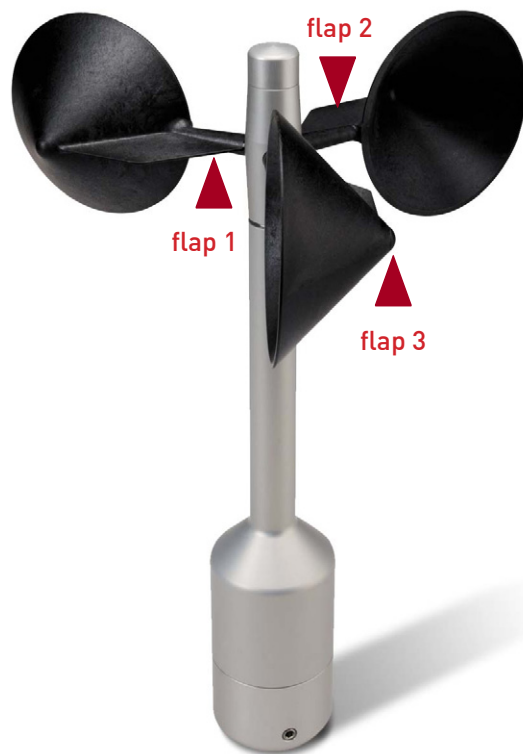


Accredited according to: IEC 61400-12-1 (2005-12), **CLASS A 0.9, B 3.0 & S 0.5**  
 MEASNET, ISO 17713-1, CLASSCUP



## Optically Scanned Cup Anemometer

The new Thies First Class Advanced anemometer gives outstanding performance. It is the only anemometer on the market that complies with all the requirements of IEC 61400-12-1 (2005-12), Class S 0.5.

Its performance ratings have even improved on the previous Thies First Class anemometer, which was rated the best of its kind according to the CLASSCUP / ACCUWIND Study, (Risø-R-1563-EN, Table 4-4).

This anemometer gives optimal dynamic performance with the following characteristics:

- ▶ High accuracy
- ▶ Minimal deviation from cosine line
- ▶ Excellent behaviour to turbulences
- ▶ Minimum overspeeding
- ▶ Small distance constant
- ▶ Low start up value
- ▶ Low power consumption
- ▶ Digital output

Measurement of power curves and site assessment reports are the main tasks for this instrument. The patented design is the result of long testing in the wind tunnel.

The sensor is designed for measuring the horizontal component of wind velocity in the fields of meteorology, climate measuring technology, site assessment, and the measurement of capacity characteristics of wind power systems (power curves).

For winter operation this instrument is equipped with electronically regulated heating to guarantee smooth running of the ball bearings and prevent the shaft and slot from ice build up.

### Classification:

IEC 61400-12-1 (2005-12)  
 Class A Classification Index A 0.9  
 Class B Classification Index B 3.0  
 Class S Classification Index S 0.5

### Linearity (MEASNET):

$r > 0.999\ 99$  (4...20 m/s)

## Comparison of Performance of Anemometers

Cup Anemometer	Class A	Class B	Information as stated according to CLASSCUP & ACCUWIND Study (Table 4-4 horizontal wsp definition Risø R-1563-EN)
NRG max 40	2.4	7.7	
Risø P2546	1.9	8.0	
Vaisala WAA151	1.7	11.1	
Vector L100	1.8	4.5	
Thies First Class	1.5	2.9	
<b>Thies First Class Advanced</b>	<b>0.9</b>	<b>3.0</b>	<b>IEC 61400-12-1 (2005-12) according to Deutsche WindGuard</b>

**Specification**

<b>Characteristics</b>	
Physical functionality	Optically scanned cup anemometer
Delivered signal	Frequency output (pulse)
<b>Accuracy</b>	
Accuracy	0.3...50 m/s 1% of meas. value or < 0.2 m/s
Linearity	Correlation factor r between frequency and wind speed $y = 0.0462 * f + 0.21$ typical $r > 0.99999$ (4...20 m/s)
Starting velocity	< 0.3 m/s
Resolution	0.05 m wind run
Distance constant	< 3 m [acc. to ASTM D 5096 - 96] 3 m acc. to ISO 17713-1
Turbulent flow	Deviation $\Delta v$ turbulent compared with stationary horizontal flow $-0.5\% < \Delta v < +2\%$ Frequency < 2 Hz
Inclined flow - mean deviation from cosinus line - Turbulence effect	< 0.1 % (in range of $\pm 20^\circ$ ) < 1 % (in the range up to 30% turbulence intensity)
Wind load	Approx. 100 N @ 75 m/s
<b>Operating range</b>	
Measuring range	0.3...75 m/s
Survival speed	80 m/s (mind. 30 min)
Permissible ambient conditions	-50...+80 °C, all occurring situations of relative humidity
<b>Electrical data</b>	
Output signal	Form rectangle, 1082 Hz @ 50 m/s, supply voltage max. 15 V
Electrical supply for optoelec. scanning	Voltage: 3.3...42 VDC (galvanic isolation from housing) Current: 0.3 mA @ 3.3 V (w/o external load) < 0.5 mA @ 5 V (w/o external load)
Electrical supply for heating*	Voltage: 24 V AC/DC (galvanic isolation from housing) Idling Voltage: max. 30 V AC, max. 42 VDC Power Consumption: 25 W
<b>General</b>	
Connection	8-pole plug-connection for shielded cable in the shaft
Mounting	on mast tube R1"
Dimensions	290 x 240 mm
Fixing boring	35 x 25 mm
Weight	approx. 0.5 kg
Finishes - housing	Anodised Aluminium
Finishes - cup star	Carbon-fibre-reinforced plastic
Protection	IP 55 (DIN 40050)
Patented	EP 1398637
EMC	EN 61000-6-2:2001 (immunity) EN 55022:2001, Class B (interfering transmission)
Manufacturer	Thies 4.3351.10.000 (without heating) / 4.3351.00.000 (with heating)

\* applies only for S11100H (P6101H)

## Thies Anemometer First Class Advanced

P6101 / P6101H

### Characteristics curve / Calibration

Wind speed Y is determined by the linear function of the frequency output f:

$$Y = a * f + b$$

Y = corrected values (m/s)

a = slope (m)

f = raw data (1/s)

b = Offset (m/s)

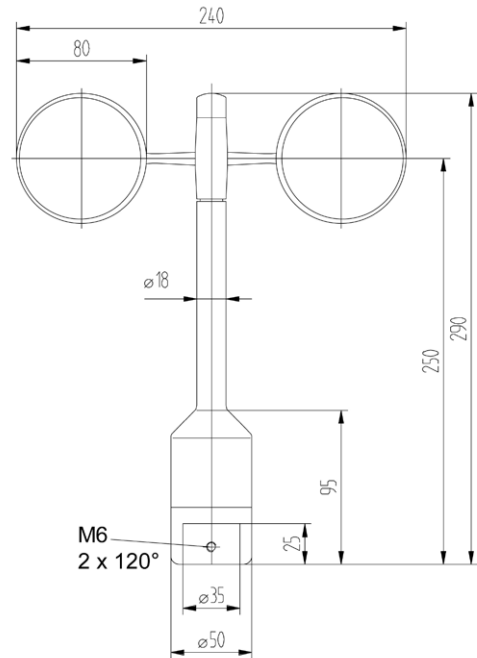
Manufacturers instructions:

Slope = 0.046 m

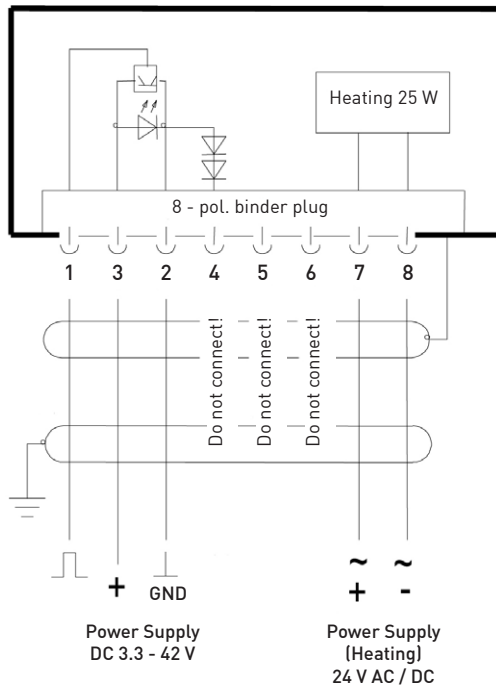
Offset = 0.21 m/s

For wind assessment campaigns it is required to perform an individual MEASNET calibration of each anemometer in a wind tunnel test to achieve an optimum accuracy and precision. After calibration please use the values for slope and offset according to the calibration protocol.

### Dimensional Drawing



### Cable Connection



Connection Anemometer	wire colors	Connection Data Logger (32)		
		"Wind" 12-pin.	"Meteo" 7-pin.	"Xtend" 8-pin.
1 - Pulse	green	A, B or C	6	5, 6
2 - Ground	brown	M	-	-
3 - Supply	white	H	-	-
7 - heating 1	yellow, grey			
8 - heating 2	pink, blue			
4	Do not connect Ammonit data loggers!			
5 / 6	Do not connect!			

Cable type without heating: LiY (C) Y 3 x 0.25 mm<sup>2</sup>

Cable type with heating cores: LiY (C) Y 7 x 0.25 mm<sup>2</sup>

Connect the shield logger-sided to Ground (GND)