

Weather Station Training Unit

Overview

Weather station training unit is a benchtop kit which is designed to introduce the trainees to various sensors and devices used for monitoring and measuring weather conditions in real life. The unit allows the trainees to measure wind speed, wind direction, ambient conditions & air quality using different sensors and display the results and readings through the software.



Specifications

- The system composes of a bench top unit in addition to an accessories box.
- The bench top unit presents a wind vane and a cup anemometer mounted on its surface, in addition to a gps tracker and a handheld anemometer .
- The wind vance is used to detect wind direction.
- A cup anemometer is supplied with a pocket for rain detection.
- The cup anemometer is highly sensitive to wind motion, so it can capture the smallest amount of wind and detect its speed and direction.
- The education unit is supplied internally with a pressure sensor, temperature sensor and humidity sensor to measure the ambient conditions of the weather.
- Additionally, a handheld anemometer is used to detect various weather parameters such as pressure, temperature and relative humidity.
- It also acts as a reference for the training unit measurements.

- The training unit is provided with a software to display the measurements of the educational unit such as the reading of the temperature, relative humidity, pressure and air quality sensors in addition to the gps reading and map.
- The trainer is connected to the Laboratory PC via wifi for display of the software using a receiver and a transmitter chips.
- The unit is supplied with two LEDs, one of them is an indication for system connection

to the power supply and the other one is an indication for system connection to the software.

- The trainer is also provided with schematic diagrams of the cup anemometer and wind direction mathematical analysis.
- The accessories kit including :
 - » Transmitter and receiver chips
 - » Power cable
 - » Handheld anemometer.

Experiments

- Familiarization with sensors used for weather detection and their theory of operation.
- Measuring wind speed using the cup anemometer.
- Detection of wind direction using wind vane

- Detection of ambient conditions and the air quality using provided sensors and software.
- Detection of wind speed and ambient conditions using handheld anemometer

Technical Data

Temperature Sensor

- » Range: -40 ~ 85°C.
- » Absolute accuracy temperature: $\pm 0.01^\circ\text{C}$.
- » Supply current: 1.0 μA .

Humidity Sensor

- » Operating temperature: -40 ~ 85°C.
- » Supply current: 1.8 μA .
- » Range: 0 ~ 100%RH.
- » Resolution: 0.008%RH.
- » Absolute accuracy tolerance: $\pm 3\%$ RH.
- » Hysteresis: $\pm 1\%$ RH.
- » Non linearity: 1%RH.
- » Response time: 1 Sec.
- » Stability: 0.5%RH per year.

Pressure Sensor

- » Operating temperature: 0 ~ 65°C.
- » Range: 30,000 pa ~ 110,000 pa.
- » Resolution: 0.18 pa.
- » Accuracy: ± 12 pa.
- » Supply current: 2.8 μA .
- » Temperature coefficient of offset: ± 1.5 pa/K.
- » Absolute accuracy: ± 100 pa.
- » Stability: ± 1 pa.

Altitude sensor

- » Range: 0 ~ 9 Km.
- » Accuracy: ± 1 m at sea level.

Air quality sensor

- » Total Volatile Organic Compound (TVOC) sensing from 0 to 32,768 ppm.
- » eCO2 sensing from 400 ppm to 29,206 ppm.

Handheld Anemometer

- » Wind speed range of 0.3 ~ 30 m/s, with unit switching function (m/s, Km/hr, ft/min, Knots, mph) and a resolution of 0.1 m/s.
- » The temperature ranges from -10 ~ 45°C, with unit switching function ($^\circ\text{C}$ & $^\circ\text{F}$) and a resolution of 0.2 $^\circ\text{C}$.
- » The humidity ranges from 5% ~ 95%RH with a resolution of 0.1% RH.
- » The altitude ranges from 0 ~ 6000 m with a resolution of 1 m.

Cup Anemometer

- » Range: 0 ~ 320 Km/hr.
- » Resolution: 0.1 Km/hr.

Components



1	Wind vane.	2	Cup anemometer.
3	Rain detection pocket	4	Handheld anemometer.
5	Transmitter	6	GPS tracker.
7	Cup anemometer schematic diagram.	8	Operation indication LEDs.

Scope of Delivery

- Weather station training system (MMS113)
- Hard copy user manual

Required for Operation

- Laboratory PC

Options

- Digital content (BI01).