



MONTREAL SOLUTIONS

# Montreal Solutions

## Devices Manual

Version: 1.0

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# 1 Introduction

In this document you will find a summary of the equipment installed by Montreal Solutions on the wind turbine at the RDM. It will show the basic overview of how everything is connected. If you want to connect your own, make sure you install it conform the documentation of the sensor as well as our equipment.

Warning: You will void your warranty as soon as you alter any of our equipment.

# 2 Installed sensors & devices

We have installed a few different sensors in multiple places, high up on the wind turbine but also in the electrical cabinet next to the turbine.

## 2.1 Wind turbine sensors

The wind turbine has three different sensors installed on it. Two of them are near the rotating head of the turbine and one is located on the tail of the turbine. All these sensors go to a waterproof box also mounted near the head of the turbine to be combined into one cable that will descent downwards. In the current situation, we can only have 2 sensors connected due to limitations of the slipring at the head of the turbine.

### 2.1.1 Induction sensor (currently offline)

The induction sensor (1) is a small sensor that can detect the metal of the wind turbine blades moving in front of it. It will send a pulse signal to a pulse counter module inside the box (2). This will communicate with our eGauge in the electrical box to save the pulses. This sensor is a Heschen LJ18A3-8-J/DZ.

### 2.1.2 Vibration sensor

We also mounted a vibration sensor (3) on the turbine. This can measure the amount of vibrations and acceleration in a precise way. This is connected via modbus to the eGauge. The type is WitMotion WTVB01-485 and its documentation can be found [here](#).

### 2.1.3 Rotation sensor

We have placed a rotation sensor on the tail of the wind turbine to measure the angle of the head. This 9-axis IMU can measure the rotation precisely. It is the WitMotion WT901C-485 and connects via modbus to the eGauge as well. Its documentation can be found [here](#).



## 2.2 Electrical cabinet sensors

The electrical cabinet is located at the base of the wind turbine. After opening this, you can see our equipment located on the left side on a wooden board. There are 3 main areas of this.

The top right box (4) contains a power supply and breaker switch. This goes into our main equipment box (5) where we house our controllers. The last box (6) is an extra box where extra sensors can be placed. It has an ethernet connection to our modem and has 24VDC power.

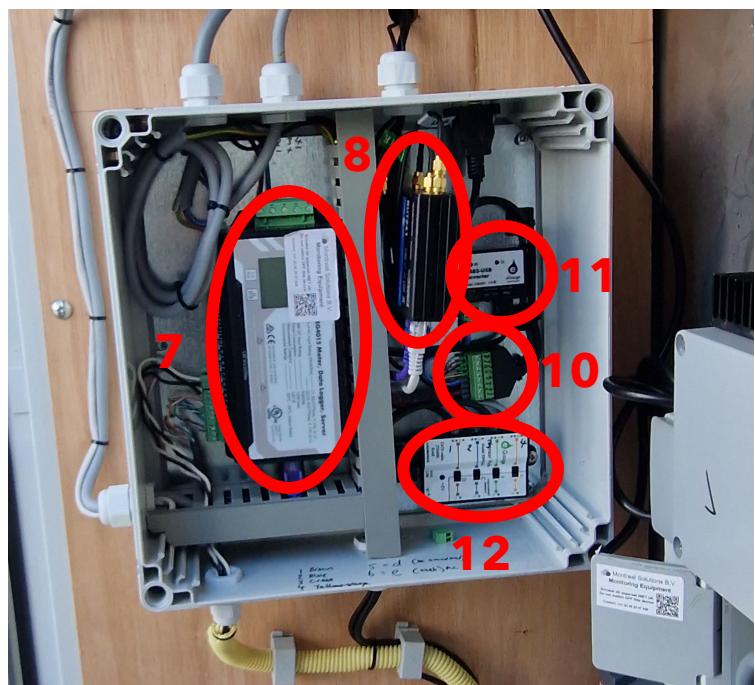


### 2.2.1 Data logger

The main equipment box contains many different components. The biggest one is our data logger (7). We can collect data from many different devices and coils here and it will store it per second. This is an eGauge EG4015 (Core) and the documentation can be found [here](#).

### 2.2.2 Internet modem

The logger needs internet to be able to connect to the dashboard. This is done by the 4G modem (8). It has an unlimited SIM from the Hogeschool Rotterdam and has 2 ethernet ports available. This modem has a big antenna at the top of the electrical cabinet (see 9 in the above picture). The modem is a Teltonika RUT241 and you can find more information [here](#).



### 2.2.3 Other converters

This box also has some other converters needed to read out all sensors. The incoming combined cable from the wind turbine comes in and gets split into their separate cables with the RJ45 splitter (10). The cables from the modbus sensors then go into the eGauge RS485-USB converter (11) to connect to the eGauge via USB. It also has an eGauge Smart Hub (12) for the eGauge to be able to read DC Coils and the pulse counter.

### 2.2.4 Coils

We have also placed power coils throughout the entire electrical cabinet to measure power going in and out of the system. The cables from these go into the eGauge to log the data.