

# ICE DETECTION SYSTEM



Non-contact ice detection sensor for the wind industry





## The Innovation in Ice Detection

### Innovative measurement technology as key

The ice detection sensor IDS-30, in the shape of a cube or of rods, is used for the reliable and precise measurement of icing, ice thickness and the melting of the ice for wind power turbines.

#### **Measuring principle**

The innovative ice sensor makes use of the different physical characteristics of air, water and ice at varying frequencies. Measuring the complex impedances within the medium around the sensor the IDS-30 is able to distinguish between water and ice and hence recognize the formation of ice.



Pic: IDS-Cube-Sensor

## Data quality is key

### Advantages of the non-contact measurement

#### **Increased data quality due to plausibility check**

The formation and accretion of ice depends on specific climatic conditions determined by the state of the air temperature and the temperature of the surface, where the ice adheres to. Now, the unique and very valuable feature of the IDS-30 is that it additionally considers meteorological data for the purpose of a plausibility check. Therefore, it is possible to qualitatively increase the reliability of the measurements and improve the ice detection results.

#### **Advantages**

- Easy to mount
- Simple installation and integration in existing monitoring and control systems
- Data output via multiple interfaces: SDI-12, RS-485, Modbus, analog (4 ... 20 mA), pulse signal
- Maintenance-free



## Application in the Wind power industry

### Wind power industry

Many wind turbines are installed in predominately colder areas, because the cold high density air is favorable for the wind production. This location bring also the danger that ice can influence the operation of the wind turbine drastically, as followed:

- Shut down of the turbine
- Loss of power production
- Ice throw – endangerment of people
- Higher maintenance costs
- Lost of aerodynamics



Pic: Wind turbine



Pic: IDS-Cube-Sensor at a wind turbine in Germany



## System Versions - Perfect sensor for every application

### IDS-30 - Cube

Sensor will detect ICE so early that blade heating can be switch on before the ICE can influence the operation. Life time of the turbine and the blades will be increased.

- Detect ICE very early (from 0,1mm)
- Output the complete ICEING event (ICEING event = ICE is growing)
- Perfect for blade heating control



Pic: IDS-Cube sensor

### IDS-30 - Rod

Sensor will output the total amount of ICE on the NOT heated turbine parts and blades. The sensor will also output when the ICE is melting. The melting information is important to restart the turbine as fast as possible after a ICE shutdown.

- Will measure the ICE thickness of the total ice (up to 80mm)
- Gives you the information how much ice is on the turbine and blades
- Output when the ICE is melting
- Perfect for turbine without heating



Pic: IDS-Rod sensor



## IDS-30 - All-In-One

### Modern facility management

- Will detect ICE early and measures total ICE thickness as well as the melting
- Gives you all ICE related information you need. ICE, ICING event, ICE thickness and ICE is melting
- Perfect for ICE studies or collect more information
- Perfect to get all site information



Pic: IDS-All-In-One





## Communication

### Relay outputs:

The easiest integration is via the three freely programmable relays. The relays can signal for example that the ice thickness is more than a adjustable threshold, that now ice is growing, that the ice is now melting or that the sensor is working correctly.

### Digital communication:

The IDS-30 has several digital interfaces like , SDI-12, Modbus-RTU or RS 485 (ASCII protocol). Because many modern wind turbines work with modem bus system, the IDS-30 has an option to use a convert from Modbus RTU to Profibus, Profinet and CANopen.



Pic: Wind farm in the US

### Radio transmission:

The IDS-30 can be connected to radio modem that will transmit the measurement data wireless to other turbines or in a close by command center. As well to a signal or alarming post that will signal ICE throw or ICE fall danger in the area.



Pic: Wind farm at the coast

### Advantages

- Application in aggressive environment possible
- Water-proof, tight housing
- Higher safety for staff and equipment
- Monitoring of ice rates



## Mobile internet transmission:

### Mobile internet transmission:

The IDS-30 can be connected to the MRL-7 SOMMER data logger and remote access unit. The MRL-7 data logger saves the data and transfers them either immediately or periodically to various addresses. In that way the user can retrieve the latest data online and therefore has an overview of the potential danger spots any time. Additionally a notification service can be setup, which – in case of need – can inform dedicated people via SMS or E-mail, about exceedance of limit value.



Pic: 2G/3G/4G data connections

Via mobile internet the MRL-7 data logger and from there the IDS-30 can be accessed via remote access. This will save safe cost, and makes it easier to get the measurement data just in time.

### Technical data:

#### IDS-sensors, ice detection measurement

Sensor types	cube sensor 5	cube sensor 1	rod sensor 80
Measuring range ice thickness	0.1 ... 5 mm	0.01 ... 1 mm	1 ... 80 mm
Weight	0.7 kg	0.7 kg	2.3 kg
Length	560 mm	560 mm	580 mm

Weight	1 kg
Dimensions (mm)	310 x 120 x 165 (H x W x D)

Weight	3.6 kg
Dimensions (mm)	318 x 208 x 132 (L x W x D)
Protection	IP 66
Operation temperature	-40 ... 60 °C
Power supply	ice sensor: 10 ... 28 VDC   heating: 24 V AC/DC
Power consumption	active measurement: 50 mA at 12 VDC   heating: max. 7 A at 24 V AC/DC
Outputs	SDI-12; RS 485 (Modbus RTU) three relay-outputs
Miscellaneous	integrated lightning protection; integrated overvoltage protection



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