



## Model KAMP5K

### ADVANCED THERMAL DISPERSION AIRFLOW & TEMPERATURE MEASURING PROBE

#### APPLICATION

Kele model KAMP5K is a highly accurate thermal dispersion airflow and temperature measuring probe. Multiple velocity and temperature points on one or more probes installed in the duct or plenum are averaged to arrive at air measurements. The KAMP5K is capable of measuring a velocity range from 0 to 5,000 FPM and displaying the flow and temperature at each sensing point. Within each low pressure drop airfoil shaped probe are up to 8 moisture resistant flex sensors. Both velocity and temperature are measured by each flex sensor thermistor pair. The flex sensor pair is protected from the elements with a thin conformal coating. Trouble free performance is assured by laser etched, micro welded and hermetically sealed flex sensor connection points. The highest accuracy over the entire range of air flows results from probe sensing elements that are factory tested and calibrated at 20 points.

#### STANDARD CONSTRUCTION

##### PROBE MATERIAL

Low profile 2" x 3/4" (51 x 19) 6063T6 high yield extruded aluminum with acid etch clear anodized finish

##### ACCURACY

Airflow:  $\pm 2\%$  of reading and  $\pm 0.25\%$  repeatability  
Temperature:  $\pm 0.10^\circ\text{F}$  ( $0.06^\circ\text{C}$ )

##### PRODUCT PERFORMANCE RANGES

Airflow: 0-5000 FPM (0-25 m/s)  
Transmitter Temperature:  $-20^\circ\text{F}$  to  $120^\circ\text{F}$  ( $-29^\circ\text{C}$  to  $49^\circ\text{C}$ )  
Sensor Temperature:  $-20^\circ\text{F}$  to  $120^\circ\text{F}$  ( $-29^\circ\text{C}$  to  $49^\circ\text{C}$ )  
Humidity: 0-99% RH, non-condensing

##### POWER REQUIREMENTS

24 VAC (+/- 15%); 15 VA

##### SENSOR DISTRIBUTION

Max 128 sensing points.

##### CALIBRATED METERED ORIFICE

U.L. 94 flame rated, high impact ABS

##### SENSOR CIRCUIT

Conformal coated, water resistant flexible polyimide circuit, with heated and ambient thermistors

##### MASTER CONTROL CIRCUIT

Field configurable, solid state, circuit board robotically assembled. Production includes high pressure deionizing wash, solder reflow, wave solder, secondary deionizing wash final assembly, four step inspection, conformal coating, retest and calibration. Two individually configurable outputs for Velocity or Temperature.  
Velocity Output: 4-20mA or 2-10 VDC with 500 ohm resistor  
Temperature Output: 4-20mA or 2-10 VDC with 500 ohm resistor

##### AGENCY LISTINGS

All components are U.L. Listed and compliant with Part 15 of the FCC rules and RoHS directive 2002/95/EC

##### DUCT/PLENUM SIZE

Width: 8" to 120" (203 to 3050)  
Height: 8" to 120" (203 to 3050)

##### NOTES:

1. Values shown in ( ) indicate metric units.
2. Refer to Installation Instructions for additional details.



Remote  
(Optional)

Ancillary

Primary

One primary probe to be combined with the required quantity of ancillary probes based on duct size.

#### STANDARD FEATURES

- Self-diagnostics utilizing artificial intelligence
- BACNET and analog output standard
- Lowest power consumption thermal dispersion device available
- Tool-free one touch setup through surface membrane label
- Stainless Steel mounting hardware.
- Standard cabling, no proprietary cables
- Third party verified FCC, UL, BTL, AMCA, NIST and ISO 9001
- Airfoil shaped acid-etch clear anodized sensing probes featuring lower pressure drop and less noise
- Highest density thermal dispersion sensing array up to 128 sensing points!

#### VARIATIONS

The KAMP5K is available with the following Optional Variations.

- Remote User Interface Hard-Wired to Primary Probe
- Wireless Remote User Interface. Wireless connectivity between the Remote Interface and the Primary Probe.
- Wired Primary Controller, mounted remotely.
- NEMA 4 hinged, weather-resistant enclosure with liquid tight construction.
- Custom density probe/sensor array.
- Equal Area Distribution, Log-Tchebycheff arrangement, or Round EK Log.
- Internal Mount for duct sizes of 14" to 120" width.
- Weather Shield for installations exposed to direct sunlight or where temperatures may exceed  $120^\circ\text{F}$  ( $49^\circ\text{C}$ ).

# INSTALLATION DETAILS

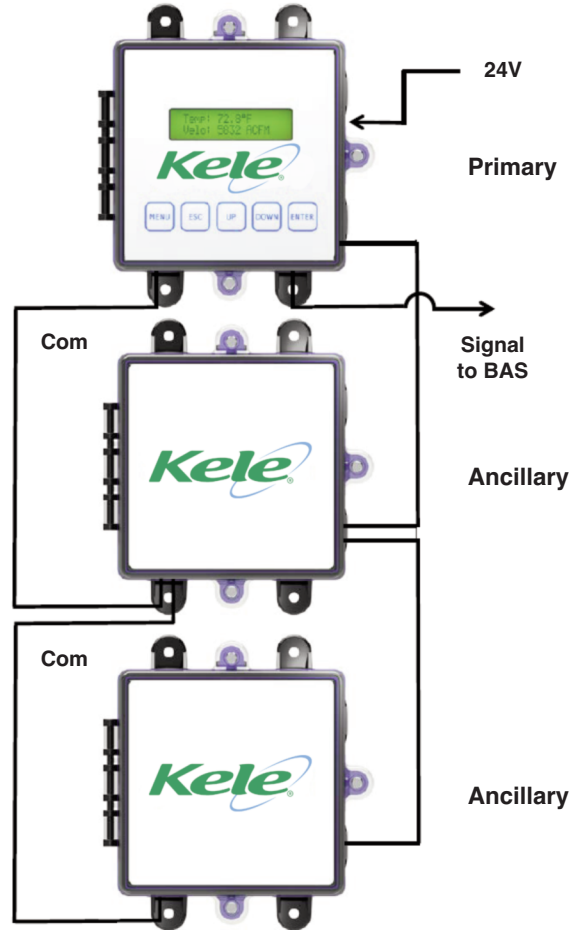
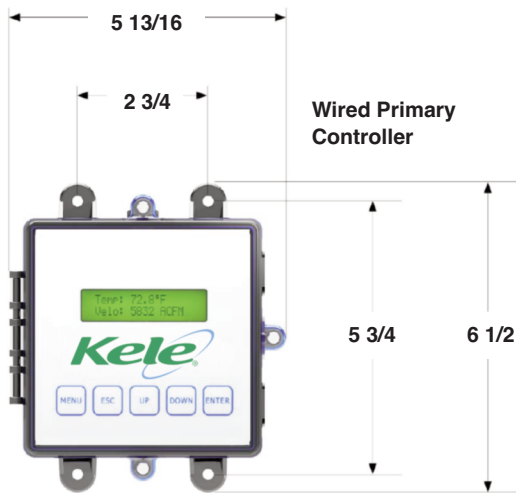
Probe kit comes with Primary Control Probe and utilizes thermal dispersion technology to calculate the airflow and average the temperature. Two thermistors at multiple sensing points measure ambient temperature and velocity. Temperature and velocity thermistors at each sensing point are housed in a high impact, ABS, calibrated metered orifice that is mechanically fastened to the airfoil probe. The probe and sensor circuit default density are based on the

duct or plenum size and corresponding density chart. Number of probes and number of sensor per probe are based on the OD dimensions where "A" is the duct or plenum width\* and "B" is the duct or plenum height. The sensor readings are digitally communicated to the primary probe.

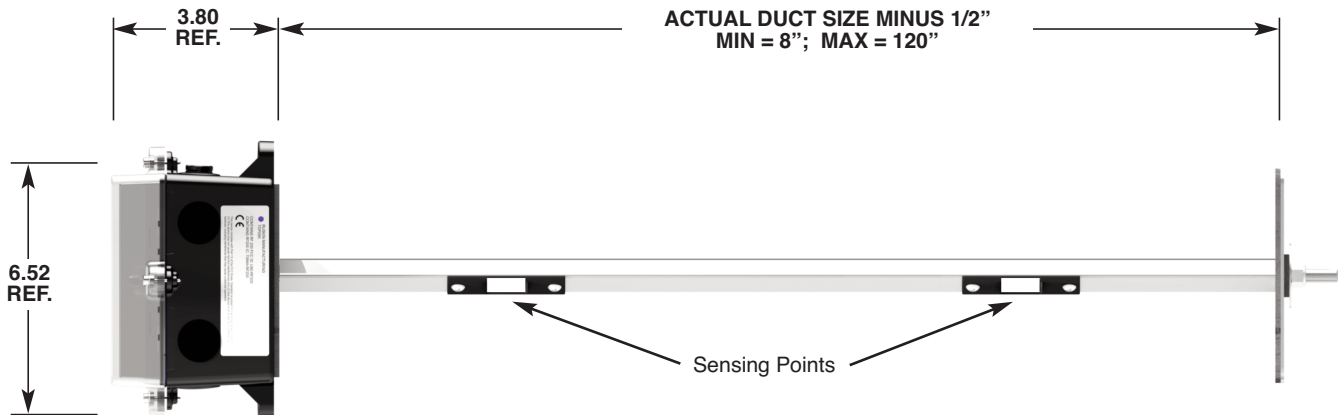
\* Stand-off mounts ID

## TYPICAL WIRING DETAIL

- Recommended cable is Connect Air W24182P-2306BL.
- Cable length as required and can be cut to desired length.
- Connections are 2 part pluggable Phoenix terminals.
- Primary/Ancillary probe design facilitates quick daisy chain wiring (probe to probe).
- Hinged enclosure with dust tight or weather resistant construction comes pre-drilled with four connection access points (with dust caps or optional NEMA 4 plugs).
- For use with outdoor rated cable, NEMA 4 Cord Grips can be ordered to facilitate a sealed cable connection.



The optional wired Primary Controller can be purchased with any KAMP5K system. All probes become Ancillary, and the separate wired Primary Controller can be mounted up to 500 feet from the KAMP5K probes.



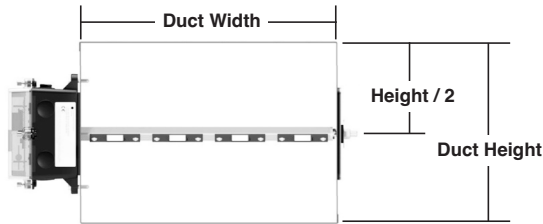
### FRONT VIEW

Install with sensors on bottom of probe when installed horizontally.

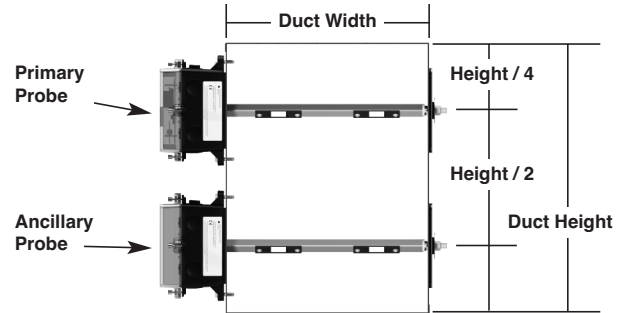
# HIGHEST SENSOR DENSITY PER SQUARE FOOT IN THE INDUSTRY

The model KAMP5K probe assembly may be installed in square, round, or oval ducts and plenums. Hardware required for the insertion style mounting configuration (as depicted in the DETAILS shown below) is provided as standard with the KAMP5K. Stand-off mounting hardware is available as an option for applications that require probes mounted onto the upstream side of a control damper (damper sold separately).

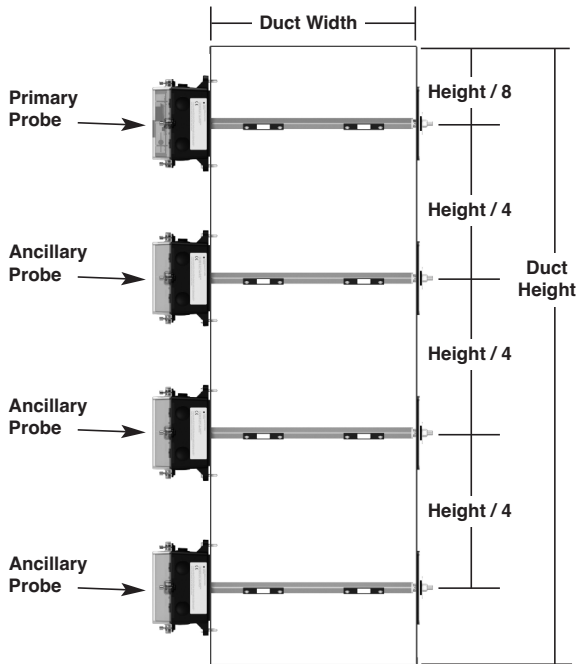
For specific installation and operation details, and for round or oval applications, refer to the Installation and Maintenance Instructions. The information on this data sheet is for general reference and is subject to correction or modification.



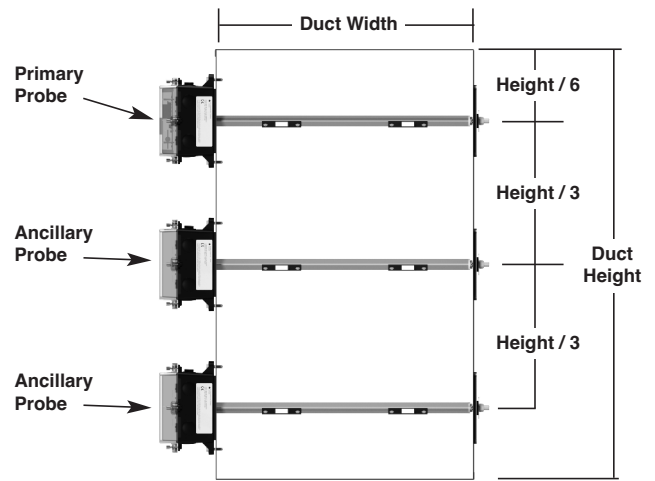
**DETAIL 1**



**DETAIL 2**



**DETAIL 4**



**DETAIL 3**

Duct Height "B"	Rectangular Duct Width "A" = Probe Length																			
	8" (203)	12" (305)	14" (356)	16" (406)	18" (457)	20" (508)	22" (559)	24" (610)	30" (762)	36" (914)	42" (1067)	48" (1219)	54" (1372)	60" (1524)	66" (1676)	72" (1829)	84" (2134)	96" (2438)	108" (2743)	120" (3048)
8" (203)	1/2	1/2	1/3	1/3	1/4	1/4	1/4	1/4	1/6	1/6	1/6	1/6	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8
12" (305)	1/2	1/2	1/3	1/3	1/4	1/4	1/4	1/4	1/6	1/6	1/6	1/6	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8
14" (356)	1/2	1/3	1/3	1/3	1/4	1/4	1/6	1/6	1/6	1/6	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8
16" (406)	2/2	2/2	2/2	2/2	2/3	2/3	2/3	2/3	1/6	1/6	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8
18" (457)	2/2	2/2	2/2	2/2	2/3	2/3	2/3	2/3	1/6	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8
20" (508)	2/2	2/2	2/2	2/3	2/3	2/3	2/3	2/3	2/4	1/8	1/8	1/8	1/8	2/6	2/6	2/6	2/6	2/7	2/8	2/8
22" (559)	2/2	2/2	2/3	2/3	2/3	2/3	2/3	2/3	2/4	1/8	1/8	1/8	2/6	2/6	2/6	2/6	2/7	2/8	2/8	2/8
24" (610)	2/2	2/2	2/3	2/3	2/3	2/3	2/3	2/3	2/4	2/4	1/8	1/8	2/6	2/6	2/6	2/6	2/7	2/8	2/8	2/8
30" (762)	3/2	3/2	3/2	3/2	3/2	2/4	2/4	2/4	2/4	2/4	2/6	2/6	2/6	2/7	2/7	2/8	2/8	2/8	2/8	2/8
36" (914)	3/2	3/2	3/2	3/2	3/3	3/3	3/3	2/4	2/4	2/6	2/6	2/6	2/7	2/8	2/8	2/8	2/8	2/8	2/8	2/8
42" (1067)	3/2	3/2	3/3	3/3	3/3	3/3	3/3	3/3	2/6	2/6	2/7	2/7	2/8	2/8	2/8	2/8	2/8	2/8	2/8	2/8
48" (1219)	3/2	3/2	4/2	4/2	4/2	4/2	4/2	4/2	3/4	2/6	2/7	2/8	2/8	2/8	2/8	2/8	2/8	2/8	2/8	2/8
54" (1372)	4/2	4/2	4/2	4/2	4/2	4/2	3/4	3/4	3/4	2/7	2/8	2/8	2/8	2/8	2/8	4/4	4/4	2/8	2/8	2/8
60" (1524)	4/2	4/2	4/2	4/2	4/2	3/4	3/4	3/4	4/4	4/4	2/8	2/8	2/8	4/4	4/4	4/4	4/4	2/8	2/8	2/8
66" (1676)	4/2	4/2	4/2	4/2	4/3	3/4	3/4	3/4	4/4	4/4	4/4	2/8	2/8	4/4	4/4	4/4	4/4	2/8	2/8	2/8
72" (1829)	4/2	4/2	4/2	4/2	4/3	3/4	3/4	3/4	4/4	4/4	4/4	2/8	4/4	4/4	4/4	4/4	4/4	4/4	4/4	2/8
84" (2134)	4/2	4/2	4/2	4/2	4/3	3/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4
96" (2438)	4/2	4/2	4/2	4/2	4/3	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4
108" (2743)	4/2	4/2	4/2	4/2	4/3	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4
120" (3048)	4/2	4/2	4/2	4/2	4/3	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4	4/4

**DETAIL A**

Probe/sensor placement for rectangular applications  
Refer to Installation Instructions for round and oval mounting information.

## REMOTE USER INTERFACE

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The Remote User Interface is an available option for the KAMP5K. The remote user interface duplicates the controls of the primary probe.

We recommend the REMOTE USER INTERFACE for NEMA4 outside installations such that the user interface can be mounted in a remote location for enhanced ease of setup.

The primary probe is always the interface point with the building automation system.

The remote user interface is connected as another ancillary device to the primary probe.

Wireless option between the remote user interface and primary probe allows the user interface to be powered with 24VAC from a separate source and will duplicate all the features available on the primary display without any wires between the air measurement station and the remote user interface. Distances for wired units up to 500 Feet away are possible and for wireless units up to 200 Feet away are possible depending on the environment where installed.



## REMOTE MOUNTING OPTIONS - Examples with 3 Probes

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Standard Installation:

1 Primary Probe and 2 Ancillary Probes. Building Automation connection at Primary Probe.

Wired Primary, mounted remotely:

1 Remote Primary and 3 Ancillary Probes. Building Automation connection at Remote Primary.

Wired Remote User Interface, with Primary Probe including Display:

1 Wired Remote Display, 1 Primary Probe with display and 2 Ancillary Probes. Building Automation connection at Primary Probe.

Wired Remote User Interface, with Primary Probe without Display:

1 Wired Remote Display, 1 Primary Probe without display and 2 Ancillary Probes. Building Automation connection at Primary Probe.

Wireless Remote User Interface, with Primary Probe including Display:

1 Wireless Remote Display, 1 Primary Probe with display and 2 Ancillary Probes. Building Automation connection at Primary Probe.

Wireless Remote User Interface, with Primary Probe without Display:

1 Wireless Remote Display, 1 Primary Probe without display and 2 Ancillary Probes. Building Automation connection at Primary Probe.

## SUGGESTED SPECIFICATION

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Furnish and install, at locations shown on plans or as in accordance with schedules, an electronic thermal dispersion type airflow and temperature measuring station. The AFTMS shall be capable of monitoring and reporting the airflow and temperature at each measuring location with up to 16 measuring probes containing 1 to 8 sensor points per probe. AFTMS shall include a primary probe that interfaces with the building automation system (BAS) using BACNET protocol or 4-20mA analog outputs reporting velocity and temperature measurements. Probe(s) shall be constructed of an airfoil shaped acid-etch clear anodized 6063T6 aluminum extrusion containing the sensor circuit(s) for low pressure drop and low noise in installed applications. Each moisture resistant flexible polyimide sensor circuit shall consist of thermistors for velocity and temperature. Primary probe user interface shall feature tool-free touch setup through surface membrane label on a hinged enclosure with dust tight or weather resistant construction. Factory calibration of thermal dispersion sensors shall be at 20 points between 0 and 5,000 FPM using NIST traceable calibration standards.

Production of all circuits shall include primary and secondary deionizing wash and include conformal coating.

Complete assembly shall be constructed and calibrated in an ISO 9001 certified facility following strict ISO calibration test procedures.

Proprietary cables are not acceptable. For ease of installation, a composite 4 wire cable similar to Connect Air W24182P-2306BL with communications and power in one cable is recommended. Alternatively, communications cable shall be a TSP (Twisted Shielded Pair) 24AWG low capacitance wire and power shall be an 18AWG Pair. Primary Control Probe shall be capable of processing up to 128 (16 probes, 8 sensors/probe each) independent sensing points per AFTMS and shall operate on a Class 2 24VAC low-voltage supply. Primary Control Probe shall feature a 16 character x 2 line alphanumeric backlit LCD display, digital offset/gain adjustment, continuous performing sensor/transmitter diagnostics and a visual alarm to detect malfunctions. Display shall be field adjustable to display either I.P. or S.I. units. Primary Control Probe output shall be BACnet® compatible and also supply a field adjustable 4-20 mA, or 2-10 VDC across a 500 ohm resistor. All electronic components of the assembly shall be lead-free RoHS compliant. Accuracy shall be based on tests and procedures performed in accordance with AMCA publications 610 and 611.