

KHF - SERIES A

Horizontal Fan Coil Units | Low Profile



SUGGESTED SPECIFICATION & CONFIGURATION

GENERAL

Furnish and install Krueger Model KHF Horizontal 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. Units shall be capable of meeting or exceeding the scheduled capacities for cooling, heating and air delivery. Unit dimensions for each model and size shall be considered maximums. Units shall be cETLus listed in compliance with UL/ANSI Standard 1995, and be certified as complying with the latest edition of AHRI Standard 440.

CONSTRUCTION

Unit chassis shall be fabricated of galvanized steel panels. Exterior panels shall be insulated with 3/8" thick elastomeric closed cell foam insulation. Insulation shall conform to UL 181 for erosion and NFPA 90A for fire and smoke, 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.

Ducted units shall have a minimum 1-1/2" duct collar on the discharge. Plenum and exposed units shall have a minimum 3/4" duct collar on the return.

Exposed units shall have exterior panels fabricated of galvanized steel. The fan and filter bottom access panel shall be attached with quarter turn quick open fasteners to allow for easy removal and access for service.

Unit mounting shall be by hanger brackets provided at four locations.

PAINTED FINISH

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

SOUND

Ducted units shall have published sound power level data tested in accordance with AHRI Standard 260-2012. Exposed units shall have published sound power level data tested in accordance with AHRI Standard 350-2015 (non-ducted equipment).

FAN ASSEMBLY

Unit fan shall be a dynamically balanced, forwardly curved, DWDI centrifugal type constructed of 18 gauge zinc coated 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.

The fan assembly shall be easily removable for servicing the motor and blower at, or away from the unit. The entire fan assembly shall be able to come out of the unit by removing two screws and unplugging the motor. Plenum unit fan assemblies shall be easily serviced through an access panel in casing.

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

(Optional) Provide Electronically Commutated (EC) Motor capable of operation with low voltage 3-speed thermostat. Motor shall come factory programmed and configured for 3-speed operation.

(Optional) Motor shall be capable of accepting a 2-10 VDC output from BAS.

(Optional) Provide an electronic (SCR) fan speed controller as an 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.

COILS

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 moisture carryover.

Each coil shall be pressured to 450 PSIG and rated for a maximum of 450 PSIG working pressure.

Steam coils shall be standard steam type suitable for air temperatures above 35°F and 15 PSIG maximum working pressure.

(Optional) Coil casing shall be fabricated from Stainless Steel. Coils shall be provided with a manual air vent fitting to allow for coil venting.

(Optional) Provide automatic air vents in lieu of manual air vents. Heating coils shall be furnished in the reheat or preheat position on units with chilled water coils, or in the reheat position for DX coils.

DRAIN PANS

Primary condensate drain pans shall be single wall, galvanized steel for corrosion resistance, and extend under the entire cooling coil. Drain pans shall be of one-piece construction and be double sloped for condensate removal.

SUGGESTED SPECIFICATION & CONFIGURATION (CONTINUED)

Drain pans shall be fully removable without the use of any tools.

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.

(Optional) Provide a single wall primary drain pan constructed entirely of stainless steel for superior corrosion resistance. Stainless steel drain pans shall be externally insulated.

(Optional) Provide a secondary drain connection on the primary drain pan for condensate overflow.

FILTERS

Plenum and exposed units shall be furnished with a minimum 1" nominal glass fiber throwaway filter. Filters shall be tight fitting to prevent air bypass. Plenum unit filters shall be easily removable from the bottom of the unit without the need for tools.

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

(Optional) Provide unit with 1" pleated filter (MERV 13).

ELECTRICAL

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

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 designed and rated for installation on the fan coil unit without the use of duct extensions or transitions, and be located in the unit as to not 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 cETLus listed with the unit as an assembly in compliance with UL/ANSI Standard 1995.

Heating elements shall be open coil type nichrome wire mounted in ceramic insulators and located in an insulated galvanized steel housing. 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. Internal wiring shall be rated for 105°C minimum. Heaters shall include overtemperature protection consisting of an automatic reset primary

thermal limit and back up secondary thermal limit. Heaters shall be single stage.

(Optional) Provide a manual reset secondary thermal limit.

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

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

PIPING PACKAGES

Provide a standard factory assembled valve piping package to consist of a 2-way or 3-way, on/off, motorized electric control valve and two ball isolation valves. Control valves are piped normally closed to cold water coils and normally open to hot water coils. Maximum entering water temperature on the control valve is 200 °F.

Provide high pressure close-off actuators for 2-way or 3-way on/off control valves. Maximum close-off pressure is 125 PSIG.

(Optional) Valve package mounted from the factory with structural supports. Field mounted valves are not acceptable.

(Optional) 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.

(Optional) Provide 0-10V proportional control valve (fail-in-place) in lieu of standard 2-position control valve with factory assembled valve piping package.

(Optional) Provide a fixed flow control device with a removable cartridge or each piping package.

(Optional) Normally open in lieu of Normally Closed on/off valves.

(Optional) Spring return (N.O. or N.C.) modulating control valve.

(Optional) Spring return (N.O. or N.C.) proportional control valve.

(Optional) Provide pressure-temperature ports for each piping package.

Piping package shall be completely factory assembled, including interconnecting pipe, and shipped separate from the unit for field installation on the coil, so as to minimize the risk of freight damage.

SUGGESTED SPECIFICATION & CONFIGURATION (CONTINUED)

1. SERIES: (XXXX)

KHFE - Horizontal Fan Coil, Exposed Cabinet
 KHFH - Horizontal Fan Coil, Concealed Ceiling
 KHFP - Horizontal Fan Coil, Concealed with Plenum

2. SIZE: (XX)

02, 03, 04, 06, 08, 09, 10, 12

3. MOTOR: (X)

A - 115/1/60 PSC
 D - 277/1/60 PSC
 F - 115/1/60 ECM
 G - 208/1/60 ECM
 H - 230/1/60 ECM
 J - 277/1/60 ECM
 K - 220-240/1/50 ECM
 L - 115/1/60 ECM 3 SPD
 M - 208/1/60 ECM 3 SPD
 N - 230/1/60 ECM 3 SPD
 P - 277/1/60 ECM 3 SPD
 Q - 220-240/1/50 ECM 3 SPD

4. MOTOR CONTROL: (X)

0 - None
 A - 3-Speed Adjustable (Select)
 B - 2-10 VDC (Sync)
 C - 3-Speed Fixed

5. UNIT CAPACITY: (X)

0 - Standard Capacity
 H - High Capacity

6. COIL 1: (X)

0 - None
 A - 2-Row C/W
 B - 3-Row C/W
 C - 4-Row C/W
 D - 5-Row C/W
 E - 6-Row C/W
 F - 1-Row H/W
 G - 2-Row H/W
 H - 2-Row DX
 J - 3-Row DX
 K - 4-Row DX
 L - 5-Row DX
 T - 1-Row Steam
 V - 2-Row Steam
 P - 2-Row with Changeover
 R - 3-Row with Changeover
 S - 4-Row with Changeover
 M - 5-Row with Changeover
 N - 6-Row with Changeover

7. COIL 1 DIAMETER: (XX)

00 - None
 38 - 3/8" Tube Diameter
 12 - 1/2" Tube Diameter

8. COIL 1 FPI: (XX)

00 - None
 10 - 10 FPI
 12 - 12 FPI
 14 - 14 FPI

9. COIL 1 TUBE WALL: (X)

0 - None
 3 - 0.012" Tube Wall Thickness
 2 - 0.025" Tube Wall Thickness

10. COIL 1 HAND: (X)

0 - None
 L - Left-Hand
 R - Right-Hand

11. COIL 1 AIR VENT: (X)

0 - None
 1 - Manual Air Vent
 2 - Auto Air Vent

12. COIL 1 CASING: (X)

0 - None
 1 - Galvanized Coil Casing
 2 - Stainless Steel Coil Casing

13. COIL 1 REFRIGERANT TYPE (KHFE, KHFH Only): (X)

0 - None
 4 - R-410

14. COIL 1 DISTRIBUTOR: (XXX)

(See Krueger's selection software.)

15. COIL 1 PIPING SIZE: (X)

H - 1/2"
 T - 3/4"

16. COIL 1 PIPING VALVE: (X)

0 - None
 A - 2-Way Control Valve
 B - 3-Way Control Valve
 C - 3-Way with Balance Bypass Valve

17. COIL 1 PIPING PACKAGE: (XX)

00 - 1/2" Valve Package (Provided by Others)
 01 - 3/4" Valve Package (Provided by Others)
 24 - MBV with MS
 25 - MBV with MS, Fixed Flow Control
 36 - MBV with MS
 37 - MBV with MS, Fixed Flow Control
 50 - MBV with MS

SUGGESTED SPECIFICATION & CONFIGURATION (CONTINUED)

18. COIL 1 FIXED GPM: (X)

- 0 - Not Available
- A - 0.5 GPM
- B - 1.0 GPM
- C - 1.5 GPM
- D - 2.0 GPM
- E - 2.5 GPM
- F - 3.0 GPM
- G - 3.5 GPM
- H - 4.0 GPM
- J - 5.0 GPM
- K - 6.0 GPM
- L - 7.0 GPM
- M - 8.0 GPM
- N - 9.0 GPM
- P - 10.0 GPM
- R - 11.0 GPM
- S - 12.0 GPM

19. COIL 1 UNIONS: (X)

- 0 - None
- U - Union

20. COIL 1 P/T PORTS: (X)

- 0 - None
- P - P/T Port

21. COIL 1 AQUASTAT BLEED LINE: (X)

- 0 - None
- A - Aquastat Bleed Line

22. COIL 1 COIL 1 Y-STRAINER: (X)

- 0 - None
- Y - Y-Strainer with Blowdown

23. COIL 1 ACTUATOR TYPE: (X)

- 0 - None
- 1 - 2-Position Close-Off, 24V
- 3 - Modulating Valves, Floating Point, 24V
- 4 - Proportional Valves, 24V

24. COIL 1 ACTUATOR POSITION: (XX)

- 00 - None
- 2C - Normally Closed - 2-Position Close-Off
- 2O - Normally Open - 2-Position Close-Off
- MC - Normally Closed - Modulating
- MO - Normally Open - Modulating
- MP - Fail-In-Place - Modulating
- PC - Normally Closed - Proportional
- PO - Normally Open - Proportional
- PP - Fail-In-Place - Proportional

25. COIL 1 PIPING FACTORY MOUNT: (X)

- 0 - None, Shipped Loose
- M - Piping Package Mounted at Factory

26. ELECTRIC HEAT VOLTAGE: (X)

- A - 115 Volt, 1-Phase, 1-Stage
- D - 208 Volt, 1-Phase, 1-Stage
- G - 220 Volt, 1-Phase, 1-Stage
- H - 230 Volt, 1-Phase, 1-Stage
- J - 240 Volt, 1-Phase, 1-Stage
- K - 277 Volt, 1-Phase, 1-Stage

27. kW: (XX)

- 00 - 00 kW
- 01 - 01 kW
- 15 - 1.5 kW
- 02 - 02 kW
- 03 - 03 kW
- 04 - 04 kW
- 05 - 05 kW
- 06 - 06 kW
- 07 - 07 kW
- 08 - 08 kW
- 09 - 09 kW
- 10 - 10 kW
- 12 - 12 kW

28. SILENT RELAY: (X)

- 0 - None
- S - Silent Relay

29. ELECTRIC HEAT HAND: (X)

- 0 - None
- L - Left-Hand
- R - Right-Hand

30. COIL 2 SELECTIONS

(See Coil 1 options. Differences may apply.)

31. FILTER (KHFE/KHFP Only): (X)

- 0 - 1" Throwaway Filter
- P - 1" Pleated Filter MERV 8
- T - 1" Pleated Filter MERV 13

32. SPARE FILTER (KHFE, KHFP Only): (X)

- 0 - None
- 1 - QTY 1 - 1" Spare Throwaway Filter
- 2 - QTY 2 - 1" Spare Throwaway Filter
- 3 - QTY 3 - 1" Spare Throwaway Filter
- 4 - QTY 1 - 1" Spare Pleated Filter MERV 8
- 5 - QTY 2 - 1" Spare Pleated Filter MERV 8
- 6 - QTY 3 - 1" Spare Pleated Filter MERV 8
- 7 - QTY 1 - 1" Spare Pleated Filter MERV 13
- 8 - QTY 2 - 1" Spare Pleated Filter MERV 13
- 9 - QTY 3 - 1" Spare Pleated Filter MERV 13

SUGGESTED SPECIFICATION & CONFIGURATION (CONTINUED)

33. ACCESS PANEL (KHFH, KHFP Only): (X)

- 0 - None
- S - Solid Ceiling Access Panel - British White
- C - Ceiling Access RAP - British White
- T - Ceiling Access RAP with Telescoping Duct - British White

34. ACCESS PANEL SIZE (KHFH, KHFP Only): (XX)

- 00 - None
- 02 - 02
- 03 - 03
- 04 - 04
- 06 - 06
- 08 - 08
- 09 - 09
- 10 - 10
- 12 - 12

35. INSULATION: (X)

- C - Elastomeric Closed Cell Foam Insulation

36. UNIT DRAIN PAN: (X)

- 0 - None
- G - Galvanized Drain Pan
- S - Stainless Steel Unit Drain Pan

37. SECONDARY DRAIN CONNECT: (X)

- 0 - None
- C - Secondary Drain Connection

38. AUXILIARY DRIP PAN: (X)

- 0 - None
- G - Galvanized Auxiliary Drip Pan
- S - Stainless Steel Auxiliary Drip Pan

39. 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

40. FAN SPEED CONTROLLER: (X)

- 0 - None
- F - SCR Fan Speed Controller

41. DISCONNECT SWITCH: (X)

- 0 - None
- L - Door Interlocking non-Fused Disconnect
- T - Toggle Disconnect Switch

42. MAIN FUSING: (X)

- 0 - None
- M - Main Fusing

43. FLOAT SWITCH: (X)

- 0 - None
- D - Drain Pan Float Switch

44. SPEED SWITCH: (X)

- 0 - None
- U - Unit Mount 3-Speed Switch with Off Position
- R - Remote Mount 3-Speed Switch with Off Position

45. RETURN AIR (KHFP Only): (X)

- 1 - Return Rear No Duct Collar
- 2 - Return Rear Duct Collar
- 3 - Return Bottom No Duct Collar

46. RETURN AIR (KHFE Only): (X)

- 0 - Return Bottom Stamped Louver Grille
- 1 - Return Rear Stamped Louver Grille
- 2 - Return Rear Duct Collar

47. SUPPLY AIR (KHFE Only): (X)

- 0 - Supply Stamped Louver Grille
- 1 - Supply Duct Collar
- 2 - Supply Double Deflection Aluminum Grille

48. PAINT (KHFE Only): (X)

- 0 - Pearl White Satin
- 1 - British White

49. THERMOSTAT: (XXXX)

(See Krueger's selection software.)

50. NETWORK CAPABILITY: (X)

- 0 - None
- B - BACnet Enabled
- S - Standalone

51. THERMOSTAT LOCATION: (X)

- 0 - None
- R - Remote Mounted Thermostat
- U - Unit Mounted Thermostat

52. AQUASTAT: (X)

- 0 - None
- A - Aquastat

53. VIBRATION ISOLATION: (X)

- 0 - None
- Y - Vibration Isolation

54. DIRTY FILTER SENSOR (KHFE, KHFP Only): (X)

- 0 - None
- D - Dirty Filter Sensor

55. ACCESS LATCHES (KHFE Only): (X)

- S - Standard
- T - Tamper Proof

56. CONDENSATE PUMP: (X)

- 0 - None
- C - Condensate Pump

Continued on next page.

SUGGESTED SPECIFICATION & CONFIGURATION (CONTINUED)

57. DISCHARGE AIR SENSOR: (X)

- 0 - None
- D - Discharge Air Sensor

58. CURRENT SENSOR: (X)

- 0 - None
- C - Current Sensor

59. ENCLOSURE MOUNT: (X)

- U - Unit Mount
- R - Remote Mount

60. SEISMIC UNIT (KHFP Only): (X)

- 0 - None
- S - Seismic Unit

61. OUTSIDE AIR (KHFP, KHFE Only): (X)

- 0 - None
- 1 - Manual Outside Air Damper
- 2 - Motorized Outside Air Damper
- 3 - Flange Only

62. OUTSIDE AIR LOCATION (KHFP, KHFE Only): (X)

- 0 - None
- T - Top
- R - Rear

63. COIL FREEZE SENSOR (KHFP, KHFE Only): (X)

- 0 - None
- C - Coil Freeze Sensor