Labkotec Ice Detector

LID 3300IP

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Level and flow know-how since 1964

Benefits of using Ice Detector

- Stops wind turbine to prevent icethrow
  Safety first of all ! Safety device
- Authorities / construction licence
  fulfills requirements
- Stops wind turbine due to turbine safety
  less service
- Helps to prevent stress for turbine gear
  less service
- Preventation of energy decrease
- Start of blade heating

⇒ LID Ice Detector gives an ice warning
from the very early phase of ice build-up

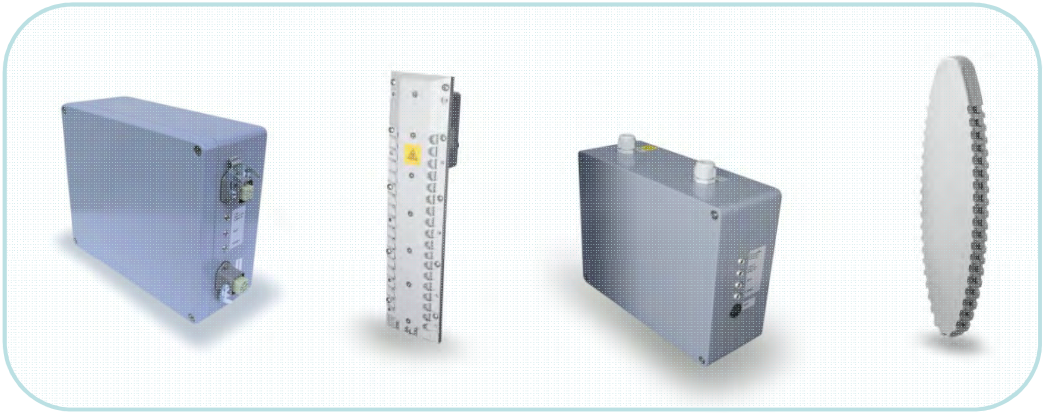
LID-3300IP Features

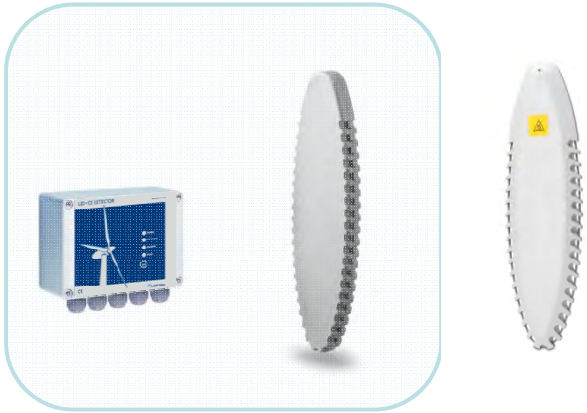
- Compact, rugged design
- Easy and quick installation, for new or old wind turbines, for all models in the world. Installation time only few hours
- Ready to use, no calibration needed on site.
- Sensors are fully replacable to each other. No need to calibrate the sensor with the specific control unit.
- Communication between sensor and control unit is RS-485 which gives more freedom to choose the cable type and length.
- Temperature compensation of the sensor
- TCP/IP interface and a web user interface
- 2 pcs of analog outputs, e.g. Ice value and ambient temperature. (Earlier only Ice value)

LID Ice Detector versions

Sensors and control units of LID-3210C and LID-3210D, including LID/IS ice sensor, are compatible with each other.

Next generation LID Ice Detector





	LID-3210C Control Unit and Ice Sensor	**LID-3210D Control Unit with:** – **Ice Alarm LED** – **Test button**	**LID/IS Ice Sensor**	**LID-3300IP Control Unit LID/ISD Ice Sensor** – **Web Server and UI for remote access**
1994 ->	2002 -> 2008	1Q/2008	4Q/2008	1Q/2010

ICE THROW FROM WIND TURBINES

DEWI, Deutsches Windenergie-Institut GmbH

$$d = (D + H) \cdot 1.5$$

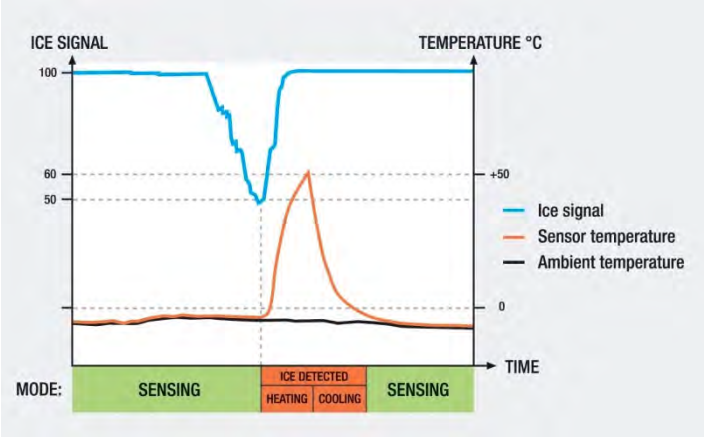
d = maximum throwing distance in m

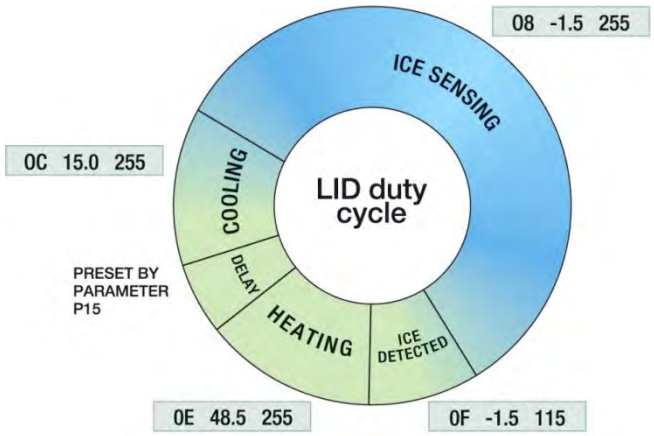
D = rotor diameter in m

H = hub height in m

This empirical and simplified equation can only be a "rough guess" and a help for a first shot in planning the position of a wind turbine close to streets or other objects, involving a certain risk. A more detailed calculation is recommended.

How it works



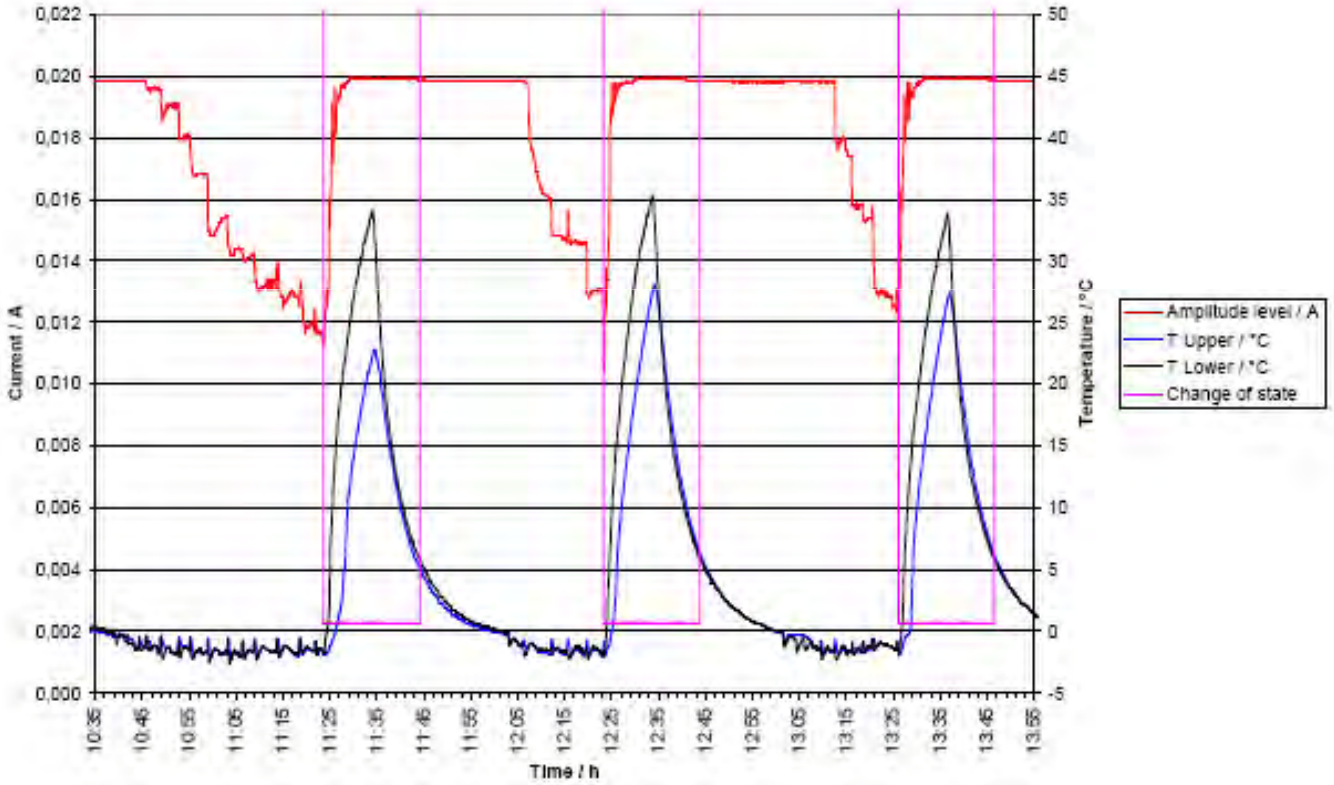


Note that the mode digits may vary - this is only an example.

- Ice detection of the LID Ice Detector is based on measuring the strength of an ultrasonic signal in a special sensor wire.
- During the icing conditions the signal amplitude will start to decrease → ice alarm signal at the given alarm level (set by parameter P00).
- Alarm reached → turbine is stopped or blade heating started.
- Right after the ice is detected, the sensor starts heating itself to melt the detected ice.
- After a set delay and cooling periods the ice alarm signal will go off and sensor is ready to detect icing conditions again.

Test results (LID/IS in freezing rain)

Icing/Freezing rain, MIL-STD-810F, Method 521.2 (1 January 2000)



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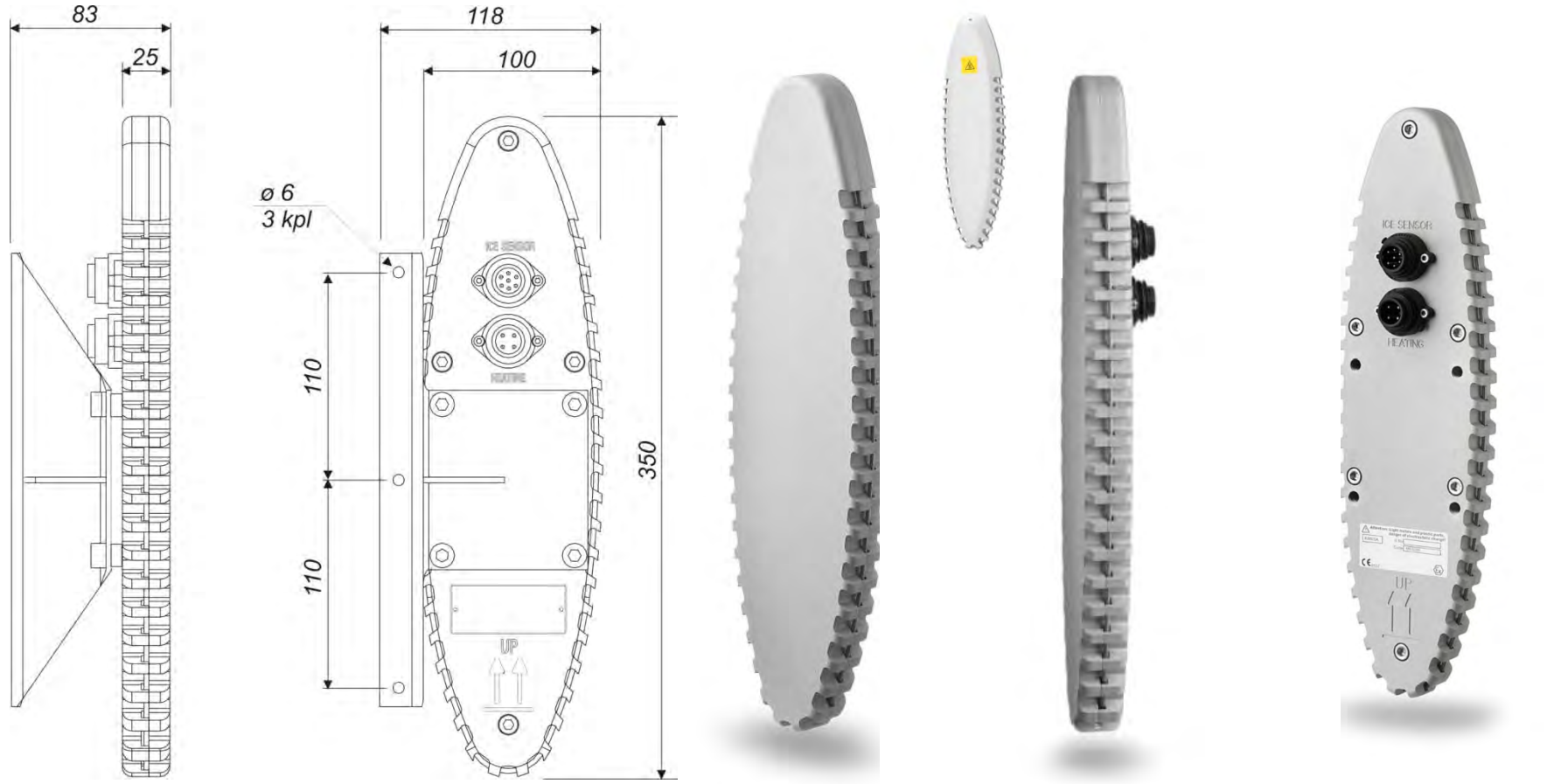
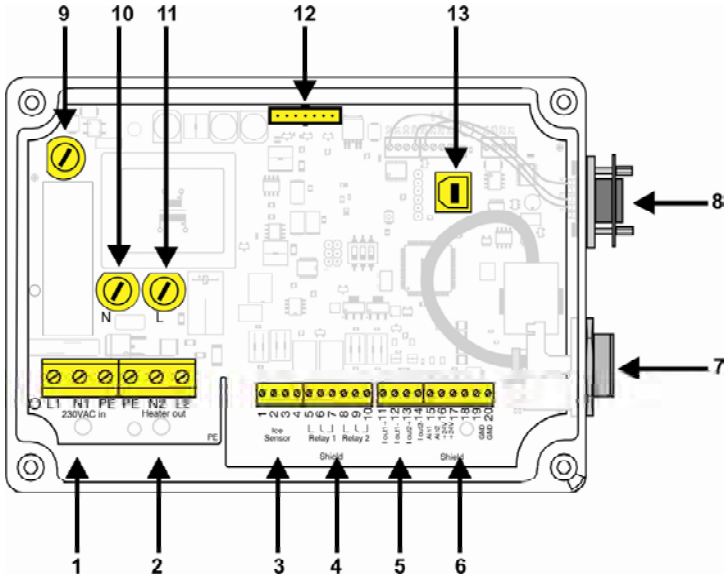
LID/IS(D) Ice Sensor

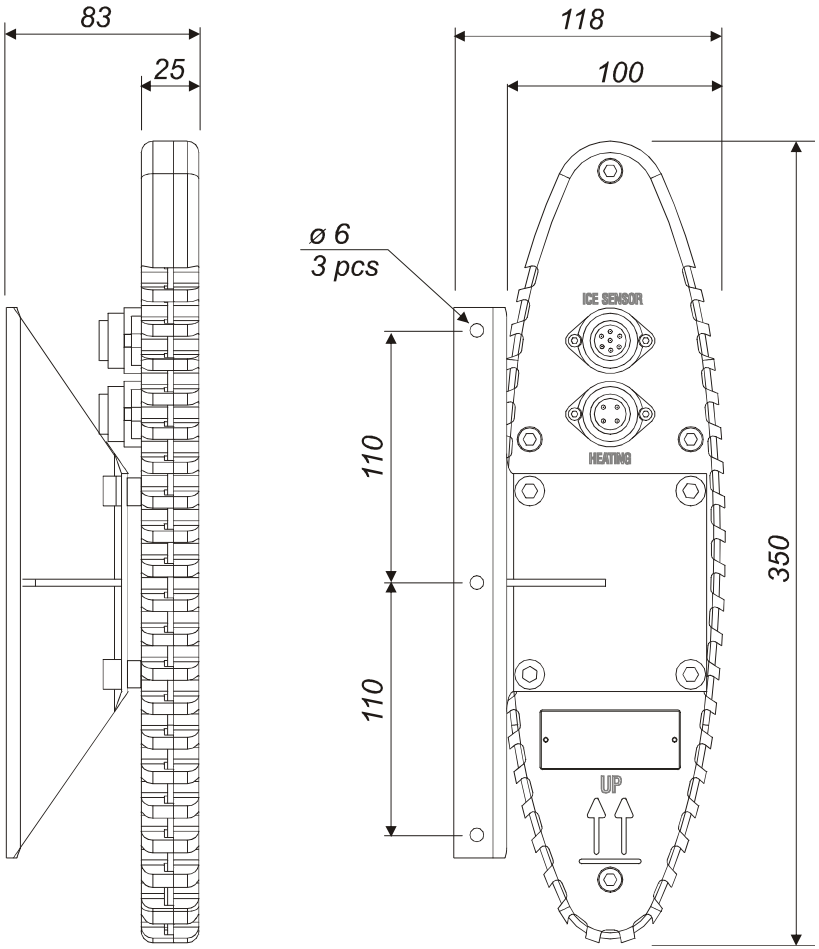


LID-3300IP

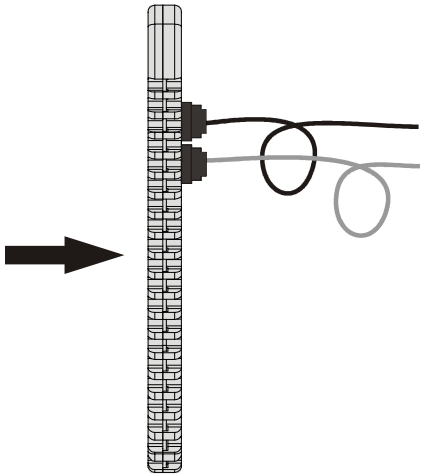
1. Power
2. Sensor heating
3. Ice Sensor signal
4. Relay outputs
   - Fault relay
     - 5 = normally closed
     - 6 = common contact
     - 7 = normally open
   - Ice Alarm relay
     - 8 = normally open
     - 9 = common contact
     - 10 = normally closed
5. Analog outputs
   - Analog output 1
     - 11 = Iout1+
     - 12 = Iout1-
   - Analog output 2
     - 13 = Iout2+
     - 14 = Iout2-
6. Not in use at the moment
7. Ethernet RJ-45 connector for Internet Web access
8. RS-232 D-connector
9. Main fuse
10. Fuse for sensor heating
11. Fuse for sensor heating
12. Connector for front panel flat cable
    USB connector for software download



Installation

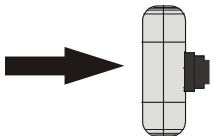


SIDE VIEW



Preferred wind directions

TOP VIEW



Installation on the nacelle

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Inside of nacelle

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Test results (freezing rain test)

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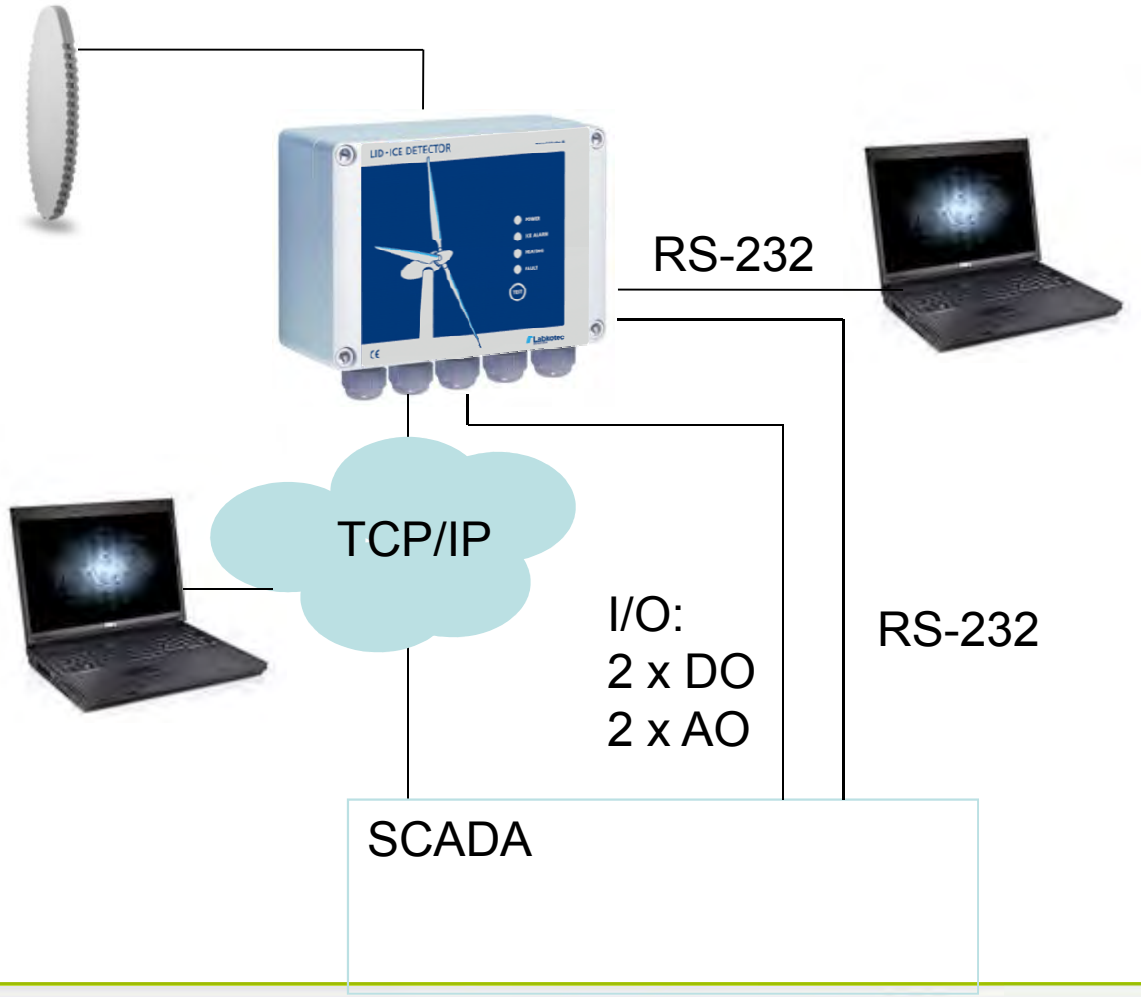
New Ice Detector LID-3300IP – System Overview



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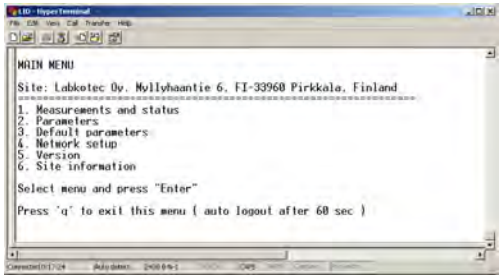
LID-3300IP Interfaces

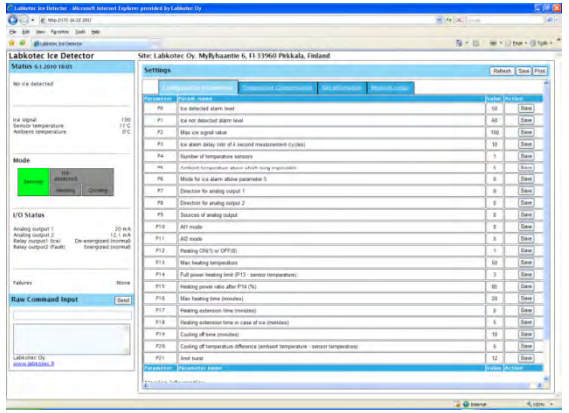
Front Panel:
- Power
- Ice Alarm
- Heating
- Fault
- Test button

Power
230 VAC

RS-232:
Command interface for PC
M2M serial interface



TCP/IP:
Web-UI



Electrical Outputs:
- Alarm relay
- Fault relay
- 2 pcs analog output 4..20 mA (e.g. ice value and temperature)

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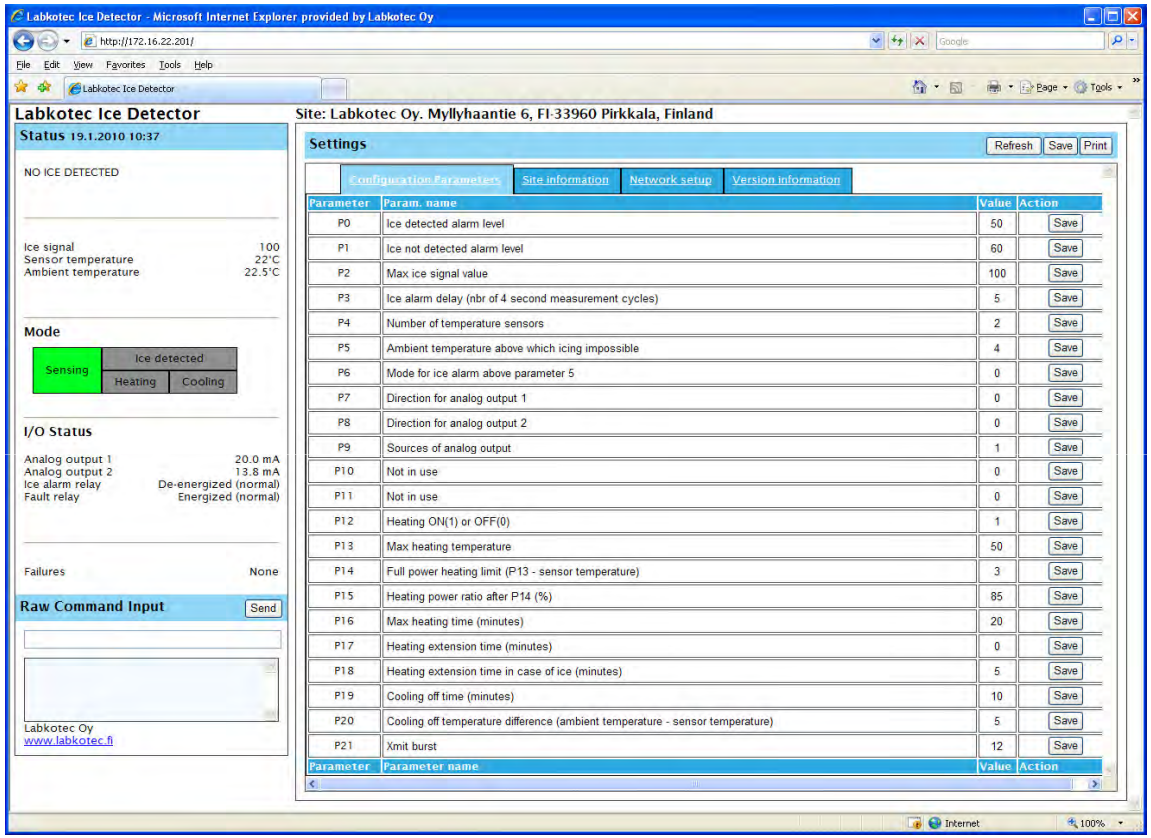
LID-3300IP WEB UI



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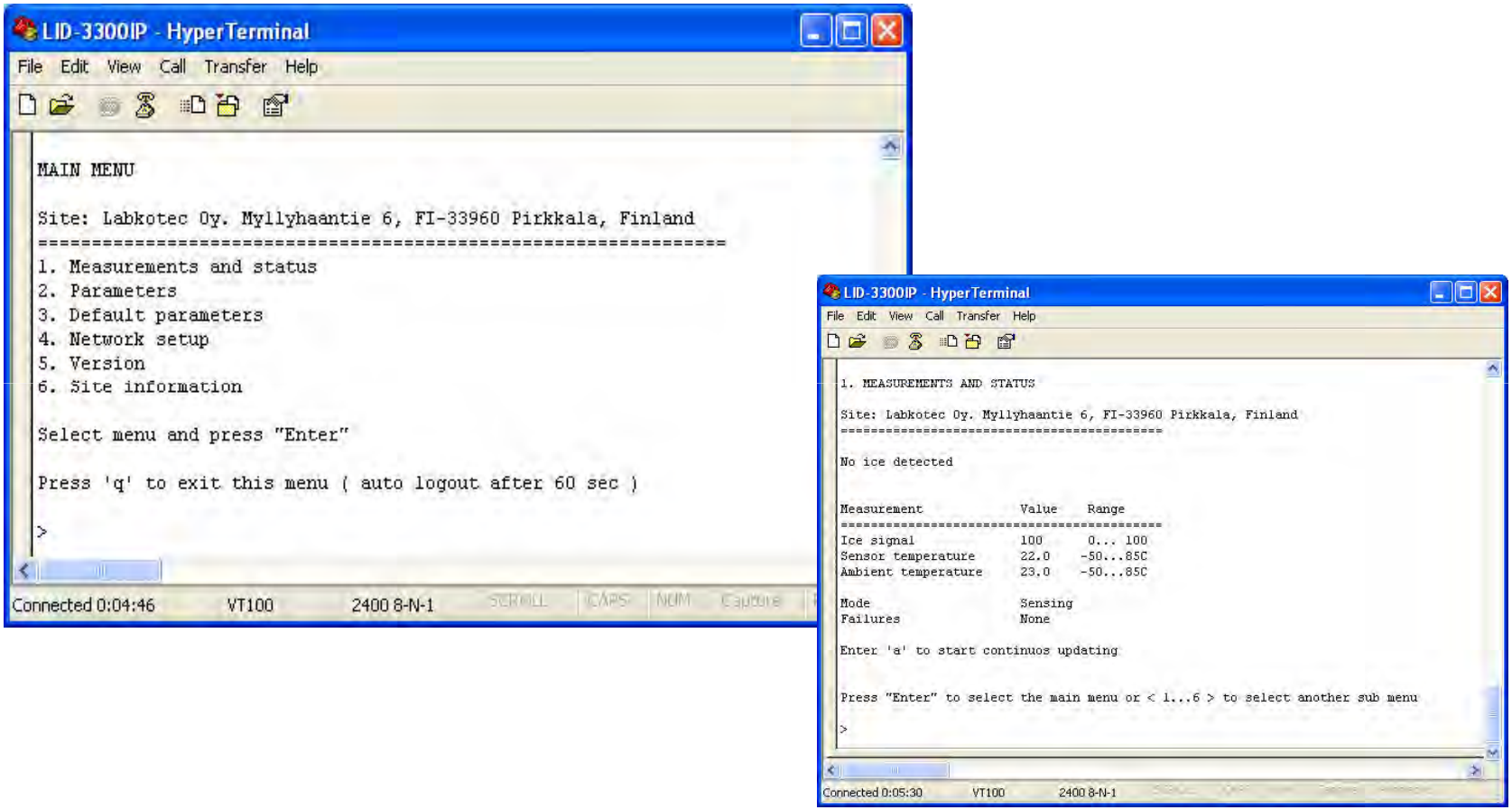
LID-3300IP RS-232 interface



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LID-3300IP Front Panel

Indicator / button	Meaning
POWER	Green light means power in on. No light means no power.
ICE ALARM	Red light means ICE ALARM. No light means NO ICE ALARM.
HEATING	Red light means HEATING is ON. No light means HEATING is NOT ON.
FAULT	Red light means FAULT is ON. No light means FAULT is NOT ON.
TEST BUTTON	Pushing the test button about 2 seconds will generate an ICE ALARM. Pushing the test button longer (about 7 seconds) will reset the device.

Technical specification

LID-3300IP Ice Detector Control Unit	
Enclosure	125 x 175 x 75 mm (h x w x d) Material: Polycarbonate Degree of protection: IP 66/67
Operating temperature	-30 ºC …+60 ºC
Power supply	230 VAC, 50/60 Hz
Power consumption	Normally 7 VA, Max 350 W during sensor heating
Fuse	50 mAT, IEC 127 5 x 20 mm
Analog output	2 pcs, 4-20 mA (for Ice signal and Temperature)
Relay output	2 pcs (Ice alarm and Fault), potential free relay output
Front panel	LED indication for Power, Ice Alarm, Heating and Fault. Test button to simulate Ice Alarm.
Serial output	RS-232 serial output for configuration and automatic reading
Web server	Integrated Web server and web based user interface for remote access to Ice Detector via Internet. Standard RJ-45 connector. IP address is configured via RS-232.
Electrical Safety (LVD)	EN 61010-1, Class I, CAT II EN 61010-2-010
EMC	EN 61000-6-4 (Emission) EN 61000-6-2 (Immunity)

LID/ISD Ice Sensor	
Dimensions	350 x 100 x 25 mm (h x w x d)
Material	Aluminum
Degree of protection	IP 65
Operating temperature	-40 ºC …+60 ºC

Labkotec at your service

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