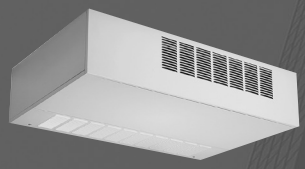
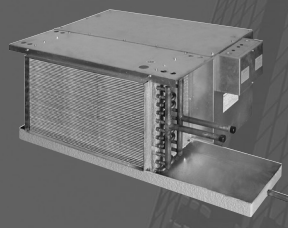
FAN COILS

E2





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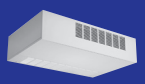
KRUEGER
Excellence in Air Distribution

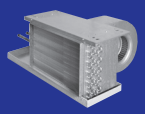


KHFE
Part of the Horizontal Low Profile series, this model features an exposed cabinet configuration.

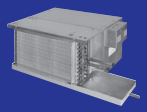
KHFH
Part of the Horizontal Low Profile series, this model features a concealed ceiling configuration.

KHFP
Part of the Horizontal Low Profile Series, this model features a standard concealed ceiling with plenum. configuration.

KHGE
Part of the Horizontal High Capacity Series, this model features a horizontal exposed cabinet configuration.

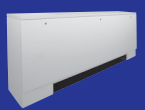


KHGH
Part of the Horizontal High Capacity Series, this model features a concealed ceiling configuration.

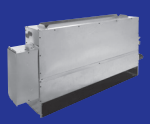


KHGP
Part of the Horizontal High Capacity Series, this model features a concealed ceiling with plenum configuration.

KVFS
Part of the Vertical Standard Series, this model features an exposed cabinet slant top configuration.



KVFF
Part of the Vertical Standard Series, this model features an exposed cabinet flat top configuration.



KVFH
Part of the Vertical Standard Series, this model features a concealed console configuration.

KVPH
Part of the Vertical Stack Series, this model features a vertical stack, recessed hi-rise configuration.

KVPP
Part of the Vertical Stack Series, this model features a vertical stack, recessed primary configuration.

KVPS
Part of the Vertical Stack Series, this model features a vertical stack, recessed secondary configuration.

KVIP
Part of the Vertical Stack Series, this model features a twin pack primary vertical stack, recessed hi-rise configuration.

KVIS
Part of the Vertical Stack Series, this model features a twin pack secondary vertical stack, recessed hi-rise configuration.

KVPE
Part of the Vertical Stack Series, this model features a vertical stack, recessed hi-rise configuration.

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Introduction: KVP Series

The Krueger vertical floor mounted fan coil units are designed to maximize flexibility of selection and installation.

The units are also designed to exceed the stringent quality standards of the institutional market, while remaining cost competitive in the light commercial segment of the market.

Krueger vertical fan coil units set the new standards for quality, flexibility, and competitive pricing.

MODEL

KVPH - Vertical Stack Fan Coil, Stand Alone
KVPP - Vertical Stack Fan Coil, Primary (Shipped Separate)
KVPS - Vertical Stack Fan Coil, Secondary (Shipped Separate)
KVIP - Vertical Stack Fan Coil, Primary Twin Pack
KVIS - Vertical Stack Fan Coil, Secondary Twin Pack
KVPE - Vertical Stack Fan Coil, Exposed
RISER - Riser for Vertical Stack Fan Coils

KVIP

KVPH

KVPE

KVP Series Product Description

HIGH PERFORMANCE

Krueger KVP series of vertical hi-rise fan coil units are designed to maximize flexibility of selection and installation, and for ease of service.

The units are also designed to exceed the stringent quality standards of the institutional market, while remaining cost competitive in the commercial and residential segments of the market.

Krueger vertical hi-rise fan coil units set the new standards for innovation, quality, flexibility, and competitive pricing.

DESIGNED FOR MAXIMUM FLEXIBILITY

The extensive variety of standard options available on KVP series fan coils are where you find the versatility to fit any HVAC system designer's needs.

Options include: single wall stainless steel drain pans, foil faced or elastomeric closed cell foam insulation, double deflection aluminum discharge grilles, manual or motorized outside air dampers and electric heat with single point power connection and silent relays. All electric heat units are listed with ETL as an assembly and carry the cETL label.

All units comply with the latest edition of AHRI Standard 440 for testing and rating fan coil units, are certified, and display the AHRI symbol.

High efficiency motors, fan relays, disconnects and fusing mean easier coordination between mechanical and electrical trades.

Coil options allow for three or four row chilled water and one or two row hot water coils in the reheat position only. A total of five rows of coil are accommodated.

OPTIMUM BUILDING PERFORMANCE

The KVP series fan coil chassis is built from galvanized steel. This metal surpasses the ASTM 125 hour salt spray test for corrosion and rust. Decorator front panels, supply grilles, and exposed cabinet Model KVPE are powder coated galvannealed 18 gauge steel. Standard insulation is 1/2" thick fiberglass, complying with UL 181 and NFPA 90A. Optional foil faced or elastomeric closed cell foam insulation may be specified.

All units, with or without electric heat, are cETL listed and labeled. All wiring is in compliance with NEC, assuring safety and quality for the owner.

KVP series fan coil units have removable fans and coils. The entire coil assembly can be easily removed from the unit and replaced or serviced on a workbench, reducing equipment down time. Coils are accessible for cleaning and removable for service or replacement. Filters are easily replaceable when the decorator front panel is removed. As an option, the drain pan can be equipped for removal for cleaning or replacement without disturbing the coil assembly.

Tandem Primary and Tandem Secondary models KVIP/KVIS ship complete with risers enclosed in a wall plenum with one layer of 5/8" gypsum for sound attenuation. As an option, Tandem Primary and Tandem Secondary Units may be ordered with two layers of 5/8" gypsum and fire blocking material. The Tandem Primary and Tandem Secondary fire rated unit has been tested and certified for 1 hour rating per UL 1479.

CONVENIENT INSTALLATION

All KVP series fan coil units are shipped completely assembled, reducing field installation time and labor. All units are thoroughly inspected and tested prior to shipment, eliminating potential problems at startup. Motor wiring is brought to a control compartment on the inside of the unit, reducing electrical hook-up time. Factory furnished pressure tested valve packages assure proper fit, operation and performance.

Factory furnished pressure tested risers with swaged connections are available in a variety of materials, diameters and lengths.

KVP series fan coil units have several standard features that provide for installation flexibility that are unmatched in the industry. Featuring internal stainless steel braided hoses that link the piping packages to the riser shut-off valves, the unique design of the KVP series allows for easy field configuration of left hand, right hand, or back riser connections without the need for thermal cutting and joining of piping. Both the sides as well as the back panels are manufactured with riser slot knockouts. Supply air opening knockouts are included on all sides, and the top of the unit. If requested, the KVPH/KVPP/KVPS units ship from the factory with knockouts removed for the selected arrangement of supply air and riser location.

Risers may ship in advance of the unit to facilitate installation and fire safing of floor penetrations in limited space. Delaying the delivery of units until walls are in place protects the fan coil units from construction debris during installation and pressure testing of the risers.

CONSTRUCTION FEATURES

Fan Deck: For ease of service, the fan/motor assembly is easily removed by unscrewing two locknuts located at the front of the assembly. Slide rails support the fan during removal and installation, and the electrical harness is equipped with a quick connect plug.

Drain Pan: The sloped insulated drain pan is available in stainless steel construction. Standard drain pans are externally insulated, single wall galvanized steel. As an option, the KVP series drain pan can be equipped for easy removal from the front of the unit for inspection and cleaning. For optimum moisture resistance and cleanability, the fan coil unit may be lined with foil faced fiberglass insulation (shown above) or elastomeric closed cell foam insulation.

Filters: Filter options include 1" throwaway (standard), pleated MERV 8, or synthetic media. Filters are easily replaceable from the return air when the front panel is removed.

KVP Series Product Description

Coils and Piping: All fan coils are available in 2 or 4 pipe configurations. The heating coil is standard in the reheat position. Access for cleaning on both the entering and leaving air sides is available. Coils are removable from the front of the unit for service.

Stainless Steel Braided Hoses: Stainless steel braided hoses allow for flexibility and thermal expansion within the unit cabinet. The hose-to-coil and hose-to-riser connections are made via a threaded swivel adapter, simplifying coil removal.

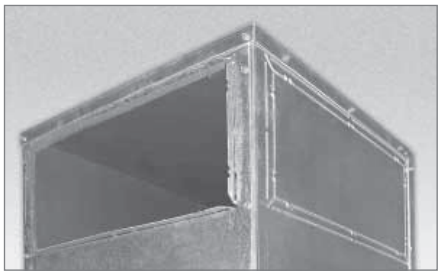
Risers: Risers, coils and piping packages are pressure tested and ship installed on the unit as a complete package. Risers may also ship in advance of the unit. This option greatly simplifies installation, while keeping the units free of construction debris during pressure testing of the risers

Powder Coat Painted Surface: Exposed cabinet, model KVPE, as well as the front return textured decorator panel, feature a powder coat finish that resists scuffing, scratching, fading, and fingerprints.

Reducing Mold Growth In Hi-Rise Residential Projects:
Krueger's KV fan coils feature several options to mitigate mold and mildew when applied in a properly designed and constructed building. For humid climates, Krueger offers innovations to ensure optimum humidity control at part load conditions.

- Elastomeric closed cell foam insulation is a great alternative to fiberglass insulation in extremely humid climates, as well as educational and hi-rise residential facilities. The material's smooth and cleanable surface makes it naturally mold resistant, with no danger of fibrous material entering the airstream. Additional features include:
  - Easily cleaned surface resists dirt, moisture absorption, and microbial growth – even if torn or punctured.
  - Higher temperature limit than polyethylene CCF, able to withstand service temperature spikes without permanent failure.
  - More flexible than polyethylene CCF at 75°F, allowing expansion and contraction in hot and cold cycle applications.
  - Compression resistance; retains its thermal insulating capacity.
  - Outer moisture vapor barrier or liner not required.
  - Ratings: NFPA 90A and 90B, ASTM E84, ASTM G-21 (fungi resistance), UL 181 (mold growth/humidity and air erosion)
- Motorized coil bypass damper in conjunction with fan speed control increases dehumidification at part load and more closely matches cooling capacity to the room load during off peak operation.
- Innovative temperature and humidity controller improves part load relative humidity control.
- Deep loading, synthetic media filtration protects both the coil and the coil bypass air from airborne contaminants. Filter frame and media are non organic, and will not support mold growth.
- Risers (shipped in advance) allow installation and pressure testing during building construction, prior to units arriving on job site.
- Stainless steel drain pans and coil casings are available for use where added corrosion resistance or longevity are required.
- Coils and piping packages are removable in minutes through the standard front panel with only a screwdriver and pair of wrenches for periodic cleaning or service outside of the unit.
- IAQ drain pan is positively sloped to prevent standing water. An optional drain pan is removable for effective cleaning.
- Refer to the engineering specifications in this catalog for additional information on many of these features.

Positively sloped drain pan prevents standing water; lined with closed cell foam insulation for added moisture protection.



Supply air opening knockouts may be left in place during building construction to keep units dry and free from construction debris.

KVP Series Product Description

STANDARD FEATURES

Construction
- AHRI 440 certified and labeled.
- Galvanized steel construction.
- 1/2” thick fiberglass insulation.
- Integral filter rack with 1” throwaway filter.
- Riser slot knockouts.
- Supply air knockouts.

Decorator Front Panel
- Stamped louver return air grille.
- Durable powder coat paint.
- Quarter-turn cam lock fasteners.

Supply Air
- Single outlet.
- Front, side or top outlets.

Coils
- Cooling - 3 or 4 row chilled water.
- Heating - 1 or 2 row hot water - reheat position.
- 5 total rows of cooling and heating coils maximum.
- 3/8” O.D. seamless copper tubes.
- 0.012” tube wall thickness.
- High efficiency aluminum fin surface for optimizing heat transfer, pressure drop and carryover.
- Easily removable for service.
- Manual air vents.

Drain Pans
- Single wall, galvanized steel, externally insulated – fire retardant and antimicrobial.
- Positively sloped to drain connection.
- 7/8” O.D. drain connection.
- P-trap factory installed.

Fan Assemblies
- Forward curved, DWDI centrifugal type blowers.
- 115 volt, single phase, three tap PSC motors.
- Quick disconnect motor connections.
- Easily removable fan/motor deck for service.

Electrical
- cETL listed for safety compliance.
- Electrical enclosure with access door for field wiring terminations.
- Terminal block for field connections.

Electric Heat
- ETL listed as an assembly for safety compliance.
- Integral electric heat assembly with removable elements for easy service.
- Automatic reset primary and back-up secondary thermal limits.
- Single point power connection.

OPTIONAL FEATURES

Construction
- Primary/secondary arrangements.
- Foil faced fiberglass insulation.
- Blower shield.
- 1” pleated filter (MERV 8).
- 1" synthetic media filter (MERV 6).
- Elastomeric closed cell foam insulation.
- Manual or motorized outside air damper.

Supply Air
- Double deflection discharge grille(s).
- Double outlets.
- Sight and sound baffles for double outlet units.
- Opposed blade damper.

Coils
- Automatic air vents
- Stainless steel coil casings.

Drain Pans
- Stainless steel construction with external insulation.
- Removable for cleaning.

Fan Assemblies
- 208-230 & 277 volt, single phase, three tap PSC motors.
- EC motor (3 speed).

Electrical
- SCR fan speed controller.
- Fan relay packages.
- Silent solid state fan relays.
- Toggle disconnect switch.
- Condensate overflow switch (drain pan).
- Unit and remote mounted three speed fan switches.
- Main fusing.

Electric Heat
- Manual reset secondary thermal limit.
- Silent relay/contactors.
- Door interlocking disconnect switches.
- Main fusing.

Piping Packages
- Factory assembled and installed.
- 1/2” 2-way and 3-way normally closed, two position electric motorized valves.
- Stainless steel braided hoses (threaded swivel connections) for thermal expansion including isolation ball valves with memory stop.
- Fixed and adjustable flow control devices.
- High pressure close-off actuators (50 PSIG max).
- P/T ports and Y-strainers.
- Modulating control valves.

Thermostats
- Analog, digital display, or programmable.
- Unit and wall mounted.
- 2 and 4-pipe control sequences.
- Automatic and manual changeover.
- Integral three speed fan switches.
- ADA mounting location on front panel or unit sides.

Risers
- Type-M or L copper with swaged connections.
- 3/4” to 3” diameters.
- 1/2” and 3/4” closed cell insulation.
- Type-M copper condensate riser.
- Riser extensions.
- Riser cover.
- Ship in advance risers.

KVP Series Coil & Filter Information

COILS

Krueger offers hot water and chilled water coils for specific application with all KVP series fan coil units. Strict on-site inspection before, during, and after installation guarantees the highest quality and performance available.

STANDARD FEATURES

- Cooling - 3 or 4 row chilled water.
- Heating - 1 or 2 row hot water.
- 5 total rows of cooling and heating coils maximum.
- 3/8" O.D. seamless copper tubes.
- 0.012" tube wall thickness.
- High efficiency aluminum fin surface for optimizing heat transfer, pressure drop and carryover.
- Manual air vents.

OPTIONAL FEATURES

- Automatic air vents.
- Stainless steel coil casings.

AIRFLOW CORRECTION

Unit Size	1-Row Hot Water			2-Row Hot Water		
	High	Medium	Low	High	Medium	Low
3	0.927	0.961	0.950	0.859	0.924	0.903
4	0.988	0.939	0.946	0.976	0.882	0.895
6	0.965	0.953	0.927	0.931	0.908	0.859
8	0.973	0.966	0.977	0.947	0.933	0.955
10	0.981	0.975	0.997	0.962	0.951	0.994
12	0.966	0.968	0.947	0.933	0.937	0.897

NOTES: Use for addition of HW coils with CW coils on 4-pipe units only. Not for use on 2-pipe changeover systems. For 1 row HW coil, use with 3 row or 4 row CW coils. For 2 row HW coil, use with 3 row CW coils only.

Example: KVP03 with 3 row cooling coil and no additional external static pressure, determine airflow with the addition of a 2 row HW coil.

Solution: From KV03 fan curve, CFM is 350 at 0 ESP. Multiply CFM by correction factor for 2 row coil. (350 x .859 = 300 CFM)

ALTITUDE CORRECTION

Altitude (ft.)	0	1000	2000	3000	4000	5000	6000	7000
Air Density (lb./ft^3)	0.075	0.0722	0.0697	0.0672	0.0648	0.0625	0.0601	0.0579
Total Capacity	1.000	0.988	0.986	0.983	0.981	0.979	0.977	0.975
Sensible Capacity	1.000	0.960	0.930	0.900	0.860	0.830	0.800	0.770
Static Pressure	1.000	0.960	0.930	0.900	0.860	0.830	0.800	0.770

NOTES: Capacity and static pressures will be affected for applications above sea level. To apply correction factors, multiply factor to desired coil capacity or fan curve data.

Example: KVP03 with 3 row coil, high speed fan operation at 3000 ft. above sea level and with 0.1 IN. W.C. ESP.

Solution: Using correction factors from Altitude Correction chart for 3000 ft. above sea level, data from AHRI Standard Ratings table and fan curves.

Total Capacity *= 12,500 BTUH (.983) = 12,288 BTUH*
Sensible Capacity *= 8,000 BTUH (.90) = 7,200 BTUH*
SP *= .1 (.90) = .09" W.C.*

FACE AREA, FREE AREA AND FILTER SIZES

Unit Size	Coil Face Area	Filter Face Area	Nominal Filter Sizes
3	2.17 [.20]	2.29 [.21]	13 3/4" x 24" x 1" (349 x 610 x 25)
4	2.17 [.20]	2.29 [.21]	13 3/4" x 24" x 1" (349 x 610 x 25)
6	2.77 [.26]	2.90 [.27]	15 3/4" x 26 1/2" x 1" (400 x 673 x 25)
8	2.77 [.26]	2.90 [.27]	15 3/4" x 26 1/2" x 1" (400 x 673 x 25)
10	3.85 [.36]	3.98 [.37]	19 3/4" x 29" x 1" (502 x 737 x 25)
12	3.85 [.36]	3.98 [.37]	19 3/4" x 29" x 1" (502 x 737 x 25)

KVP Series AHRI Ratings, Weight Information, & Heating Capacity

AHRI STANDARD RATINGS

Unit Size	Coil		Airflow CFM (Dry Flow)	Cooling Capacity		Water		Power Input (WATTS)
	Rows	FPI		QT (BTUH)	QS (BTUH)	Flow Rate (GPM)	WPD (ft-wg)	
KVP03	3	14	346	12649	8920	2.5	6.36	66
KVP04	3	14	441	15649	11060	3.1	8.48	118
KVP06	3	14	601	23430	16069	4.6	15.93	142
KVP08	3	14	799	26969	19200	5.4	10.13	247
KVP10	3	14	1006	36419	25510	7.3	8.49	279
KVP12	3	14	1238	42229	29959	8.4	9.63	474
KVP03	4	14	337	15750	10470	3.1	11.31	66
KVP04	4	14	426	19450	12989	3.9	13.86	118
KVP06	4	14	587	27260	18129	5.4	13.86	142
KVP08	4	14	779	33709	22799	6.7	17.96	247
KVP10	4	14	989	42099	28780	8.4	7.1	279
KVP12	4	14	1206	49159	33970	9.7	8.49	474

NOTE: Based on 80°F DB and 67°F WB EAT, 45°F EWT, 10°F temperature rise, high fan speed. Motor type is PSC and motor voltage is 115/1/60. Airflow under dry coil conditions. All models tested at 0.05" external static pressure.

UNIT WEIGHTS

Component		Unit Size					
		03	04	06	08	10	12
KVP Base Unit		218 [99]	218 [99]	235 [107]	235 [107]	277 [126]	277 [126]
KVIP/KVIS Fire Rated Wall Plenum		130 [59]	130 [59]	145 [66]	145 [66]	160 [73]	160 [73]
KVIP/KVIS Non-Fire Rated Wall Plenum		78 [35]	78 [35]	87 [40]	87 [40]	96 [44]	96 [44]
(4) 2" Risers & (1) 1" Riser (115" L & 3/4" INS)		100 [45]	100 [45]	100 [45]	100 [45]	100 [45]	100 [45]
Coil Rows	3 Row - Dry	20 [9]	20 [9]	24 [11]	24 [11]	34 [15]	34 [15]
	3 Row - Wet	26 [12]	26 [12]	31 [14]	31 [14]	44 [20]	44 [20]
	4 Row - Dry	25 [11]	25 [11]	30 [14]	30 [14]	42 [19]	42 [19]
	4 Row - Wet	32 [15]	32 [15]	39 [18]	39 [18]	55 [25]	55 [25]
	5 Row - Dry	30 [14]	30 [14]	35 [16]	35 [16]	50 [23]	50 [23]
	5 Row - Wet	38 [17]	38 [17]	46 [21]	46 [21]	66 [30]	66 [30]

NOTE: Unit weight data is in pounds [kilograms].

HEATING CAPACITY

Unit Size	1 Row				2 Row				2 Row				2 Row			
	CFM	QS (MBH)	GPM	WPD	CFM	QS (MBH)	GPM	WPD	CFM	QS (MBH)	GPM	WPD	CFM	QS (MBH)	GPM	WPD
KVP03	337	17059	0.9	0.53	330	27760	1.4	2.41	346	31879	1.6	1.48	350	36400	1.9	5.2
KVP04	451	17399	0.9	0.26	443	34409	1.8	3.59	467	40209	2.1	2.27	450	45800	2.3	6.7
KVP06	577	24200	1.2	0.26	557	45930	2.4	8.1	591	50540	2.1	3.07	600	58700	3.0	4.4
KVP08	836	29270	1.5	0.32	800	58310	3.0	12.3	859	59150	2.1	1.35	836	79040	4.1	5.97
KVP10	960	43990	2.3	0.75	911	72470	3.7	3.64	978	67529	2.1	0.81	1000	96500	4.9	3.7
KVP12	1206	49169	2.5	0.92	1171	85629	4.4	4.9	1238	73050	2.1	0.82	1206	114169	5.9	2.37

NOTE: Based on 70°F DB EAT, 180°F EWT, 40°F temperature drop, high fan speed.

** Uses 3 Row CW (4 Total Rows)*
*** Uses 4 Row CW (5 Total Rows)*

KVP Series Electric Heat Features & Capacities

Krueger offers electric heating coils for specific application with all vertical floor series fan coil units. This allows the flexibility to provide an unrivaled amount of electric heat options in one complete package.

ELECTRIC HEAT STANDARD FEATURES

- ETL listed as an assembly for safety compliance.
- Single point power connection.
- Mounted in preheat position.
- Automatic reset primary and back-up secondary thermal limits.
- Internal wiring rated at 105°C.
- Integral electric heat assembly with removable element for easy service.
- Stainless steel terminals and hardware.

OPTIONAL HEATER CONTROL

- Silent solid state relays.
- Manual reset secondary thermal units.
- Door interlocking disconnect switch.
- Main fusing.

ELECTRICAL CALCULATIONS INFORMATION

- Non-fused door interlock disconnect switch shall be sized according to MCA.
- Fused door interlock disconnect switch and main fusing shall be sized according to MOP.

USEFUL FORMULAS

kW* = (CFM x ΔT x 1.085**) / 3413

1Ø AMPs = (kW x 1000) / Volts

** 1kW = 3413 BTU/H*
*** Capacity at Sea Level*

ALTITUDE CONSIDERATIONS:

Reduce by 0.034 for each 1000 ft. of altitude above sea level.

Example:
5000 ft./1000 ft. = 5
5 x 0.034 = 0.17
1.085 - 0.17 = 0.915

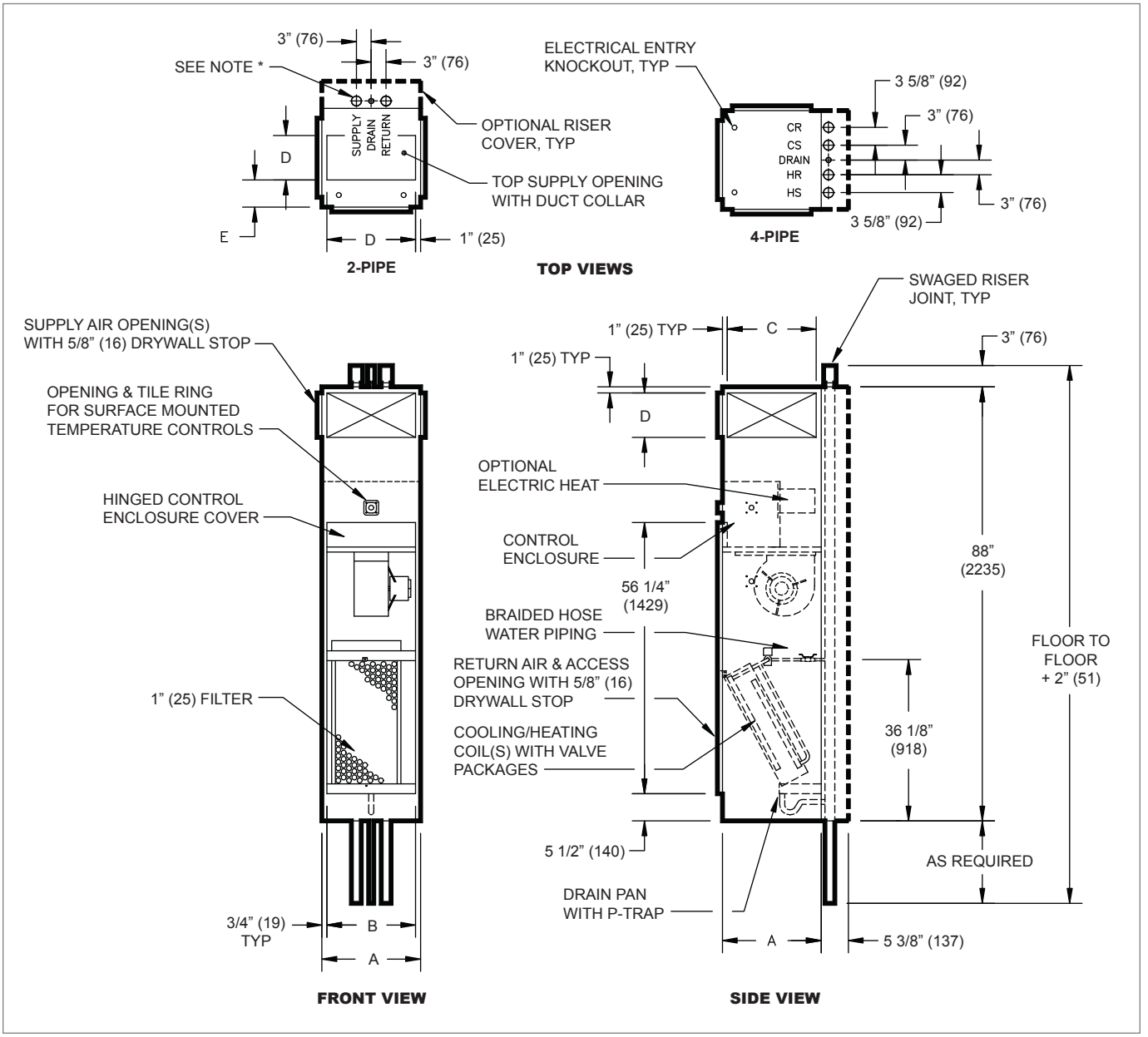
ELECTRIC HEAT SELECTION CHART

Unit Size	MBH	3.4	6.8	10.2	13.7	17.1	20.5	23.9	27.3	30.7	34.1
	kW	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0
	VOLTS	AMPS									
03	115	8.7	17.4	26.1	-	-	-	-	-	-	-
	208	4.8	9.6	14.4	-	-	-	-	-	-	-
	230	4.4	8.7	13.1	-	-	-	-	-	-	-
	277	3.6	7.2	10.8	-	-	-	-	-	-	-
04	115	8.7	17.4	26.1	34.8	-	-	-	-	-	-
	208	4.8	9.6	14.4	19.2	-	-	-	-	-	-
	230	4.4	8.7	13.1	17.4	-	-	-	-	-	-
	277	3.6	7.2	10.8	14.4	-	-	-	-	-	-
06	115	8.7	17.4	26.1	34.8	-	-	-	-	-	-
	208	4.8	9.6	14.4	19.2	24.1	-	-	-	-	-
	230	4.4	8.7	13.1	17.4	21.8	-	-	-	-	-
	277	3.6	7.2	10.8	14.4	18.1	-	-	-	-	-
08	115	8.7	17.4	26.1	34.8	-	-	-	-	-	-
	208	4.8	9.6	14.4	19.2	24.1	28.9	33.7	38.5	-	-
	230	4.4	8.7	13.1	17.4	21.8	26.1	30.5	34.8	-	-
	277	3.6	7.2	10.8	14.4	18.1	21.7	25.3	28.9	-	-
10	115	8.7	17.4	26.1	34.8	-	-	-	-	-	-
	208	4.8	9.6	14.4	19.2	24.1	28.9	33.7	38.5	43.3	-
	230	4.4	8.7	13.1	17.4	21.8	26.1	30.5	34.8	39.2	43.5
	277	3.6	7.2	10.8	14.4	18.1	21.7	25.3	28.9	32.5	36.1
12	115	8.7	17.4	26.1	34.8	-	-	-	-	-	-
	208	4.8	9.6	14.4	19.2	24.1	28.9	33.7	38.5	43.3	-
	230	4.4	8.7	13.1	17.4	21.8	26.1	30.5	34.8	39.2	43.5
	277	3.6	7.2	10.8	14.4	18.1	21.7	25.3	28.9	32.5	36.1

NOTES: Dashes (-) indicate kW and voltage options not available. Available voltages are single phase, 60 hertz. Size heater for Leaving Air Temperature (LAT) less than 104°F. Silent, solid state heater relay is available for heater currents less than 18 amps. Ask your Krueger representative about continuously modulating electric heat using SSR and special control options.

KVPH / KVPP Dimensional Information

KVPH OR KVPP (TANDEM PRIMARY UNIT) TOP AND SIDE VIEWS



DIMENSIONAL REFERENCES

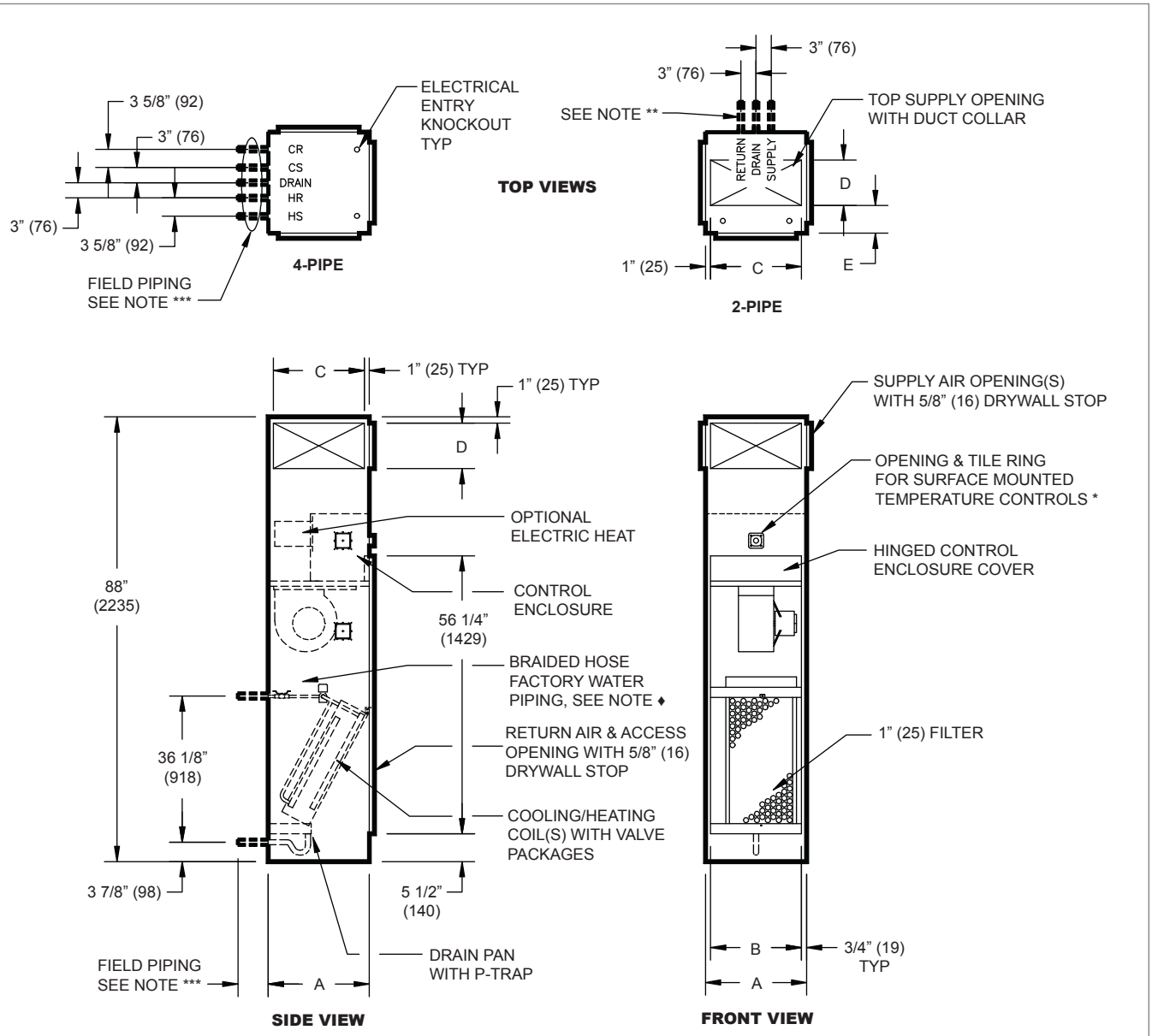
Unit Size	A	B	Single Supply		E
			C	D	
03 - 04	18" (457)	16 1/2" (419)	16" (406)	8" (203)	6" (152)
06 - 08	20" (508)	18 1/2" (470)	18" (457)	12" (305)	6" (152)
10 - 12	24" (610)	22 1/2" (572)	22" (559)	14" (356)	8" (203)

NOTES: All dimensions are in inches (millimeters) and are +/- 1/4" (6mm). Tile ring is installed on front of unit as shown, and may be moved to left or right side of unit in field. Wiring from electrical entry point to control enclosure is furnished and installed by others in field. Risers available from 3/4" (19mm) to 3" (76mm) diameter with 1/2" (13mm) thick insulation, and 3/4" (19mm) to 2 1/2" (64mm) diameter with 3/4" (19mm) thick insulation. Riser length is 120" (3048mm) max., 100" (2540mm) min. Factory mounted risers shown. Risers may also ship in advance of unit. See riser drawings for details.

** Back riser location shown. See arrangement drawings for available unit configurations.*

KVPS Dimensional Information

KVPS TOP AND SIDE VIEWS



DIMENSIONAL REFERENCES

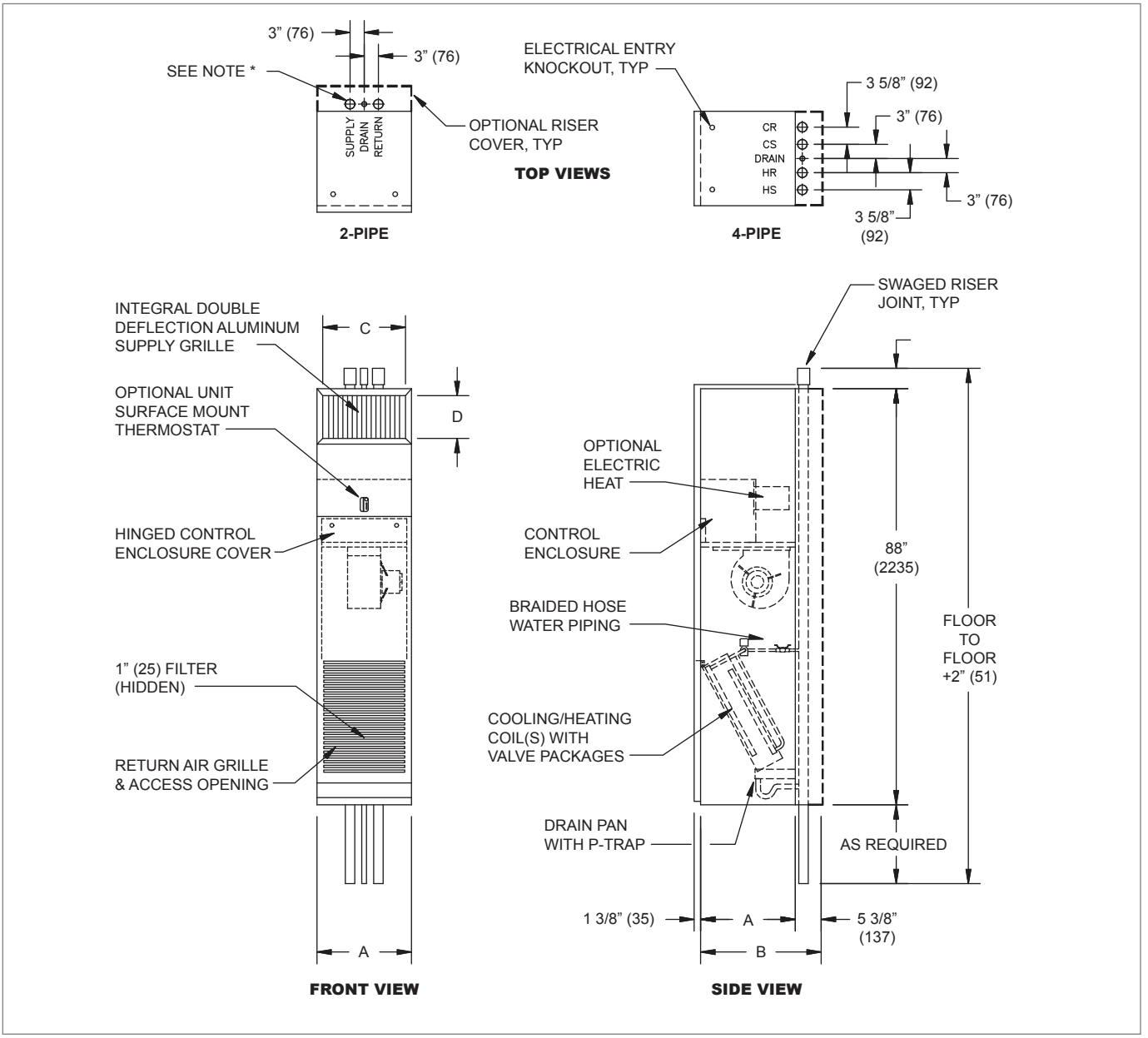
Unit Size	A	B	Single Supply		E
			C	D	
03 - 04	18" (457)	16 1/2" (419)	16" (406)	8" (203)	6" (152)
06 - 08	20" (508)	18 1/2" (470)	18" (457)	12" (305)	6" (152)
10 - 12	24" (610)	22 1/2" (572)	22" (559)	14" (356)	8" (203)

NOTES: All dimensions are in inches (millimeters) and are +/- 1/4" (6mm). Wiring from electrical entry point to control enclosure is furnished and installed by others in field. All piping and insulation between secondary unit and risers is furnished and installed in the field by others.

* *Tile ring is installed on front of unit as shown, and may be moved to left or right side of unit in field.*
** *Back connection location shown. See arrangement drawings for available unit configurations.*
*** *All coil and drain connections are "retracted" and braced internally for shipment. Coil connections are 5/8" (16mm) O.D. female sweat. Drain P-trap is designed to accept 7/8" (22mm) O.D. copper tube.*
♦ *Secondary units are furnished with factory installed shutoff valves and field connection tubes, unless primary unit risers are shipped.*

KVPE Dimensional Information

KVPE TOP AND SIDE VIEWS



DIMENSIONAL REFERENCES

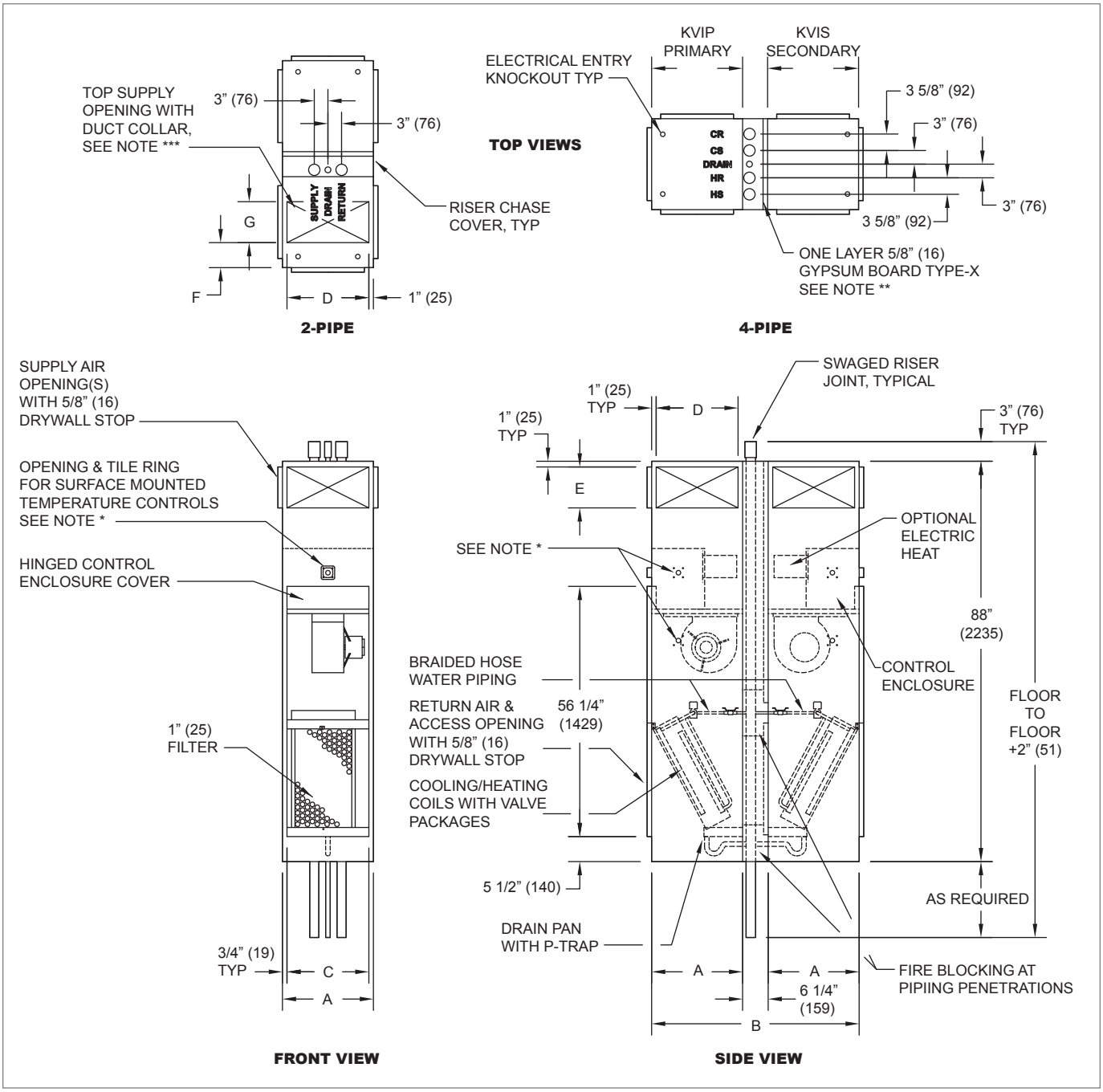
Unit Size	A	B	C	D
03 - 04	18" (457)	23 3/8" (594)	16" (406)	8" (203)
06 - 08	20" (508)	25 3/8" (645)	18" (457)	12" (305)
10 - 12	24" (610)	29 3/8" (746)	22" (559)	14" (356)

NOTES: All dimensions are in inches (millimeters) and are +/- 1/4" (6mm). Thermostat is shipped loose and may be unit surface mounted or remote wall mounted. Wiring from electrical entry point to control enclosure is furnished and installed by others in field. Risers available from 3/4" (19mm) to 3" (76mm) diameter with 1/2" (13mm) thick insulation, and 3/4" (19mm) to 2 1/2" (64mm) diameter with 3/4" (19mm) thick insulation. Riser length is 120" (3048mm) max., 100" (2540mm) min. Factory mounted risers shown. Risers may also ship in advance of unit. See riser drawings for details. Standard cabinet finish is Pearl White Satin. Floor and ceiling trim furnished and installed by others.

** All units are back riser, front single supply, arrangement BF00 only.*

KVIP, KVIS Tandem Unit Dimensional Information

KVIP, KVIS TOP, FRONT AND SIDE VIEWS



NOTES: All dimensions are in inches (millimeters) and are +/- 1/4" (6mm). Wiring from electrical entry point to control enclosure is furnished and installed by others in field. Risers available from 3/4" (19mm) to 2-1/2" (64mm) diameter with 1/2" (13mm) or 3/4" (19mm) thick insulation. Riser length is 120" (2921mm) max, 100" (2540mm) min. For further fire rating information refer to the Installation Instructions. See next page for dimensions.

* *Thermostat Mounting: Tile ring is installed on front of unit as shown and may be moved to left or right of unit as shown and may be moved to left or right side of unit in field.*

** *NON-FIRE RATED unit shown with type-X gypsum board at back of slave unit. FIRE RATED units have type-X gypsum board at back of both slave and master units. FIRE RATED unit design has been tested in accordance with UL1479 - Fire Test of Through Penetration Fire Stops, and is approved to bear the ETL listing mark for Through Penetration Fire Stop Assemblies.*

*** *Refer to arrangement drawings for available Tandem Primary and Tandem Secondary unit configurations.*

KVIP, KVIS Tandem Unit Dimensional Information

DIMENSIONAL REFERENCES

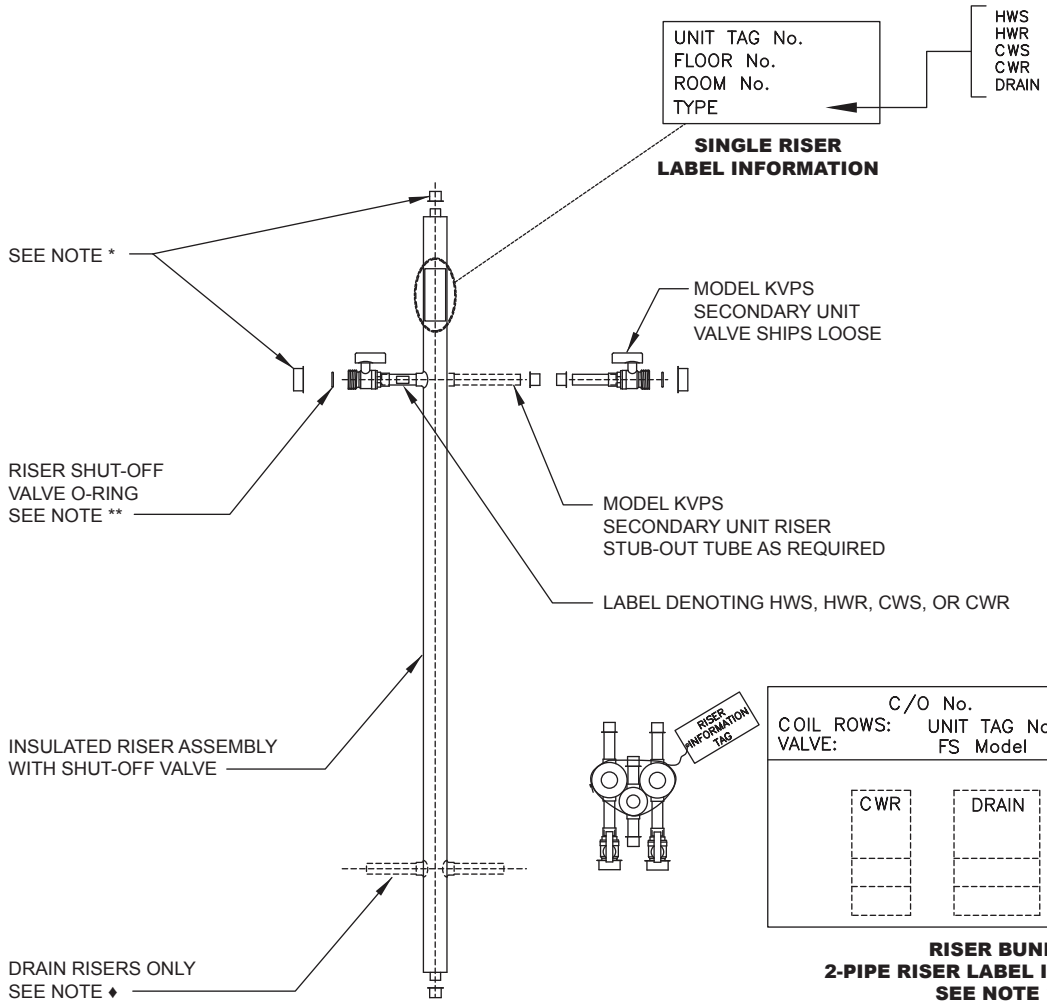
KVIP (Primary)	KVIS (Secondary)	A	B	C	D	KVIP / KVIS Supply Air		
						Single / Double		Top
						E	F	G
03 or 04	03 or 04	18” (457)	42 1/4” (1073)	16 1/2” (419)	16” (406)	8” (203)	6” (152)	8” (203)
	06 or 08	20” (508)	46 1/4” (1175)	18 1/2” (470)	18” (457)	12” (305)	6” (152)	12” (305)
	10 or 12	24” (610)	54 1/4” (1378)	22 1/2” (572)	22” (559)	14” (356)	8” (203)	14” (356)
06 or 08	03 or 04	20” (508)	46 1/4” (1175)	18 1/2” (470)	18” (457)	12” (305)	6” (152)	12” (305)
	06 or 08							
	10 or 12	24” (610)	54 1/4” (1378)	22 1/2” (572)	22” (559)	14” (356)	8” (203)	14” (356)
10 or 12	03 or 04	24” (610)	54 1/4” (1378)	22 1/2” (572)	22” (559)	14” (356)	8” (203)	14” (356)
	06 or 08							
	10 or 12							

NOTE: See previous page for corresponding drawing.

Tandem Primary and Secondary Models KVIP/KVIS ship complete with risers enclosed in a wall plenum with one layer of 5/8” gypsum for sound attenuation. As an option, Tandem Primary and Secondary unit may be ordered with two layers of 5/8” gypsum and fire blocking material for a one hour fire rating per UL 1479.

KVP Series Riser Dimensional Information

KVP RISER ASSEMBLY



NOTES: All risers are factory tested, and guaranteed to be leak free at time of shipment.

* *All risers and valves are shipped with protective caps. These caps should remain in place until installation of the unit.*

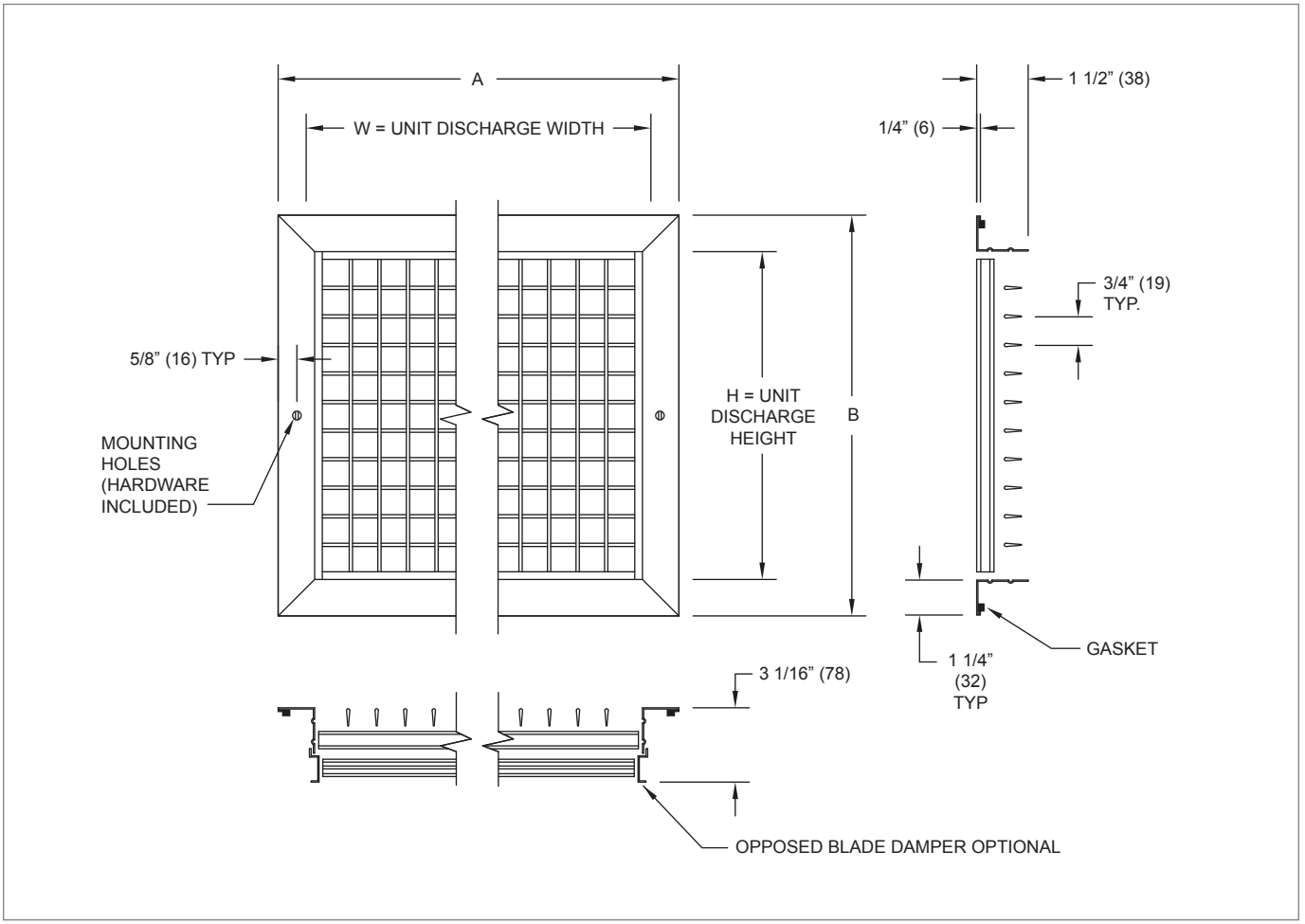
** *Each valve is supplied with an O-ring that is bagged and shipped loose for field installation by others.*

*** *Riser information shown shall reflect matching unit identification labels. KVPS secondary units will have mirror image orientation and will be labeled in units.*

♦ *Condensate P-trap and hose clamps ship installed in unit for field connections to drain riser.*

KVP Series Double Deflection Grille Dimensional Information

KVP SERIES DOUBLE DEFLECTION GRILLE TOP AND SIDE VIEWS



DIMENSIONAL REFERENCES

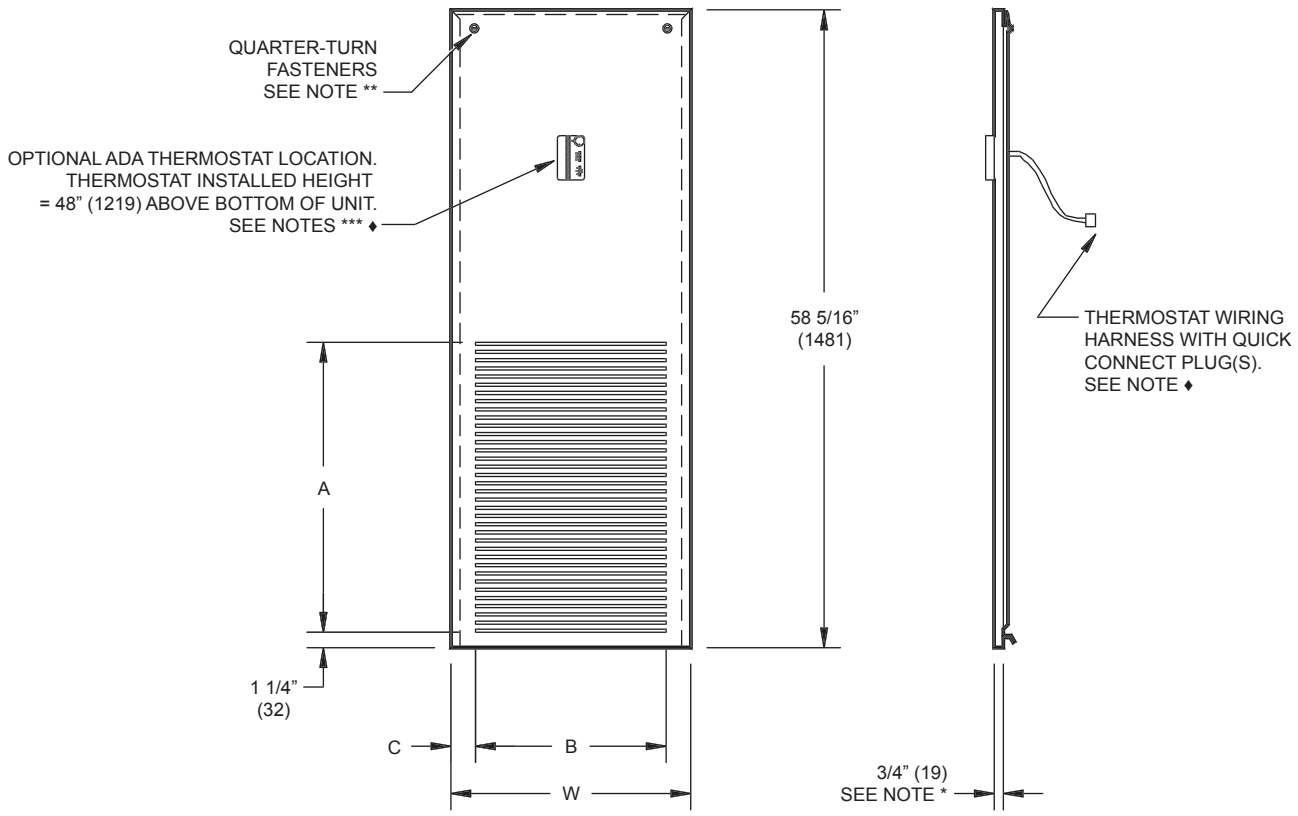
Model Type	Unit Size	Cabinet Height	Single & Double Supply			
			W	H	A	B
Vertical Hi-Rise & Tandem Primary & Secondary Same Size Units	03 or 04	Standard	16" (406)	8" (203)	17 11/16" (449)	9 11/16" (246)
	06 or 08	Standard	18" (457)	12" (305)	19 11/16" (500)	13 11/16" (348)
	10 or 12	Standard	22" (559)	14" (356)	23 11/16" (602)	15 11/16" (398)

Model Type	Unit Size	Cabinet Height	Single & Double Supply			
			W	H	A	B
Tandem Primary & Secondary Up-sized Units	03 or 04 mated to 06 or 08	Standard	18" (457)	12" (305)	19 11/16" (500)	13 11/16" (348)
	03 or 04 mated to 10 or 12	Standard	22" (559)	14" (356)	23 11/16" (602)	15 11/16" (398)
	06 or 08 mated to 10 or 12	Standard	22" (559)	14" (356)	23 11/16" (602)	15 11/16" (398)

NOTES: All dimensions are in inches (millimeters) and are +/- 1/4" (6mm). Discharge grilles are shipped loose for field installation. Construction is roll formed aluminum frame and blades. Standard finish is powder coat baked enamel. Color is "Pearl White Satin". Installation of grilles on adjacent unit sides may require furring one side away from unit to prevent interference of frames.

KVP Series Return Air Panel Dimensional Information

KVP SERIES STAMPED, LOUVERED FRONT RETURN AIR PANEL FRONT AND SIDE VIEWS



STANDARD SIZE DIMENSIONAL REFERENCES

Unit Size	W	A	B	C
03 - 04	17 1/2" (445)	24 1/8" (613)	15" (381)	1 1/4" (32)
06 - 08	19 1/2" (495)	24 1/8" (613)	15" (381)	2 1/4" (57)
10 - 12	23 1/2" (597)	28 1/2" (724)	21" (533)	1 1/4" (32)

UP-SIZED DIMENSIONAL REFERENCES

Unit Size	W	A	B	C
0306 - 0408	19 1/2" (495)	24 1/8" (613)	15" (381)	2 1/4" (57)
0310 - 0412	23 1/2" (597)	24 1/8" (613)	21" (533)	1 1/4" (32)
0610 - 0812	23 1/2" (597)	24 1/8" (613)	21" (533)	1 1/4" (32)

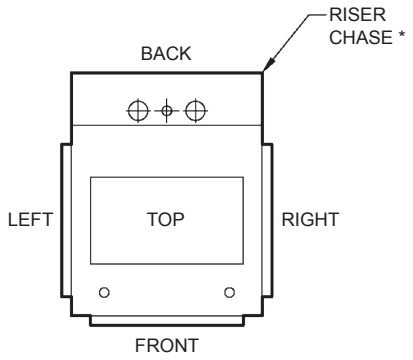
NOTES: All dimensions are in inches (millimeters) and are +/- 1/4" (6mm). Standard finish is powder coat baked enamel. Color is Pearl White Satin. Sizes shown for "Up-sized" cabinet units used in Tandem Primary and Secondary pairs.

* *Installed wall panels extend approximately 3/4" (19mm) from finished wall surface.*
** *Mounting hardware is shipped loose for field installation.*
*** *ADA Thermostat: Actual installed height is determined by unit installation method and may vary.*
♦ *ADA Thermostat is shipped loose for field installation by others.*

KVPH, KVPP, KVIP Unit Arrangements

UNIT ARRANGEMENT DETAIL

F = Front
T = Top
B = Back
L = Left
R = Right
0 = None

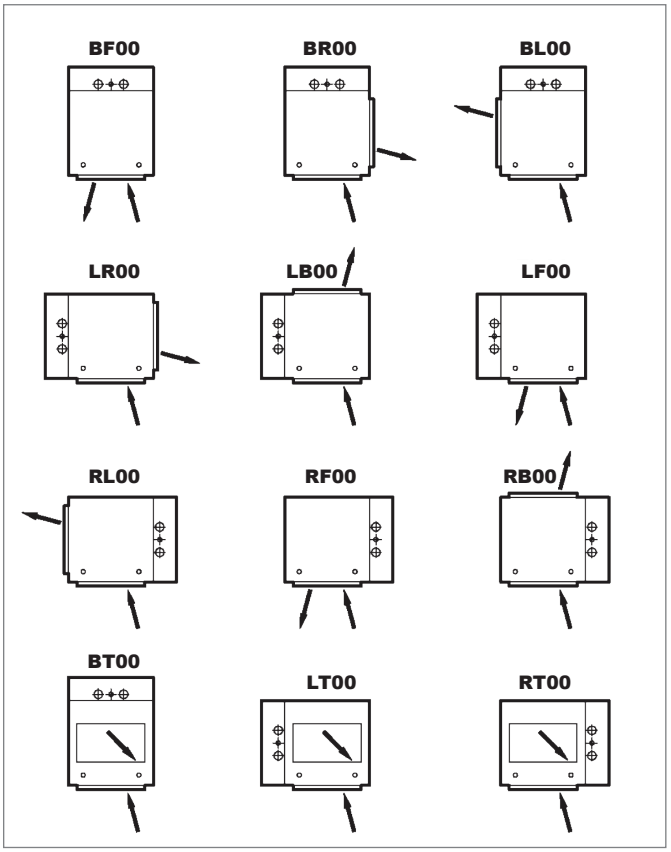


Unit Side Designations	Example
Position 1 - Riser Location	B
Position 2 - Discharge Location 1	F
Position 3 - Discharge Location 2	0
Position 4 - Outside Air Location **	0

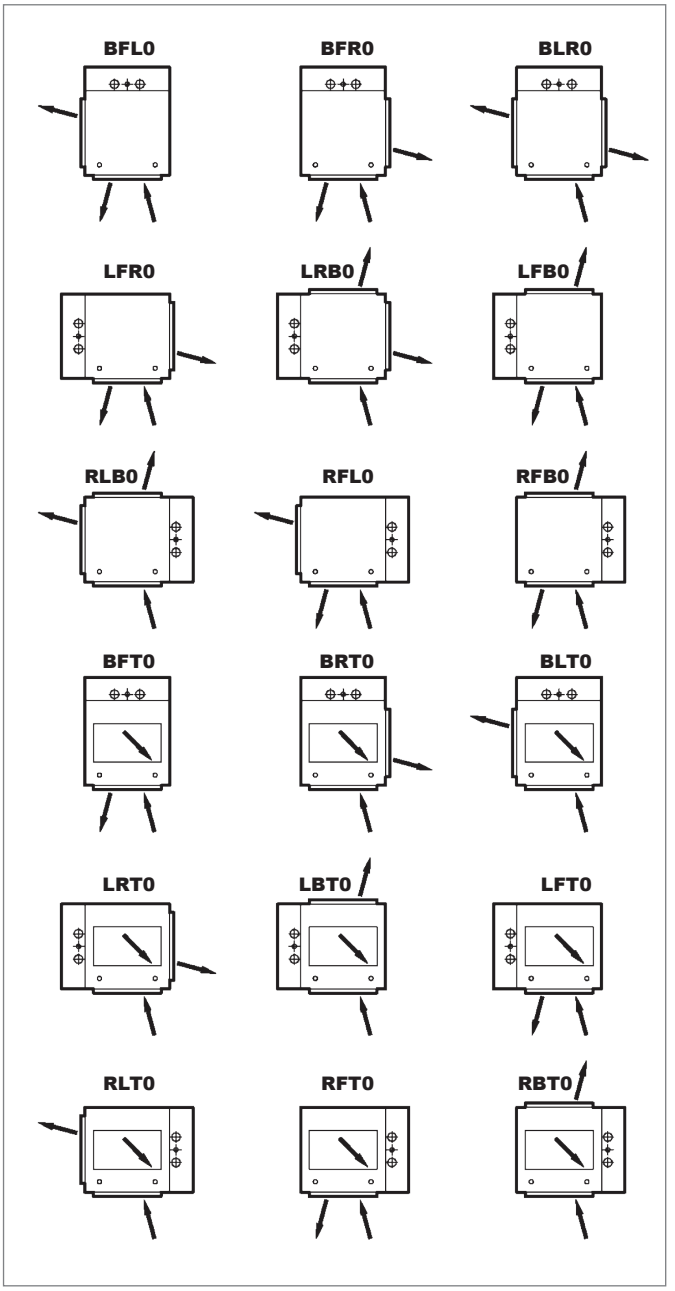
* *Model KVPH units shown above with optional riser chase. Riser chase not available on KVPP units. KVIP units must be mated to KVIS units.*

** *Fourth character indicates outside air location.*

SINGLE SUPPLY ARRANGEMENTS



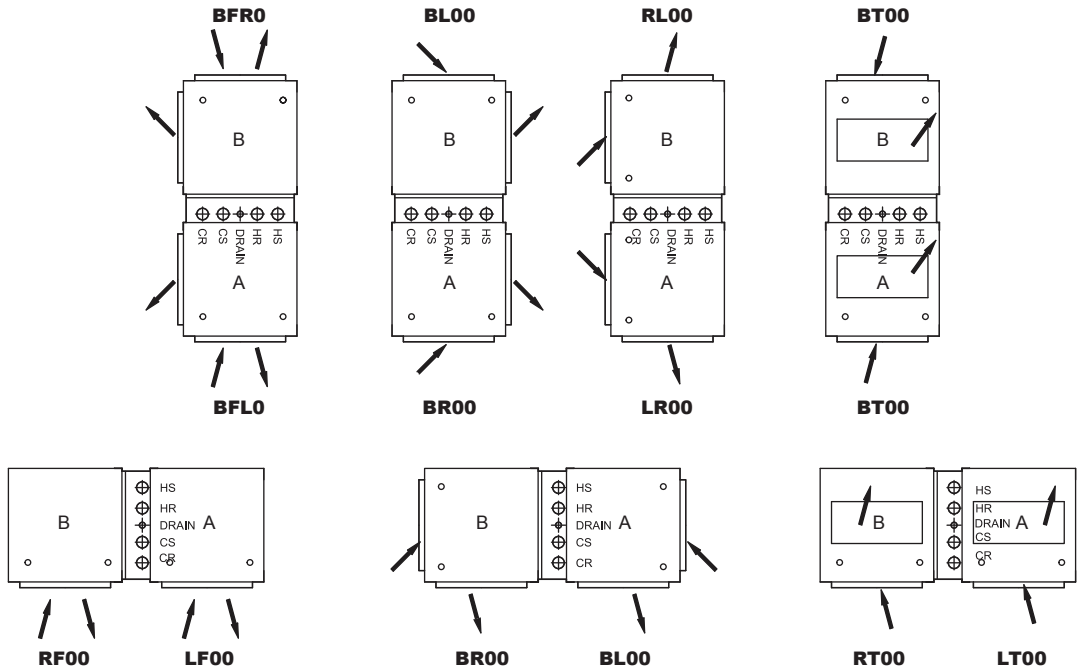
DOUBLE SUPPLY ARRANGEMENTS



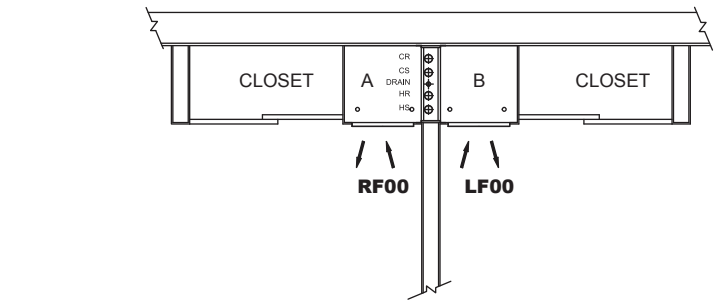
NOTES: Arrows indicate airflow direction. All drawings subject to change without prior notice. Return air and access are always on front of unit. Sight and Sound baffle provided as required. Sight and Sound baffle not available on units with top supply outlet. Opposed blade damper is optional on one supply grille for units with double supply outlets. This drawing applies to single and primary units. Model KVPE available with arrangement BF00 only. For field configured arrangements, specify 0000 when ordering.

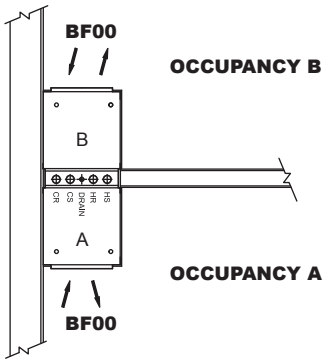
KVPH, KVPP, KVIP Tandem Unit Arrangements

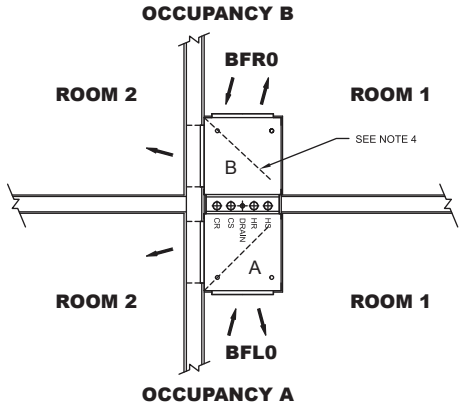
PRIMARY AND SECONDARY UNIT CONFIGURATIONS



TYPICAL ARRANGEMENTS







LEGEND

- EXTERIOR WALL
- INTERIOR WALL
- TANDEM PRIMARY & SECONDARY FIRE RATED
- TANDEM PRIMARY & SECONDARY NON-FIRE RATED
- AIR FLOW
- A — PRIMARY UNIT
- B — SECONDARY UNIT

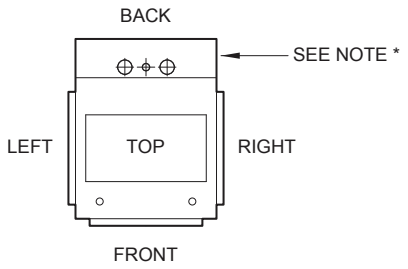
NOTES: All drawings subject to change without prior notice. Fire rated units shown non fire rated is standard.

** Sight and Sound baffles provided as required.*

KVP Series Air Inlet Designations

OUTSIDE AIR INLET ARRANGEMENT DETAIL

F = Front
T = Top
B = Back
L = Left
R = Right
0 = None

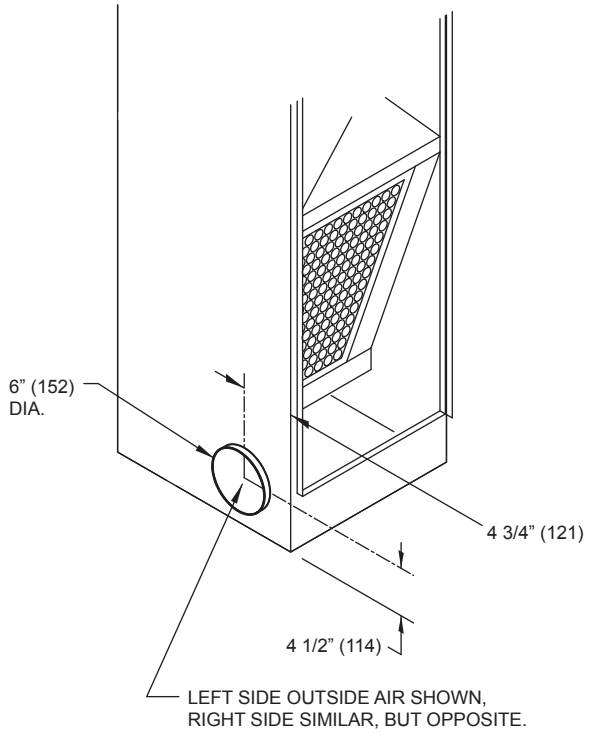


Unit Side Designations	Example - BF00
Position 1 - Riser Location	B
Position 2 - Discharge Location 1	F
Position 3 - Discharge Location 2	0
Position 4 - Outside Air Location **	R

Return air and access are always on front of unit. This drawing shows available return and outside air inlet locations. See arrangement drawings for complete unit riser, supply, and return configuration details. Outside air inlet location is always last character in arrangement code.

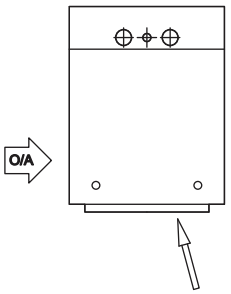
**KVPH unit with optional riser chase shown. Outside air location designations are typical for all KVP models.*

OUTSIDE AIR INLET DIMENSIONS



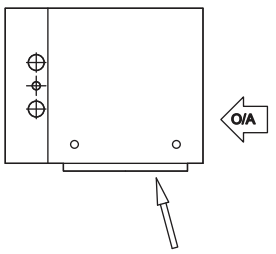
OUTSIDE AIR INLET UNIT DESIGNATIONS

B ** L



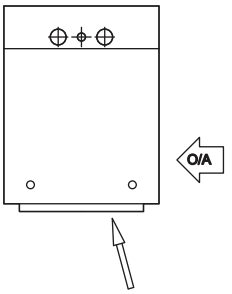
BACK RISER - LEFT O/A

L ** R



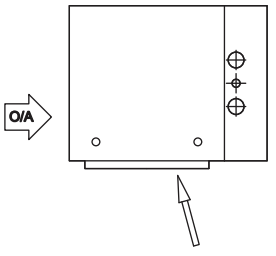
LEFT RISER - RIGHT O/A

B ** R



BACK RISER - RIGHT O/A

R ** L



RIGHT RISER - LEFT O/A

KVP Series Riser Selection & Data

RISER APPLICATION AND SIZING

Technical information on heat transfer, fluid flow and pipe sizing can be found in the ASHRAE Fundamentals Handbook and various other technical documents and publications. Some of the factors affecting riser application and sizing are noise, tube erosion and economics. The Friction Loss For Risers chart (right) displays riser tube diameter sizes as a function of flow (GPM), friction loss and water velocity. For maximum riser velocity on pressure drop per 100 ft., refer to ASHRAE 2001 Fundamentals 35.3 Table 6 for Riser Sizing. Riser sizes can be of a single diameter on low rise buildings, or varying sizes on medium to high rise buildings. Generally, riser copper type, size, length and insulation thickness are determined by the location of the fan coil unit in the building. Chilled water and hot water risers are available in Type-M or Type-L copper, varying diameters from 3/4" to 3", and with either 1/2" or 3/4" thick closed cell foam insulation. Condensate risers are available in Type-M copper, varying diameters from 3/4" to 1 1/4", and with 1/2" thick closed cell foam insulation.

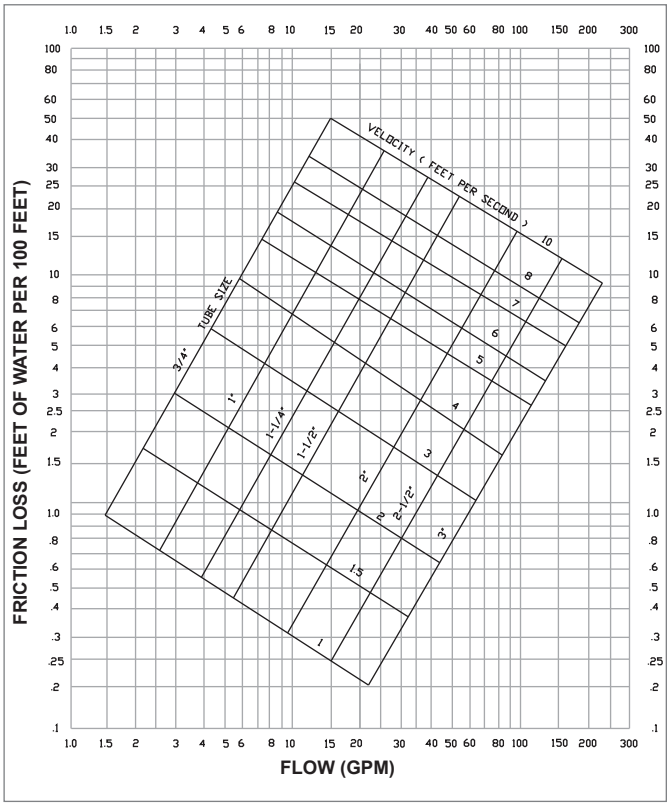
RISER EXPANSION

Generally, in medium to high rise buildings, allowance must be made for pipe expansion. Our KVP series of hi-rise fan coil units are furnished with hoses which act as expansion loops integral to the unit. The hose will allow for +/- 1 1/2" of riser expansion and contraction. Additional expansion compensation must be made in the riser system in the field where movement is expected to exceed the factory allowances. The Allowable Riser Lengths Between System Expansion Loops chart (right) displays the expansion characteristics of risers compared to water temperature difference. Technical information on pipe expansion, contraction and anchoring can be found in the ASHRAE HVAC Systems and Equipment Handbook and various other technical documents and publications.

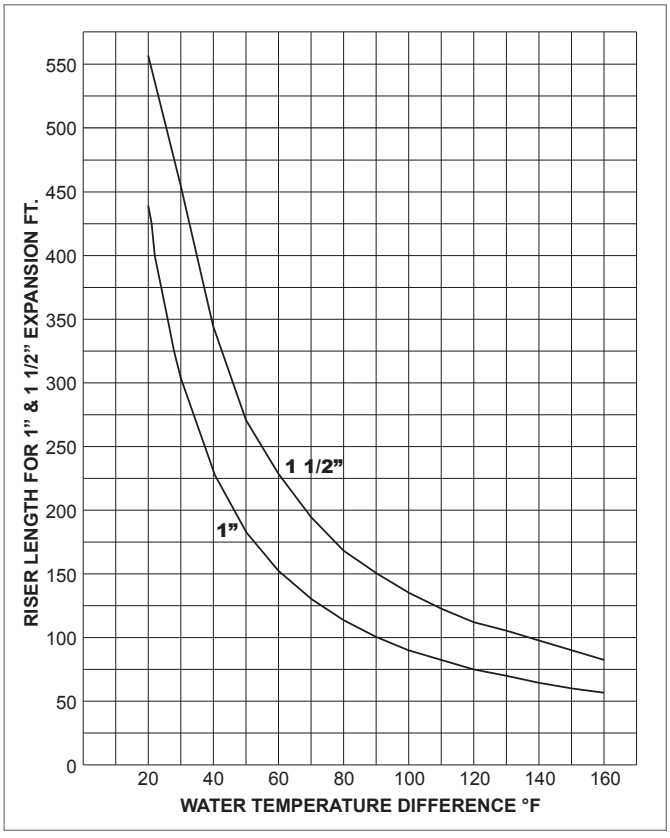
GENERAL FAN NOTES

- Fan curves on the following page depict actual performance of each motor tap without any additional fan balance adjustment. Actual capacities which fall below each curve can be obtained by adding an adjustment device.
- Krueger fan coil units are equipped with permanent split-capacitor (PSC) motors with three separate taps (High, Medium and Low) which provides variable horsepower outputs. Most often, size selections are conservative and actual CFM requirements and/or external static pressure requirements are lower than those specified. In this case, the unit fan motor can be run at low or medium tap, substantially reducing the operating cost of the unit.
- All fan curves are for 115/1/60 motors and include losses for cabinet, return grilles, electric heater, 3 or 4 row coil and clean 1" throwaway filter. For other coil configurations, adjust performance curves based on pressure losses for the coils using Krueger's selection program.
- See page E2-103 for fan motor electrical data.

FRICTION LOSS FOR RISERS

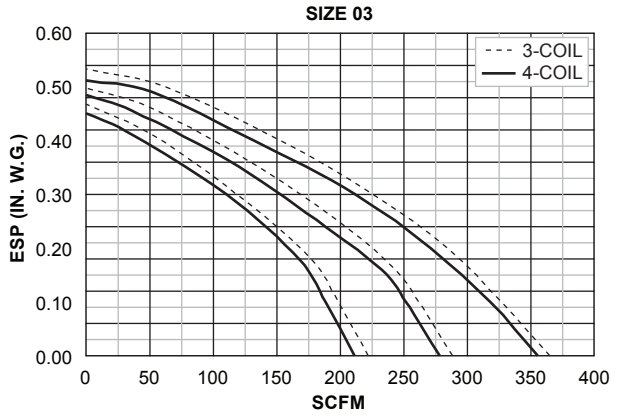


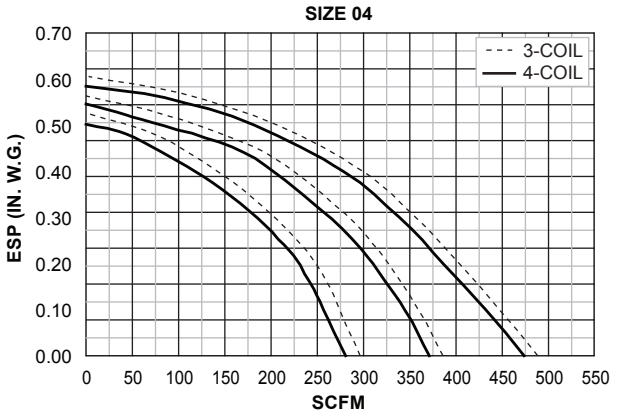
ALLOWABLE RISER LENGTHS BETWEEN SYSTEM EXPANSION LOOPS

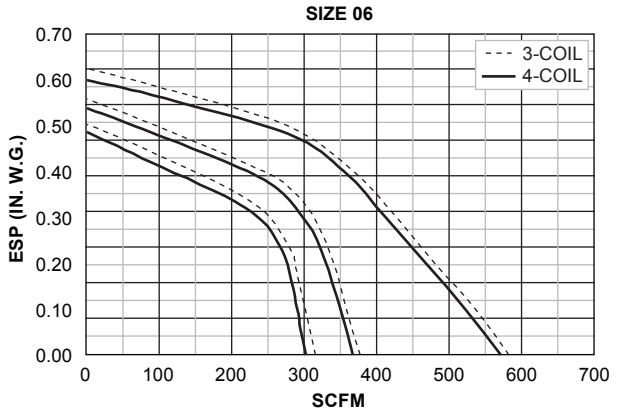


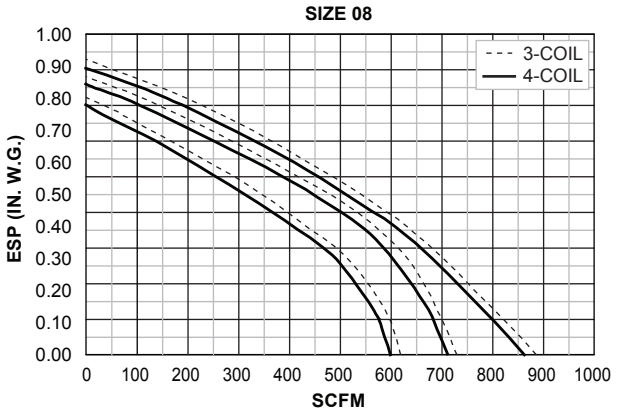
KVP Series Fan Curves

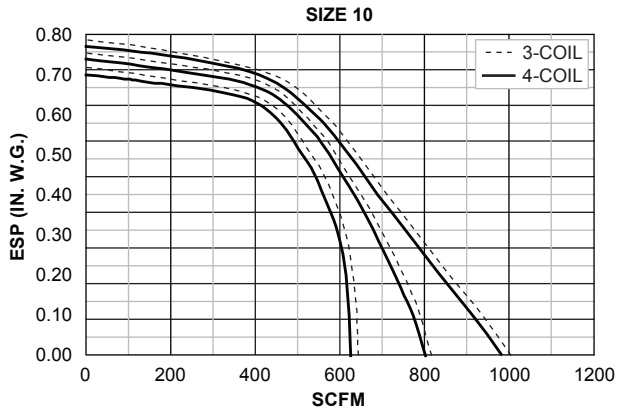
KVP SERIES PSC FAN CURVES

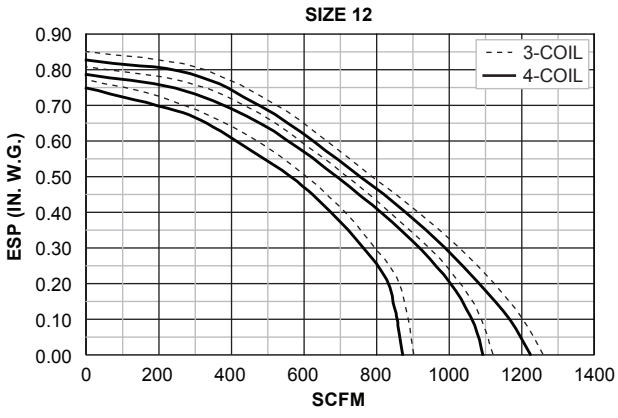












KVP Series Performance Data

MOTOR & FAN DATA

Unit Size	Fan Speed	Motor HP (Qty)	115 Volts		208-230 Volts		277 Volts	
			FLA	WATTS	FLA	WATTS	FLA	WATTS
03	High	1/35	0.6	66	0.3	74	0.3	70
	Medium	1/60	0.5	54	0.2	58	0.2	58
	Low	1/150	0.4	40	0.2	43	0.2	45
04	High	1/25	1.0	118	0.5	118	0.5	124
	Medium	1/50	0.7	76	0.4	91	0.3	93
	Low	1/100	0.5	52	0.3	67	0.3	68
06	High	1/15	1.3	132	0.6	129	0.5	126
	Medium	1/30	0.9	82	0.5	93	0.4	94
	Low	1/60	0.7	69	0.4	85	0.3	93
08	High	1/6	2.7	247	1.4	233	1.0	240
	Medium	1/8	2.4	245	0.9	202	0.9	217
	Low	1/10	2.2	205	0.6	177	0.8	214
10	High	1/5	2.7	279	1.2	310	1.0	290
	Medium	1/6	1.9	277	0.8	285	0.7	255
	Low	1/8	1.0	202	0.6	245	0.5	220
12	High	1/4	4.9	474	2.2	477	2.0	458
	Medium	1/5	4.3	420	1.5	364	1.4	418
	Low	1/6	3.7	325	1.1	332	1.0	332

NOTES: Motor electrical data is nameplated data. Actual data will vary with application. 230 volt motor is nameplated for 208-230/1/60. Use 230 volt motor data for 208 volt applications.

SOUND DATA

Unit Size	Motor Speed	TOTAL SOUND POWER LEVEL OCTAVE BAND / CENTER FREQUENCY (HZ)						
		2/125	3/250	4/500	5/1000	6/2000	7/4000	8/8000
03	High	63	56	53	48	42	37	33
	Medium	59	52	49	43	36	32	27
	Low	51	45	41	34	25	22	21
04	High	65	58	54	49	46	42	36
	Medium	60	54	50	45	41	37	31
	Low	53	47	41	37	32	28	26
06	High	70	61	56	51	48	45	40
	Medium	63	54	52	45	41	41	36
	Low	58	51	47	42	34	28	25
08	High	71	63	61	59	54	52	47
	Medium	68	60	58	54	49	48	39
	Low	63	57	55	50	45	42	35
10	High	73	66	62	62	58	53	51
	Medium	71	63	59	55	50	47	45
	Low	64	59	57	53	48	44	41
12	High	74	70	69	65	61	61	53
	Medium	71	67	64	60	56	53	47
	Low	65	60	59	55	50	44	42

NOTES: Sound data tested in accordance with AHRI 350-2000. Sound levels are expressed in decibels, dB Re: 1 x 10^{-12} watts. Total sound power level data based on Model KVPH with fan CFM at corresponding motor tap with 115/1/60 volt motor, 4 row coil, 1" throwaway filter, double deflection discharge grille, 0.0" external static pressure and standard rated internal pressure losses.

KVP Series Engineering Specification & Configuration

GENERAL
Furnish and install Krueger KVP series of vertical hi-rise, direct drive fan coil units where indicated on the plans and in the specifications. Units shall be completely factory assembled, tested and shipped as one piece. All units shall be capable of meeting or exceeding the scheduled capacities for cooling, heating and air delivery. All unit dimensions for each model and size shall be considered maximums. Units shall be ETL listed in compliance with UL/ANSI Standard 1995, and be certified as complying with the latest edition of AHRI Standard 440.

CONSTRUCTION
All unit chassis shall be fabricated of heavy gauge galvanized steel panels able to meet 125 hour salt spray test per ASTM B-117. All exterior panels shall be insulated with 1/2" thick insulation with a maximum k value of .24 (BTU • in) / (hr • ft^2 • °F) and rated for a maximum air velocity of 5000 f.p.m. Insulation must meet all requirements of ASTM C1071 (including C665), UL 181 for erosion, and carry a 25/50 rating for flame spread/ smoke developed per ASTM E-84, UL 723 and NFPA 90A.

Option: For units with multiple outlets, include an insulated sheet metal baffle inside the discharge plenum to break the sight lines between the two discharge outlets and to attenuate room noise that could be transmitted through the openings.

All unit panels shall have knockouts for supply air openings and riser slots to facilitate the field conversion of riser location and supply air grille location.

Option: Supply air opening knockouts shall be factory sealed and left in place during shipping and staging at the job site.

All units shall have decorator front panels fabricated of not less than 18 gauge galvannealed steel. The front panel shall include a stamped louver return air grille and be attached with quarter turn quick open fasteners to allow for easy removal and access for service.

All concealed units shall have a duct collar on the discharge.

All exposed units shall have exterior panels fabricated of not less than 18 gauge galvannealed steel. The front panel shall be attached with quarter turn quick open fasteners to allow for easy removal and access for service.

Option: Provide an architectural grade double deflection aluminum discharge grille.

Option: Provide foil faced insulation in lieu of standard. Foil insulation shall meet or exceed the requirements stated above, and in addition meet ASTM Standards C-665 and C-1136 for biological growth in insulation. Insulation shall be lined with aluminum foil, fiberglass scrim reinforcement, and 30 pound kraft paper laminated together with a flame resistant adhesive. All exposed edges shall be sealed to prevent any fibers from reaching the air stream.

Option: Provide Elastomeric Closed Cell Foam Insulation in lieu of standard. 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 insulation is not acceptable.

Option: Tandem Primary and Tandem Secondary units. Primary and Secondary units shall be supplied joined together by a nominal 6" wall that contains the supply, return and condensate risers. The cabinets of both units in the pair will be the same height and width regardless of capacity and will be the standard dimension of the unit with the greater capacity.

The Secondary unit will have a 5/8" layer of type-X gypsum board mechanically fastened to the unit wall adjacent to the risers.

Where a one hour rating of the partition between the units is required, a second layer of type-X gypsum board shall be mechanically fastened to the Primary unit wall adjacent to the risers. An 18 gauge steel blower shield shall be provided for both the Primary and Secondary units. Piping penetrations in the partition walls shall be provided with fire blocking material. The unit shall be cETL listed in compliance with ANSI/UL-1479 Standard Test Method for Fire Tests of Through Penetration Fire Stops. A copy of the Authorization to Mark certifying compliance by a nationally recognized testing laboratory shall be provided with the unit submittal.

PAINTED FINISH
All painted cabinet exterior panels shall be finished with a heat cured anodic acrylic powder paint of the standard factory color.

SOUND
Units shall have published sound power level data tested in accordance with AHRI Standard 350-2000.

FAN ASSEMBLY
Unit fan shall be dynamically balanced, forward curved, DWDI centrifugal type constructed of 18 gauge galvanized steel for corrosion resistance. Motors shall be high efficiency, permanently lubricated sleeve bearing, permanent split-capacitor type with UL and CSA listed automatic reset thermal overload protection and three separate horsepower taps. Single speed motors are not acceptable.

Option: Provide a blower shield to cover the entire fan assembly. The blower shield shall be tight fitting to prevent air bypass and prohibit accidental contact with the fan assembly. Units that allow accidental contact with the fan assembly with the front panel removed are not acceptable.

The fan assembly shall be removed and serviced through the front and safety panels. The entire assembly shall be able to come out of the unit easily by removing two lock nuts and unplugging the motor.

Option: Provide an electronic fan speed controller (SCR) wired to high motor tap for aid in balancing the fan capacity. The speed controller shall have a turn down stop to prevent the possibility of harming the motor bearings, and incorporate electrical noise suppression to minimize noise on the incoming power lines.

KVP Series Engineering Specification & Configuration

Option: Devices used to energize and de-energize (switch) fan speeds must be totally silent. Magnetic, mercury, and/or quiet relays and/or contactors are not acceptable.

COILS
All cooling and heating coils shall optimize rows and fins per inch to meet the specified capacity. Coils shall have seamless copper tubes and shall be mechanically expanded to provide an efficient, permanent bond between the tube and fin. Fins shall have high efficiency aluminum surface optimized for heat transfer, air pressure drop and carryover.

All coils shall be hydrostatically tested at 450 PSIG air pressure under water, and rated for a maximum 300 PSIG working pressure at 200°F.

Heating coils shall be furnished in the reheat position as standard.

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

Option: Provide automatic air vents in lieu of manual air vents.

Option: Provide a motorized two-position coil bypass damper. Damper shall be sized such that when it is opened, 30% of the fan airflow capacity will be drawn through the damper opening, bypassing the cooling coil.

Option: Coil casing shall be fabricated from stainless steel.

DRAIN PANS
Primary condensate drain pans shall be single wall, heavy gauge 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. A P-Trap shall be furnished, factory piped to the condensate drain riser.

The drain pan shall be externally insulated with a fire retardant, 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.

The P-Trap shall be easily removed and serviced through the front panel.

Option: Provide a removable primary drain pan to allow for inspection and cleaning. The drain pan shall be easily removed through the front panel without disturbing the coils. Drain pan access that requires removal of coils is not acceptable.

Option: Provide a primary drain pan constructed entirely of heavy gauge type stainless steel for superior corrosion resistance. Stainless steel drain pans shall be externally insulated and meet or exceed the requirements stated above.

FILTERS
All units shall be furnished with a minimum 1" nominal glass fiber throwaway filter. Filters shall be tight fitting to prevent air bypass. Filters shall be easily removable from the return air opening with the front panel removed, without the need for tools.

Option: Provide unit with 1" pleated filter (MERV 8).

Option: Provide unit with 1" self-gasketing filter consisting entirely of synthetic media and frames. Filter shall be tight fitting to prevent air bypass. Filter shall be easily removable from the return air opening with the front panel removed. Filter efficiency shall be 40% at 1.5 microns.

ELECTRICAL
Units shall be furnished with single point power connection. Provide an electrical junction box with terminal strip for motor and other electrical terminations. The factory mounted terminal wiring strip consists of a multiple position screw terminal block to facilitate wiring terminations for the electric control valves and thermostats.

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 assembly shall be rated for installation on the fan coil unit and be located so as not to expose the fan assembly to excessive leaving air temperatures that could affect motor performance.

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 open coil type Ni-Chrome wire mounted in ceramic insulators and located in an insulated heavy gauge galvanized steel housing. All elements shall terminate in a machine staked stainless steel terminal secured with stainless steel hardware for corrosion resistance. The element support brackets shall be spaced no greater than 3-1/2" on center. 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 and back-up secondary thermal limit. All heaters shall be single stage.

Option: Provide a manual reset secondary thermal limit.

All units with electric heat shall be provided with an incoming line power distribution block, designated to accept single point power wiring capable of carrying 125% of the calculated load current.

Option: Devices used to energize and de-energize (switch) electric heat must be totally silent. Magnetic, mercury, and/or quiet relays and/or contactors are not acceptable.

KVP Series Engineering Specification & Configuration

PIPING PACKAGES
Provide a standard factory assembled valve piping package to consist of a 2 or 3-way, on/off, motorized electric control valve and two ball isolation valves. Control valves shall be piped normally closed to the coil. Maximum entering water temperature on the control valve shall be 200°F, and maximum close-off pressure 25 PSIG. Maximum operating pressure shall be 300 PSIG.

Piping packages shall include stainless steel braided hoses to allow for thermal expansion within the unit cabinet. The hose shall be EPDM inner lined and Kevlar® reinforced, with stainless steel FNPT swivels and/or fittings. The hoses shall be rated for a maximum 450 PSIG working pressure at 250°F, and shall conform to NFPA 90A and carry no more than a 25/50 Flame Spread and Smoke Developed Rating, per ASTM E-84 and UL 723.

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 high pressure close-off actuators for 2-way on/off control valves. Maximum close-off pressure is 50 PSIG (1/2").

Option: Provide either a fixed or adjustable flow control device for each piping package.

Option: Provide pressure-temperature ports for each piping package.

Piping packages shall be completely factory assembled, including interconnecting pipe, and mounted inside the unit in a serviceable location over the coil and primary drain pan.

RISERS
Furnish chilled and hot water supply and return risers mounted to the unit. Risers shall be Type-M seamless copper tube and include swaged connections at the top for connection to the unit above. Slip couplings are not acceptable.

Option: Provide Type-L copper risers that meet or exceed the requirements stated above.

Risers shall be insulated with 1/2" closed cell foam insulation covering the entire riser. Insulation shall conform to NFPA 90A and carry no more than a 25/50 Flame Spread and Smoke Developed Rating, per ASTM E-84 and UL 723.

Option: Provide 3/4" closed cell foam insulation that meets or exceeds the requirements stated above.

Condensate drain risers shall be Type-M seamless copper tube and meet the requirements stated above.

Option: Risers shall be factory fabricated, bundled, and tagged separate from the fan coil units, allowing for shipment and installation of risers prior to the fan coil units. The riser tag must show the corresponding FCU tag, floor number, room number, riser number, CW, HW, and condensate pipe diameters. Refer to submittal drawing on Ship in Advance risers.

OUTSIDE AIR DAMPER
Option: Provide a manual outside air damper with locking mechanism integral to the unit.

Option: Provide a motorized outside air damper integral to the unit and interlocked with the fan motor. The damper actuator shall be spring return closed.

KVP Series Engineering Specification & Configuration

1. **SERIES: (XXX)**
   KVPH - Vertical Stack Fan Coil, Stand Alone
   KVPP - Vertical Stack Fan Coil, Primary
   KVPS - Vertical Stack Fan Coil, Secondary
   KVIP - Vertical Stack Fan Coil, Primary Twin Pack
   KVIS - Vertical Stack Fan Coil, Secondary Twin Pack
   KVPE - Vertical Stack Fan Coil, Exposed

2. **SIZE: (XX)**
   03, 04, 06, 08, 10, 12

3. **MOTOR: (X)**
   (*See Krueger's selection software.*)

4. **MOTOR CONTROL: (X)**
   0 - None
   C - 3 Speed Fixed

5. **UNIT CAPACITY: (X)**
   0 - Standard Capacity
   H - High Capacity

6. **ARRANGEMENT: (X)**
   (*See Krueger's selection software.*)

7. **COIL 1: (X)**
   B - 3 Row Cold Water
   C - 4 Row Cold Water
   R - 3 Row with Changeover
   S - 4 Row with Changeover

8. **COIL 1 DIAMETER: (X)**
   38 - 3/8" Tube Diameter

9. **COIL 1 TUBE WALL: (X)**
   3 - 0.012" Tube Wall Thickness

10. **COIL 1 AIR VENT: (X)**
    1 - Manual Air Vent
    2 - Auto Air Vent

11. **COIL 1 PIPING SIZE: (X)**
    H - 1/2"

12. **COIL 1 PIPING PACKAGE: (XX)**
    0 - None
    A - 2-Way Control Valve
    B - 3-Way Control Valve
    C - 3-Way with Balance ByPass Valve

13. **COIL 1 FLOW CONTROL: (XX)**
    (*See Krueger's selection software.*)

14. **COIL 1 FIXED GPM: (X)**
    (*See Krueger's selection software.*)

15. **COIL 1 Y-STRAINER CLEANOUT: (XX)**
    0 - None
    1 - Y-Strainer Cleanout

16. **COIL 1 P/T PORTS: (X)**
    0 - None
    P - P/T Port

17. **COIL 1 AQUASTAT BLEED LINE: (X)**
    0 - None
    A - Aquastat Bleed Line

18. **COIL 1 ACTUATOR TYPE: (X)**
    0 - Field Provided by Others 2-Position Close-Off
    1 - Factory Provided 2-Position Close-Off, NC
    2 - MV, 2 Way, Floating Point, Fail-In-Place, 24V
    3 - MV, 3 Way, Floating Point, Fail-In-Place, 24V
    4 - HP Close-Off Actuator, 2-Way Valve-24/115/208V
    5 - HP Close-Off Actuator, 2-Way Valve-230/277V
    Note: MV = Modulating Valves, HP = High Pressure

19. **COIL 2 SELECTIONS**
    (*See Coil 1 options. Differences may apply.*)

20. **ELECTRIC HEAT VOLTAGE: (X)**
    0 - None
    A - 115 Volt, 1 Phase, 1 Stage
    D - 208 Volt, 1 Phase, 1 Stage
    G - 230 Volt, 1 Phase, 1 Stage
    K - 277 Volt, 1 Phase, 1 Stage

21. **kW: (XX)**
    (*See Krueger's selection software.*)

22. **SILENT RELAY: (X)**
    0 - None
    S - Silent Relay

23. **MANUAL RESET: (X)**
    0 - None
    M - Manual Reset

24. **COIL CASING: (X)**
    1 - Galvanized Coil Casing
    2 - Stainless Steel Coil Casing

25. **FILTER: (X)**
    0 - 1" Throwaway Filter
    P - 1" Pleated Filter MERV 8
    S - 1" Synthetic Media Filter MERV 8

26. **SPARE FILTER: (X)**
    (*See Krueger's selection software.*)

27. **INSULATION: (X)**
    0 - Standard 1/2" thick Fiberglass
    F - Foil Faced Insulation
    C - Elastomeric Closed Cell Foam Insulation

28. **BLOWER SHIELD: (X)**
    B - Blower Shield

KVP Series Engineering Specification & Configuration

29. UPSIZE CABINET: (X) (KVIP/KVIS Only)
0 - None
1 - Upsize Cabinet - 03/04 to 06/08
2 - Upsize Cabinet - 06/08 to 10/12
3 - Upsize Cabinet - 03/04 to 10/12

30. UNIT DRAIN PAN: (X)
0 - Galvanized Drain Pan
S - Stainless Steel Unit Drain Pan

31. REMOVABLE DRAIN PAN: (X)
0 - None
R - Removable Drain Pan

32. BASIC CONTROL PACKAGE: (X)
0 - Line Voltage with Electric Heat (EH)
1 - Line Voltage
2 - 24V, Unit S/S Relay, Fan Op. Relay, Trans.
3 - 24V, Unit S/S Relay, Fan Op. Relay, Trans. with EH

33. THERMOSTAT LOCATION: (X)
R - Remote Mounted Thermostat
U - Unit Mounted Thermostat
F - ADA Front Panel Mounted Thermostat
S - ADA Side Mounted Thermostat

34. THERMOSTAT: (XXXX)
(*See Krueger's selection software.*)

35. AQUASTAT: (X)
0 - None
A - Aquastat

36. DISCONNECT SWITCH: (X)
0 - None
L - Door Interlocking non-Fused Disconnect
T - Toggle Disconnect Switch

37. MAIN FUSING: (X)
0 - None
M - Main Fusing

38. FLOAT SWITCH: (X)
0 - None
D - Drain Pan Float Switch

39. SPEED SWITCH: (X)
0 - None
U - Unit Mount 3-Speed Switch with Off Position
R - Remote Mount 3-Speed Switch with Off Position

40. SOLID STATE RELAY: (X)
0 - None
1 - SSR (1) in Lieu of Start/Stop Relay
2 - SSRs (2) for (High, Low) Fan Control
3 - SSRs (3) for (High, Medium, Low) Fan Control

41. UL FIRE RATED: (X) (KVIP Only)
0 - None
1 - UL Fire Rated, 1 Hour

42. RETURN AIR: (X)
0 - Stamped Louver Front Panel
1 - Stamped Louver Front Panel with TPF
2 - Stamped Louver Front Panel - ADA
3 - Stamped Louver Front Panel with TPF - ADA
4 - No Front Panel

43. QUANTITY OF SUPPLY GRILLES: (X)
0 - None
1 - Quantity (1) Supply Grille
2 - Quantity (2) Supply Grilles

44. SUPPLY AIR: (X)
0 - None (Not available for KVPE)
1 - Aluminum Double Deflection Grille
2 - Aluminum Double Deflection Grille with OBD

45. OUTSIDE AIR: (X)
0 - None
1 - Manual Sliding Outside Air Damper
2 - Motorized Outside Air Damper
3 - Outside Air Opening Only - No Damper

46. PAINT: (X)
0 - Pearl White Satin
1 - British White

47. UNIT DISCHARGE: (X)
0 - None
B - Sight and Sound Baffle

48. RISER COVER: (X) (KVPE/KVPH/KVPP Only)
0 - None
1 - 22 Gauge Riser Cover

49. FM DDC MANUFACTURER: (X)
0 - None
6 - Johnson Controls

50. FM DDC MODEL: (XX)
00 - None
01 - FEC 1610