

SENSORS																		
SENSOR	1000	2000	2500	3000	3500	3500 DT	4000	4200	4250	4300	4400	4500	4500 HOR	ACCURACY (+/-)	RESOLUTION	SPECIFICATION RANGE	OPERATIONAL RANGE	NOTES
Wind Speed   Air Flow	●	●	●	●	●		●	●	●	●	●	●	●	Larger of 3% of reading, least significant digit or 20 ft/min	0.1 m/s 1 ft/min 0.1 km/h 0.1 mph 0.1 knots 1 B	0.6 to 40.0 m/s 118 to 1274 ft/min 2.2 to 144.0 km/h 1.3 to 184.2 mph 1.2 to 117.8 knots 0 to 12.8	0.6 to 60.0 m/s 118 to 1811 ft/min 2.2 to 216.0 km/h 1.3 to 184.2 mph 1.2 to 117.8 knots 0 to 12.8	1 inch/25 mm diameter impeller with precision axle and low-friction Zynell bearings. Startup speed stated as lower limit; readings may be taken down to 0.4 m/s (15.5 ft/min) (3 mph) (3 ft) after impeller startup. Off-axis accuracy -1% @ 8° off-axis; -2% @ 10°; -3% @ 15°. Calibration drift < 1% after 100 hours use at 16 MPa (17 msi). Replacement impeller (NPK-PN-0801) held in place with a screwdriver. Wind speed calibration and testing should be done with triangle on impeller located at the top front face of the Kestrel.
Ambient Temperature		●	●	●	●		●	●	●	●	●	●	●	0.9 °F 0.5 °C	0.1 °F 0.1 °C	-20.0 to 158.0 °F -29.0 to 70.0 °C	14.0 to 131.0 °F -10.0 to 55.0 °C	Hermetically-sealed, precision thermistor mounted externally and thermally isolated (US Patent 5,939,645) for rapid response. Airflow at 2.2 mph (1 m/s) or greater provides fastest response and reduction of radiation effect. Calibration drift negligible. Thermistor may also be used to measure temperature of water or snow by submerging thermistor portion into material - remove impeller prior to taking submerged measurements and ensure humidity sensor membrane is free of liquid water prior to taking humidity based measurements after submersion.
Globe Temperature - Tg												●		-°F 1.4 °C	0.1 °F 0.1 °C	-20.0 to 140.0 °F -29.0 to 60.0 °C	14.0 to 131.0 °F -10.0 to 55.0 °C	Temperature inside 1in/25 mm black powder coated copper globe converted to Tg equivalent for standard 6 in/150 mm globe. Closest equivalence obtained with airflow greater than 2.2 mph (1 m/s).
Relative Humidity			●	●	●		●	●	●	●	●	●	●	3.0 %RH	0.1 %RH	5 to 95% non-condensing	0 to 100%	Polymer capacitive humidity sensor mounted in thin-walled chamber external to case for rapid, accurate response (US Patent 6,257,074). To achieve stated accuracy, unit must be permitted to equilibrate to external temperature when exposed to large, rapid temperature changes and be kept out of direct sunlight. Calibration drift < 1% over 24 months. Humidity sensor may be recalibrated at factory or in field using Kestrel Humidity Calibration Kit (NPK-PN-0802).
Pressure	●						●	●	●	●	●	●	●	inHg 1.0 inHg/bar 0.01 PSI	0.03 0.01 inHg 0.1 inHg/bar 0.01 PSI	8.86 to 32.49 inHg 300.0 to 1100.0 hPa/mbar 4.35 to 15.95 PSI and 32.0 to 165.0 °F 0.0 to 85.0 °C	0.30 to 48.87 inHg 10.0 to 1654.7 hPa/mbar 0.14 to 24.0 PSI and 14.0 to 131.0 °F -10.0 to 55.0 °C	Monolithic silicon piezoresistive pressure sensor with second-order temperature correction. Pressure sensor may be recalibrated at factory or in field. Adjustable reference altitude allows display of station pressure or barometric pressure connected to MSL. Kestrel 4200 displays station pressure on a dedicated screen. Kestrel 2500 and 3000 display continuously updating three-hour barometric pressure trend indicator - rising rapidly, rising, steady, falling, falling rapidly. Kestrel 4000 series displays pressure trend through graphing function. PSI display on Kestrel 4000 series only.
Compass												●	●	5°	1° 1/16th Cardinal Scale	0 to 360°	0 to 360°	2-axis solid-state magnetoresistive sensor mounted perpendicular to unit plane. Accuracy of sensor dependent upon unit's vertical position. Self-calibration routine eliminates magnetic error from batteries or unit and must be run after every full power-down (battery removal or change). Readout indicates direction to which the back of the unit is pointed when held in a vertical orientation. Declination/variation adjustable for True North readout.
CALCULATED MEASUREMENTS																		
MEASUREMENT	1000	2000	2500	3000	3500	3500 DT	4000	4200	4250	4300	4400	4500	4500 HOR	ACCURACY (+/-)	RESOLUTION	SPECIFICATION RANGE	SENSORS EMPLOYED	NOTES
Air Density								●	●					0.0002 kg/m³ 0.0003 kg/m³	0.001 kg/m³ 0.001 kg/m³	Refer to Ranges for Sensors Employed	Temperature Relative Humidity Pressure	Mass of air per unit volume
Air Flow								●						6.71%	1 dm³/m³ 1 m³/min 0.1 m³/s 1 L/s	Refer to Ranges for Sensors Employed	Air Flow User Input (Duct Shape & Size)	Volume of air flowing through an opening. Automatically calculated from Air Velocity measurement and user-specified duct shape (circle or rectangle) and dimensions (units: in, ft, cm or m). Maximum duct dimension input: 258.0 in (215.6 ft) (655.3 cm) (6.55 m).
Altitude		●	●	●	●		●	●	●	●	●	●	●	typical: 23.6 ft 7.2 m max: 48.2 ft 14.7 m	1 ft 0.1 m	typical: 750 to 1100 mBar max: 300 to 750 mBar	Pressure User Input (Reference Pressure)	Height above Mean Sea Level ("MSL"). Temperature compensated pressure (barometric) altimeter requires accurate reference barometric pressure to produce maximum absolute accuracy. Both accuracy specs corresponds to a reference pressure anywhere from 850 to 1100 mBar.
Barometric Pressure		●	●	●	●		●	●	●	●	●	●	●	0.07 inHg 2.4 hPa/mbar 0.03 PSI	0.01 inHg 0.1 hPa/mbar 0.01 PSI	Refer to Ranges for Sensors Employed	Pressure User Input (Reference Altitude)	Air pressure that would be present in identical conditions at MSL. Station pressure compensated for local elevation provided by reference altitude. Requires accurate reference altitude to produce maximum absolute accuracy.
Crosswind & Headwind/Tailwind												●	●	7.1%	1 mph 1 ft/min 0.1 km/h 0.1 m/s 0.1 knots	Refer to Ranges for Sensors Employed	Wind Speed Compass	Effective wind relative to a target or travel direction. Auto-switching headwind/tailwind indication.
Delta T			●											3.2 °F 1.8 °C	0.1 °F 0.1 °C	Refer to Ranges for Sensors Employed	Temperature Relative Humidity Pressure	Difference between dry bulb temperature and wet bulb temperature. When spraying, indicates evaporation rate and droplet lifetime. Safe range for pesticide spraying is 4 to 16 °F / 2 to 9 °C.
Density Altitude							●	●	●	●	●	●	●	226 ft 69 m	1 ft 1 m	Refer to Ranges for Sensors Employed	Temperature Relative Humidity Pressure	Local air density converted to equivalent elevation above sea level in a uniform layer consisting of the International Standard Atmosphere.
Dewpoint		●	●	●	●		●	●	●	●	●	●	●	3.4 °F 1.9 °C	0.1 °F 0.1 °C	15 to 95 % RH Refer to Range for Temperature Sensor	Temperature Relative Humidity	Temperature that a volume of air must be cooled to at constant pressure for the water vapor present to condense into dew and form on a solid surface. Can also be considered to be the water-to-air saturation temperature.
Evaporation Rate										●				0.01 lbH₂O/hr 0.06 kgH₂O/hr	0.01 lbH₂O/hr 0.01 kgH₂O/hr	Refer to Ranges for Sensors Employed	Wind Speed Temperature Relative Humidity Pressure User Input (Concrete Temperature)	The rate at which moisture is lost from the surface of curing concrete. Requires user measurement and entry of concrete temperature obtained with an accurate IR or probe thermometer (°F or °C, not included). Readings should be taken 20 inches above your surface with the thermometer shaded, and averaged for 6-10 seconds using built-in averaging function.
Heat Index		●	●	●	●		●	●	●	●	●	●	●	7.1 °F 4.0 °C	0.1 °F 0.1 °C	Refer to Ranges for Sensors Employed	Temperature Relative Humidity	Perceived temperature resulting from the combined effect of temperature and relative humidity. Calculated based on NWS Heat Index (HI) tables. Measurement range limited by extent of published tables.
Moisture Content   Humidity Ratio ("Grains")								●	●					3 g/g ghg	0.4 0.01 g/kg	Refer to Ranges for Sensors Employed	Temperature Relative Humidity Pressure	Mass of water vapor in a mass of air.
Relative Air Density									●					0.3%	0.1%	Refer to Ranges for Sensors Employed	Temperature Relative Humidity Pressure	The ratio, expressed as a percentage, of measured air density to the air density of a standard atmosphere as defined by the ICAO.
Thermal Work Limit (TWL)												●		10.9 W/m²	0.1 W/m²	Refer to Ranges for Sensors Employed	Wind Speed Temperature Globe Temperature Relative Humidity Pressure	Estimated safe maximum continuously sustainable human metabolic rate (W/m²) for the conditions and clothing factors. Based off of estimated metabolic output of typical human. On-screen zone warnings.
Outdoor Wet Bulb Globe Temperature (WBGT)												●		1.3 °F 0.7 °C	0.1 °F 0.1 °C	Refer to Ranges for Sensors Employed	Wind Speed Temperature Globe Temperature Relative Humidity Pressure	Measure of human heat stress defined as the combination of effects due to radiation, convection, and conduction. Outdoor WBGT is calculated from a weighted sum of natural wet bulb (Twb), globe temperature (Tg), and dry bulb temperature (Tdb). User settable on-screen warning zones.
Wet Bulb Temperature - Naturally Aspirated (Twb)												●		1.4 °F 0.8 °C	0.1 °F 0.1 °C	Refer to Ranges for Sensors Employed	Wind Speed Temperature Globe Temperature Relative Humidity Pressure	Similar to psychrometric wet bulb temperature (see below). However, Twb only undergoes forced convection from the ambient air velocity. Twb is a measure of the evaporative cooling that the air will allow. This is accounted for by combining the effects of, mainly, relative humidity and wind speed.
Wet Bulb Temperature - Psychrometric				●	●	●	●	●	●	●	●	●	●	3.2 °F 1.8 °C	0.1 °F 0.1 °C	Refer to Ranges for Sensors Employed	Temperature Relative Humidity Pressure	Temperature indicated by a sling psychrometer. Due to nature of the psychrometric ratio for a water-air system, this approximates the thermodynamic wet-bulb temperature. The thermodynamic wet-bulb temperature is the temperature a parcel of air would have if cooled adiabatically to saturation temperature via water evaporating into it.
Wind Chill		●	●	●	●		●	●	●	●	●	●	●	1.6 °F 0.9 °C	0.1 °F 0.1 °C	Refer to Ranges for Sensors Employed	Wind Speed Temperature	Perceived temperature resulting from combined effect of wind speed and temperature. Calculated based on the NWS Wind Chill Temperature (WCT) Index, revised 2001, with wind speed adjusted by a factor of 1.5 to yield equivalent results to wind speed measured at 10 m above ground. Measurement range limited by extent of published tables.
ADDITIONAL SPECIFICATIONS																		
Display & Backlight	●	●	●	●	●									Reflective 3 1/2 digit LCD. Digit height 0.36 in / 9 mm. Aviation green electroluminescent backlight. Manual activation with auto-off.				
Response Time & Display Update	●	●	●	●	●		●	●	●	●	●	●	●	Reflective 5 digit LCD. Digit height 0.36 in / 9 mm. Choice of aviation green or visible red (NV modes only) electroluminescent backlight. Manual activation with auto-off.				
Max/Avg Wind	●	●	●	●	●		●	●	●	●	●	●	●	Multifunction, multi-digit monochrome dot-matrix display. Choice of aviation green or visible red (NV modes only) electroluminescent backlight. Automatic or manual activation.				
Data Storage & Graphical Display, Min/Max/Avg History							●	●	●	●	●	●	●	All measurements except those based on relative humidity respond accurately within 1 second. Relative humidity and all measurements which include RH in their calculation may require as long as 1 minute to fully equilibrate to a large change in the measurement environment. Display updates every 1 second.				
Data Upload & Bluetooth® Data Connection Option							●	●	●	●	●	●	●	One-button clear and restart of Max Wind Gust and Average Wind measurement.				
Clock / Calendar	●	●	●	●	●		●	●	●	●	●	●	●	Max and average wind calculation may be started and stopped independently of data logging of other values, along with all other wind-related functions: air velocity, crosswind, headwind/tailwind, wind chill, WBGT, TWL, evaporation rate.				
Auto Shutdown	●	●	●	●	●		●	●	●	●	●	●	●	Minimum, maximum, average and logged history stored and displayed for every measured value. Large capacity data logger with graphical display. Manual and auto data storage. Min/Max/Avg history may be reset independently. Auto-store interval settable from 2 seconds to 12 hours, convenient on or off. Logs even when display off except for 2 and 5 second intervals (code version 4.18 and later). Data capacity should be reset.				
Languages	●	●	●	●	●		●	●	●	●	●	●	●	Requires optional PC interface (USB or RS-232) or Bluetooth data transfer option and provided software.				
Certifications	●	●	●	●	●		●	●	●	●	●	●	●	Requires optional PC interface (USB or RS-232) or Bluetooth data transfer option and provided software.				
Origin	●	●	●	●	●		●	●	●	●	●	●	●	Requires optional PC interface (USB or RS-232) or Bluetooth data transfer option and provided software.				
Battery Life	●	●	●	●	●		●	●	●	●	●	●	●	English, French, German, Italian, Spanish.				
Shock Resistance	●	●	●	●	●		●	●	●	●	●	●	●	CE certified, RoHS and WEEE compliant. Individually tested to NIST traceable standards (written certificate of tests available at additional charge).				
Sealing	●	●	●	●	●		●	●	●	●	●	●	●	Designed and manufactured in the USA from US and imported components. Complies with Regional Value Content and Tariff Code Transformation requirements for NAFTA Preference Criterion B.				
Operational Temperature Limits	●	●	●	●	●		●	●	●	●	●	●	●	CR2032, one, included. Average life, 300 hours. Battery life reduced by backlight use in 2000 to 3500 models.				
Storage Temperature	●	●	●	●	●		●	●	●	●	●	●	●	Standard Models: AAAA Alkaline, two, included. Average life, 400 hours of use, reduced by backlight or Bluetooth radio transmission use.				
Size & Weight	●	●	●	●	●		●	●	●	●	●	●	●	UL, STD-510, Transit Shock, Method S16.5 Procedure IV, unit only; impact may damage replaceable impeller.				
														Waterproof (IP67 and NEMA-4).				
														14 °F to 131 °F / -10 °C to 55 °C. Measurements may be taken beyond the limits of the operational temperature range of the display and batteries by maintaining the unit within the operational range and exposing it to the most extreme environment for the minimum time necessary to take reading.				
														22.0 °F to 140.0 °F / -30.0 °C to 60.0 °C.				
														4.8 x 1.9 x 1.1 in / 12.2 x 4.8 x 2.8 cm, 3.6 oz / 102 g (including slip-on cover).				
														5.0 x 1.8 x 1.1 in / 12.7 x 4.5 x 2.8 cm, 3.6 oz / 102 g.				
														6.5 x 2.3 x 1.1 in / 16.5 x 5.9 x 2.8 cm, 4.4 oz / 125 g.				

\* NOTE: Accuracy calculated as uncertainty of the measurement derived from statistical analysis considering the combined effects from primary sensor specifications, circuit conversions, and all other sources of error using a coverage factor of k=2, or two standard deviations (2σ).

Please note, these specifications are valid for all Kestrel 4400 products and all other Kestrel 4000 series with a serial number higher than 659340. If your product has a lower serial number, please reference the previous version of the specifications.