

KLPS, KLPS-D Engineering Specification & Configuration**KLPS UNIT**

Fan powered terminal unit size 1 shall be ultra low profile not exceeding 8 5/8" in height or 48" in length, or unit sizes 2 - 4 shall be a low profile type not exceeding 11" in height and 41" in length, or unit size 5 shall be a low profile type unit not exceeding 17" in height and 47" in length, completely factory assembled and wired with motor, blower, mixing plenum, and primary air damper contained in a single unit housing. Unit shall be Krueger model KLPS.

The induced air fan shall operate continuously during central system operation. Primary airflow controller shall compensate for central system pressure fluctuations. When room temperature requires maximum heating, the (direct digital) (analog) (pneumatic) pressure independent velocity controller maintains the minimum primary airflow setting by modulating the damper. The electric heating coil or hot water coil, if supplied, is energized (activated). As room temperature begins to rise, the heating coil is de-energized (deactivated). As room temperature rises above the setpoint, the primary air damper will modulate to maintain room temperature. When the room temperature calls for maximum cooling, the velocity controller maintains the maximum primary airflow setting.

To prevent the fan/motor from running in the backward direction, the unit induced air fan shall be field wired so that it is electrically or pneumatically interlocked with the central system fan.

Terminals shall be tested by use of the AHRI Standard 880. The terminal unit shall be ETL listed as a complete assembly. All electrical components shall be UL listed and installed in accordance with the National Electric Code. All electrical components shall be mounted in sheet metal control enclosures. Electrical connection shall be single point.

Unit casing shall be constructed of not less than 20 gage galvanized steel. Unit discharge shall be rectangular, suitable for flanged duct connections.

Unit labels shall be adhered to each unit including model size, airflow (CFM), balancing chart, and tagged data.

KLPS unit shall be equipped with a factory installed airflow sensing device. Provide a K4 LineaCross, four quadrant, multi-point center averaging sensor with an amplified signal.

- **(Optional)** Provide a linear, multi-point, velocity averaging sensor with an amplified signal.

Provide balancing taps to allow for easy airflow verification.

Fan motor and all interior components must be accessible through a removable bottom access panel.

Fan shall be of the forward curve, centrifugal type. The fan motor shall be single speed (120, 208/240, 277), 60 cycle, single phase, energy efficient design, permanently lubricated, using permanent split capacitor for starting and be specifically designed for use with an SCR fan speed controller. Motor must have thermal overload protection. The fan motor shaft shall be connected directly to the fan and fan motor shall be isolated from the unit casing to prevent transmission of vibration.

- **(Optional)** ECM Fan Motor: The fan motor shall be [120, 208/240, or 277 volt, single-phase] ECM (electronically commutated motor) fan motors including either a manual or remote adjustable speed controller. The manual adjustable speed controller is field set with a digital display, alternating between RPM and percentage full airflow. The remote adjustable speed controller provides a means to remotely set and/or adjust the fan speed.

The radiated and discharge attenuation factors for the specified NC levels shall be based on attenuation factors from AHRI Standard 885-08 Appendix E, which includes room absorption, environmental adjustment factor, duct insertion, end reflection and duct branching.

Unit casing shall be lined with 1/2" thick, 1 1/2 lb. dual density fiberglass insulation that meets UL 181 and NFPA 90A. Insulation shall be attached to the unit casing by adhesive and weld pins.

- **(Optional)** Cellular Insulation; Unit casing shall be lined with 1/2" or 1" (size 5 only) thick, 1 1/2 lb. density, smooth surface, polyolefin, closed-cell, foam insulation for fiber free application. Cellular insulation meets UL 181 and NFPA 90A and does not support mold or bacteria growth. Insulation shall be attached to the unit casing by adhesive and weld pins.
- **(Optional)** Sterilwall Insulation: Unit casing shall be lined with 1/2", 1 1/2 lb. dual density fiberglass insulation that meets UL 181 and NFPA 90A, enclosed between the unit casing and a non-perforated internal sheet metal cover

extending over the fiberglass insulation, as well as covering the liner cut edges.

- **(Optional)** Perforated Doublewall Insulation: Unit casing shall be lined with 1/2", 1 1/2 lb. dual density fiberglass insulation that meets UL 181 and NFPA 90A, enclosed between the unit casing and a perforated internal sheet metal cover extending over the fiberglass insulation, as well as covering the liner cut edges.
- **(Optional)** Foil Encapsulated Insulation: Unit casing shall be lined with foil reinforced, wrapped edges, 1/2" or 1" (size 5 only) thick, 1 1/2 lb. density fiberglass insulation that meets UL 181 and NFPA 90A. Insulation shall be attached to the unit casing by adhesive and weld pins.
- **(Optional - Unit Size 5 Only)** Steriliner Insulation: Unit casing shall be lined with 13/16" thick, 4 lb. density, rigid board insulation with fiber reinforced foil covering insulation fibers that meets UL 181 and NFPA 90A. Liner shall be attached to unit casing by adhesive and weld pins with foil tape sealing the insulation cut edges.
- **(Optional - Unit Size 5 Only)** 1" Thick Insulation: Unit casing shall be lined with 1" thick, 1 1/2 lb. dual density fiberglass insulation that meets UL 181 and NFPA 90A. Insulation shall be attached to the unit casing by adhesive and weld pins.
- **(Optional)** No Liner: Unit casing shall be equipped with no internal insulation liner.

ELECTRIC HEAT COILS

Electric coils shall be supplied by the terminal unit manufacturer and shall be ETL listed in accordance with UL standards. Construct coil casing with minimum of 20 gage galvanized steel. Elements shall be 80/20 Ni-Cr and supported by ceramic insulators. The integral control panel shall be housed in a NEMA 2 enclosure with hinged access door for access to all controls and safety devices.

Electric coils shall contain a primary automatic reset thermal cutout and differential pressure airflow switch for proving of airflow.

- **(Optional)** Electric coils shall include fused or non-fused door interlocking disconnect switch, AC solid state relay, fuse-block, manual reset cutout, and/or dust tight enclosure construction.
- **(Optional)** LineaHeat solid state electronic proportional control of electric heat shall meet the requirements of ASHRAE Standard 62, Addenda N.

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- **(Optional)** LineaHeat solid state electronic controlled heater with control of the leaving air temperature limiting the unit discharge temperature to a set value.

HOT WATER COILS

Hot water coil casing shall be constructed with minimum 20 gage galvanized steel with flanged discharge for attachment to downstream ductwork. Coils shall be factory installed on the terminal unit. Fins shall be rippled and corrugated heavy gage aluminum, mechanically bonded to

tubes. Tubes shall be copper with minimum wall thickness of 0.016" and with male solder header connections. Coils shall be leak tested to 400 psi. Number of coil rows and circuits shall be selected to provide performance as required by the plans. Coil performance data shall be based on tests run in accordance with AHRI Standard 410.

SENSIBLE COOLING COIL (KLPS-D)

Cooling water coil casing shall be constructed with minimum 18 gage galvanized steel with filter frame to accept 1" construction type or MERV 8 filter. Coils

shall be factory installed on the induced air inlet of terminal unit. Fins shall be rippled and corrugated heavy gage aluminum, mechanically bonded to tubes. Tubes shall be copper with minimum wall thickness of 0.016" and with male solder header connections. Coils shall be leak tested to 400 psi. Number of coil rows and circuits shall be selected to provide performance as required by the plans. Coil performance data shall be based on tests run in accordance with AHRI Standard 410.

1. SERIES: (XXXXX)

- KLPS - Low Profile Fan Powered Terminal Unit
- KLPS-D - Low Profile Fan Powered Terminal Unit, Dedicated Outdoor Air System

2. SENSOR TYPE: (X)

- 1 - Linear Averaging
- 3 - K4 LineaCross (Four Quadrant)

3. LINER TYPE: (X)

- 0 - 1/2" Liner
- 1 - 1" Liner ^
- 2 - Steriliner ^
- 3 - No Liner ^
- 4 - Sterilwall with 1/2" Dual Density
- 6 - 1/2" Foil Encapsulated
- 9 - 1" Foil Encapsulated ^
- A - Perforated Doublewall with 1/2" Dual Density
- F - 1/2" Cellular
- H - 1" Cellular ^

4. UNIT CASING CONTROLS: (XX)

- 1L - Left-hand Side, 20 Gage
- 1R - Right-hand Side, 20 Gage
- 2L - Left-hand Side, 20 Gage, Dual Access Panels
- 2R - Right-hand Side, 20 Gage, Dual Access Panels

5. UNIT SIZE: (X)

- 1 - Inlet Sizes: 4", 5", 6", 7"
- 2 - Inlet Sizes: 4", 5", 6", 7", 8"
- 3 - Inlet Sizes: 4", 5", 6", 7", 8", 10"
- 4 - Inlet Sizes: 10", 8" x 14"
- 5 - Inlet Sizes: 6", 7", 8", 10", 12", 14"

6. INLET CODE: (XX)

- 04 - 4" Round
- 05 - 5" Round
- 06 - 6" Round
- 08 - 8" Round
- 10 - 10" Round
- 12 - 12" Round
- 14 - 14" Round
- 12 - 8" x 14" Rectangle ^^^

7. MOTOR VOLTAGE: (X)

- 1 - 120V, 1-Phase
- 2 - 208/240V, 1-Phase
- 3 - 277V, 1-Phase
- 4 - ECM Motor, 120V, 1-Phase **
- 5 - ECM Motor, 208/240V, 1-Phase **
- 6 - ECM Motor, 277V, 1-Phase **

8. CONTROL TYPE: (XXXX)

- (2XXX) - Analog
- (7XXX) - Digital, BACnet Compatible
- (6XXX) - Digital, Standalone
- (XXXX) - Factory Mounted, Provided by Others
- (1XXX) - Pneumatic

9. UNIT ACCESSORIES: (Up to 6)

- 0 - None
- A - Motor Toggle Disconnect *
- F - Fan Motor Fuse
- P - Cam Lock for Access Panels ^^
- R - Induction Inlet Filter, Construction Type
- S - Hanger Brackets
- 1 - 2 Row Cooling Coil, Upstream Piping Connection *
- 2 - 2 Row Cooling Coil, Downstream Piping Connection *
- 3 - 4 Row Cooling Coil, Upstream Piping Connection *
- 4 - 4 Row Cooling Coil, Downstream Piping Connection *
- 5 - 6 Row Cooling Coil - Upstream Piping Connection *
- 6 - 6 Row Cooling Coil - Downstream Piping Connection *
- M - MERV 8 Filter **

10. WATER HEAT: (ROWS/CONNECTION HAND) (XXX)

- 000 - N/A / None
- W11 - 1 Row/Right
- W12 - 2 Row/Right
- W21 - 1 Row/Left
- W22 - 2 Row/Left

11. ELECTRIC HEAT: (XX)
LINEAHEAT: (XX)

- 00 - None
- E1 - 120v/1-Phase
- E2 - 208v/1-Phase
- E3 - 240v/1-Phase
- E4 - 277v/1-Phase
- E6 - 208v/3-Phase/3-Wire
- E9 - 480v/3-Phase/4-Wire
- L1 - 120v/1-Phase
- L2 - 208v/1-Phase
- L3 - 240v/1-Phase
- L4 - 277v/1-Phase
- L6 - 208v/3-Phase/3-Wire
- L9 - 480v/3-Phase/4-Wire

12. ELECTRIC HEAT STEPS: (X)

- 0 - None
- 1 - 1-Stage
- 2 - 2-Stage
- 3 - 3-Stage

13. HEAT COIL ACCESSORIES: (X) (X) (X) (X)

- 0 - None
- C - Fuse Block
- F - Manual Reset Cutout
- G - Dust-tight Construction
- H - Staged Solid State Relays
- K - Door-interlocking Fused Disconnect
- L - Door-interlocking Non-fused Disconnect

* Motor Toggle Disconnect not available with electric heat.

** Manual or remote adjustable speed controller for ECM motor option is required.

^ Liner Available on unit size 5 only.

^^ Cam Locks ONLY available with casing configurations 2R' & '2L'.

^^^ KLPS Size 4 Only.

* Available on KLPS-D only.

** Available with ECM Motor only.

SAMPLE CONFIGURATION: KLPS - 1 - 0 - 1L - 3 - 08 - 2 - 6208 - 0 - 0 - 0 - 0 - W12