



kintech
engineering



DATASHEET

K308TH SERIES

TEMPERATURE & HUMIDITY SENSOR

Temperature & Humidity sensor developed and manufactured by Kintech Engineering specifically for wind & solar resource assessment applications.

K308TH SERIES | TEMPERATURE & HUMIDITY SENSOR

DESCRIPTION

The K308TH series Temperature and Humidity sensor is developed and manufactured by Kintech Engineering specifically for wind & solar resource assessment applications. It's a solid and highly reliable PT1000 (Class A) temperature sensor offering a measurement accuracy of $\pm 0.3^{\circ}\text{C}$ at 20°C combined with a highly stable humidity sensor with direct transducer output. Available in three different versions as indicated below.

Benefits

- High accuracy PT1000 (class A) temperature sensor
- Stable humidity sensor with direct transducer output
- Very low power consumption
- Signal integrity guaranteed at hub height measurements thanks to its highly buffered output adequate for long cables
- Strong stainless steel sensor housing
- Double louvred high impact U.V stable polycarbonate radiation plates with matt black undersides that reduce solar radiation influxes and durable white polyester powder coating

APPLICATIONS AND TECHNICAL DATA

Wind resource assessment, solar resource assessment, solar PV monitoring. The sensor output is used for energy density calculations, monitoring air temperature, calculating atmospheric stability conditions and identifying icing conditions in cold climates.

Temperature

Sensor	Pt1000 RTD element (DIN A)
Analogue output	0...5 VDC
K308TH	
Measurement range	-30...+70 °C
K308TH-50 and K308TH-50-D	
Measurement range	-50...+70 °C
Accuracy	$\pm 0.3^{\circ}\text{C}$ at 20°C / $\pm 0.5^{\circ}\text{C}$ at $-50..70^{\circ}\text{C}$

Humidity

Analogue output	0...1 VDC
Measurement range	0...100%
Accuracy	$\pm 3\%$ (from 11...89%)

General

Supply voltage	6...30VDC
Current consumption	0.85mA
Temperature operating range	-45...+85 °C
Humidity operating range	0...100%
Housing & IP	Stainless steel, IP65 (until August 2024 aluminum)
Dimension	120 mm x 12 mm
Sensor protection	Sintered porous metal filter
Cable recommendation	Signal "Cable recommendation" section below.
Cable length	4 m
Compatibility	All Kintech Engineering data loggers
Manufacturer	Kintech Engineering

Radiation shield

Material	Highly resistant thermoplast
Dimension	120 mm x 140 mm
Mounting	Attaches to mast with included support brackets

For more information please contact web@kintech-engineering.com or visit our website www.kintech-engineering.com

K308TH SERIES | TEMPERATURE & HUMIDITY SENSOR

COMPARISON BETWEEN THE AVAILABLE VERSIONS IN THE K308TH SERIES

	*K308TH	K308TH-50	K308TH-50-D
Mechanics	All stainless steel (INOX)	All stainless steel (INOX)	All stainless steel (INOX)
Sensor calibration	Individual calibration in a calibrated high-precision constant climate chamber	Individual calibration in a calibrated high-precision constant climate chamber	Individual calibration in a calibrated high-precision constant climate chamber
Protection	Heavily improved PCB protection and PCB coating for use in harsh climatic conditions	Heavily improved PCB protection and PCB coating for use in harsh climatic conditions	Heavily improved PCB protection and PCB coating for use in harsh climatic conditions
Temperature measurement range	-30...+70°C	-50...+70°C (now suitable for very cold climates)	-50...+70°C (now suitable for very cold climates)
Output	Analog	Analog	RS485 digital output (Modbus RTU protocol)

*Manufactured until August 2024 in aluminium mechanics, with standard factory calibration and standard PCB seal.

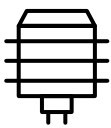

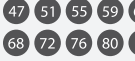





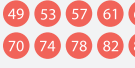


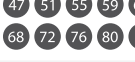


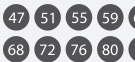







HOW TO ORDER

T ^a measuring range	RH measuring range	Output	Termination	Order code
-30...+70°C	0...100%	Analog	Wire, 4m	K308TH
-50...+70°C	0...100%	Analog	Wire, 4m	K308TH-50
-50...+70°C	0...100%	Digital	Wire, 4m	K308TH-50-D

CABLE RECOMMENDATION

K308TH / K308TH-50: Signal cable up to 150m: **6x0.25 mm² + shield**. For longer cable, please consult sensor manufacturer.
 K308TH-50-D: Signal cable up to 150m: **4x0.25 mm² + shield**. For longer cable, please consult sensor manufacturer.

SENSOR WIRING TABLE (FOR K308TH AND K308TH-50)

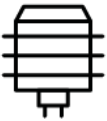





Sensor Model	Kintech Cable Colors			Orbit 360			EOL Zenith	
				Section	Terminal	Type	Section	Terminal
		Green	Temp (-)	Analog Channels		(-)	Analog Inputs	
		Yellow	Temp (+)	Analog Channels		Signal	Analog Inputs	
		Pink	Supply (+)	Analog Channels		*(+)	BAT	
		Brown	Supply (-)	Analog Channels		(-)	BAT	
		White	RH (-)	Analog Channels		(-)	Analog Inputs	
		Grey	RH (+)	Analog Channels		Signal	Analog Inputs	
		Yellow Green	Shield	Power Input	BAT		BAT	

Note:

Data logger hardware version < 3, (+) = Bat+ with current limited (12mA). Only 1 sensor must be powered on each output terminal.
 Data logger hardware version ≥ 3, (+) = Bat+ with current limited (50mA). Only 1 sensor must be powered on each output terminal.

K308TH SERIES | TEMPERATURE & HUMIDITY SENSOR

SENSOR WIRING TABLE (FOR K308TH-50-D)

Sensor Model	Kintech Cable Colors			Orbit 360		
				Section	Terminal	Type
		White	RS485 (A)	RS485	33 37 41	A1, A2, A3
		Yellow	RS485 (B)	RS485	34 38 42	B1, B2, B3
		Green	Supply (+)	RS485	36 40	*(+)
		Brown	Supply (-)	RS485	35 39	(-)
		Yellow Green	Shield	Power Input	⏏	

Note: *(+) = Bat+ with current limited (200mA). When several K308TH-50-D are connected to same digital BUS please contact our technical support.

REQUIRED DATA LOGGER VERSION

K308TH:

Minimum data logger required: ORBIT 360 BASIC PLUS.

Minimum firmware required: 2.40.

K308TH-50:

Minimum data logger required: ORBIT 360 BASIC PLUS.

Minimum firmware required: 2.59.

K308TH-50-D:

Minimum data logger required: ORBIT 360 PREMIUM.

Minimum firmware required: 2.59.

FOR K308TH and K308TH-50 ONLY: If your data logger has an older firmware version than the required one. Please configure the sensor as a generic sensor (voltage) in both Atlas software and the data logger. Remember to fill in both the slope and the offset for both the temperature and the humidity sensor (see table below for slopes and offsets).

HOW TO CONFIGURE IN ATLAS

Start Atlas and open the data logger you are working on. Now go to Site settings and scroll down to the Channels section and select the following type and model:

K308TH:

Group: Analog channels	Group: Analog channels
Sensor Type: Temperature	Sensor Type: Relative Humidity
Sensor Model: K308TH	Sensor Model: K308TH
Slope: 20	Slope: 100
Offset: -30	Offset: 0

K308TH-50:

Group: Analog channels	Group: Analog channels
Sensor Type: Temperature	Sensor Type: Relative Humidity
Sensor Model: K308TH-50	Sensor Model: K308TH-50
Slope: 24	Slope: 100
Offset: -50	Offset: 0

K308TH SERIES | TEMPERATURE & HUMIDITY SENSOR

K308TH-50-D:

The variables from the digital output signal can be chosen (or assigned to an analog channel according to the list here below).

Example:

Serial bus 1 baud rate: 9600bps

Bus: Serial 1 >>> ID: A >>> Sensor model: K308TH-50 >>> Name: K308TH_SERIAL1_A

Group: Analog channels

Sensor Type: Serial instrument

Sensor Model: **K308TH_SERIAL1_A**

Sensor Model: **Temperature**

Sensor Model: **Humidity**

*Refer to the section “RS485 DIGITAL OUTPUT: MODBUS RTU” for more information about the digital output.

Sensor response time: **12,5ms.**

The sum of the response time of all the sensors connected to the same bus must not exceed 850ms.

The screenshot shows a configuration panel with four dropdown menus: 'Bus' (SERIAL1), 'ID' (A), 'Sensor model' (K308-TH-50), and 'Name' (K308TH_SERIAL1_A). Below these is a section titled 'Serial buses baud rates' with a dropdown for 'Serial bus 1 baud rate' set to 9600 bps.

Sensor type	Sensor model	Height	Name	
Serial instrument	K308TH_SERIAL1_A	Temperature	0	A1_T_0_0_K308TH
Serial instrument	K308TH_SERIAL1_A	Humidity	0	A2_RH_0_0_K308TH

Example how to configure the K308TH-50-D in Atlas:

The screenshot shows the 'Analog channels / Serial instrument variables' configuration screen. It lists two channels: ANL1 and ANL2. Channel ANL1 is configured for Temperature with a height of 0 and name A1_T_0_0_K308TH. Channel ANL2 is configured for Humidity with a height of 0 and name A2_RH_0_0_K308TH. Each channel has a detailed configuration section including 'Ignore channel', 'Serial number', 'Units', 'Connection Diagram', 'Calibration' (Standard calibration, Slope, Offset), 'Number of decimals' (General, Max Min, Std Dev), and 'Number of decimals real time' (All).

Important! Please make sure you are working with the latest version of Atlas. To check for new updates, click the Check for updates button in the left-hand menu located in the main dashboard.

K308TH SERIES | TEMPERATURE & HUMIDITY SENSOR

RS-485 DIGITAL OUTPUT: MODBUS RTU

The sensor supports Modbus RTU protocol, over its RS-485 physical interface. The Modbus communication protocol follows a master-slave format, where the sensor is the slave and an external device is the master.

Modbus is widely used to connect the Supervisory Control and Data Acquisition (SCADA) system in the wind farm (master) with the different remote terminal units (RTU) connected to the bus (slaves).

Parameter	Factory Settings	Selectable values
Baudrate	9600	4800,9600,19200, 38400, 57600, 115200
Data bits	8	8
Parity	None	None, Even, Odd
Stop bits	1	1,2
Address	1	1 to 15

Among the standard functions of the Modbus protocol, the sensor implements the function 03: "Read Holding Registers". The sensor features 25 Modbus registers that are accessible through said function and start at address 0x0000 (PLC address: 40001).

The following table describes the Modbus map and the content of the data registers corresponding to a sensor response.

Address	PLC address	Variable / Parameter	Read / Write	Data type	Range & scale	Example (incl. units)
0	40001	Temperature	Read only	Signed 16	10	154 = 15.4°C
1	40002	Relative humidity	Read only	Unsigned 16	1	45 = 45%
2	40003	FW version	Read only	Unsigned 16	1000	1311 = 1.311
3	40004	Protocol version	Read only	Unsigned 16	1	1
4	40005	Temperature status	Read only	Unsigned 16	"0=OK 0!=No OK"	0
5	40006	Humidity status	Read only	Unsigned 16	"0=OK 0!=No OK"	0
6	40007	Reserved	Read only	Unsigned 16	-	-
7	40008	Reserved	Read only	Unsigned 16	-	-
8	40009	Serial number (high)	Read only	Unsigned 16	1	0
9	40010	Serial number (low)	Read only	Unsigned 16	1	41775
10	40011	T. Slope calibration	Read only	Unsigned 16	10000	10095=1.0095°C/°C
11	40012	T. Offset calibration	Read only	Signed 16	1000	50=0.050°C
12	40013	RH. Slope calibration	Read only	Unsigned 16	100000	10095=1.0095%/%
13	40014	RH. Offset calibration	Read only	Signed 16	10000	50=0.050%
14	40015	Reserved	Read only	Unsigned 16	-	-
15	40016	Reserved	Read only	Unsigned 16	-	-
16	40017	Reserved	Read only	Unsigned 16	-	-
17	40018	Reserved	Read only	Unsigned 16	-	-
18	40019	Slave ID	Read/Write	Unsigned 16	1 to 15	1
19	40020	Baudrate	Read/Write	Unsigned 16	"0=4800 1=9600 2=19200 3=38400 4=57600 5=115200"	1
20	40021	Parity	Read/Write	Unsigned 16	0=None 1=Even 2=Odd	0
21	40022	Stop bits	Read/Write	Unsigned 16	"0=1 stop bit 1=2 stop bits"	0
22	40023	Termination resistor	Read/Write	Unsigned 16	0=Disabled 1=Enabled	0
23	40024	Reserved	Read only	Unsigned 16	-	-
24	40025	Reserved	Read only	Unsigned 16	-	-

K308TH SERIES | TEMPERATURE & HUMIDITY SENSOR

The Slave Address, baud rate, parity, stop bits and termination resistor registers can be configured writing on the registers 18 to 22. The configuration is done using the Modbus RTU standard function 16: “Write Multiple Registers”.

Important! The registers 18-22 can be configured register by register or at the same time using a single write (using function 16) on the five registers at once.

HOW TO CONFIGURE THIS SENSOR ON SITE (FOR ANALOG OUTPUT ONLY)

We recommend performing the entire sensor configuration using Atlas at the office before installing sensors onsite. Once the sensor is correctly setup in Atlas, use the *Upload settings* tool, to upload the sensor configuration to the data logger.

In case you are already on site and need to configure the sensor directly on the data logger, follow these steps:

1. Turn on the data logger.
2. Using the keypad on the data logger, navigate the menu until you see *Sensor model*, then click the “right arrow” on the keypad.
3. Now scroll down to the channel you are going to connect the sensor to, and click the “right arrow” on the keypad.
4. Now click “Set” on the keypad and scroll up in the menu to set the sensor model type according to the table here below. Once you have found the correct sensor model, click the “right arrow” key twice to select it and save.
5. Click the “left arrow” several times to go back to the main menu.

K308TH:

Data logger model	Firmware version	Sensor model type on data logger		
		Magnitude	Number	Name
ORBIT 360	< 2.40	Temperature	01	milliVolts
		Relative humidity	01	milliVolts
	≥ 2.40	Temperature	10	TEMP K308TH
		Relative humidity	40	HUM K308TH
EOL ZENITH	any	Temperature	01	milliVolts
		Relative humidity	01	milliVolts

K308TH-50:

Data logger model	Firmware version	Sensor model type on data logger		
		Magnitude	Number	Name
ORBIT 360	< 2.59	Temperature	01	milliVolts
		Relative humidity	01	milliVolts
	≥ 2.59	Temperature	09	TEMP K308TH-50
		Relative humidity	41	HUM K308TH-50
EOL ZENITH	any	Temperature	01	milliVolts
		Relative humidity	01	milliVolts

Keep in mind: if the sensor channel has been configured as milliVolts, the output values on data logger display will always be shown in milliVolts. Remember to fill in both the slope and the offset for both the temperature and the humidity sensor to see real sensor values in °C and % in your datasets during a real-time connection with the data logger (from either Atlas or Atlas Mobile).

HOW TO CONFIGURE IN EOL MANAGER (FOR ANALOG OUTPUT ONLY)

Open EOL Manager and go to *Settings* of the data logger you are working on. Open the *Inputs* tab and select the following type and model:

TEMPERATURE

- Group: Analog Inputs
- Sensor Type: Voltmeter
- Sensor Model: **Generic Voltmeter**
- **K308TH:** Slope: 20, Offset -30
- **K308TH-50:** Slope 24, Offset: -50

RELATIVE HUMIDITY

- Group: Analog Inputs
- Sensor Type: Voltmeter
- Sensor Model: **Generic Voltmeter**
- Slope: 100
- Offset: 0