

Meteorological Station Kit

OPERATION MANUAL



Station Kit v2018 | MetOS v1.2 | Document v0.3
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Custom Solutions for Observation Systems

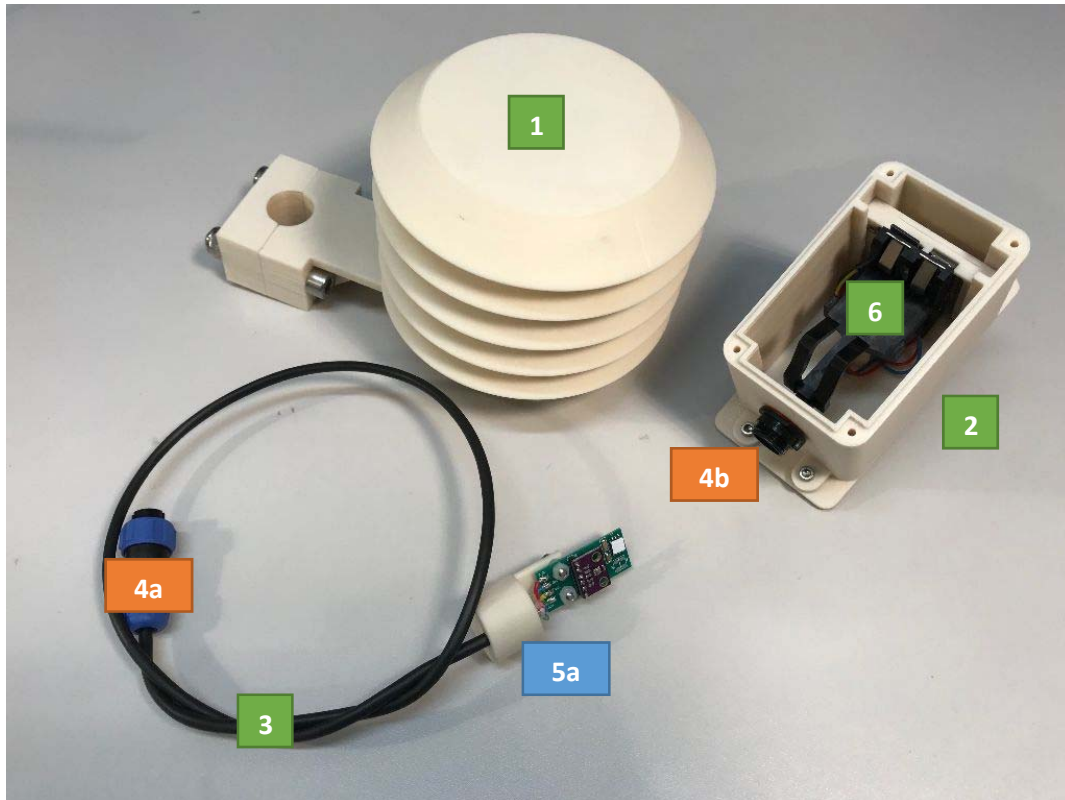
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1. General

This Met Station Kit system measures air temperature (°C), air humidity (%) and air pressure (hPa). The system consists of 3 major components. The heat-shield for the sensors (1), the data logger & power box (2), and the sensor cable (3) with data logger box connector on one end (4a) and heat-shield ring already mounted on the other end (5a).



1.1 Connecting the hardware

In order to log the data from the sensors, you need to connect the sensor cable (3) to the data logger & power box (2) using the provided connectors (4a to 4b).

If you are planning to use the sensors outside or in direct sunlight, we recommend placing the sensor circuit board (5a) into the provided heat-shield for more stable readings.

1.2 Software

Met station operating system is written into the non-volatile memory on-board the data logger. The provided SD card is only used for system configuration and data/status logging.

System configuration settings such as sampling interval and start time are located in **config.json** file on the SD card. All meteorological data is logged to **data.log** file on the SD card, while all system activity metrics are written to the **sys.log** file on the SD card.

See more about file syntax and structure in section 3 below.

1.3 Powering up the system

To power up the system, you need to insert a 9V battery into the battery holder (6) inside the data logger & power box.

Please mind the battery polarity matches the battery holder polarity (+ to +, - to -), as labeled on the battery holder front and 9V battery sides.

As soon as the 9V battery is inserted, the system will power up and start logging meteorological data at regular intervals, as configured in the config.json file.

2. Sensors

We use two different digital sensors to record all the data in this kit. These are:

2.1 Honeywell HIH6130

Honeywell HumidCon™ Digital Humidity/Temperature Sensors: HIH6130/6131 Series, is a digital output-type relative humidity (RH) and temperature sensor combined in the same package.

More info @ <https://sensing.honeywell.com/hih6130-6131-install-50061154-3-en-final-24oct11.pdf>

2.2 Bosch BMP280

The BMP180 consists of a piezo-resistive sensor, an analog to digital converter and a control unit with E2PROM and a serial I2C interface. The BMP280 delivers the uncompensated value of pressure and temperature.

More info @ <https://ae-bst.resource.bosch.com/media/tech/media/datasheets/BST-BMP280-DS001-19.pdf>

3. Device Configuration & Data

To configure your device, remove the SD card from the data logger (located inside the data logger & power box) and place it into a micro SD card reader connected to your computer. The SD card partition is compatible with all major operating systems (Windows, Mac OS X, Linux) and should be automatically mounted to your computer operating system similar to any other USB drive.

NOTE: Always remember to safely remove (unmount) the SD card from your computer operating system before you physically disconnect it from your computer.

Device configuration settings are located in the **config.json** file. Locate this file on the SD card and edit it using your favorite text editor such as Notepad in Windows.

3.1 data.log file

All meteorological measurement data is written to the **data.log** file stored on the SD card. The data format is comma delimited, with each new record separated into a new line.

Column headers are:

- Date & time,
 - Reading timestamp, starting from configured StartDateTime
- pressure,
 - Atmospheric pressure in hPa from BMP280
- temperature pressure,
 - Atmospheric temperature in degrees C from BMP280
- air temperature,
 - Atmospheric temperature in degrees C from HIH6130
- Humidity
 - Atmospheric relative humidity in % from HIH6130

Sample data record:

```
2017-10-11 12:0:0,22.42,996.68,23.1377,49.9298
```

This data record is timestamped October 11, 2017 at 12:00:00 hours, with pressure sensor reporting temperature reading of 22.42 °C and 996.68 hPa of absolute air pressure. The humidity sensor reported 23.1377 °C of air temperature and 49.9298 % of relative humidity.

3.2 config.json file

All configuration settings are stored in the **config.json** file stored on the SD card.

Using your favorite text editor, you can configure the following parameters in JSON format.

- **StartDateTime:**
 - [year, month, day, weekday, hours, minutes, seconds, sub-seconds]
- **CurrentDateTime:**
 - Used for restoring date/time after sleep
 - Leave blank using empty quotes e.g. ""
- **Sleep:**
 - Time to sleep between readings in minutes
- **OutputType:**
 - To enable writing data to SD card, always set to "1"

Sample configuration:

```
{ "StartDateTime": [2018, 10, 11, 3, 11, 46, 0, 0],  
  "CurrentDateTime": "",  
  "Sleep": "15",  
  "OutputType": "1" }
```

This will set the start observation timestamp to October 11, 2018 at 3:11:46 hours with sampling interval every 15 minutes. The observed data will be stored on the SD card.

3.3 sys.log file

All system log data is written to the sys.log file on the SD card. This log of system activity is useful to monitor power consumption and overall system operation.

Sample system log entry:

```
=====  
Start DateTime:(2015, 1, 1, 0, 0, 0, 3, 1)  
Battery:3.746982 V  
Power on, set DateTime:[2018, 5, 8, 2, 12, 0, 0, 0]  
RTC DateTime!:(2018, 5, 8, 2, 12, 0, 0, 255)  
DateTime to write on SD:2018-5-8 12:0:0  
Go to sleep for: 15
```

4. Support

Please let us know if we can be of further assistance as you explore the features and capabilities of this observation system.

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