

KHG Series Engineering Specification & Configuration

GENERAL

Furnish and install Krueger KHG horizontal concealed 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 fiberglass insulation with a maximum k value of .24 (BTU • in) / (hr • ft² • °F) and rated for a maximum air velocity of 5000 f.p.m. Insulation must meet all requirements of ASTM C-1071 (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: 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.

All concealed units shall have a minimum 1 1/4" duct collar on the discharge. Plenum units shall have a minimum 1" duct collar on the return.

Option: For concealed units, provide a hinged bottom access panel either solid or with bottom return single deflection grille. A telescoping plenum section is available with bottom return option.

All exposed units shall have exterior panels fabricated of galvanized steel.

Option: For exposed units, the side and bottom access panels shall be attached with quick open fasteners to allow for easy removal and access for service.

Option: For exposed units, provide double deflection discharge grille and either a rear return or bottom return single deflection grille, powder coat painted to match unit color. Supply and return duct connections are available. Unit mounting shall be by hanger holes provided at a minimum of four locations.

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 four nuts per fan and unplugging the motor(s). Plenum unit fan assemblies shall be easily serviced through the filter opening or through the bottom panel.

Option: 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.

Option: Provide EC motor in lieu of standard PSC motor.

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 of 300 PSIG working pressure at 200°F.

Direct expansion cooling coils shall include a fixed orifice distributor. All evaporator coils shall be factory sealed and charged with a minimum 5 PSIG nitrogen or refrigerated dry air.

All 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.

Cooling and heating coils shall be in a common tube sheet. Water coils on concealed models shall be field reversible for right or left hand connections.

Heating coils shall be furnished in the reheat or preheat position.

DRAIN PANS

Primary condensate drain pans shall be single wall; heavy gauge galvanized steel for corrosion resistance, and extend under the entire cooling coil. Drain pans shall be of one-piece construction and be positively sloped for condensate removal. Drain pans shall be field reversible for right or left hand connections.

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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.

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

Option: Provide a secondary drain connection on the primary drain pan for condensate overflow.

Option: Provide a condensate overflow switch in the primary drain pan for condensate overflow.

FILTERS

All 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 and exposed unit filters shall be easily removable from the bottom of the unit without the need for tools.

Option: Provide unit with 1" or 2" pleated filters rated at 25-30% efficiency and MERV 8 based on ASHRAE 52.2 - 1999.

MIXING BOX SECTION

Provide a fully insulated integral mixing box section with return and outside air dampers, including the interconnecting damper linkage. Mixing box section shall be shipped attached to the concealed plenum unit as an assembly. Damper actuator to be factory provided, mounted, and wired to control enclosure.

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 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 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 unless noted otherwise on the plans.

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.

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 are piped normally closed to the coil. Maximum entering water temperature on the control valve is 200°F, and maximum close-off pressure is 40 PSIG (1/2"), 20 PSIG (3/4"), or 17 PSIG (1"). Maximum operating pressure shall be 300 PSIG.

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"), 25 PSIG (3/4"), or 20 PSIG (1").

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

Option: Provide unions and/or 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.

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| <p>1. SERIES: (XXXX)
 KHGE - Horizontal High Capacity Fan Coil, Exposed Cabinet
 KHGH - Horizontal High Capacity Fan Coil, Concealed Ceiling
 KHGP - Horizontal High Capacity Fan Coil, Concealed with Plenum</p> <p>2. SIZE: (XX)
 06, 08, 10, 12, 14, 16, 18, 20</p> <p>3. MOTOR: (X)
 (See Krueger's selection software.)</p> <p>4. MOTOR CONTROL: (X)
 0 - None
 A - 3 Speed Adjustable
 B - 2-10 VDC
 C - 3 Speed Fixed</p> <p>5. UNIT CAPACITY: (X)
 0 - Standard Capacity
 H - High Capacity</p> <p>6. COIL 1: (X)
 A - 3 Row Cold Water
 B - 4 Row Cold Water
 C - 6 Row Cold Water
 D - 3 Row DX
 E - 4 Row DX
 F - 6 Row DX
 G - 1 Row Hot Water
 H - 2 Row Hot Water
 J - 3 Row Hot Water
 K - 4 Row Hot Water
 L - 3 Row with Changeover
 M - 4 Row with Changeover
 N - 6 Row with Changeover</p> <p>7. COIL 1 DIAMETER: (XX)
 38 - 3/8" Tube Diameter
 12 - 1/2" Tube Diameter</p> <p>8. COIL 1 TUBE WALL: (X)
 1 - 0.016" Tube Wall Thickness
 3 - 0.012" Tube Wall Thickness</p> <p>9. COIL 1 AIR VENT: (X)
 1 - Manual Air Vent
 2 - Auto Air Vent</p> <p>10. COIL 1 REFRIGERANT TYPE: (X) (KHGE/KHGH Only)
 4 - R-410</p> <p>11. COIL 1 DISTRIBUTOR: (XXX)
 (See Krueger's selection software.)</p> | <p>12. COIL 1 PIPING SIZE: (X)
 H - 1/2"
 T - 3/4"
 N - 1"</p> <p>13. COIL 1 PIPING VALVE: (X)
 0 - None
 A - 2-Way Control Valve
 B - 3-Way Control Valve
 C - 3-Way with Balance ByPass Valve</p> <p>14. COIL 1 PIPING PACKAGE: (XX)
 (See Krueger's selection software.)</p> <p>15. COIL 1 FIXED GPM: (X)
 (See Krueger's selection software.)</p> <p>16. COIL 1 UNIONS: (X)
 0 - None
 U - Union</p> <p>17. COIL 1 P/T PORTS: (X)
 0 - None
 P - P/T Port</p> <p>18. COIL 1 AQUASTAT BLEED LINE: (X)
 0 - None
 A - Aquastat Bleed Line</p> <p>19. 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
 <i>Note: MV = Modulating Valves, HP = High Pressure</i></p> <p>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
 H - 220 Volt, 1 Phase, 1 Stage
 K - 277 Volt, 1 Phase, 1 Stage</p> <p>21. kW: (XX)
 (See Krueger's selection software.)</p> <p>22. SILENT RELAY: (X)
 0 - None
 S - Silent Relay</p> <p>23. MANUAL RESET: (X)
 0 - None
 M - Manual Reset</p> |
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FAN COILS

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S**24. COIL 2 SELECTIONS***(See Coil 1 options. Differences may apply.)***25. COIL HAND: (X)**L - Left Hand
R - Right Hand**26. COIL FPI: (XX)**

10 - 10 FPI

27. COIL CASING: (X)1 - Galvanized Coil Casing
2 - Stainless Steel Coil Casing**28. FILTER: (X) (KHGE/KHGP Only)**0 - 1" Throwaway Filter
P - 1" Pleated Filter MERV 8
R - 2" Pleated Filter MERV 8**29. FILTER ACCESS: (X) (KHGE/KHGP Only)**0 - Bottom Filter Access
S - Side Filter Access (KHGP Only)**30. SPARE FILTER: (X) (KHGE/KHGP Only)***(See Krueger's selection software.)***31. BOTTOM RETURN DUCT CONNECTION: (X) (KHGP Only)**0 - None
D - Bottom Return Duct Connection**32. INLET: (X) (KHGP Only)**0 - None
2 - Mixing Box with Linkage**33. MIXING BOX DAMPER LOCATION: (XX) (KHGP Only)**00 - None
BR - Bottom and Rear Inlet
TR - Top and Rear Inlet**34. DAMPER ACTUATOR MOUNT: (X) (KHGP Only)**0 - None
A - Mounted and Wired Damper Actuator**35. INSULATION: (X)**0 - Standard 1/2" thick Fiberglass
F - Foil Faced Insulation (KHGE/KHGP Only)
C - Elastomeric Closed Cell Foam Insulation**36. UNIT DRAIN PAN: (X)**0 - 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. ACCESS PANEL: (X) (KHGH/KHGP Only)**0 - None
C - Ceiling Access RAP - British White (KHGP Only)
S - Solid Ceiling Access Panel - British White
T - Ceiling Access RAP with Telescoping Duct -
British White (KHGP Only)**40. ACCESS PANEL SIZE: (XX) (KHGH/KHGP Only)***(See Krueger's selection software.)***41. 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**42. FAN SPEED CONTROLLER: (X)**0 - None
F - SCR Fan Speed Controller**43. DISCONNECT SWITCH: (X)**0 - None
L - Door Interlocking non-Fused Disconnect
T - Toggle Disconnect Switch**44. MAIN FUSING: (X)**0 - None
M - Main Fusing**45. FLOAT SWITCH: (X)**0 - None
D - Drain Pan Float Switch**46. SPEED SWITCH: (X)**0 - None
U - Unit Mount 3-Speed Switch with Off Position
R - Remote Mount 3-Speed Switch with Off Position**47. 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**48. RETURN AIR: (X) (KHGE Only)**0 - Bottom Aluminum Single Deflection Return Grille
1 - Rear Aluminum Single Deflection Return Grille
2 - Rear Duct Collar**49. SUPPLY AIR: (X) (KHGE Only)**0 - Double Deflection Aluminum Supply Grille
2 - Front Duct Collar

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50. PAINT: (X) (KHGE Only)

- 0 - Pearl White Satin
- 1 - British White

51. THERMOSTAT: (XXXX)

(See Krueger's selection software.)

52. AQUASTAT: (X)

- 0 - None
- A - Aquastat

53. FACTORY MOUNTED DDC MANUFACTURER: (X)

(See Krueger's selection software.)

54. FACTORY MOUNTED DDC MODEL: (XX)

(See Krueger's selection software.)