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SENSOR INSTRUCTIONS

The following is a series of wiring diagrams for several different sensors. Please locate the sensor you are going to use in the list below and follow the corresponding wiring diagram and setup in either Atlas or EOL Manager.

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

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DATASHEET

THIES FIRST CLASS

WIND VANE (POTENTIOMETER)

The Thies First Class wind vane is used to determine the horizontal component of the wind direction and is one of the most common wind vanes used in wind resource assessment

4.3151.10.X12 (2kΩ)
4.3151.00.X12 (2kΩ)(heated)
4.3151.10.X10 (10kΩ)
4.3151.00.X10 (10kΩ)(heated)
4.3150.X0.X1X

THIES FIRST CLASS POTENTIOMETER | WIND VANE

DESCRIPTION

The Thies First Class wind vane is designed for the acquisition of the horizontal component of the wind direction. Having accurate wind direction data is a very important part of any wind development project. Studies show that even small wind direction measurement errors can have a dramatic negative impact on the total wind farm power output.

Features:

- High level of measuring accuracy and resolution
- High damping ratio at a small delay distance
- Low starting threshold
- Magnetic coupling, which is free of hysteresis and wear, situated between the axis of vane and potentiometer

Electronic protective circuit both for limiting the current and to protect against erroneous connection (model 4.3151.x0.110 and 4.3151.x0.012). The outer parts of the instrument are made of corrosion-resistant anodized aluminum, and stainless steel with highly effective labyrinth gaskets and O-rings protecting the sensitive parts inside the instrument against humidity and dust.

Heated version: The Thies First Class wind vane can be supplied in a heated version to improve performance under cold climate conditions.

Note: Given the impact incorrect wind direction measurements have, the recently updated IEC61400.12.1 (2017) now requires complete assessment of wind direction measurement uncertainties. By adding a Geovane to your wind measurement campaign (in combination with either a Thies First Class or a Thies Compact wind vane) you are guaranteed to get the most accurate wind direction data available on the market.

APPLICATIONS

Wind resource assessment, solar resource assessment, site calibration, power performance studies, solar monitoring and meteorology.

THIES FIRST CLASS POTENTIOMETER | WIND VANE

FEATURES

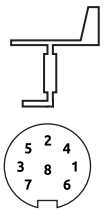
Technical Data	
Measuring range	0…360°
Measuring accuracy	0.25% (1°)
Survival speed	85 m/s up to 30 minutes (w/o damages)
Permissible ambient conditions for operation	-50...+80 °C All occurring situations of r.h. including dew moistening
Electrical output 4.3151.x0.212 4.3151.x0.210	 2 kΩ Potentiometer 10 kΩ Potentiometer
Electrical output 4.3151.x0.012 4.3151.x0.110	With electronic protective circuit which circuit avoids an overloading of the poten-tiometer in case of erroneous connection and on transition 0° → 360° The protective circuit represents a nominal series R=50 Ω. However it limits the short-circuit-current on transition from 0° → 360 ° (and vice versa) to ≤1 mA at Pot=10 kΩ and ≤2 mA at Pot=2 kΩ
Linearity	0.25% (1°)
Starting threshold	<0.5 m/s at 10° amplitude (acc. to ASTM D 5366-96) <0.2 m/s at 90° amplitude (acc. to VDI 3786 Part 2)
Delay distance	<1.8 m (acc. to ASTM D 536696)
Damping ratio	D>0.3 (acc. to ASTM D 536696)
Quality factor	K>1 D = damping ratio ω0 = angular frequency of undamped oscillation p = air density u = wind speed
Heating	Surface temperature of housing neck >0 °C at 20 m/s up to –10 °C air tempera-ture. At 10 m/s up to –20 °C using the THIES icing standard 012002 on the housing neck heating regulated with temperature sensor
Electrical supply for potentiometer at 4.3151.x0.210 / 212	Voltage Us: 0...30 VDC Please maintain a supply current of maximum 20mA – short circuit at the North point (galvanic isolation from the housing) Current: ≤Supply voltage/Potentiometer resistance
Electrical supply for potentiometer with electronic protective circuit at 4.3151.x0.012 / 110	Voltage Us: 4 VDC...42 VDC (galvanic isolation from the housing) Current: ≤Supply voltage/Potentiometer resistance ≤1 mA at transition 0° → 360° and 360° → 0° equipped with 10 kΩ Pot ≤2 mA at transition 0° → 360° and 360° → 0° equipped with 2 kΩ Pot Serial R=50 Ω (representative)
Electrical supply for heating 4.3151.00.x1x	Voltage: 24 V AC/DC, 45…65 Hz (galvanic isolation from the housing) Capacity: 25 W
Weight	ca. 0.7 kg
Protection	IP 55 (DIN 40050)

THIES FIRST CLASS POTENTIOMETER | WIND VANE

CABLE RECOMMENDATION

Signal cable up to 150m: **3x0.5 mm² + shield**. For longer cable, please consult sensor manufacturer.
Heating cable cross-section should be calculated based on the power system requirements (Volts and Amps) and the cable length. Please use a wire sizing tool for selecting the most suitable cable.

SENSOR WIRING TABLE



Base sensor view / Soldering connector view.

Sensor Model	Sensor Pin		Kintech Cable Colors		Orbit 360			EOL Zenith	
					Section	Terminal	Type	Section	Terminal
	1	Signal	○	White	Analog Channels	48 52 56 60 65 69 73 77 81 84 85 86 90 91 92	Signal	DIR Analog Inputs	SIG SIG 1 2 3 4 5
	2	GND	●	Brown	Analog Channels	47 51 55 59 64 68 72 76 80 87	(-)	DIR Analog Inputs	− − − −
	3	Us (+)	●	Green	Analog Channels	50 54 58 62	*5п	DIR Analog Inputs	*+ + *+ +
	4		Do not connect						
	5		Do not connect						
	6		Do not connect						
	Shield		●	Yellow Green	Power Input	⏚		BAT	⏚
	7	Heating (+)	●	Brown	Independent power supply 24 AC/DC				
	8	Heating (-)	●	Blue					

Note: *5п, + + = *Pulsating 5V with current limited (4mA). Only 1 sensor must be powered per terminal.*

REQUIRED DATA LOGGER VERSION

Minimum data logger required: **ORBIT 360 BASIC PLUS**.
Minimum **firmware** required: **any**

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:

4.315x.x0.x12

- Group: Analog channels
- Sensor Type: Windvane
- Sensor Model: **Thies 2K**

4.315x.x0.x10

- Group: Analog channels
- Sensor Type: Windvane
- Sensor Model: **Thies 10K / NRG 200P**

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.

THIES FIRST CLASS POTENTIOMETER | WIND VANE

HOW TO CONFIGURE THIS SENSOR ON SITE

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.

Data logger model	Firmware version	Sensor model	Sensor model type on data logger		
			Magnitude	Number	Name
ORBIT 360	any	4.315x.x0.x12	Wind direction	16	VANE THIES 2K
		4.315x.x0.x10	Wind direction	12	VANE NRG/THIES 10K
EOL ZENITH	any	4.315x.x0.x12	Wind direction	06	THIES 2K
		4.315x.x0.x10	Wind direction	02	NRG/THIES 10K

HOW TO CONFIGURE IN EOL MANAGER

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:

4.315x.x0.x12

- Group: Wind Vanes / Analog Inputs
- Sensor Type: Windvane
- Sensor Model: **THIES 2K**

4.315x.x0.x10

- Group: Wind Vanes / Analog Inputs
- Sensor Type: Windvane
- Sensor Model: **NRG 200P / THIES 10K**

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THIES FIRST CLASS POTENTIOMETER | WIND VANE

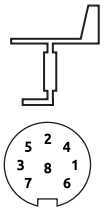
4.3151.10.312 (2k)

4.3151.00.312 (2k) (heated)

CABLE RECOMMENDATION

Signal cable up to 150m: **3x0.5 mm² + shield**. For longer cable, please consult sensor manufacturer.
Heating cable cross-section should be calculated based on the power system requirements (Volts and Amps) and the cable length. Please use a wire sizing tool for selecting the most suitable cable.

SENSOR WIRING TABLE



Base sensor view / Soldering connector view.

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	6		Do not connect						
	Shield		◐	Yellow Green	Power Input	⏚		BAT	⏚
	7	Heating (+)	●	Brown	Independent power supply 24 AC/DC				
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Note: *5п, + + = Pulsating 5V with current limited (4mA). Only 1 sensor must be powered per terminal.*

REQUIRED DATA LOGGER VERSION

Minimum data logger required: **ORBIT 360 BASIC PLUS**.
Minimum **firmware** required: **any**

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:

- Group: Analog channels
- Sensor Type: Windvane
- Sensor Model: **Thies 2K**

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.

THIES FIRST CLASS POTENTIOMETER | WIND VANE

4.3151.10.312 (2k)

4.3151.00.312 (2k) (heated)

HOW TO CONFIGURE THIS SENSOR ON SITE

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Data logger model	Firmware version	Sensor model type on data logger		
		Magnitude	Number	Name
ORBIT 360	any	Wind direction	16	VANE THIES 2K
EOL ZENITH	any	Wind direction	06	THIES 2K

HOW TO CONFIGURE IN EOL MANAGER

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:

- Group: Wind Vanes / Analog Inputs
- Sensor Type: Windvane
- Sensor Model: **THIES 2K**

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