

Meteorological Conditions Monitoring Station (MCMS)

- by Instrumentation Ictetek inc. (www.ictetek.ca) -

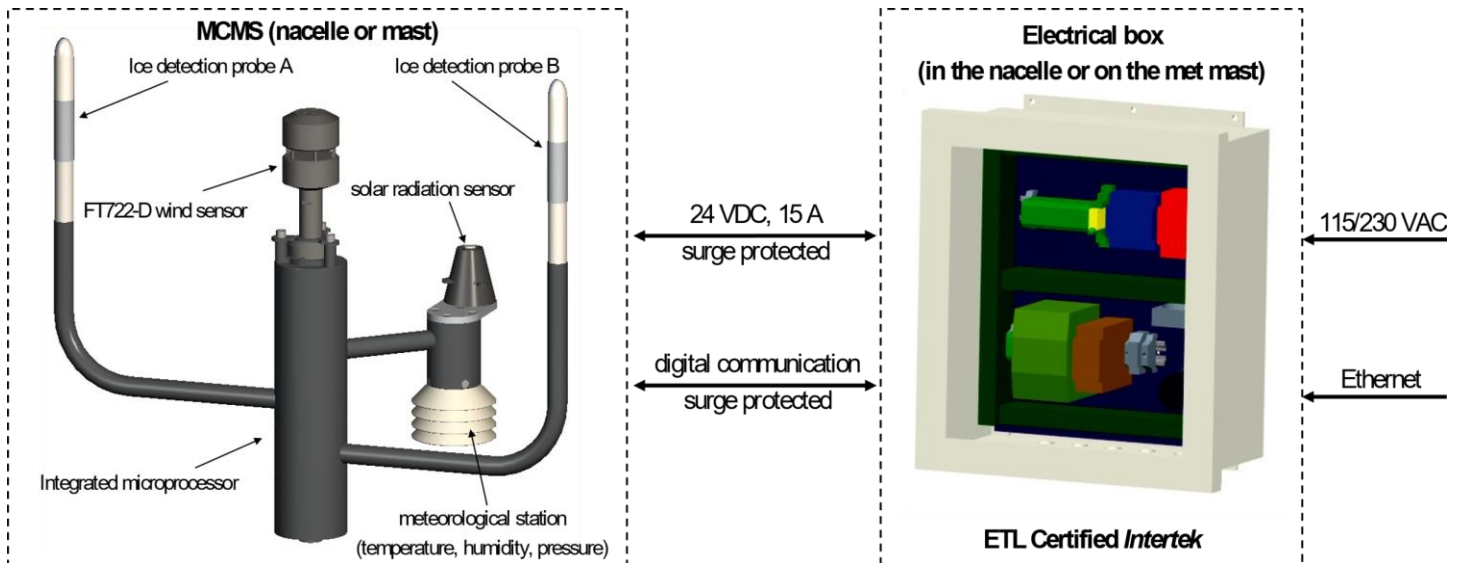
The MCMS is a revolutionary instrument used to detect and quantify icing events, as well as to quantify numerous meteorological features. It is a robust, reliable, easy to install and easy to use instrument. Originally designed to be installed as a nacelle-based instrument, it can also be adapted for meteorological mast operations. In either configuration, it is an instrument perfectly adapted to the wind energy industry in cold climate. The electrical box can be provided by Ictetek as per customer requirements. As an option, a pan-tilt-zoom (PTZ) camera can be installed on the turbine to get visual data, with custom boom and ice shield. The instrument has been successfully installed on Vestas V90, Enercon E82/E92, Senvion MM82/MM92, SIEMENS 3.2. Ictetek also provides solutions for the installation of the MCMS with custom booms and brackets.

Ice related features :

- detection of icing events
- icing type based on ISO-12494
- LWC estimation (g/m^3)
- icing severity estimation ($\text{g}/(\text{sm}^2)$)
- ice accumulation estimation (mm)

Other measurements :

- wind speed and direction
- air temperature
- relative humidity
- barometric pressure
- solar radiation



Technical performance

Power requirement¹

Supply voltage	24VDC nominal (12V to 30 VDC)
Supply current (Heater on)	10.6A @24VDC (255W)
Supply current (heater off)	4W

Environment

Temperature range	-40 to 70°C (accuracy reduced over 30°C)
Humidity	0 to 100%
Altitude	0 to 4000m

Data I/O

RS485 FULL-DUPLEX	Digital RS485 full-duplex. A Central Computing Unit (CCU) can be added to convert Digital RS485 to Modbus over TPC. This unit should be installed in an electrical box.
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Measurements (@ 1Hz)

Wind speed	0 to 50m/s	±0.3m/s (0-16m/s) ±2% (16-40m/s) ±4% (40-50m/s)
Wind direction	0 to 360°	± 4°
Temperature	-40 to 70°C	±0.1°C (-20°C à 30°C) ±0.5°C (<-20°C et >30°C)
Relative humidity	10 to 100%	±3% RH
Barometric pressure	30 to 110kPa	±1kPa
Solaire radiation	0 to 1800W/m ²	±5%
Liquid Water Content eff. ²	Typ. 0 to 1g/m ³	
Severity ²	Typ. 0 to 6g/(s m ²)	
Ice accumulation ²	mm or g	
Ice type ²	Glaze, soft rime, hard Rime (based on ISO 12494)	
Precipitation	on/off	
Meteorological icing	on/off	
Instrumental icing	on/off	

Other features

Programmable digital output	0-5V (50mA) e.g. triggering based on ice detection
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¹ to ensure the safe installation and operation of this product, the equipment must be protected by appropriate surge protection devices (Ictetek can provide appropriate equipment)

² estimated value