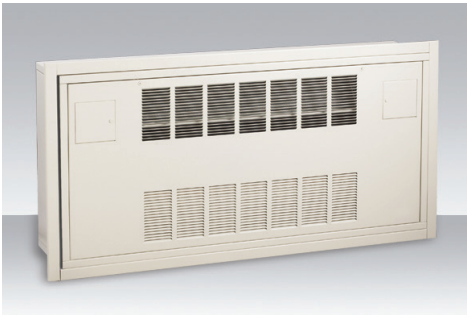
Wall models



FW: Wall

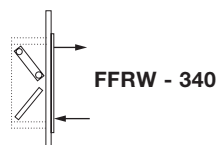
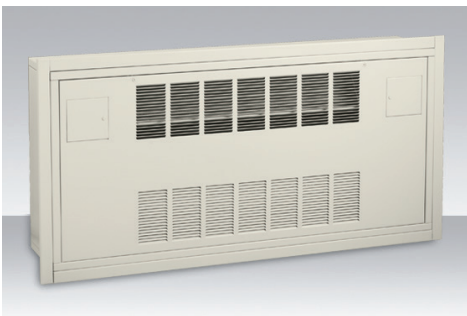
FW-280 shown

FW-260 and FW-270 available



FRW: Partially recessed wall

FRW-320



FFRW: Fully recessed wall

FFRW-340

Standard features

A: Cooling coil

3 row; 2 row low profile

- Sturdy, mechanically-bonded copper/aluminum coil with 12 fins per inch, 1/2" nominal tubes and 0.016" tube wall thickness.
- High BTU/hr capacity with low noise.
- Coil assemblies tested for a maximum of 300 psig working pressure.
- Manual air vent.

B: Speed control/ access door

- Hidden from view, three-speed fan switch allows speed selection for comfort control.
- Easy opening access doors feature cam lock fasteners.

C: Blower fan housing

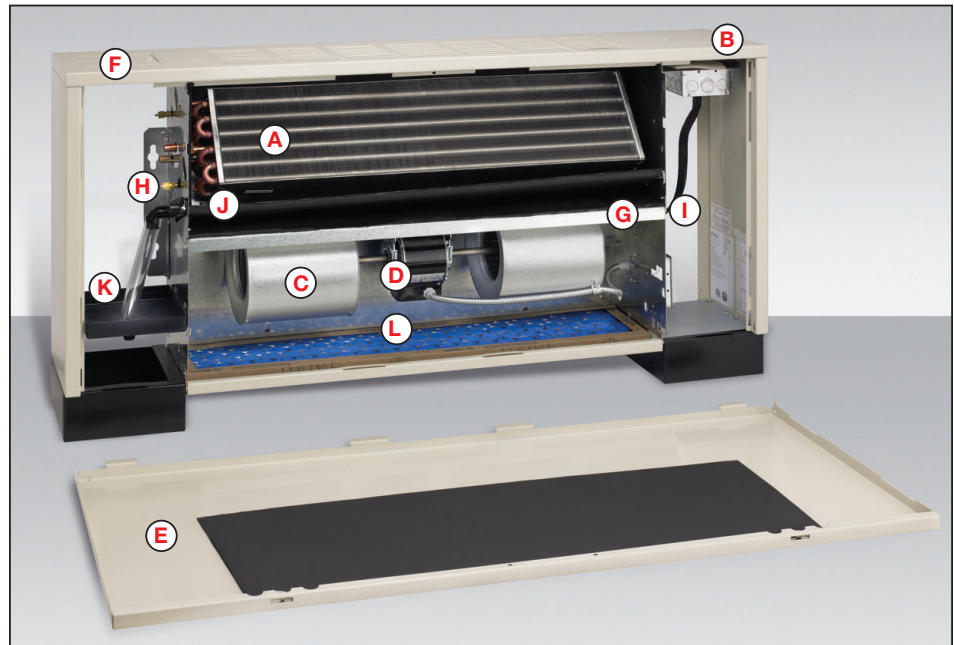
- Provides excellent CFM output per unit size.
- Operating ampere ranges from 0.35 amps (115 CFM) to 2.26 amps (1050 CFM), 120 volts.

D: Motor

- Motors are permanent split capacitor (PSC) for extended, reliable motor life.
- Multispeed motors achieve a wide range of CFM delivered.

E: Cabinet

- Heavy duty 16-gauge front panel protects against impact. Tamper-resistant, flush-mounted quarter-turn fasteners included as standard.
- Hideaway units are made of 18-gauge galvanized corrosion resistant steel with flanged outlet for duct connection.
- Coil section fully insulated with 1/4" closed-cell insulation to dampen sound, provide thermal efficiency and ensure superior indoor air quality.



F: Finish

- Attractive ivory epoxy powder coating.

G: Blower deck

- Blower deck enhances strength and stability, with easy accessibility.
- Removable for ease of maintenance.
- Fully insulated with 1/4" closed cell insulation.

H: Internal support bracket

- All wall and ceiling units are equipped with internal mounting brackets for secure attachment to wall.

I: Access area

- Large rough-in area at each end of the unit provides ample room for plumbing and electric controls.
- 8" end pockets featured only on exposed cabinet units.
- Removable front panel provides access to valve/piping connection (standard on left side) and electrical wiring area (standard on right side).

J: Drain pan

- Fire resistant ABS plastic.
- Positively sloped to ensure proper drainage and maximize protection against microbial growth.
- External surface fully insulated with 1/4" closed-cell insulation.

K: Auxiliary drain pan

- Made of fire resistant ABS plastic.
- Positively sloped to ensure proper drainage and maximize protection against microbial growth.
- Provided with 1/2" NPT drain connection.
- Provided with tabs for easy, screw-free mounting.
- For valve and piping condensate control.

L: Filter

- 1" disposable MERV 4 spun glass media slides easily into locating tabs.
- Easily removed from floor models without front panel removal.

Options and accessory equipment

Field assembled accessories

Changeover switch

- Switches a thermostat from heating to cooling based on a change in supply water temperature.
- Mounts to supply piping with a simple spring clip included with the switch.

Wall seal

- Used to recess wall models (included as standard with all fully and partially recessed units).

Remote temperature sensor

- Recommended with all unit mounted thermostats.
- Operates with all standard Zehnder control packages with the removal of JP1 jumper internal to electronic, non-digital thermostat.

Factory assembled

Cabinet

Construction

- 14-gauge front panel only and complete 14-gauge cabinet construction.
- Torx head security fasteners.
- Contact the factory for false back.

End pocket extensions

- Increases standard end pocket to 14".
- 6" left hand and/or right hand end pocket extensions for mounting of valve packages and required for 4-pipe valve packages containing three-way control valves.
- Access doors located in standard position.

Insulation

- Contact the factory for 1/2" fiberglass, foil-faced or closed cell insulation.

Coils

High capacity chilled water

- 4 row or 3 row (low profile) cooling coil available to provide higher cooling output.
- Sturdy, mechanically-bonded copper/aluminum coil with 12 fins per inch, 1/2" nominal tubes and 0.016" tube wall thickness.
- Coil assemblies tested for a maximum of 300 psig working pressure.
- Manual air vent.

Hot water

- 1 row or 2 row hot water heating coil used in 4-pipe systems.
- Sturdy, mechanically-bonded copper/aluminum coil with 12 fins per inch, 1/2" nominal tubes and 0.016" tube wall thickness.
- Coil assemblies tested for a maximum of 300 psig working pressure.
- Manual air vent.
- Can be mounted in reheat or preheat position. (Low profile: reheat position only).

Steam

- 1 row steam heating coil also available to provide high heat output for use with 20 psig steam maximum.
- Sturdy, mechanically-bonded copper/aluminum coil with 12 fins per inch, 1/2" nominal tubes and 0.016" tube wall thickness.
- Coil assemblies tested for a maximum of 300 psig working pressure.
- Manual air vent.

- Can be mounted in reheat or preheat position. (Low profile: reheat position only).
- Opposite orientation and opposite end connections for 4-pipe systems available upon request.

Stainless steel coil casing(s)

- All mounting flanges and structural steel to be 304 stainless steel.

Automatic air vent

- Efficient way to automatically remove air from the system.

Motors

Alternate voltage

- 208/60/1, 230/60/1 and 277/60/1 supply voltage converted to 120/60/1 by transformer.

High static motor

- 1550 RPM, 120/60/1 permanent split capacitor (PSC) motor.
- Standard airflow maintained with external static pressure of up to 0.2" water column.

EC motor

- Electronically commutated motors (ECM).
- High-efficiency, programmable, brushless DC motors that utilize a permanent magnet rotor and built-in inverter.
- Provide low operating cost and ultra-quiet operation.
- Separate 2-10 VDC or three-speed control card is included.

Motor quick connect

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

Options and accessory equipment

Grilles

Steel bar grille

- Welded steel, epoxy painted, pencil-proof bar grille.

Double deflection discharge grille

- Aluminum framed grille with adjustable blades in two directions.
- Models FF-200, FS-200, FW-260 only.

Louvered kick space inlet for models FF and FS

- The kick space louvered inlet provides appealing, continuous closed floor line and hinders build up of dust, papers, or other material.

Electric heat

- Single stage or intermediate season electric heating.
- Includes grounding terminals, linear limit switch, fusible link(s) and magnetic contactor(s).
- Contact the factory for quiet contactor, SCR control or two stage options.

Drain pan

304 stainless steel

- External surface fully insulated with 1/4" closed-cell insulation.

Condensate pump

- 120/60/1 pump for removing up to 5.0 gph @ 33 ft. of head.
- Includes GFCI.
- Contact the factory for other voltages.

Power supply cord

- Heavy-duty grounded plug-in cord conveniently connects unit to standard wall outlet.

Disconnect switch

- 120/60/1 (15A), 277/60/1 (15A), 277/60/1 (30A) or 600/60/3 (40A).
- Installed on face of electrical junction box.
- Located in electrical end pocket.

Motor starter

- 120/60/1.
- 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.
- Located in electrical end pocket.
- Not available with electric heat.
- Contact factory for alternate voltages.

GFCI

- 120/60/1.
- Ground fault circuit interrupter, unit mounted and wired.
- Requires a disconnect switch.

Condensate level switch

- 120V or 24V.
- Mounted to auxiliary drain pan.
- De-energizes fan upon rising condensate water level.

Outside air dampers

0 to 25% manual

- Includes damper, manually adjustable through return air opening.
- Located in bottom of floor mounted units only.

0 or 25% motorized

- Operational at 0% or 25% outside air.
- Furnished with a 120/60/1 synchronous motor that is wired to the blower to automatically open the damper when the fan starts.
- When the power is off or interrupted, the damper returns to the closed position.
- Located in bottom of floor mounted units.

Outside air wall box

- Aluminum wall box to match up to outside air damper opening.
- Telescoping feature allows flexibility for varying wall depths.
- Insect screen is included to keep debris from entering unit.
- Shipped loose for field installation.

Leveling legs

- Four leveling legs, per unit, allow for pitch adjustment and mounting on uneven surfaces.

Security

Security access doors

- Tamper proof fasteners are available with an Allen head or Torx head style.
- A special tool is required to open the doors.

Filters

Cleanable aluminum mesh

- 1" aluminum mesh filter complete with aluminum frame & drain holes.

MERV 8, 11 or 13

- 1" high efficiency, pleated throwaway filter.

Synthetic media filter

- 1" polyester media throwaway filter.

Options and accessory equipment

Controls

- Valve control by air temperature
- Fan control by air temperature
- Valve control by water temperature

Thermostats

- Electronic, non-digital
- Digital, non-programmable
- Digital, 7-day programmable
- Unit or remote mounted
- Contact the factory for freezestat.
- See pages 20-25 for more information on control packages.

Note: Low profile units require valve or fan control to minimize potential of condensate dripping from coil into blower housings when fan is not running.

Color

- Additional colors are optionally available. Please furnish a color chip for custom color.

Valve packages

- Shipped loose for field installation. See pages 15-19 for more information.
- Unions may be factory mounted on deluxe valve packages to make field connection of valve.
- Contact the factory for mounting of customer supplied valves, hose kits or steam control valves.

AHRI approved standard ratings

Table A1

Unit size		02	03	04	06	08	10	12
Certified cooling ratings (3 row main coil)	Total MBH	5.5	7.2	12.0	15.1	19.9	23.5	29.2
	Sensible MBH	4.0	4.9	8.9	10.9	14.4	19.4	23.4
	GPM	1.1	1.4	2.3	3.0	4.3	4.7	5.9
	PD, ft. of H ₂ O	2.8	4.9	14.4	5.2	11.0	6.7	10.9
Heating capacity (3 row main coil)	MBH	18.7	24.5	42.3	56.6	73.4	89.9	107.2
	GPM	2.0	2.6	4.7	6.7	8.9	9.2	11.0
	PD, ft. of H ₂ O	9.3	16.6	11.9	26.3	21.2	20.7	30.5
Certified cooling ratings (4 row main coil)	Total MBH	6.4	8.4	13.3	18.7	24.4	28.2	32.8
	Sensible MBH	4.1	5.6	9.6	13.8	18.6	20.6	25.0
	GPM	1.3	1.7	2.5	3.6	4.8	5.7	6.6
	PD, ft. of H ₂ O	4.6	9.9	4.4	10.0	7.7	7.1	9.9
Heating capacity (4 row main coil)	MBH	19.9	25.5	46.3	65.8	87.0	100.7	119.9
	GPM	1.9	2.5	4.3	5.8	7.5	10.3	12.3
	PD, ft. of H ₂ O	6.2	11.8	35.8	15.2	26.1	19.6	28.4
Heating capacity (optional 1 row reheat coil)	MBH	7.4	10.5	16.9	25.1	31.8	37.3	43.2
	GPM	0.8	1.1	1.7	2.6	3.2	3.8	4.4
	PD, ft. of H ₂ O	0.1	0.2	0.5	1.1	1.8	2.6	3.5
CFM: standard	High	180	230	440	625	860	1000	1190
	Medium	145	160	325	360	650	675	900
	Low	115	130	235	250	335	475	500
CFM: high static (@ 0.2" ESP)	High	350	400	570	660	1000	1160	1210
	Medium	320	370	530	600	910	1100	1130
	Low	280	330	430	520	780	950	970
Coil	FPI	12	12	12	12	12	12	12
	Face area, ft ²	0.94	1.25	1.56	2.19	2.50	2.92	3.44
	Coil connections	1/2" Cu	1/2" Cu	1/2" Cu	1/2" Cu	1/2" Cu	1/2" Cu	1/2" Cu
Blower	Quantity	1	1	2	2	1, 2	4	4
	Diameter	5.7"	5.7"	5.7"	5.7"	5.7"	5.7"	5.7"
	Width	7.5"	10.4"	7.5"	10.4"	7.5", 10.4"	7.5"	10.4"
Filter	Number	1	1	1	1	1	1	1
	Length, in.	22	28	34	46	52	60	70
	Width, in.	9.75	9.75	9.75	9.75	9.75	9.75	9.75
	Thickness, in.	1	1	1	1	1	1	1
Cabinet size	Height, in.	26.5	26.5	26.5	26.5	26.5	26.5	26.5
	Length, in.	38.2	44.2	50.2	62.2	68.2	76.2	86.2
	Width, in.	10	10	10	10	10	10	10
Minimum free area	Inlet, in ²	99	126	153	207	234	270	315
	Outlet, in ²	92	110	129	184	220	257	294
Shipping weight, lbs.		90	105	120	145	160	175	200

Notes:

- Airflow under dry conditions. Inlet air 70-80 °F DB
- Cooling capacity based on inlet air 80 °F DB, 67 °F WB, 45 °F entering water, 55 °F leaving water, high fan speed
- Heating capacity based on inlet air 60 °F DB, 180 °F entering water, 160 °F leaving water, high fan speed
- Pressure drop (PD) shown in feet of water
- Overall length for fully and partially recessed units is (length + 3"). Wall rough-in hole dimension to be (length + 1/8") by 24-1/8" width.
- Height dimension applies to floor units only. Wall and ceiling units are 24". Sloped top units are 29-1/4".
- Model FF and FS filters are 7.25" width.
- Model FFH 4 row total MBH should be multiplied by 0.93



AHRI approved standard ratings, low profile

Table A2

Unit size		02	03	04	06
Certified cooling ratings (2 row main coil)	Total MBH	2.7	5.5	7.7	9.9
	Sensible MBH	2.6	4.5	6.3	8.1
	GPM	0.8	1.4	2.0	2.3
	PD, ft. of H ₂ O	0.4	0.8	1.7	2.5
Heating capacity (2 row main coil)	MBH	18.0	27.1	35.4	54.0
	GPM	1.9	2.8	3.7	5.6
	PD, ft. of H ₂ O	1.0	2.3	4.2	10.8
Cooling ratings (3 row high capacity coil)	Total MBH	5.2	9.6	13.3	17.2
	Sensible MBH	3.7	6.4	8.9	12.2
	GPM	1.2	2.0	2.7	3.6
	PD, ft. of H ₂ O	0.7	2.0	4.2	8.2
Heating capacity (3 row main coil)	MBH	19.8	29.9	39.6	60.1
	GPM	2.0	3.1	4.1	5.0
	PD, ft. of H ₂ O	1.5	3.7	6.9	12.1
Heating capacity (optional 1 row heating coil)	MBH	11.4	17.2	23.1	35.3
	GPM	1.2	1.8	2.4	3.7
	PD, ft. of H ₂ O	0.3	0.6	1.2	3.2
CFM: standard	High	200	290	390	580
	Medium	150	170	290	325
	Low	100	120	150	220
CFM: high capacity	High	275	390	480	680
	Medium	260	375	460	625
	Low	240	350	400	520
Coil	FPI	12	12	12	12
	Face area, ft ²	1.25	1.67	2.08	2.92
	Coil connections	1/2" Cu	1/2" Cu	1/2" Cu	1/2" Cu
Blower	Quantity	1	1	2	2
	Diameter	5.7"	5.7"	5.7"	5.7"
	Width	7.5"	10.4"	7.5"	10.4"
Filter	Number	1	1	1	1
	Length, in.	21.75	27.75	33.75	45.75
	Width, in.	8.25	8.25	8.25	8.25
	Thickness, in.	1	1	1	1
Cabinet size	Height, in.	15.5	15.5	15.5	15.5
	Length, in.	38.2	44.2	50.2	62.2
	Width, in.	12.5	12.5	12.5	12.5
Minimum free area	Inlet, in ²	67	86	105	144
	Outlet, in ²	92	110	129	184
Shipping weight, lbs.		75	90	110	130

Notes:

- Airflow under dry conditions. Inlet air 70-80 °F DB
- Cooling capacity based on inlet air 80 °F DB, 67 °F WB, 45 °F entering water, 55 °F leaving water, high fan speed
- Heating capacity based on inlet air 60 °F DB, 180 °F entering water, 160 °F leaving water, high fan speed
- Pressure drop (PD) shown in feet of water



Electrical data

Table B1

Motor type			02	03	04	06	08	10	12
HP	PSC	Standard	1/60	1/60	1/25	1/15	1/30, 1/15	(2) 1/15	(2) 1/15
		High static	1/12	1/12	1/10	1/7	1/12, 1/7	(2) 1/7	(2) 1/7
	ECM	Standard	1/15	1/15	1/4	1/4	(2) 1/4	(2) 1/4	(2) 1/4
		High static	1/4	1/4	1/4	1/4	(2) 1/4	(2) 1/4	(2) 1/4
RPM high	PSC	Standard	700	900	870	1040	1100	1150	1150
		High static	1525	1525	1375	1350	1500	1550	1500
	ECM	Standard	800	900	910	1045	1150	1100	1100
		High static	1540	1450	1500	1500	1500	1500	1500
RPM medium	PSC	Standard	600	650	680	630	850	800	875
		High static	1450	1450	1200	1275	1425	1320	1400
	ECM	Standard	700	650	720	635	890	850	850
		High static	1475	1400	1300	1300	1300	1300	1300
RPM low	PSC	Standard	450	500	500	465	500	600	500
		High static	1300	1410	1100	1100	1300	1000	1300
	ECM	Standard	560	550	515	470	525	550	550
		High static	1375	1290	1000	1000	1000	1000	1000
Motor FLA 120V/60Hz/1Ph	PSC	Standard	0.35	0.35	0.68	1.13	1.73	2.26	2.26
		High static	1.05	1.05	1.20	1.70	2.80	3.40	3.40
	ECM	Standard	0.21	0.36	1.07	1.79	2.67	2.80	3.60
		High static	1.43	1.43	2.05	2.59	3.53	3.92	4.10
Power input: watts 120V/60Hz/1Ph	PSC	Standard	35	40	65	130	170	215	255
		High static	105	110	160	190	290	368	368
Motor FLA 208-230V/60HZ/1PH	PSC	Standard	0.35	0.35	0.68	1.13	1.73	1.36	2.26
		High static	1.05	1.05	1.20	1.70	2.80	3.40	3.40
	ECM	Standard	0.13	0.22	0.66	1.09	1.64	1.10	1.74
		High static	0.87	0.87	1.26	1.58	2.15	2.40	2.52
Motor FLA 277V/60Hz/1Ph	PSC	Standard	0.35	0.35	0.68	1.13	1.73	1.36	2.26
		High static	1.05	1.05	1.20	1.70	2.80	3.40	3.40
	ECM	Standard	0.13	0.22	0.66	1.09	1.64	1.10	1.74
		High static	0.87	0.87	1.26	1.58	2.15	2.40	2.52

Notes:

- Maximum circuit ampacity (MCA) = $1.25 \times (\text{FLA motor 1} + \text{FLA motor 2} + \text{FLA electric heat})$
- Maximum over current protection (MOP) = $(2.25 \times \text{FLA motor 1}) + \text{FLA motor 2} + \text{FLA electric heat}$
- If the calculated MOP is within 10% of the next smaller available fuse size, that fuse size shall be used. If not, the next larger fuse size above the calculated MOP must be used.
- If the selected MOP is smaller than the MCA, the selected MOP must be increased to the next larger available fuse size above the MCA.
- If the MOP is less than 15, it shall be rounded up to 15 amps. This is the minimum fuse or circuit breaker permitted by code.
- 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.



Electrical data, low profile

Table B2

	Motor type		02	03	04	06
HP	PSC	Standard	1/60	1/30	1/25	1/15
		High static	1/12	1/12	1/10	1/7
	ECM	Standard	1/15	1/15	1/4	1/4
		High static	1/4	1/4	1/4	1/4
RPM high	PSC	Standard	900	1100	870	1040
		High static	1525	1525	1375	1350
	ECM	Standard	800	900	910	1045
		High static	1540	1450	1500	1500
RPM medium	PSC	Standard	700	650	680	630
		High static	1450	1450	1200	1275
	ECM	Standard	700	650	720	635
		High static	1475	1400	1300	1300
RPM low	PSC	Standard	480	450	375	465
		High static	1300	1410	1100	1100
	ECM	Standard	560	525	375	470
		High static	1375	1290	1000	1000
Motor FLA 120V/60Hz/1Ph	PSC	Standard	0.35	0.60	0.68	1.13
		High static	1.05	1.05	1.20	1.70
	ECM	Standard	0.21	0.36	1.07	1.79
		High static	1.43	1.43	2.05	2.59
Power input: watts 120V/60Hz/1Ph	PSC	Standard	40	75	75	125
		High static	105	110	160	190
Motor FLA 208-230V/60Hz/1Ph	PSC	Standard	0.35	0.60	0.68	1.13
		High static	1.05	1.05	1.20	1.70
	ECM	Standard	0.13	0.22	0.66	1.09
		High static	0.87	0.87	1.26	1.58
Motor FLA 277V/60Hz/1Ph	PSC	Standard	0.35	0.60	0.68	1.13
		High static	1.05	1.05	1.20	1.70
	ECM	Standard	0.13	0.22	0.66	1.09
		High static	0.87	0.87	1.26	1.58

Notes:

- Maximum circuit ampacity (MCA) = 1.25 x (FLA motor 1 + FLA motor 2 + FLA electric heat)
- Maximum over current protection (MOP) = (2.25 x FLA motor 1) + FLA motor 2 + FLA electric heat
- If the calculated MOP is within 10% of the next smaller available fuse size, that fuse size shall be used. If not, the next larger fuse size above the calculated MOP must be used.
- If the selected MOP is smaller than the MCA, the selected MOP must be increased to the next larger available fuse size above the MCA.
- If the MOP is less than 15, it shall be rounded up to 15 amps. This is the minimum fuse or circuit breaker permitted by code.
- 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

Table C1:
Floor and wall 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	
02	High	160	49.3	51.7	48.1	45.6	39.6	28.1	21.7	
	Medium	140	45.4	48.4	44.1	41.2	34.4	22.9	20.8	
	Low	100	39.8	43.6	38.4	34.0	25.1	19.1	20.3	
03	High	225	55.0	56.8	52.4	50.6	44.9	36.3	28.8	
	Medium	160	45.3	47.7	43.2	39.7	30.5	20.2	20.8	
	Low	130	39.7	41.4	35.9	31.0	20.9	18.4	20.7	
04	High	375	57.1	57.9	54.2	51.9	46.1	37.7	30.3	
	Medium	290	51.5	52.5	48.7	45.2	38.2	27.9	22.3	
	Low	210	46.5	44.1	39.0	32.5	24.6	18.9	21.1	
06	High	570	62.6	64.4	61.0	59.0	53.5	46.5	40.8	
	Medium	325	50.5	52.0	48.6	44.1	36.4	26.3	25.1	
	Low	240	42.2	44.6	39.7	33.5	25.4	20.3	22.2	
08	High	750	63.2	65.7	62.6	61.0	55.6	48.5	42.0	
	Medium	570	56.6	61.4	57.4	54.4	47.7	38.4	31.7	
	Low	300	42.1	44.8	40.6	35.1	29.3	19.8	21.3	
10	High	810	60.3	61.0	58.2	56.0	50.0	41.7	36.2	
	Medium	600	54.3	54.8	52.6	49.2	42.2	32.7	28.8	
	Low	400	49.2	48.2	45.1	40.2	32.1	24.0	23.9	
12	High	1050	63.2	65.4	62.4	60.8	54.9	47.1	41.4	
	Medium	620	54.4	57.1	53.0	49.6	41.8	32.9	30.0	
	Low	440	46.6	47.3	43.0	37.6	29.6	22.2	23.8	

Notes:

- The method used in conducting this test was based on the AHRI Standard 350-2008 "Sound Rating of Non-Ducted Indoor Air-Conditioning Equipment" and was conducted by an independent third party.
- Models FF, FS, FW, FFRW, FFH

Table C2:
Low profile models

Unit size	Motor speed	Motor RPM	CFM	Octave bands						
				2	3	4	5	6	7	8
				Center frequency (Hz)						
				125	250	500	1000	2000	4000	8000
02	High	900	200	48.7	48.9	46.7	46.4	40.9	28.1	21.7
	Med.	800	150	45.8	44.8	41.7	41.8	36.4	21.5	20.8
	Low	575	100	40.4	40.3	36.3	34.8	26.5	19.1	20.3
03	High	1100	290	55.8	53.3	50.0	51.0	47.0	37.5	29.4
	Med.	650	170	44.8	43.1	40.8	39.9	32.3	20.6	20.9
	Low	450	120	38.7	35.6	32.7	30.5	24.0	18.4	20.7
04	High	950	390	57.1	54.2	52.6	52.6	48.4	37.1	28.7
	Med.	750	290	51.7	49.0	47.3	45.7	40.3	28.2	23.0
	Low	375	150	47.9	40.4	38.1	33.3	28.1	19.3	21.1
06	High	1150	580	64.2	59.5	57.1	58.4	55.2	46.2	40.5
	Med.	750	325	50.0	47.1	44.7	43.7	38.4	26.6	25.0
	Low	575	220	42.1	39.6	36.0	33.0	27.5	19.7	21.6

Notes:

- The method used in conducting this test was based on the AHRI Standard 350-2008 "Sound Rating of Non-Ducted Indoor Air-Conditioning Equipment" and was conducted by an independent third party.
- Models FLF, FLH

Valve packages general data

Field mounted valve packages

Zehnder Fan Coils have standard valve packages available as a factory-built assembly, pre-wired 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 cooling piping and components are located directly above the auxiliary 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 auxiliary drain pan.

■ Valve package components

Zehnder 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" nominal (5/8" OD) 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

Feature cast bronze 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.

■ Stainless steel hoses

Flexible 302/304 stainless steel hose with EPTF - white Santopreme inner tube and JIC flare connections. Meets UL-94 VO fire rating.

■ Balance valves

An accessible port where pressure and temperature can be measured.

- Accepts standard 1/8" gauge adapter or thermometer stem.

End valves

Each 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. Consult factory for inclusion of other types of valves as end valves.

■ Ball valves

Ball valves, a.k.a. 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.

■ Manual circuit setter

A manual circuit setter, a.k.a. 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. Manual circuit setter includes two measuring ports in the valve body 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 hand wheel with memory feature including a locking feature for tamper proof setting.

Valve packages general data

■ 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.

Control valves

Valve packages are available with or without control valves.

■ 2-way on/off valves

These 1/2" 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 ΔP of 25 psi. A high pressure close off valve is offered with a C_v of 1.0 and close off ΔP of 75 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 1/2" 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 to the coil diverting full flow to the bypass line. All three-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 ΔP of 25 psi. A high pressure close off valve is offered with a C_v of 1.5 and close off ΔP of 75 psi.

■ 2-way modulating valves

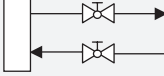
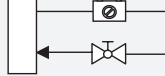
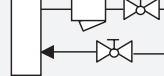
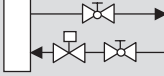
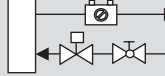
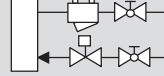
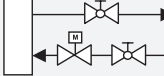
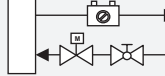
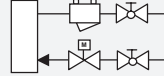
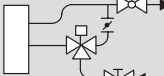
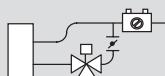
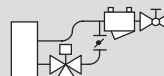
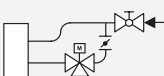
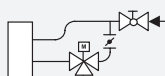
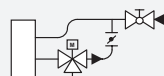
1/2", 24V valves modulate the flow of water (0-100%) through the coil in response to a signal from the controller and are normally closed to the coil as standard. Normally open valves are also available upon request. Modulating valves are either three-wire floating equal percentage valves or proportional (0-10 VDC or 4-20 mA signal), 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 ΔP of 20 psi. A high pressure close off valve is offered with a C_v of 1.0 and close off of ΔP of 50 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 1/2", 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. Three-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. Modulating valves are either three-wire floating equal percentage valves or proportional (0-10 VDC or 4-20 mA signal), 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 ΔP of 20 psi. A high pressure close off valve is offered with a C_v of 1.0 and close off of ΔP of 50 psi.

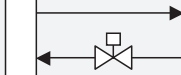
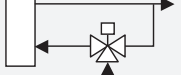
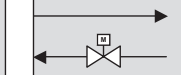
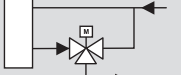
Please contact Zehnder regarding any special valve requirements including hose kits, additional P/T ports, customer supplied valves, etc.

Basic valve packages

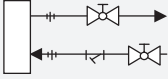
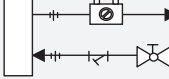
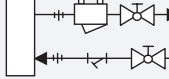
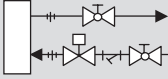
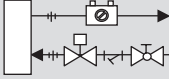
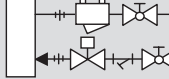
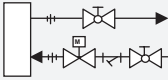
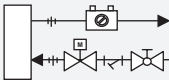
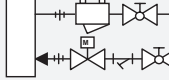

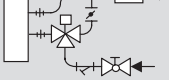

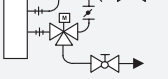
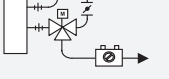
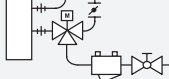
Pre-assembled packages, shipped loose for field mounting			
Control valve	Basic	Manual circuit setter	Automatic circuit setter
None	V-B1 Ball valve on supply Ball valve on return 	V-B2 Ball valve on supply Manual circuit setter on return 	V-B3 Ball valve on supply Auto circuit setter and ball valve on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

* Not available for 4-pipe low profile units

Miscellaneous ship loose parts

V-2E 2-way electric on/off valve on supply 	V-3E 3-way electric on/off valve on supply 
V-2M 2-way electric modulating valve on supply 	V-3M 3-way electric modulating valve on return 

Deluxe valve packages



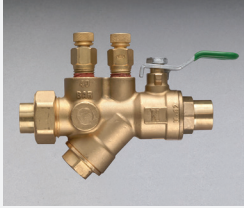

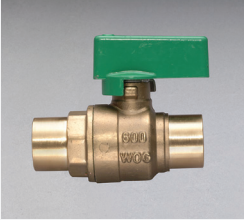
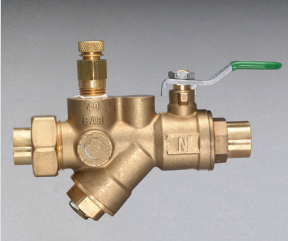

Pre-assembled packages, shipped loose for field mounting			
Control valve	Basic	Manual circuit setter	Automatic circuit setter
None	V-D1 Ball valve, union and strainer on supply Ball valve and union on return 	V-D2 Ball valve, union and strainer on supply Manual circuit setter and union on return 	V-D3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

* Not available for 4-pipe low profile units

** Not available for low profile units

Valve packages components

Mechanical specifications

Component	Part	Material	Temperature	Working pressure
Union 	Nut	Forged brass	325 °F maximum	600 psi
	Body			
Balance valve 	Body	Bronze	220 °F maximum	300 psi
	O-ring	EPDM		
Automatic circuit setter and ball valve 	Body	Forged brass	325 °F maximum	600 psi
	Ball	Brass/chrome plated		
	Flow cartridge	Stainless steel/brass		
	Seals	Viton		
	Ball seal	PTFE		
Manual circuit setter 	Body	Bronze	250 °F maximum	200 psi
	Ball	Brass		
	Seat rings	Glass and carbon filled TFE		
	O-ring	EPDM		
Ball valve 	Body	Forged brass	325 °F maximum	600 psi
	Ball	Brass/chrome plated		
	Seat	PTFE		
	Stem	Brass		
	Seals	Viton		
Strainer and ball valve with union 	Body	Forged brass	325 °F maximum	600 psi
	Ball	Brass/chrome plated		
	Seat	PTFE		
	Stem	Brass		
	Seals	Viton		
	Screen	304 stainless steel (20 mesh)		
Control valve 	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

Zehnder provides a control system that includes a thermostat, control board with relays, manually operated three-speed fan switch 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
2F0C	On/off system switch and three-speed fan control but no changeover	Unit mounted, integral to thermostat	No
2F0D		Wall mounted, integral to thermostat	No
2F0E	Manual changeover, heat/off/cool system switch and three-speed fan control	Unit mounted, integral to thermostat	Yes
2F0F		Wall mounted, integral to thermostat	Yes
2F0G	Auto changeover, on/off system switch and three-speed fan control	Unit mounted, integral to thermostat	Yes
2F0H		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
- Remote temperature sensors are recommended with all unit mounted thermostats for improved temperature control

Two pipe control:

Valve cycled

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
2V0C	On/off system switch and three-speed fan control but no changeover	Unit mounted, integral to thermostat	No
2V0D		Wall mounted, integral to thermostat	No
2V0E	Manual changeover, heat/off/cool system switch and three-speed fan control	Unit mounted, integral to thermostat	Yes
2V0F		Wall mounted, integral to thermostat	Yes
2V0G	Auto changeover, on/off system switch and three-speed fan control	Unit mounted, integral to thermostat	Yes
2V0H		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
- Remote temperature sensors are recommended with all unit mounted thermostats for improved temperature control

120 Volt Control packages

Electronic on-off valve/thermostat

Four pipe control: Fan cycled or fan/valve cycled

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
4F0B	Auto changeover, on/off system switch and three-speed fan control	Unit mounted, integral to thermostat
4F0C		Wall mounted, integral to thermostat
4F0D	Manual changeover, heat/off/cool system switch and three-speed fan control	Unit mounted, integral to thermostat
4F0E		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
- Remote temperature sensors are recommended with all unit mounted thermostats for improved temperature control

Four pipe control: Valve cycled

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
4V0B	Auto changeover, on/off system switch and three-speed fan control	Unit mounted, integral to thermostat
4V0C		Wall mounted, integral to thermostat
4V0D	Manual changeover, heat/off/cool system switch and three-speed fan control	Unit mounted, integral to thermostat
4V0E		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
- Remote temperature sensors are recommended with all unit mounted thermostats for improved temperature control

24 Volt Control packages

Electronic on-off valve/thermostat

Two pipe control: Fan cycled or fan/valve cycled. 24V power to thermostat with 120V power from thermostat to motor

Zehnder provides a control system that includes a thermostat, control board with 40VA 120V/24V control transformer and relays, manually operated three-speed fan switch 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
2F4C	On/off system switch and 120V three-speed fan control but no changeover	Unit mounted, integral to thermostat	No
2F4D		Wall mounted, integral to thermostat	No
2F4E	Manual changeover, heat/off/cool system switch and 120V three-speed fan control	Unit mounted, integral to thermostat	Yes
2F4F		Wall mounted, integral to thermostat	Yes
2F4G	Auto changeover, on/off system switch and 120V three-speed fan control	Unit mounted, integral to thermostat	Yes
2F4H		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
- Remote temperature sensors are recommended with all unit mounted thermostats for improved temperature control
- Available with EC motors

Two pipe control: Fan cycled or fan/valve cycled 24V power only

Package number	Thermostat description	Fan motor speed switch location	Changeover switch
2F4J	On/off system switch and 24V three-speed fan control but no changeover	Unit mounted, integral to thermostat	No
2F4K		Wall mounted, integral to thermostat	No
2F4L	Manual changeover, heat/off/cool system switch and 24V three-speed fan control	Unit mounted, integral to thermostat	Yes
2F4M		Wall mounted, integral to thermostat	Yes
2F4N	Auto changeover, on/off system switch and 24V three-speed fan control	Unit mounted, integral to thermostat	Yes
2F4P		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
- Three additional 24V relays are included for a completely low voltage control package option
- The fan cycles with demand for heating or cooling, but if the system switch is off, the fan is off
- Remote temperature sensors are recommended with all unit mounted thermostats for improved temperature control
- Available with EC motors

24 Volt Control packages

Electronic on-off valve/thermostat

Two pipe control: Valve cycle 24V power to thermostat with 120V power from thermostat to motor

Zehnder provides a control system that includes a thermostat, control board with 40VA 120V/24V control transformer, 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
2V4C	On/off system switch and 120V three-speed fan control but no changeover	Unit mounted, integral to thermostat	No
2V4D		Wall mounted, integral to thermostat	No
2V4E	Manual changeover, heat/off/cool system switch and 120V three-speed fan control	Unit mounted, integral to thermostat	Yes
2V4F		Wall mounted, integral to thermostat	Yes
2V4G	Auto changeover, on/off system switch and 120V three-speed fan control	Unit mounted, integral to thermostat	Yes
2V4H		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
- Remote temperature sensors are recommended with all unit mounted thermostats for improved temperature control
- Available with EC motors

Four pipe control: Valve cycled 24V power to thermostat with 120V power from thermostat to motor

Zehnder provides a control system that includes a thermostat, control board with 40VA 120V/24V control transformer 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
4V4B	Auto changeover, on/off system switch and 120V three-speed fan control	Unit mounted, integral to thermostat
4V4C		Wall mounted, integral to thermostat
4V4D	Manual changeover, heat/off/cool system switch and 120V three-speed fan control	Unit mounted, integral to thermostat
4V4E		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
- Remote temperature sensors are recommended with all unit mounted thermostats for improved temperature control
- Available with EC motors

24 Volt Control packages

Electronic on-off valve/thermostat

Four pipe control: Fan cycled or fan/valve cycled. 24V power to thermostat with 120V power from thermostat to motor

Zehnder provides a control system that includes a thermostat, control board with 40VA 120V/24V control transformer and 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
4F4B	Auto changeover, on/off system switch and 120V three-speed fan control	Unit mounted, integral to thermostat
4F4C		Wall mounted, integral to thermostat
4F4D	Manual changeover, heat/off/cool system switch and 120V three-speed fan control	Unit mounted, integral to thermostat
4F4E		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
- Remote temperature sensors are recommended with all unit mounted thermostats for improved temperature control
- Available with EC motors

Four pipe control: Fan cycled or fan/valve cycled 24V power only

Package number	Thermostat description	Fan motor speed switch location
4F4F	Auto changeover, on/off system switch and 24V three-speed fan control	Unit mounted, integral to thermostat
4F4G		Wall mounted, integral to thermostat
4F4H	Manual changeover, heat/off/cool system switch and 24V three-speed fan control	Unit mounted, integral to thermostat
4F4J		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
- Three additional 24V relays are included for a completely low voltage control package option
- The fan cycles with demand for heating or cooling, but if the system switch is off, the fan is off
- Remote temperature sensors are recommended with all unit mounted thermostats for improved temperature control
- Available with EC motors

24 Volt Control packages

Electronic modulating valve/thermostat

Two pipe with two-way or three-Way modulating valves

Zehnder provides a control system that includes a factory supplied and installed 40VA 120V/24V control transformer, manually operated three-speed fan switch and thermostat. Valves and alternate voltage (208, 230 or 277V) power supply options are not included in the control package price.

Package number	Thermostat description	Fan motor speed switch location
2M4A	No changeover, system switch or fan control	Unit mounted, separate from wall mounted thermostat

Notes:

- Fan runs continuously depending on position of unit mounted three-speed fan motor switch
- Available with EC motors

Four pipe with two-way or three-way modulating valves

Zehnder provides a control system that includes a factory supplied and installed 40VA 120V/24V control transformer, manually operated three-speed fan switch and thermostat. Valves and alternate voltage (208, 230 or 277V) power supply options are not included in the control package price.

Package number	Thermostat description	Fan motor speed switch location
4M4A	Manual changeover, heat/off/cool system switch and three-speed fan control	Unit mounted, integral to thermostat
4M4B		Wall mounted, integral to thermostat
4M4C	Auto changeover, on/off system switch and three-speed fan control	Unit mounted, integral to thermostat
4M4D		Wall mounted, integral to thermostat

Notes:

- The fan runs continuously with system switch on, but if the system switch is off, the fan is off
- Remote temperature sensors are recommended with all unit mounted thermostats for improved temperature control
- Available with EC motors

Miscellaneous control packages

Package number	Package description	Fan motor speed switch
24VR	Unit mounted 24V relay, ready for field wiring	No
24R3		Yes, shipped loose on ceiling and hideaway units
24VT*	Unit mounted 40VA, 120V/24V transformer with 120V pre-wired and 24V ready for field wiring	No
24T3*		Yes, shipped loose on ceiling and hideaway units
24FC*	Unit mounted fan center includes a 40VA, 120V/24V transformer and one 24V relay with 120V pre-wired and 24V ready for field wiring	No
24F3*		Yes, shipped loose on ceiling and hideaway units
24RP	Unit mounted relay pack includes a 40VA, 120V/24V transformer and three 24V relays with 120V pre-wired and 24V ready for field wiring	No

Note:

* Available with EC motors

Optional DDC control

Zehnder can provide a control system which includes 40VA 120V/24V transformer, manually operated three-speed fan switch with off position, fan relay and the factory mounting of a customer supplied DDC controller. The following information regarding the DDC controls and valves must be provided to Zehnder by the DDC manufacturer: (NOTE: The DDC controller is mounted in one end pocket of the fan coil. Therefore, the size of the controller must be no larger than 8" wide x 5" high x 2" deep.

Cut sheets

The cut sheets should include descriptions, mounting instructions, piping schematics and dimensional drawings of the controller, sensors, valves and any component to be field furnished for Zehnder to install.

Packing slip

The packing slip should include model numbers and quantity of each component supplied to Zehnder.

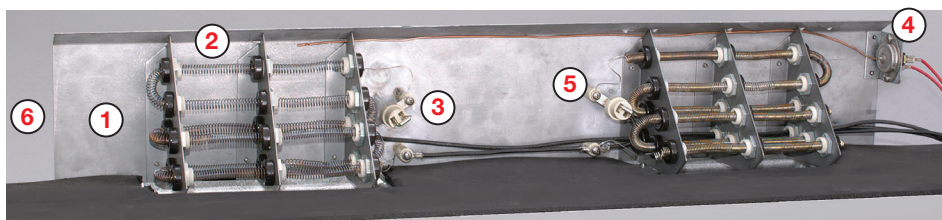
Schedule

The schedule including a listing of unit sizes, model numbers, accessories and tagging instructions should be supplied at the time the order is released.

Wiring diagrams

Wiring diagrams should be provided at the time the order is released instructing Zehnder how to wire the DDC controller and all accessories to meet the required control operation.

Electric heating element construction information



The electric heating elements are located in the Fan Coils in the preheat 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 between the fan discharge and the cooling coil. This prevents access by room occupants.

Cabinets

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

Sub panel and electrical block-off plate

All fuses, fuse holder, contactors, and terminal blocks are pre-mounted and pre-wired to the sub panel.

The electrical block-off plate prevents access to the fan coil end pocket which houses all contactors, field wiring terminals, transformers, relays, etc.

Magnetic contactors

The magnetic contactors are furnished to break all ungrounded conductors. The contactor(s) are located in the end pocket pre-mounted and wired to the sub panel.

Grounding

Ring type grounding terminals are provided for each power source.

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.

Control systems

There are four two pipe cooling with electric heat control systems available. One must be chosen with electric heating unit. Each of these is described in detail on pages 28-31.

1. Total electric heat

Manual cool/heat changeover

2. Total electric heat

Automatic cool/heat changeover

3. Intermediate season electric heat

Automatic changeover

4. Total electric heat

Automatic changeover, field supplied thermostat

1: Mounting platform

The electric heating elements are mounted to a galvanized steel plate. This plate is attached to the fan deck by several screws. This allows the motor/fan assembly and electric heat to be removed at the same time for servicing.

2: Heating elements

The electric heating element has 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.

All electric heating elements are constructed of nickel chromium

resistance wire and have a maximum operating temperature of 1850° F.

3: Coil terminals

Coil terminals are constructed of nickel plated steel with ceramic terminal insulators and bracket bushings.

4: Linear limit switch

The linear limit switch is used as the primary safety protection. It is an automatic reset thermally operated safety device. 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. These 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 Armaflex insulation prevents heat from being transmitted to the back of the fan coil unit casing.

Electric heat control packages

Zehnder provides a control system that includes a thermostat with changeover control, manually operated three-speed fan switch, 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 end pocket of the fan coil.

Chilled water cooling: Single stage electric heating

Manual changeover

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(s) 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(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: All unit mounted thermostats are factory supplied and pre-wired. All wall mounted thermostats are supplied by the factory and are field wired.

Package number	Component voltage			Fan motor speed switch location	Changeover switch location
	Power supply and electric heating element	Thermostatic valve controls	Motor		
Unit mounted: Vertical units only					
EUMA	120	120	120	Integral to thermostat	Unit mounted on thermostat
EUMB	208				
EUMC	277				
EUMD	230				
Wall mounted					
EWMA	120	120	120	Integral to thermostat	Wall mounted on thermostat
EWMB	208				
EWMC	277				
EWMG	230				
EWMD*	120	24	120	Integral to thermostat	Wall mounted on thermostat
EWME*	208				
EWMF*	277				
EWMH*	230				

Notes:

- Electric heat control packages include items shown above. The heating elements, high temperature linear limit switch, and fusible link(s) are not included. See electric heating elements pricing.
- Transformers required for high voltage motors need to be ordered separately
- Remote temperature sensors are recommended with all unit mounted thermostats for improved temperature control
- *Available with EC motors

Electric heat control packages

Zehnder provides a control system that includes a thermostat, manually operated three-speed fan switch, 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 end pocket of the fan coil.

Chilled water cooling: Single stage electric heating

Automatic changeover on space temperature

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 elements. (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(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: All unit mounted thermostats are factory supplied and pre-wired. All wall mounted thermostats are supplied by the factory and is field wired.

Package number	Component voltage			Fan motor speed switch location	Changeover switch location
	Power supply and electric heating element	Thermostatic valve controls	Motor		
Unit mounted: Vertical units only					
EUAA	120	120	120	Integral to thermostat	None, uses thermostat dead band
EUAB	208				
EUAC	277				
EUAG	230				
Wall mounted					
EWAA	120	120	120	Integral to thermostat	None, uses thermostat dead band
EWAB	208				
EWAC	277				
EWAN	230				
EWAD*	120	24			
EWAE*	208				
EWAF*	277				
EWAP*	230				

Notes:

- Electric heat control packages include items shown above. The heating elements, high temperature linear limit switch, and fusible link(s) are not included. See electric heating elements pricing.
- Transformers required for high voltage motors need to be ordered separately
- Remote temperature sensors are recommended with all unit mounted thermostats for improved temperature control
- * Available with EC motors

Electric heat control packages

Zehnder provides a control system that includes a thermostat, manually operated three-speed fan switch, changeover switches, 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 end pocket of the fan coil.

Chilled water cooling: Hot water heating, intermediate season electric heating

Automatic changeover on supply water temperature

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 elements. (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(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 water valve and breaking the electric heating circuit.

Thermostat: All unit mounted thermostats are factory supplied and prewired. All wall mounted thermostats are supplied by the factory and is field wired.

Package number	Component voltage			Fan motor speed switch location	Changeover switch location
	Power supply and electric heating element	Thermostatic valve controls	Motor		
Unit mounted: Vertical units only					
EUAD	120	120	120	Integral to thermostat	Aquistat(s) installed on supply line
EUAЕ	208				
EUAF	277				
EUAH	230				
Wall mounted					
EWAG	120	120	120	Integral to thermostat	Aquistat(s) installed on supply line
EWAH	208				
EWAJ	277				
EWAQ	230				
EWAK*	120	24	120	Integral to thermostat	Aquistat(s) installed on supply line
EWAL*	208				
EWAM*	277				
EWAR*	230				

Notes:

- Electric heat control packages include items shown above. The heating elements, high temperature linear limit switch, and fusible link(s) are not included. See electric heating elements pricing.
- Transformers required for high voltage motors need to be ordered separately
- Remote temperature sensors are recommended with all unit mounted thermostats for improved temperature control
- * Available with EC motors

Electric heat control packages

Zehnder 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 end pocket of the fan coil.

Chilled water cooling: Single stage electric heating

Field furnished thermostat

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
ECSB	208				
ECSC	277				
ECSD	230				

Notes:

- Electric heat control packages include items shown above. The heating elements, high temperature linear limit switch, and fusible link(s) are not included. See electric heating elements pricing.
- Transformers required for high voltage motors need to be ordered separately

Electric heat capacities

Table D:

Unit size	120V/60Hz/1Ph					208V/60Hz/1Ph					230V/60Hz/1Ph					277V/60Hz/1Ph				
	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
02	1	1.0	3.4	19.7	8.3	1	1.1	3.8	21.6	5.3	1	1.0	3.4	19.7	4.3	1	1.4	4.8	27.5	5.1
	1	1.4	4.8	27.5	11.7	1	1.4	4.8	27.5	6.7	1	1.4	4.8	27.5	6.1	1	1.9	6.5	37.4	6.9
	1	1.9	6.5	37.4	15.8	1	2.2	7.5	43.3	10.6	1	1.9	6.5	37.4	8.3	1	3.1	10.6	61.0	11.2
	1	3.0	10.2	59.0	25.0	1	2.9	9.9	57.0	13.9	1	3.0	10.2	59.0	13.0	-	-	-	-	-
03	1	1.0	3.4	11.4	8.3	1	1.1	3.8	12.6	5.3	1	1.0	3.4	11.4	4.3	1	1.4	4.8	16.0	5.1
	1	1.4	4.8	16.0	11.7	1	1.4	4.8	16.0	6.7	1	1.4	4.8	16.0	6.1	1	1.9	6.5	21.7	6.9
	1	1.9	6.5	21.7	15.8	1	2.2	7.5	25.2	10.6	1	1.9	6.5	21.7	8.3	1	3.1	10.6	35.5	11.2
	1	3.0	10.2	34.3	25.0	1	2.9	9.9	33.2	13.9	1	3.0	10.2	34.3	13.0	-	-	-	-	-
04	1	1.0	3.4	8.4	8.3	1	2.2	7.5	18.5	10.6	1	1.9	6.5	15.9	8.3	1	3.1	10.6	26.0	11.2
	1	1.4	4.8	11.8	11.7	1	2.9	9.9	24.3	13.9	1	3.0	10.2	25.2	13.0	2	3.8	13.0	31.9	13.7
	1	1.9	6.5	15.9	15.8	2	4.4	15.0	36.9	21.2	2	3.8	13.0	31.9	16.5	2	4.5	15.4	37.8	16.2
	1	3.0	10.2	25.2	25.0	2	5.1	17.4	42.8	24.5	2	4.9	16.7	41.1	21.3	2	5.0	17.1	42.0	18.1
	-	-	-	-	-	2	5.8	19.8	48.7	27.9	2	6.0	20.5	50.4	26.1	2	6.2	21.2	52.0	22.4
06	1	1.0	3.4	5.5	8.3	1	2.2	7.5	18.5	10.6	1	1.9	6.5	10.5	8.3	1	3.1	10.6	17.1	11.2
	1	1.4	4.8	7.7	11.7	1	2.9	9.9	24.3	13.9	1	3.0	10.2	16.6	13.0	2	3.8	13.0	21.0	13.7
	1	1.9	6.5	10.5	15.8	2	4.4	15.0	36.9	21.2	2	3.8	13.0	21.0	16.5	2	4.5	15.4	24.8	16.2
	1	3.0	10.2	16.6	25.0	2	5.1	17.4	42.8	24.5	2	4.9	16.7	27.1	21.3	2	5.0	17.1	27.6	18.1
	-	-	-	-	-	2	5.8	19.8	48.7	27.9	2	6.0	20.5	33.1	26.1	2	6.2	21.2	34.2	22.4
08	1	1.0	3.4	4.2	8.3	1	2.9	9.9	24.3	13.9	1	3.0	10.2	12.6	13.0	2	4.5	15.4	18.9	16.2
	1	1.4	4.8	5.9	11.7	2	4.4	15.0	36.9	21.2	2	3.8	13.0	15.9	16.5	2	5.0	17.1	21.0	18.1
	1	1.9	6.5	8.0	15.8	2	5.1	17.4	42.8	24.5	2	4.9	16.7	20.6	21.3	2	6.2	21.2	26.0	22.4
	1	3.0	10.2	12.6	25.0	2	5.8	19.8	48.7	27.9	2	6.0	20.5	25.2	26.1	3	8.1	27.7	34.0	29.2
	-	-	-	-	-	3	6.6	22.5	55.4	31.7	-	-	-	-	-	3	9.3	31.8	39.0	33.6
10	1	1.0	3.4	3.9	8.3	2	4.4	15.0	36.9	21.2	2	3.8	13.0	14.8	16.5	2	4.5	15.4	17.5	16.2
	1	1.4	4.8	5.4	11.7	2	5.8	19.8	48.7	27.9	2	4.9	16.7	19.0	21.3	3	5.0	17.1	19.4	18.1
	1	1.9	6.5	7.4	15.8	3	6.6	22.5	55.4	31.7	2	6.0	20.5	23.3	26.1	3	6.2	21.2	24.1	22.4
	1	3.0	10.2	11.7	25.0	-	-	-	-	-	3	7.9	27.0	30.7	34.3	3	8.1	27.7	31.5	29.2
	2	3.8	13.0	14.8	31.7	-	-	-	-	-	3	9.0	30.7	35.0	39.1	3	9.3	31.8	36.1	33.6
12	1	1.0	3.4	3.0	8.3	2	4.4	15.0	36.9	21.2	2	3.8	13.0	11.4	16.5	2	4.5	15.4	13.5	16.2
	1	1.4	4.8	4.2	11.7	2	5.8	19.8	48.7	27.9	2	4.9	16.7	14.7	21.3	3	5.0	17.1	15.0	18.1
	1	1.9	6.5	5.7	15.8	3	6.6	22.5	55.4	31.7	2	6.0	20.5	18.0	26.1	3	6.2	21.2	18.6	22.4
	1	3.0	10.2	9.0	25.0	-	-	-	-	-	3	7.9	27.0	23.7	34.3	3	8.1	27.7	24.3	29.2
	2	3.8	13.0	11.4	31.7	-	-	-	-	-	3	9.0	30.7	27.0	39.1	3	9.3	31.8	27.9	33.6

Electric heat element selection

Example selection at free delivery

Example Unit size 03, Model FF-200 (225 CFM) and a sensible heating loss of 6,000 BTU/hr.

Determine the required heating element kW using 208V incoming voltage.

Step 1 Determine the room sensible heat loss, in BTU/hr. In this example, the sensible heat loss is 6,000 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 A on page 10. Use the formula below to determine the air temperature rise.

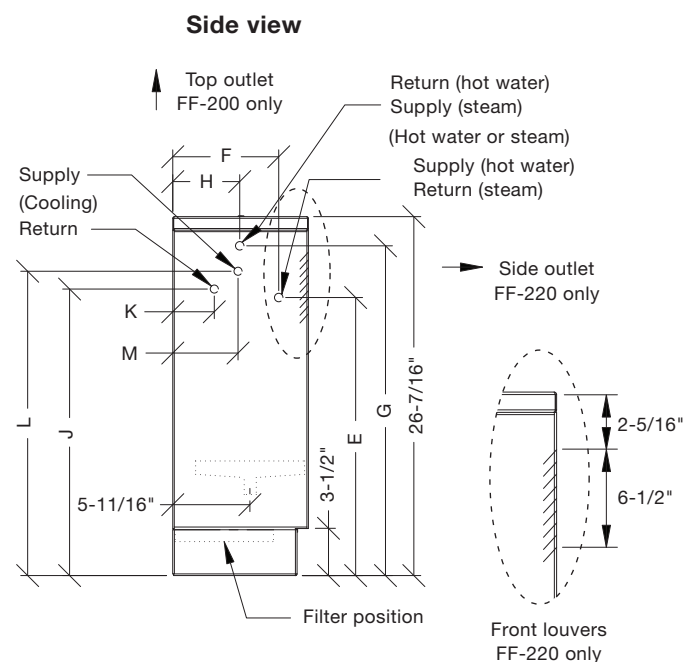
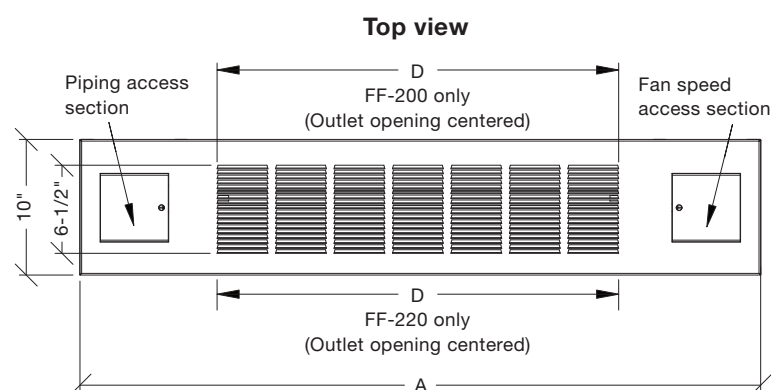
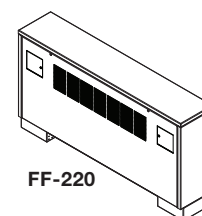
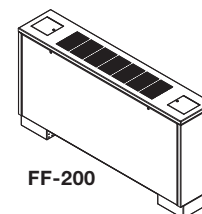
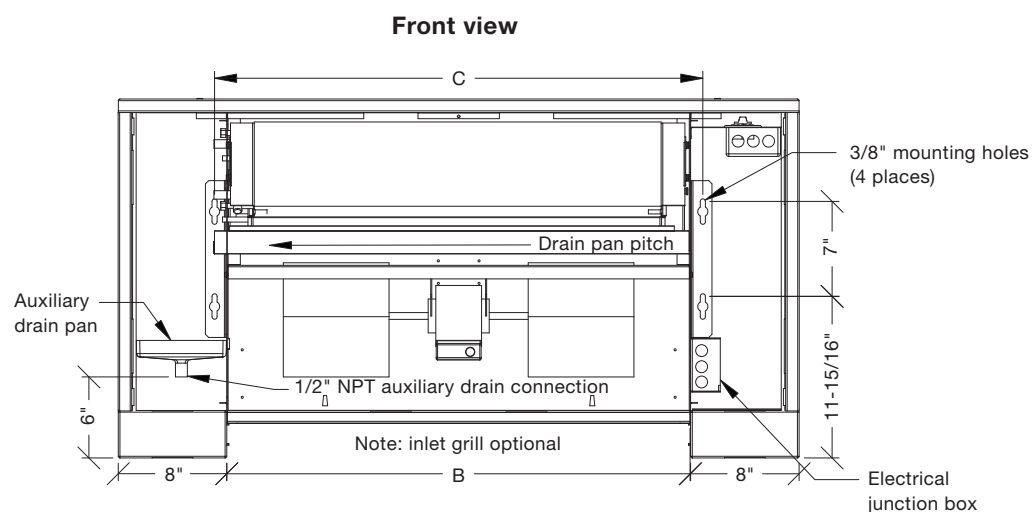
$$\Delta T = \frac{\text{BTU/hr}}{\text{CFM} \times 1.085} = \frac{6000}{225 \times 1.085} = 24.6^\circ\text{F required}$$

Step 3 Determine kW and number of heating elements based on air temperature rise required from Electric Heat Capacities table.

Answer Based on 24.6 °F temperature rise required, use a 2.2 kW heater element with 208V incoming voltage.

Dimensions and data

Model FF



Dimensional data				
Unit size	A	B	C	D
02	38-3/16	22-3/16	24	20-3/4
03	44-3/16	28-3/16	30	25
04	50-3/16	34-3/16	36	29-1/4
06	62-3/16	46-3/16	48	42
08	68-3/16	52-3/16	54	51-1/8
10	76-3/16	60-3/16	62	59
12	86-3/16	70-3/16	72	69

Dimensional data								
Coil	E	F	G	H	J	K	L	M
3 Row	N/A	N/A	N/A	N/A	18-9/16	3	19-7/8	4-5/8
4 Row	N/A	N/A	N/A	N/A	18-9/16	3	19-7/8	4-5/8
3/1 Row	18	7-3/4	21-3/4	4-5/16	18-9/16	3	19-7/8	4-5/8
4/1 Row	19-3/8	8-1/16	23-1/8	5-1/4	18-9/16	3	19-7/8	4-5/8

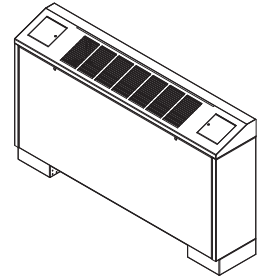
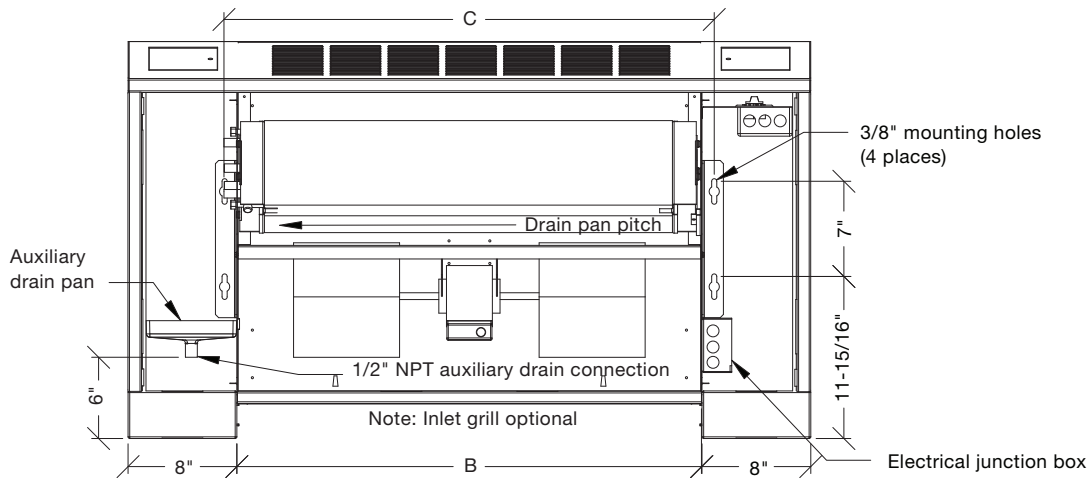
Notes:

- 3 and 4 row coil supply and return 1/2" nominal (5/8" OD) all sizes.
- 1 row coil (reheat option) supply and return 1/2" nominal (5/8" OD) all sizes.
- Left hand piping connections shown, right hand electrical as standard. Piping hand determined when facing the air outlet.
- Unit length: for 6" extended end pocket add 6" to dimension "A."
- 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.

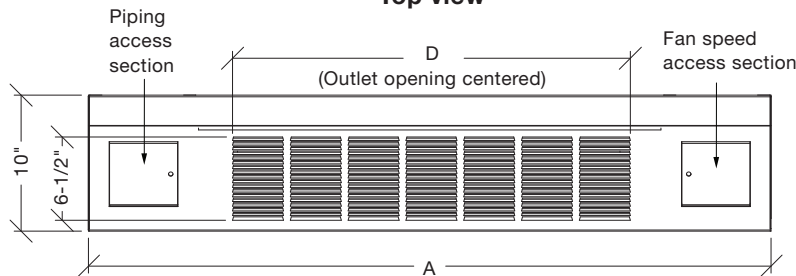
Dimensions and data

Model FS

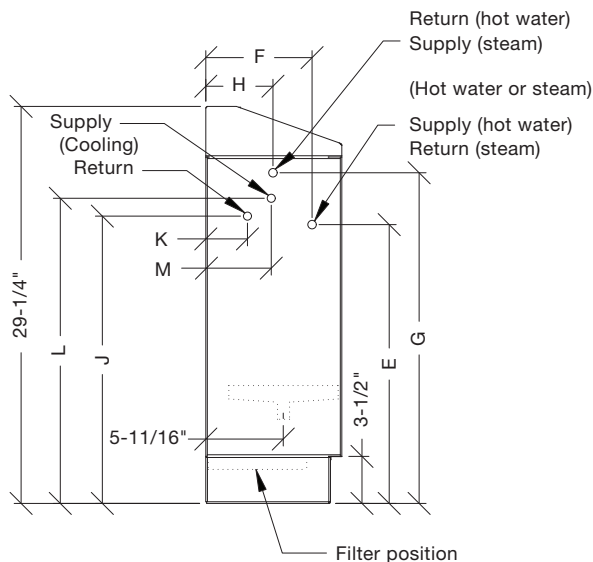
Front view



Top view



Side view



Dimensional data

Unit size	A	B	C	D
02	38-3/16	22-3/16	24	20-3/4
03	44-3/16	28-3/16	30	25
04	50-3/16	34-3/16	36	29-1/4
06	62-3/16	46-3/16	48	42
08	68-3/16	52-3/16	54	51-1/8
10	76-3/16	60-3/16	62	59
12	86-3/16	70-3/16	72	69

Dimensional data

Coil	E	F	G	H	J	K	L	M
3 Row	N/A	N/A	N/A	N/A	18-9/16	3	19-7/8	4-5/8
4 Row	N/A	N/A	N/A	N/A	18-9/16	3	19-7/8	4-5/8
3/1 Row	18	7-3/4	21-3/4	4-15/16	18-9/16	3	19-7/8	4-5/8
4/1 Row	19-3/8	8-1/16	23-1/8	5-1/4	18-9/16	3	19-7/8	4-5/8

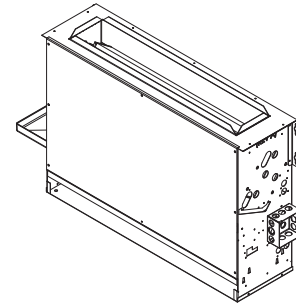
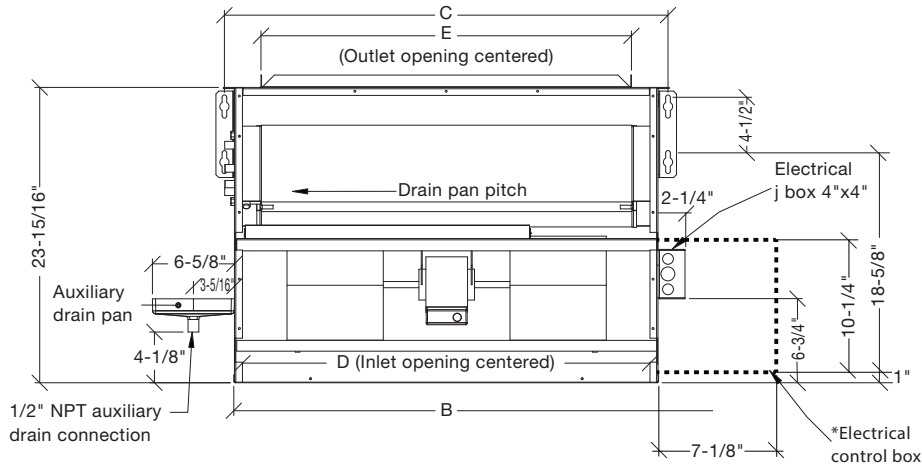
Notes:

- 3 and 4 row coil supply and return 1/2" nominal (5/8" OD) all sizes.
- 1 row coil (reheat option) supply and return 1/2" nominal (5/8" OD) all sizes.
- Left hand piping connections shown, right hand electrical as standard. Piping hand determined when facing the air outlet.
- Unit length: for 6" extended end pocket add 6" to dimension "A."
- 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.

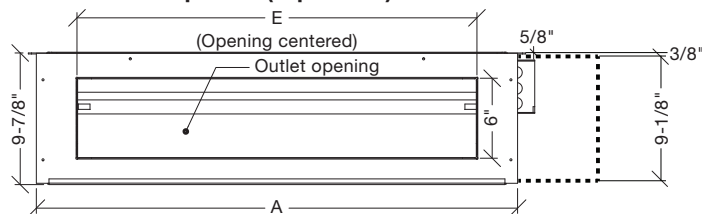
Dimensions and data

Model FFH

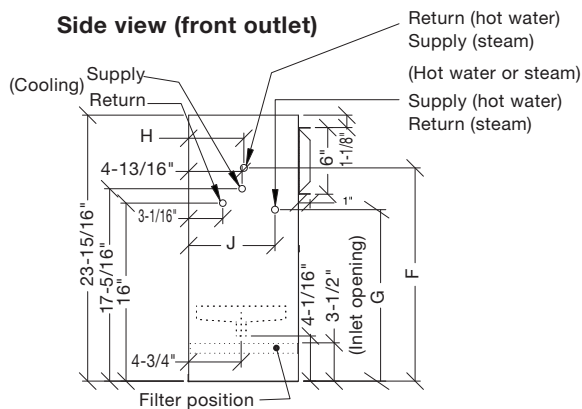
Front view (top outlet)



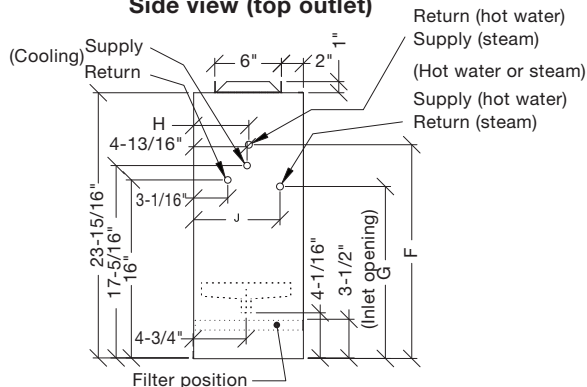
Top view (top outlet)



Side view (front outlet)



Side view (top outlet)



Dimensional data

Unit size	A	B	C	D	E
02	24-1/8	22-3/8	24	21	18
03	30-1/8	28-3/8	30	27	24
04	36-1/8	34-3/8	36	33	30
06	48-1/8	46-3/8	48	45	42
08	54-1/8	52-3/8	54	51	48
10	62-1/8	60-3/8	62	59	56
12	72-1/8	70-3/8	72	69	66

Dimensional data

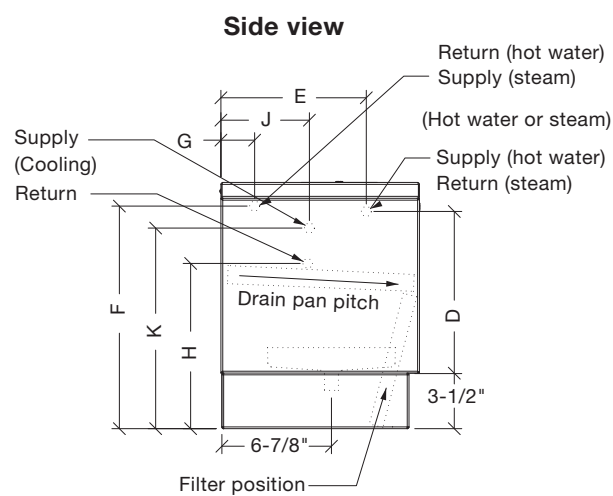
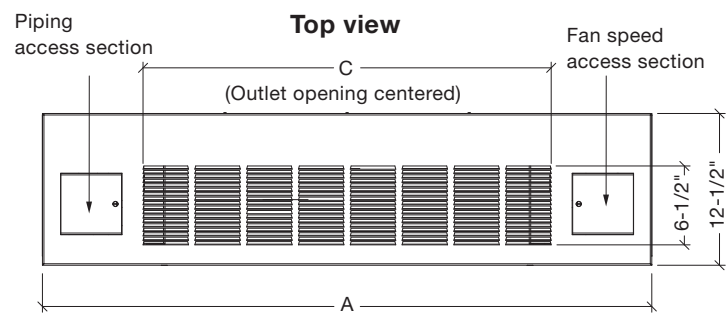
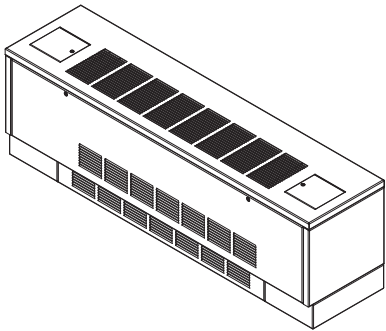
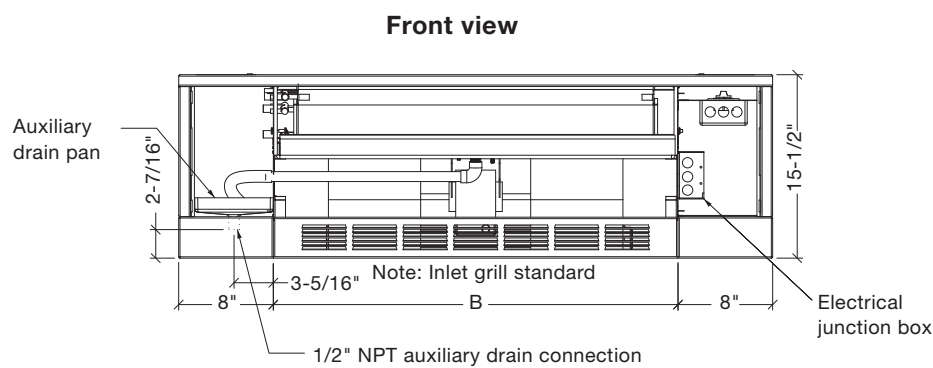
Coil	F	G	H	J
3/1 Row	19-3/16	15-7/16	4-15/16	7-3/4
4/1 Row	20-9/16	16-13/16	5-1/4	8-1/16

Notes:

- 3 and 4 row coil supply and return 1/2" nominal (5/8" OD) all sizes.
- 1 row coil (reheat option) supply and return 1/2" nominal (5/8" OD) all sizes.
- Left hand piping connections shown, right hand electrical as standard. Piping hand determined when facing the air outlet.
- Unit length: For 6" extended end pocket add 6" to dimension "A."
- 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.
- *Electrical control box will be used when any control package is chosen.

Dimensions and data

Model FLF



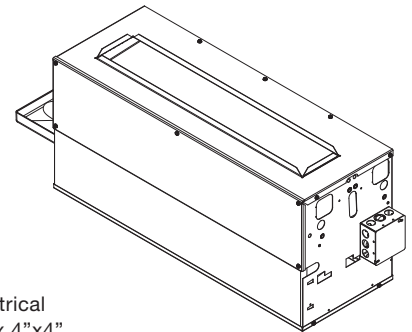
Dimensional data			
Unit size	A	B	C
02	38-3/16	22-3/16	20-3/4
03	44-3/16	28-3/16	25
04	50-3/16	34-3/16	29-1/4
06	62-3/16	46-3/16	42

Dimensional data							
Coil	D	E	F	G	H	J	K
2 row	N/A	N/A	N/A	N/A	10-3/8	5-1/2	11-1/2
3 row	N/A	N/A	N/A	N/A	10-3/8	5-9/16	12-5/8
2/1 row	12-9/16	9-1/8	12-7/8	2-1/16	10-3/8	5-1/2	11-1/2
3/1 row	13-11/16	9-1/8	14	2-1/8	10-3/8	5-9/16	12-5/8

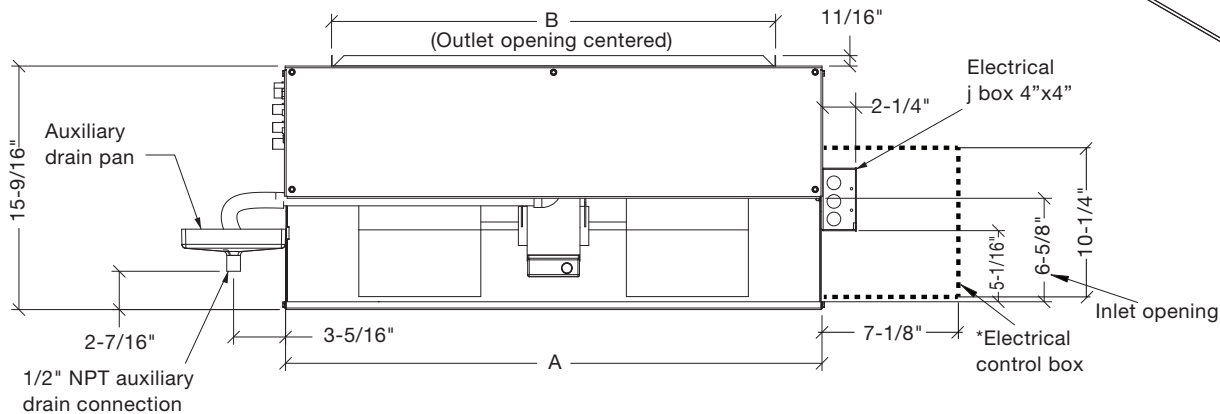
- Notes:**
- All coil connections are 1/2" nominal (5/8" OD) all sizes
 - Left hand piping connections shown, right hand electrical as standard. Piping hand determined when facing air outlet.
 - All listed dimensions are approximate and are subject to change without notice. Modifications to the product specifications must be accepted by Zehnder at its base office.

Dimensions and data

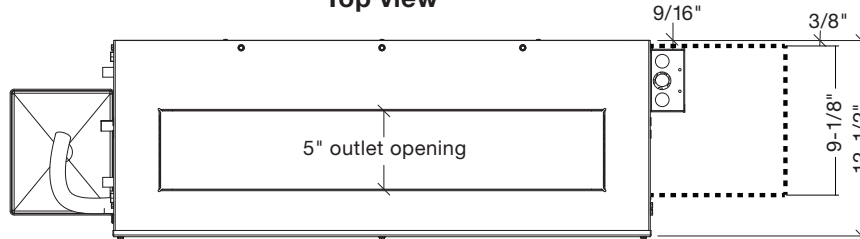
Model FLH



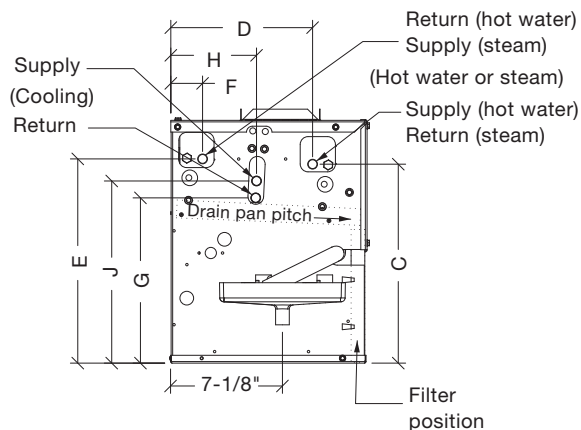
Front view



Top view



Side view



Dimensional data		
Unit size	A	B
02	22-5/16	16-3/16
03	28-5/16	22-3/16
04	34-5/16	28-3/16
06	46-5/16	40-3/16

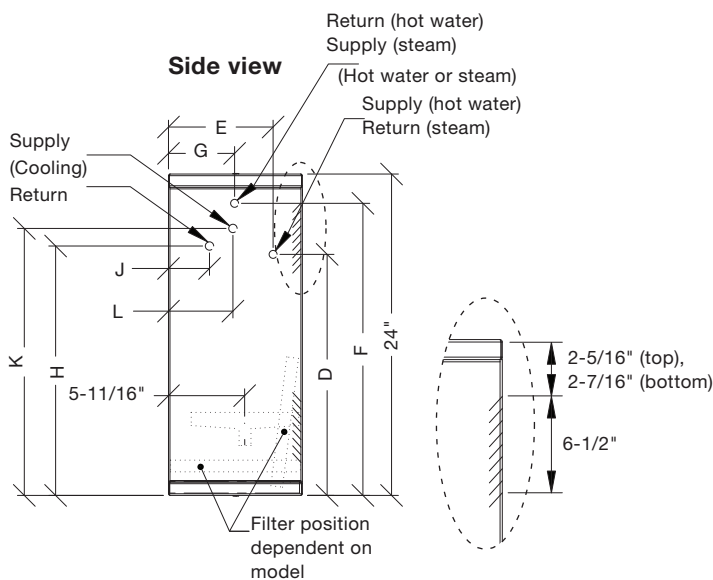
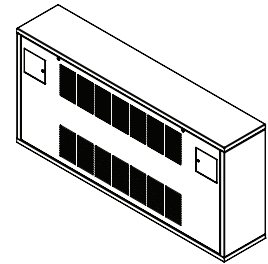
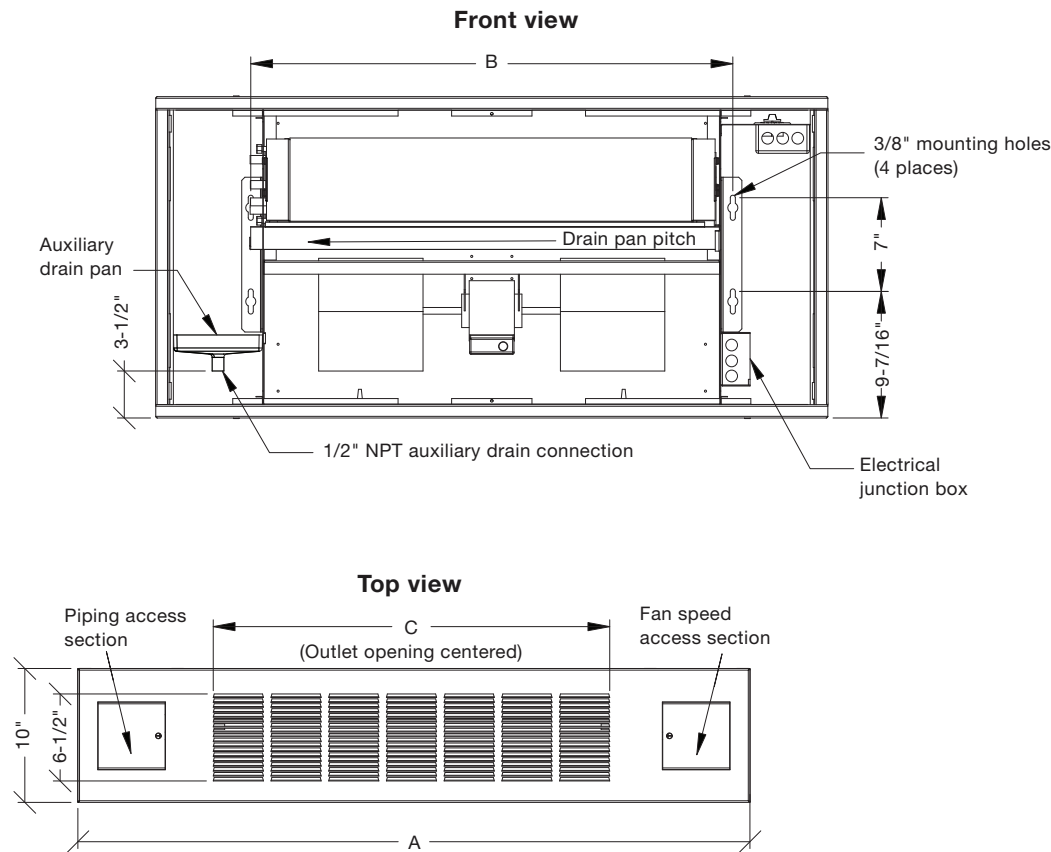
Dimensional data							
Coil	C	D	E	F	G	H	J
2 Row	N/A	N/A	N/A	N/A	10-9/16	5-1/2	11-5/8
3 Row	N/A	N/A	N/A	N/A	10-5/8	5-9/16	12-13/16
2/1 Row	12-11/16	9-1/16	13-1/16	2	10-9/16	5-1/2	11-5/8
3/1 Row	13-13/16	9-1/8	14-3/16	2-1/16	10-5/8	5-9/16	12-13/16

Notes:

- All coil connections are 1/2" nominal (5/8" OD) all sizes
- Left hand piping connections shown, right hand electrical 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.
- *Electrical control box will be used when any control package is chosen.

Dimensions and data

Model FW



Dimensional data			
Unit size	A	B	C
02	38-3/16	24	20-3/4
03	44-3/16	30	25
04	50-3/16	36	29-1/4
06	62-3/16	48	42
08	68-3/16	54	51-1/8
10	76-3/16	62	59
12	86-3/16	72	69

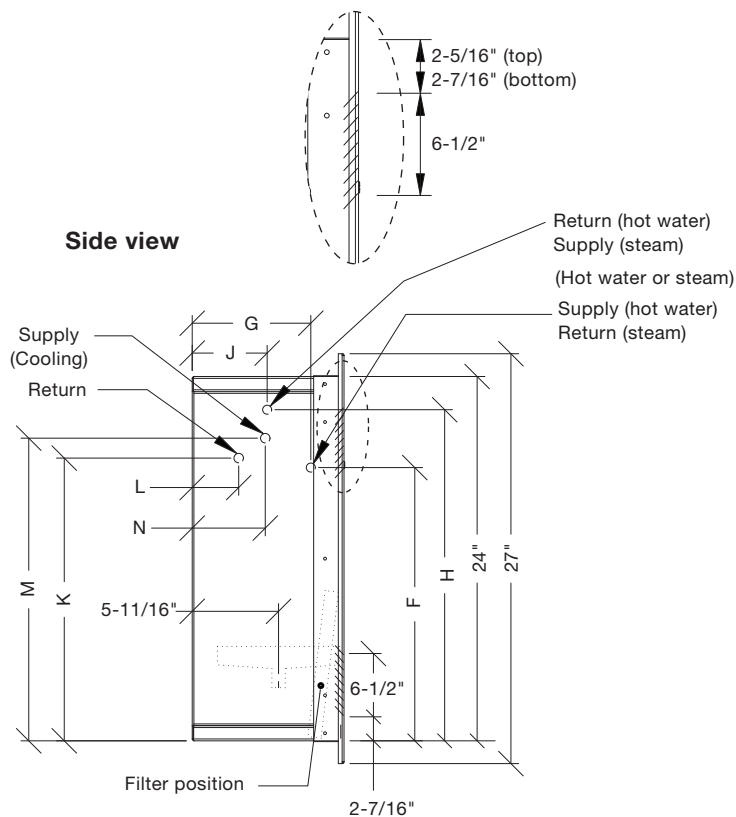
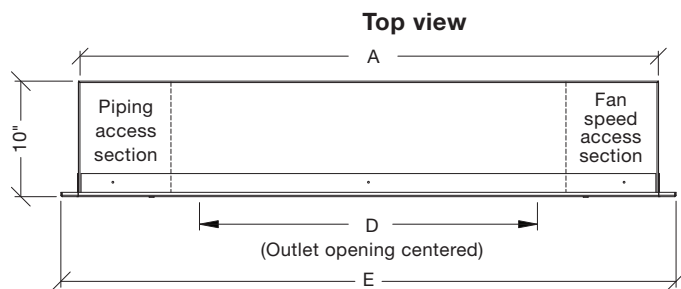
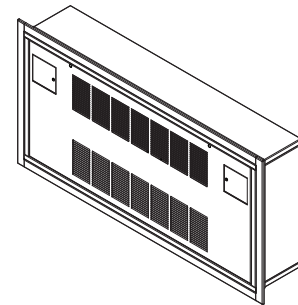
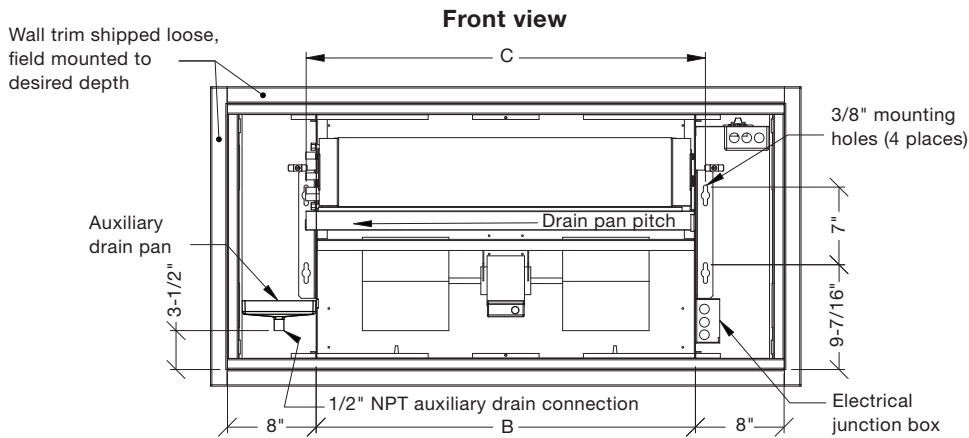
Dimensional data								
Coil	D	E	F	G	H	J	K	L
3 Row	N/A	N/A	N/A	N/A	16-1/8	3	17-3/8	4-5/8
4 Row	N/A	N/A	N/A	N/A	16-1/8	3	17-3/8	4-5/8
3/1 Row	15-9/16	7-3/4	19-5/16	4-15/16	16-1/8	3	17-3/8	4-5/8
4/1 Row	16-15/16	8-1/16	20-11/16	5-1/4	16-1/8	3	17-3/8	4-5/8

Notes:

- 3 and 4 row coil supply and return 1/2" nominal (5/8" OD) all sizes.
- 1 row coil (reheat option) supply and return 1/2" nominal (5/8" OD) all sizes.
- Left hand piping connections shown, right hand electrical as standard. Piping hand determined when facing the air outlet.
- Unit length: for 6" extended end pocket add 6" to dimension "A."
- 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 FRW and FFRW



Dimensional data					
Unit size	A	B	C	D	E
02	38-3/16	22-3/16	24	20-3/4	41-3/16
03	44-3/16	28-3/16	30	25	47-3/16
04	50-3/16	34-3/16	36	29-1/4	53-3/16
06	62-3/16	46-3/16	48	42	65-3/16
08	68-3/16	52-3/16	54	51-1/8	71-3/16
10	76-3/16	60-3/16	62	59	79-3/16
12	86-3/16	70-3/16	72	69	89-3/16

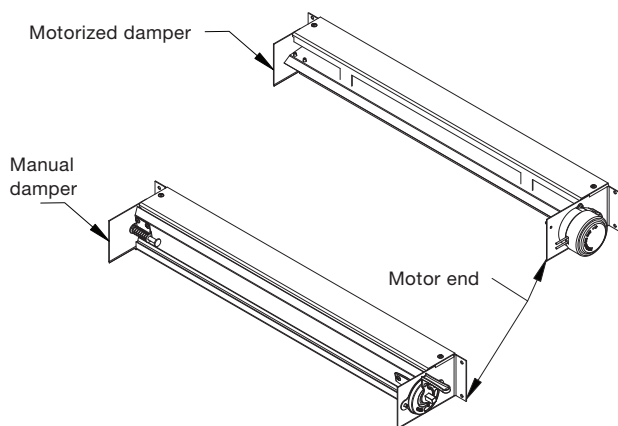
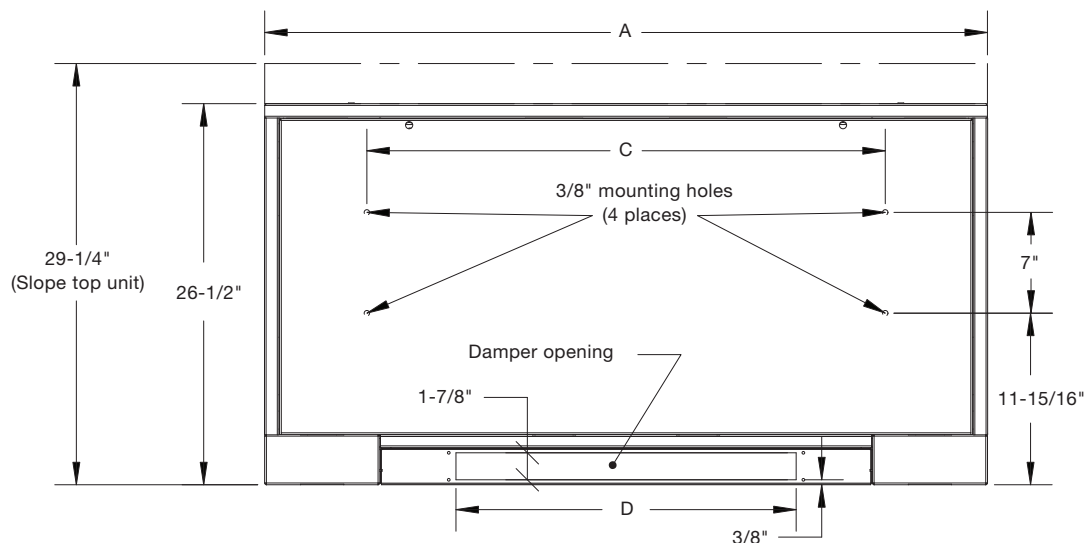
Dimensional data								
Coil	F	G	H	J	K	L	M	N
3 Row	N/A	N/A	N/A	N/A	16-1/8	3	17-3/8	4-5/8
4 Row	N/A	N/A	N/A	N/A	16-1/8	3	17-3/8	4-5/8
3/1 Row	15-9/16	7-3/4	19-5/16	4-15/16	16-1/8	3	17-3/8	4-5/8
4/1 Row	16-15/16	8-1/16	20-11/16	5-1/4	16-1/8	3	17-3/8	4-5/8

- **Notes:**
- 3 and 4 row coil supply and return 1/2" nominal (5/8" OD) all sizes.
- 1 row coil (reheat option) supply and return 1/2" nominal (5/8" OD) all sizes.
- Left hand piping connections shown, right hand electrical as standard. Piping hand determined when facing the air outlet.
- Unit length: For 6" extended end pocket add 6" to dimension "A."
- 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.

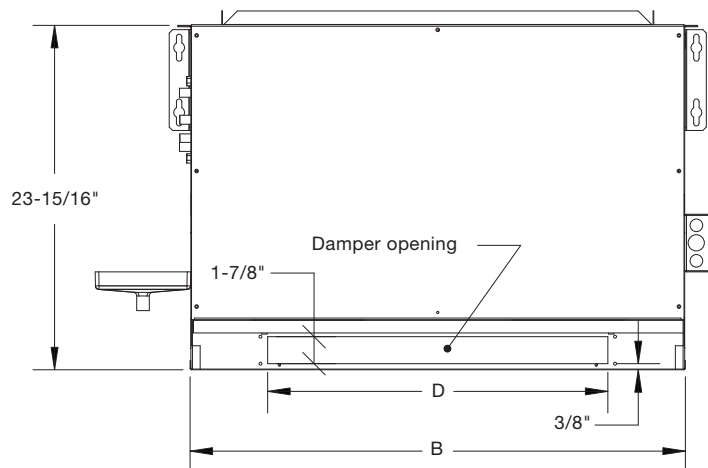
Dimensions and data

Damper models FF, FS and FFH

Front view (FF and FS)



Front view (FFH)



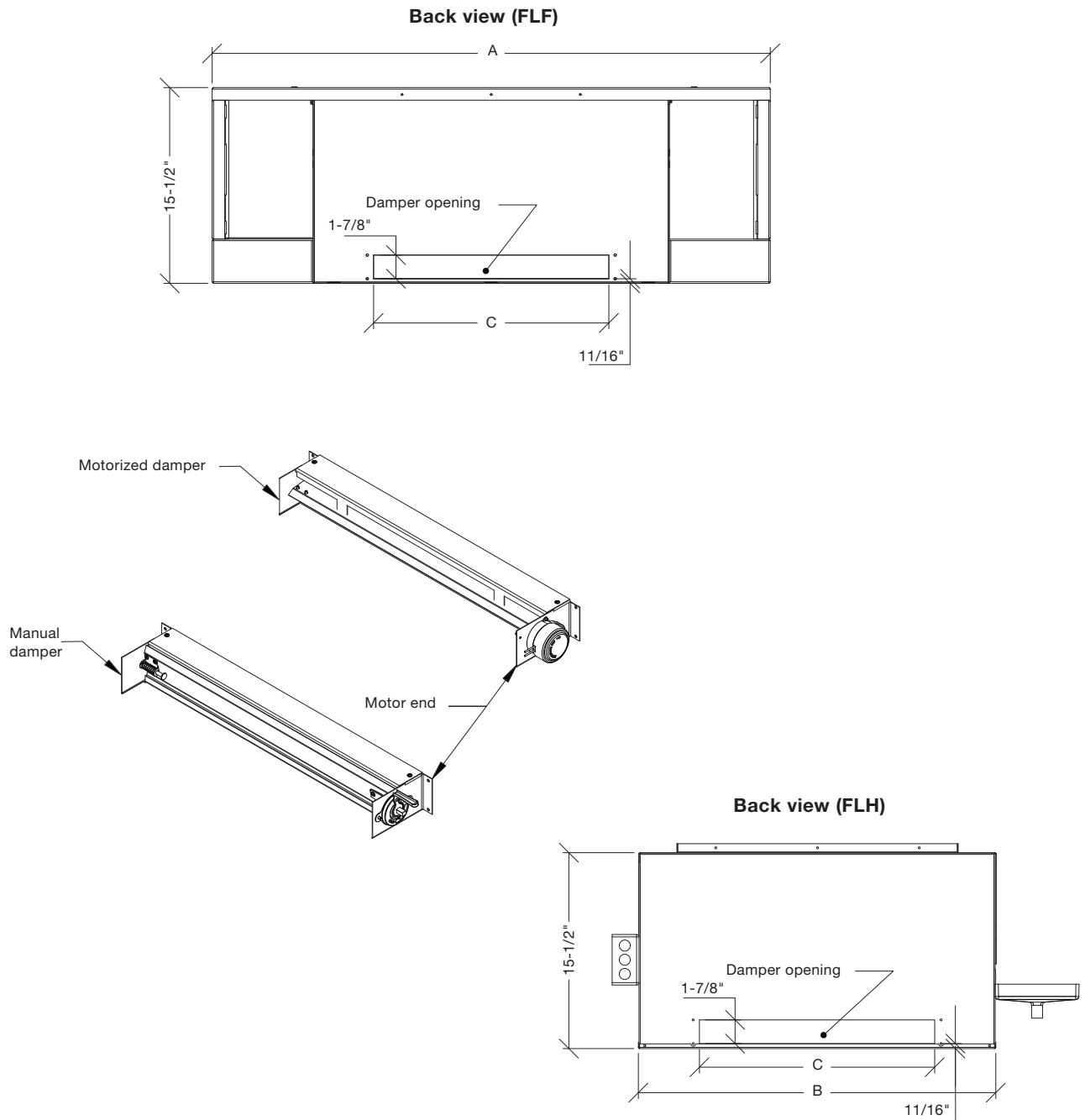
Notes:

- Damper motor always on right side when viewing unit from front side.
- 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.

Dimensional data				
Unit size	A	B	C	D
02	38-3/16	22-3/8	24	18-5/8
03	44-3/16	28-3/8	30	18-5/8
04	50-3/16	34-3/8	36	23-5/8
06	62-3/16	46-3/8	48	23-5/8
08	68-3/16	52-3/8	54	33-5/8
10	76-3/16	60-3/8	62	33-5/8
12	86-3/16	70-3/8	72	33-5/8

Dimensions and data

Damper models FLF and FLH



Dimensional data

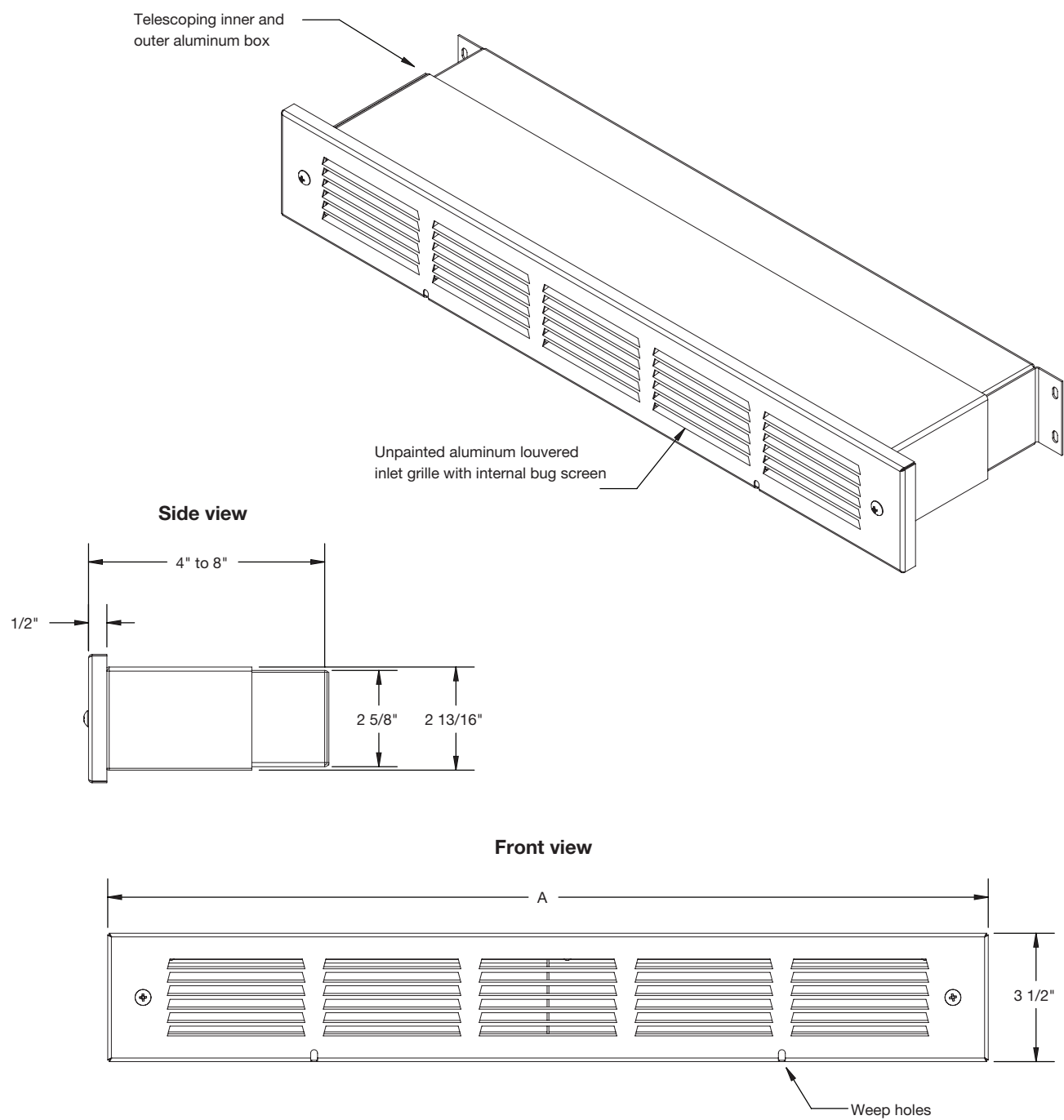
Unit size	A	B	C
02	38-3/16	22-5/16	18-5/8
03	44-3/16	28-5/16	18-5/8
04	50-3/16	34-5/16	23-5/8
06	62-3/16	46-5/16	33-5/8

Notes:

- Damper motor always on right side when viewing unit from front side.
- 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

Outside air wall box



Dimensional data		
Model	A	Rough opening
WB-0203	24	22-1/2 x 3
WB-0406	29	27-1/2 x 3
WB-081012	39	37-1/2 x 3

Mechanical specifications

General

Furnish and install Room Floor 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 be certified as complying with ARI Standard 440-2008.

Construction

All unit chassis shall be fabricated of 20-gauge galvanized steel panels. All unit chassis panels within coil section shall be insulated with elastomeric closed cell foam insulation. Insulation shall conform to UL 181 for erosion and 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. Polyethylene or fiberglass insulation is not acceptable.

All exposed units shall have exterior front, top and end panels fabricated of not less than 16-gauge cold rolled steel [14-gauge steel]. The front panel shall be attached with tamper-proof allen-head quarter turn fasteners to allow for easy removal and access for service. Side panels shall be removable for access to controls and piping within the end pockets, if required. End pockets shall be no less than 8" [extended end pockets shall be no less than 14"] in width, located on both sides of the unit.

[Provide a grille in the return air opening (FF, FS).]

All exposed units shall include a recessed stamped louver discharge grille. Louver discharge grille shall be reverse stamped (FF, FS, FW, FFRW, FLF), leaving a smooth exterior surface. [Provide an architectural aluminum double deflection discharge grille (FF, FS, FW) with a powder coated paint finish to match cabinet color. Liquid coat paint shall not be acceptable.] [Provide a steel bar grille with an oxford brown powder coated paint finish. Liquid coat paint shall not be acceptable.] All exposed units shall have exterior front and end panels fabricated of not less than 16-gauge cold rolled steel [14-gauge steel].

Louvered panel shall be supplied with two flush, hinged access doors (FF, FS, FW, FFRW, FLF) with slotted cam-lock fasteners [tamper-proof Allen-head security quarter turn fasteners] [tamper-proof Torx-head security quarter turn fasteners].

Recessed units shall be provided with a wall seal assembly. The assembly shall provide a finished appearance to the wall.

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

- Option: Adjustable leveling legs, two on each base leg, shall be provided where indicated on drawings or schedules (FF, FS, FLF).

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 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 sleeve bearing, type with automatic reset integral thermal overload protection. High static motors are available for ducted applications. 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.

Mechanical specifications

The fan/motor assembly shall be removable and serviceable through the front panel. Each fan/motor assembly shall be fastened by no more than 4 screws or (FLF, FLH) each assembly shall rest in a c-channel and be fastened by no more than 2 screws. [The motors shall have quick connects to allow service and removal without the need for tools.]

Drain pan

Primary condensate drain pans (FF, FS, FFH, FW, FFRW) shall be non-corrosive, fire-retardant ABS plastic or (FLF, FLH) 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 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. Non-corrosive, fire-retardant ABS plastic auxiliary drain pan (FF, FS, FFH, FW, FFRW, FLF, FLH) is used for condensate from primary drain pan and optional valve packages. PVC piping runs from drain connection to auxiliary drain pan (FLF, FLH).

The motors and blowers are to be attached to the drain pan with stainless steel hardware (FLF, FLH). The blower(s) must have a ¼" high, stainless steel sealed barrier around penetrations to prevent condensate from running into blower housing(s).

- 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.

Coils

All cooling and heating coils shall optimize rows to meet the specified capacity. Coils shall have 1/2" 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 1/2" 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

All units shall be furnished with a minimum 1" nominal glass fiber throwaway [1" pleated MERV 8] [1" cleanable aluminum mesh] filter. Filters shall be tight fitting to prevent air bypass. Filters shall be easily removable from the return air opening without the need for tools, unless there is an inlet louvered return provided.

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.

Mechanical specifications

- 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. Each electric heating element shall be mounted to a continuous 18-gauge galvanized steel plate (FF, FS, FFH, FW, FFRW). The plate shall be attached to the fan deck for easy removal. Electric heating elements shall be located in the preheat 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. Control valves shall be wired to junction box or unit mounted thermostat, when provided, through quick connects to allow service and replacement of valves. 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.

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

- Option: Piping package will be shipped factory installed.

Outside air damper (FF, FS, FFH, FLF, FLH)

Provide a manual [two position motorized] outside air single blade damper integral to the unit.

[A synchronous motor interlocked with the fan shall open the outside air damper automatically when the fan starts. If there is a loss in power or the blower stops, the damper shall return to a closed position.]

- Option: Provide aluminum outside air wall box with integral insect screen and weep holes for field installation.

Units shall be manufactured in accordance with ISO 9001:2013 standards established and maintained by Zehnder.

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

1ST

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 CO₂ 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

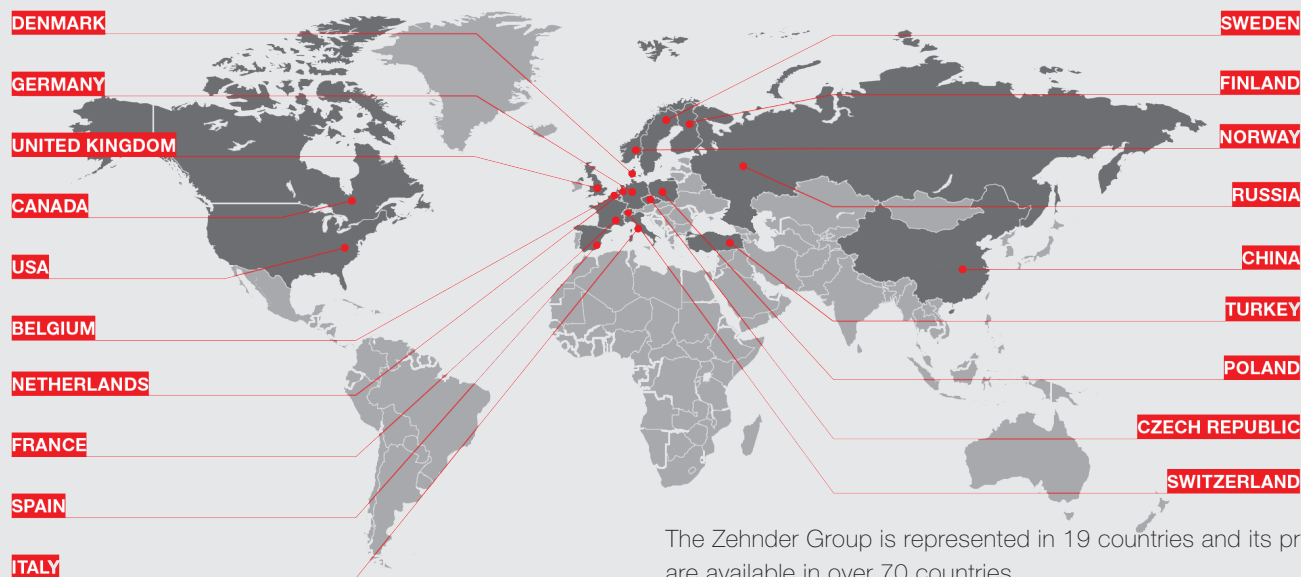
Zehnder heating and cooling ceiling systems are convenient and energy-efficient for heating and cooling. They are perfectly attuned to the relevant environment.



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.

