Cordulus Road Standard
Hardware description

Cordulus Road Standard is an IoT weather station suited for road weather condition monitoring in both urban and rural areas.

The weather station consists of a basic configuration and possible additional sensors. The basic configuration includes an air temperature sensor, relative humidity sensor and a road temperature sensor. Based on the readings, a calculated dew point is also provided. A mainboard interfaces to the sensors and communicates with the Cordulus cloud system. The basic configuration also includes rechargeable batteries and a solar panel.

The core technical solution for the station is shared with other Cordulus weather stations including Cordulus Farm with thousands of operational weather stations deployed. Data is communicated to the Cordulus cloud system where data is available through a REST API.
Third party users of data such as "Vejvejr" in Denmark use this API to get live and historical data.

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Hardware description

Road Standard basic configuration:

Sensor	Range	Resolution	Accuracy
Air temperature	-40 to 90 deg °C	0,01 deg °C	+/- 0,3 deg °C @ -40 to 0 deg °C +/- 0,2 deg °C @ 0 to 90 deg °C
Relative humidity	0 - 100%	0,01 %	+/- 2 %point
Road temperature	-55 to 100 deg °C	0,01 deg °C	+/- 0,5 dec °C @ -10 to 85 deg °C

Two additional sensors are optional:

Sensor	Range	Resolution	Accuracy
Rain	0-60 mm / hour	0,1 mm	+/- 2%
Wind speed	0,5 - 50 m/s	0,01 m/s	+/- 0,5% @ < 5 m/s +/- 3% @ 5 - 50 m/s

The Danish Road Directorate (Vejdirektoratet) has tested and evaluated the sensors and approved the Road Standard weather station for delivering data to "Vejvejr".
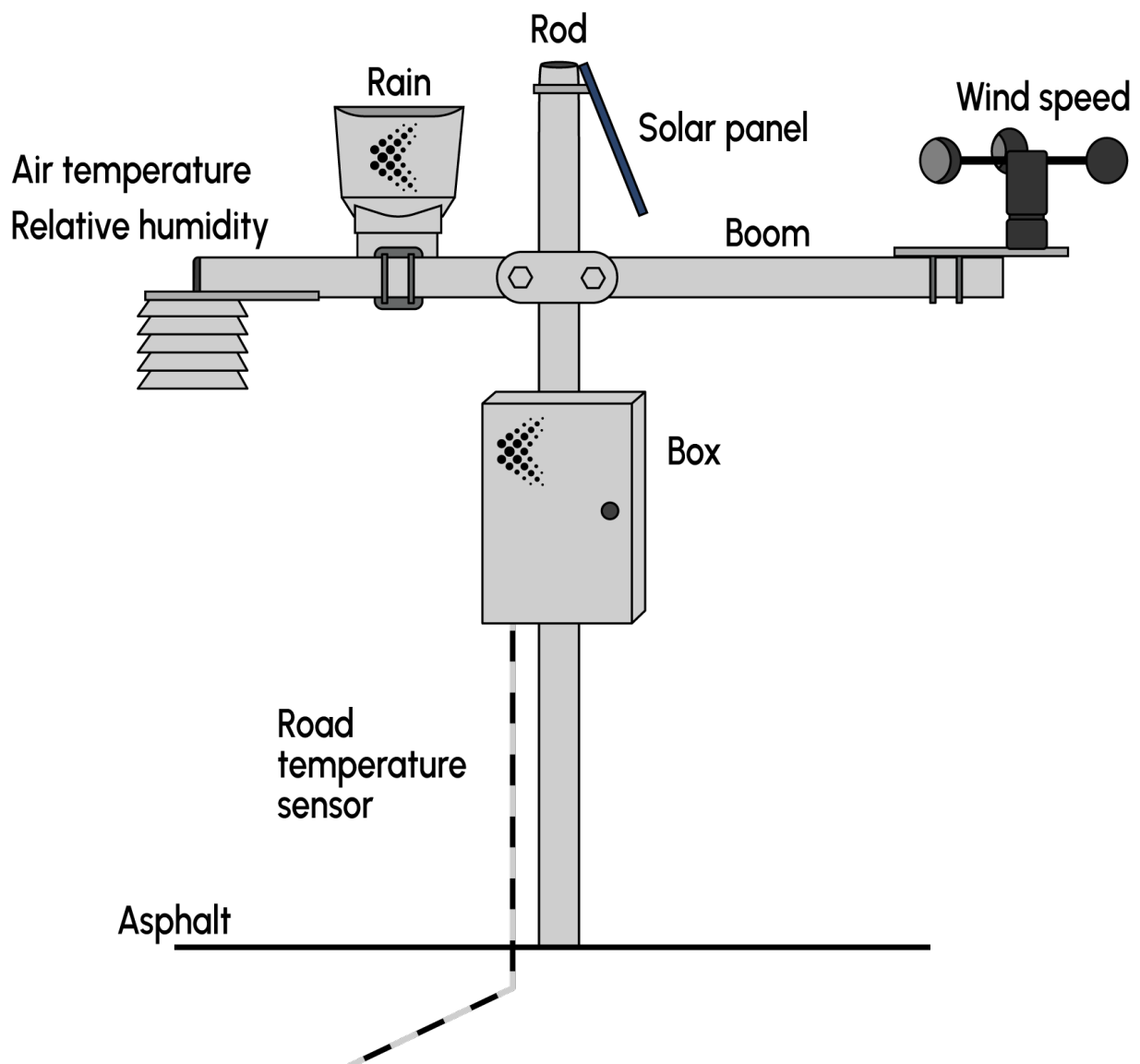
The evaluation showed that accuracy of the air temperature sensor and the road temperature sensors were better than stated in the datasheets.
Note the rain sensor is a tipping bucket sensor and hence only measures rain.

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Appendix

Rod

Rain

Solar panel

Wind speed

Air temperature
Relative humidity

Boom

Box

Road
temperature
sensor

Asphalt

Cordulus Road Standard

Hardware description

Appendix

Sensor placement

1.

Rod

Air temperature
Relative humidity

Box

Road
temperature
sensor

2.

Rod

Solar Cell

Rain

Cordulus

Air temperature
Relative humidity

Box

Road
temperature
sensor

3.

Solar Cell

Wind speed

Air temperature
Relative humidity

Rod

Box

Road
temperature
sensor

4.

Rain

Cordulus

Solar Cell

Wind speed

Air temperature
Relative humidity

Box

Road
temperature
sensor