

HIGHER TECHNICAL INSTITUTE

ELECTRICAL ENGINEERING
DEPARTMENT

DIPLOMA PROJECT

DESIGN AND CONSTRUCTION OF A
WEATHER MONITORING SYSTEM

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Design and Construction of a Weather
Monitoring Station

by

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NICOSIA - CYPRUS
ELECTRICAL ENGINEERING DEPARTMENT
DIPLOMA PROJECT

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Project Number: E. 1379

Title:

“Design and Construction of a Weather Monitoring Station.”

Objectives:

To design, construct and test a weather monitoring station.

Terms and Conditions:

- Investigate the ranges and accuracies of the required parameters.
- Investigate weather monitoring sensors and their interfacing with suitable microcontrollers / data loggers.
- Investigate methods and equipment suitable for transmitting weather data from remote collecting stations to a central control station.
- Select the most appropriate from the above and construct a weather station.

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Supervisor : Mr. Spyros P Spyrou.

External Assessor : Mr. Michalis Soroupetsis.

Mark : %

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Introduction

As stated in the preface the aim of this project is to design a low cost, reliable and accurate weather monitoring system to rival the professional available systems. For each sensor the available solutions are discussed. Their general advantages and disadvantages are listed and are analysed and the sensor to be used is chosen.

The primary meteorological variables are:

- Temperature
- Relative Humidity
- Barometric Pressure
- Wind Speed
- Wind Direction
- Rainfall

These are the variables that the system must be able to measure. In order to define the range that has to be measured by the sensors an extensive research was conducted of available systems. From the research the following specifications were formulated

Temperature:

Scale: Celsius

Range: -40°C to +60°C

Accuracy: $\pm 0.5^\circ\text{C}$ at 25°C

Since the temperature range is from -40°C to +60°C the whole system must be able to work within this range.

Relative Humidity:

0 to 100% non condensing

Barometric Pressure:

The highest recorded atmospheric pressure, 108.57 kPa (1085.7 mbar or 32.06 inches of mercury), occurred at Tonsontsengel, Mongolia, 19 December 2001.

The lowest recorded non- tornadic atmospheric pressure, 86.996 kPa (869.96 mbar or 25.69 inHg), occurred in the Western Pacific during Typhoon Tip on 12 October 1979.

Selected range: 560mbar to 1030mbar

Accuracy: 1mbar

Resolution 1mbar

Wind speed:

Minimum speed 0.5 m/s

Maximum speed 50 m/s

Accuracy 2%

Wind direction:

Continuous range

Accuracy 1%

Rain fall:

Resolution 0.025mm

A comparison table of many commercial weather stations can be found in the appendix section.