

# ***Intech*** INSTRUMENTS LTD

**Instrumentation • Monitoring • Control**

## ***WEATHER MONITORING***

### **Description**

Weather Sensor Transmitters are tools for the observation and recording of meteorological data. Weather conditions play an important role in industrial processes, laboratories, warehouses, etc. Using weather stations will give you control and assure you will make the right decision.

The sensors can monitor **air temperature, humidity, barometric pressure, light energy, wind speed, wind direction** and **rainfall**.

The output signals from the sensors are industrial standard **4~20mA** (loop powered), which will allow you for easy integration into a SCADA or PLC monitoring system of your choice.



### **Applications**

- ◆ Wine yards
- ◆ Agriculture
- ◆ Hydrologic plants
- ◆ Meteorology
- ◆ Aviation
- ◆ Shipping Industry
- ◆ Water Industry
- ◆ Construction
- ◆ And many more!

### **Features**

- ◆ Sensors are available for monitoring each of the following:
  - \* Air Temperature.
  - \* Humidity.
  - \* Barometric Pressure.
  - \* Light Energy.
  - \* Wind Speed.
  - \* Wind Direction.
  - \* Rainfall.
- ◆ 4~20mA output signals from all sensors (loop powered).
- ◆ Fully mounted type is supplied with T-Bar equipment mounting arm, complete with attachment plate and two 50mm U bolts, ready for mounting to pipe or bolting to posts or buildings.

## Extra Features

- ◆ Intech Weather Sensors are an excellent choice for industrial applications. Made in New Zealand, Intech sensors and weather stations are used in different locations around the world; users prefer them for its reliability, ruggedness and versatility.
- ◆ Available as individual sensors or as full weather station. See 'Ordering Information' section.
- ◆ Compatible with TruTrack Dataloggers, and easy integration with MicroScan SCADA and ezeio Cloud Based Monitoring System. See 'Connections' section.
- ◆ Intech weather sensors are easy to install, fully configured and ready to use upon delivery.

## WEATHER SENSORS

### Anemometer (Wind Speed)



The **Anemometer** is used for the measurement of wind velocity. The TruTrack Anemometer is manufactured from stainless steel and anodized aluminium so as to provide minimum maintenance and maximum reliability.

#### Three Cup Anemometer specifications:

- Range 0~60 m/s
- Accuracy  $\pm 2\%$
- Starting Speed 1.5 m/s
- Cable length 5m

#### Six Cup Anemometer specifications:

- Range 0~80 m/s
- Accuracy  $\pm 2\%$
- Starting Speed 0.45 m/s
- Cable length 5m

The Anemometer can be supplied with a 4~20mA Output or Pulse (switch closure).

#### 3 Cup Anemometer

4~20mA output:

Order code: **WS3-CL**

4mA = 0 metres/second

Pulse output:

Order code: **WS3-PS**

#### 6 Cup Anemometer

4~20mA output:

Order code: **WS6-CL**

4mA = 0 metres/second

Pulse output:

Order code: **WS6-PS**



The Anemometer is supplied attached to the T Bar Equipment Mounting Arm (shown right). Options are available to supply free standing or on a base mounting plate (as above) for attaching to posts or buildings.

We also have a six cup Anemometer available if your application requires lower starting speeds (=0.45 m/s).

**Ordering Code:** **WS3-CL** = Wind Speed (3 cup Anemometer) complete with 5m of cable. 4~20mA output signal.  
**WS6-CL** = Wind Speed (6 cup Anemometer) complete with 5m of cable. 4~20mA output signal.

## Wind Direction

The **Wind Vane** is manufactured from stainless steel and anodized aluminium so as to provide minimum maintenance and maximum reliability.

- ◆ Range 0°~360°
- ◆ Accuracy  $\pm 5^\circ$
- ◆ Dead band 20° (350°~10°)
- ◆ Damping: 2min Nominal over 90°

The Wind Direction Vane has a 4~20mA output. 4~20mA output is:

4mA at 0 deg North  
12mA at 180 deg South  
20mA at 360 deg North



The Wind Direction Vane is supplied attached to the T Bar Equipment Mounting Arm. Options are available to supply free standing or on a base mounting plate for attaching to posts or buildings.

**Ordering Code:** **WD-CL** = Wind Direction complete with 5m of cable. 4~20mA output signal.

## Light Energy Sensor (Pyranometer)

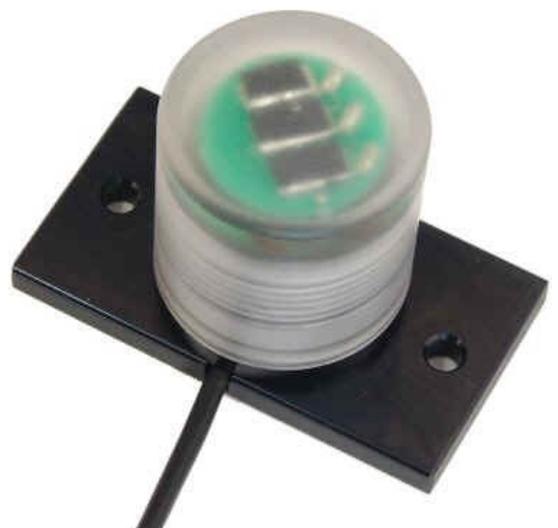
The **Light Energy Sensor** (Pyranometer) has been designed to provide a wide spectral response, a good cosine response and low susceptibility to inaccuracies caused by rain drop and dirt effects.

- ◆ Range 0~1500 w/m<sup>2</sup>
- ◆ Accuracy  $\pm 5\%$
- ◆ Cosine error is typically less than 3% from vertical to 85° in all directions
- ◆ Temperature Coefficient 0.15% per 1°C

The Light Energy Sensor is supplied attached to a T Bar Equipment Mounting Arm. Options are available to supply free standing, or on a Base Mounting Plate as shown below.

The **Pyranometer** uses an polycrystalline silicon solar cell to measure the incoming global solar radiation. This gives good accuracy without the expense and maintenance required by a Thermopile Pyranometer. It also provides a flatter spectral response than the photo diodes that are frequently used for this type of sensor (see spectral response graph).

The **Pyranometer** has a relatively large surface compared to many photo diode sensors. This minimises inaccuracies caused by the effect of rain drops and dirt on the surface. The sensor has a slightly domed top to facilitate rain drainage. Dirt sitting on the surface of the sensor is dispersed by rain flowing off the dome.



**Ordering Code:** **LE-CL** = Light Energy Sensor complete with base plate and 5m of cable. 4~20mA output signal.

## Temperature Sensor

The **Temperature Sensor** is a high accuracy thermistor that has been factory calibrated to within 0.2 °C.

This alleviates the need for any user calibration. The sensor has low thermal mass so as to ensure a fast response time.

- ◆ Temperature Range: -30°C~70°C.
- ◆ Accuracy:  $\pm 0.3^\circ\text{C}$  from 0°C~50°C.
- ◆ The Temperature Sensor is housed inside the Solar Radiation Shield.



**Ordering Code:** T-CL-E = Temperature Sensor complete with 1.5m of cable. 4~20mA output signal.

## Humidity Sensor

- ◆ Instantaneous de-saturation.
- ◆ Response time 4 seconds.
- ◆ Long-term stability.
- ◆ Range 0%~100%.
- ◆ Accuracy:
  - $\pm 3.5\% \text{RH}$  from 10% to 90%.
  - $\pm 5\% \text{RH}$  from 0% to 10% and 90% to 100%.
- ◆ The Humidity Sensor is housed inside the Solar Radiation Shield.



**Ordering Code:** H-CL-E = Humidity Sensor complete with 1.5m of cable. 4~20mA output signal.

## Barometric Pressure Sensor

- ◆ Range 10 to 1100 mBar (hPa).
- ◆ Temperature Range -40°C~125°C.
- ◆ Resolution 0.1 mBar (hPa).
- ◆ Accuracy  $\pm 1.5 \text{ mBar (hPa)}$ .
- ◆ Temperature Co-efficient  $\pm 2 \text{ mBar (hPa)}$  from -40°C to +85°C.
- ◆ The Barometric Pressure Sensor is housed inside the Solar Radiation Shield.



**Ordering Code:** BP-CL-E = Barometric Pressure Sensor complete with 1.5m of cable. 4~20mA output signal.

## Leaf Wetness Sensor

The **Leaf Wetness Sensor** measures the amount of precipitated or condensed water that could be expected to be sitting on the surface of a leaf during and after rainfall and dew. The sensor should be mounted so that the surface is at a similar angle to the leaves of interest.

- ◆ Temperature Range: 1°C to 50°C.
- ◆ Sensor Type: Gold plated printed circuit board array.
- ◆ Measurement Units: 0% to 100% leaf wetness.
- ◆ Dimensions: 10mm x 50mm x 25mm.
- ◆ Cable length: 10 metres
- ◆ Optional (please specify when ordering).



## Rain Gauge

The Rain Collector is designed to meet the guidelines of the World Meteorological Organization. Rain enters the collector cone, passes through a debris-filtering screen, and collects in one chamber of the tipping bucket. The bucket tips when it has collected an amount of water equal to the increment in which the collector measures (0.2 mm).

As the bucket tips, it causes a switch closure and brings the second tipping bucket chamber into position. The rain water drains out through the screened drains in the base of the collector.



0.2mm Rain Gauge

**Ordering Code:** RAIN = 0.2mm Rain Gauge with Pulse Output.

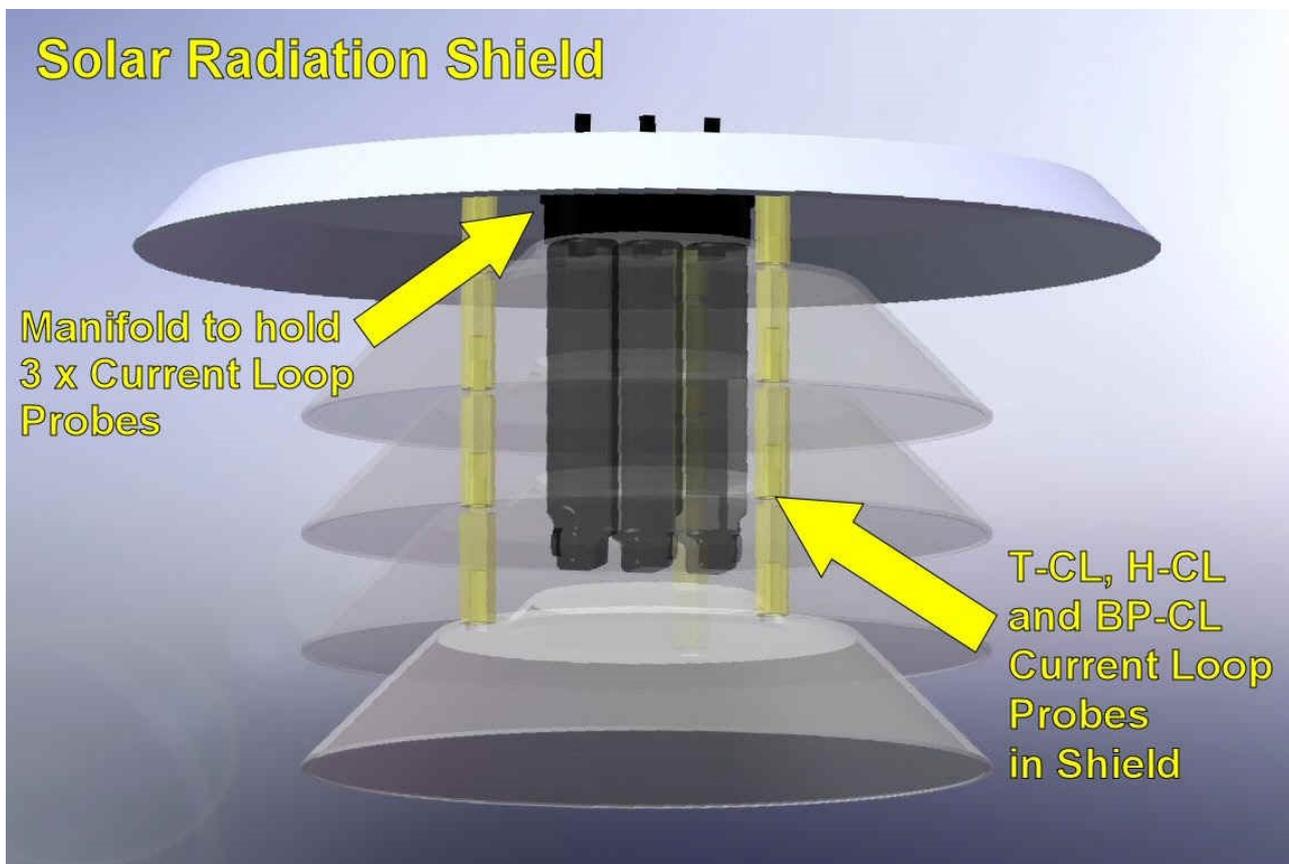
RAIN-CL = 0.2mm Rain Gauge with 4~20mA Output (included Intech PI-F Frequency transmitter).

## MOUNTING

### Solar Radiation Shield

The **Solar Radiation Shield** is a chamber made from a series of fins that use the natural convection of warm air to draw fresh air into the chamber and expel the heated air. Temperature, Humidity and Pressure Sensors that are placed within the chamber will experience a flow of fresh air and so give more accurate measurements than sensors that are exposed to direct sunlight.

The fins are made from spun aluminium that has been powder coated white.



*This shows how three Current loop probes can be mounted in our Solar Radiation Shield to give Temperature, Humidity and Barometric Pressure measurements all in one shield .*

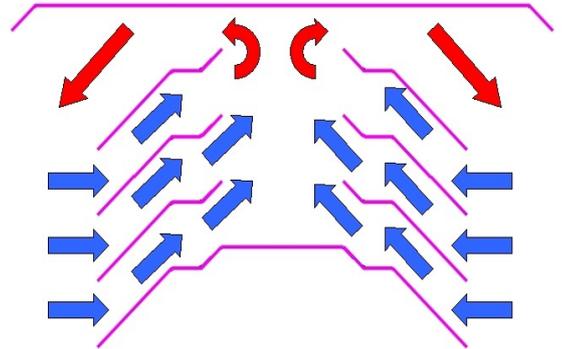
The **Solar Radiation Shield** is connected to the **T Bar Equipment Arm**. This is the most convenient way of mounting the shields to a tower, post or building.

The ventilated chamber within the **Solar Radiation Shield** is cylindrical in shape, 90mm high and 50mm in diameter. This chamber is surrounded by a stainless steel mesh grill to protect the sensors from insects and wind blown debris.

If sunlight falls on sensors they absorb radiant energy directly from the sunlight and are therefore at a higher temperature than the surrounding air. This causes erroneous readings.

If the sensors are put into a chamber so that the direct sunlight can not strike them but the chamber and the air within it are heated this will also cause erroneous readings.

If the chamber can be ventilated so that any heated air in chamber can rise and escape through convection then fresh air from the outside will be drawn in over the sensors and accurate readings of the air temperature, humidity and pressure can be made.



**Ordering Code (As an mounting option):**

**Shield** = Solar Radiation Shield (Does not include sensors). Must be attached to an L-Bar or T-bar.

## Base Mounting Plate

The TruTrack **Base Mounting Plate** is used to facilitate the attachment of Wind Vanes, Anemometers and Solar Radiation Sensors to posts or buildings. Two countersunk holes in the centre of the plate are used to attach the base. The two outer holes are then used to attach the base to a post or building.

The outer holes are 5mm in diameter and 55mm apart. There is a groove in the plate to allow the cable, from the center of the base, to emerge at the side of the **Base Mounting Plate**. When fitted in the TruTrack factory, neutral cure translucent marine silicone rubber is used to seal the base to the **Base Mounting Plate**



*Base Mounting plates. Top plate showing the countersunk holes in the centre of the plate that are used to attach the base. Lower plate showing the cable groove.*



*Base attached to a Base Mounting Plate showing the cable exit*

## L Bar & T Bar Equipment Arms

The L Bar and T Bar Equipment Arms are a mounting system for attaching loggers, solar radiation shields, wind speed anemometers, wind vanes, light sensors and cell phone or radio communications systems to towers, poles and buildings.

The **L Bar** arm is a 400mm long section of "Unistrut" steel that has been ElectroZincd to give superior outdoor protection and then White Powder coated.

Wind speed anemometers, wind direction vanes and light sensors can be attached to the top of the L Bar Equipment Arm. Cables from the sensors pass through a hole drilled in the arm into the logger or remote probe controller within the arm. This keeps the cabling tidy and out of the weather.



*WS3-CL Anemometer mounted on L-bar.*

The **T Bar** arm is 800mm long with the mounting plate in the centre of the arm. This arm is specifically designed to give good separation between wind speed anemometers and wind vanes. The Bar is 41mm U section and is supplied with a plastic capping strip to cover the underside of the arm and two end caps.



*Weather sensors mounted on T-bar.*

An End Cap is also supplied to protect equipment and cables inside the Unistrut. This can be easily removed to connect download cables to loggers inside the arm if required.



Each Arm has an attachment plate with holes that can be used for mounting to 50mm (2inch) or 25mm (1inch) diameter pipe or bolting to posts or buildings. The arm is supplied complete with two 50mm (2inch) U bolts .



**Ordering Code:** **LB** = L-Bar with attachment plate and two 50mm U bolts.  
**TB** = T-Bar with attachment plate and two 50mm U bolts.

## Weather Sensors Installation

Proper siting for weather sensors is important to ensure accurate readings. For example, wind sensors should not be installed too close to a building, as turbulence created by the building can interfere with readings. The Solar Radiation sensor should be installed in direct sunlight on a level surface.

Purchase of both the Wind Direction and Wind Speed sensors includes a T-Bar with U bolts for easy installation. The Solar Radiation Shield is used for more accurate measurements of temperature, humidity and barometric pressure sensors. The Shield should be attached to an L-Bar or T-Bar. All installation notes are included in the manuals of each sensor.

Please note installation will vary depending if it is an individual sensor or a complete weather station.

# FULLY MOUNTED WEATHER SENSORS

## Temperature, Humidity and Pressure

We also have fully mounted options as per right picture. All sensors with 4~20mA outputs.



**Ordering Code:**

**THP-LB-CL** = Temperature, Humidity and Barometric Pressure sensors, all housed in a Solar

## Wind Speed & Wind Direction



**Ordering Code:**

**WS3-WD-TB-CL** = Wind speed 3 cup (starting speed = 1.5m/sec, 20mA = 60m/sec), Wind Direction, mounted on T-Bar Mounting Arm complete with 5m cable. 4~20mA output.

**Option:** **WS6** = Fit Wind Speed 6 cup instead of WS3 on above T-Bar option.

## Temperature, Humidity and Pressure, Wind Speed & Wind Direction



**Ordering Code:**

**WS3-WD-THP-TB-CL** = Wind speed 3 cup, Wind Direction, Temperature, Humidity and Barometric Pressure sensors all housed in Solar Radiation Shield, mounted on T-Bar complete with 5m cable. 4~20mA output.

**Option:** **WS6** = Fit Wind Speed 6 cup instead of WS3 on above T-Bar option.

**LE** = Light Energy Sensor on the above T-Bar option.

**RAIN** = Rain Gauge 0.2mm on the above T-Bar option.

# ENVIRONMENTAL MONITORING SYSTEMS

Environmental Monitoring Systems are fully scalable, providing the flexibility of monitoring only the inputs needed for a given application. The systems use our popular and well tested General Purpose Data loggers, which means that inputs other than weather types can also be logged if required [E.g. 4~20mA or Voltage signal(s)]!

## Small System

Monitoring of weather signals using **GP-HR** Data logger. Up to four inputs.

The GP-HR is a high resolution (12 bit ) multi purpose Data Logger that can be configured to accept input from a wide variety of sources. It has a MASSIVE storage capacity of over 1,000,000 8bit samples; or over 500,000 12bit samples, as well as a user replaceable battery.



*GP-HR-LB with Air Temp and Humidity sensors in Shield & Solar Radiation sensor.*



*GP-HR shown with mA3+P-PS probe set (3x 4~20mA inputs + 1x Pulse input)*



*L-Bar shown with GP-HR Data Logger*

## Medium System

Monitoring of weather signals using **GP-MC** Data logger. Up to ten inputs.

The GP-MC is a high resolution (12 bit ) multi purpose Data Logger with eight analogue and two digital pulse inputs. It also provides a Start on Trigger input and two alarm outputs. The GP-MC can be supplied in an optional **IP66 Weatherproof enclosure** if required. It can be configured to accept input from a wide variety of sources.



The TruTrack Seahorse Logger Enclosure is a weatherproof lockable equipment housing designed to be mounted on posts or 50mm poles. The enclosure is a Seahorse SE300 Equipment Case that has had a plastic mounting plate welded to it. It is used to house loggers, power supplies, modems, alarm systems and sensor electronics.

Seahorse equipment cases are watertight, airtight, dustproof, crush resistant and designed to keep your logging equipment safe from the elements.

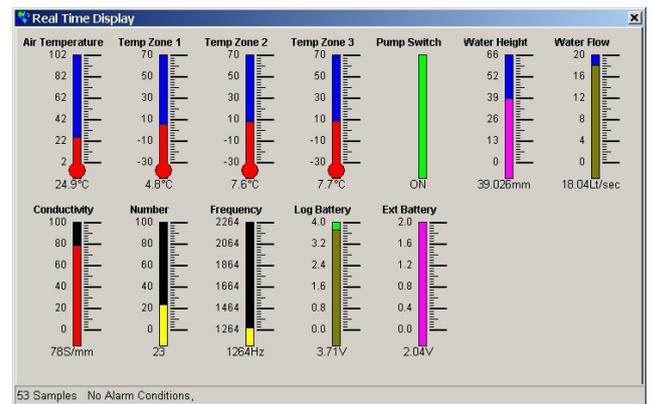
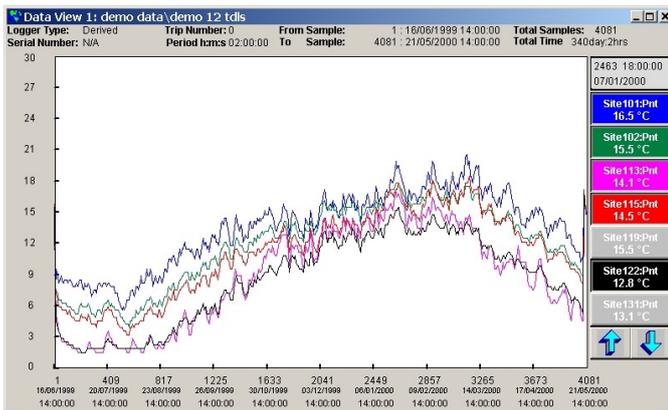
## Omni7 / OmniLog Software

The OmniLog Data Management software is an application for reading, displaying, analysing, exporting and organising data that has been downloaded from data loggers.

Data can be read from data loggers or retrieved from previously saved data files. A connected data logger can be configured, calibrated, started, read and stopped by this application.

Data retrieved from data loggers or weather stations and previously saved data files can be viewed and printed in a values spread sheet list, as a graph or as a statistics report. These values, graphs and statistics can be displayed and printed for all data or from a user selected block of data.

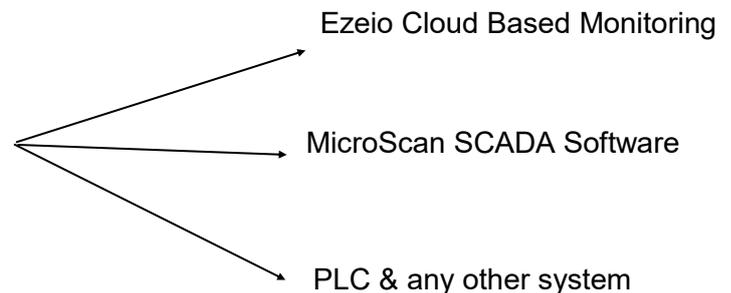
Data can also be exported in a large range of industry standard formats so as to be used by other applications.



Please note the software OmniLog comes free with the Data Loggers GP-HR and GP-MC for the monitoring of the weather stations.

## Larger Systems

The 4~20mA output signals from the weather station can also be connected to our intelligent multiplexer **2400-A16**:



This station has all the friendly features of a monitoring station. The Isolated Universal Analogue Inputs are software programmable using the user friendly [MicroScan v5.1](#) or [Station Programmer](#) software. Each input can be configured for any of the following inputs: RTD Pt100/Pt1000, Thermocouple, mA, mV, V & Pulse/Digital. There is a convenient wide choice of spans plus Custom spans can be configured also. The accuracy does not alter when changing spans.

The analogue inputs on the 2400-A16 can be expanded up to 76 using the [2400-M-R](#) / [2100-M](#) Input Multiplexers.

## Monitoring via MicroScan SCADA Software

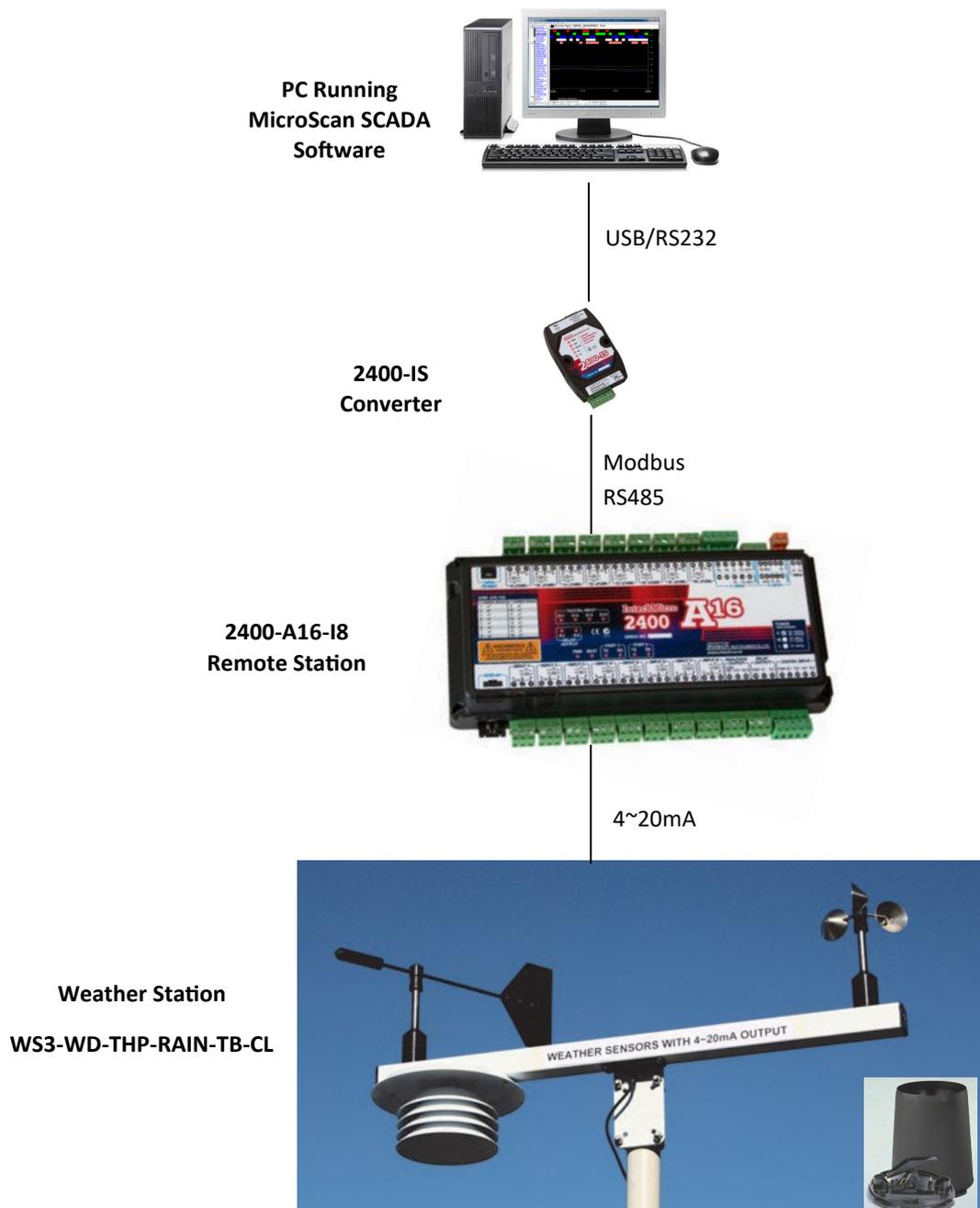
MicroScan is a complete Windows based **Supervisory Control and Data Acquisition** software product, meeting the demands of both the industrial and research environments.

By customer acclaim, MicroScan is the price-performance leader for SCADA packages. Operating on the most popular multi-tasking platform ensures flexibility and conformity to industry standards to serve your current needs, while being ready to expand when you are.

MicroScan is known to be the best feature packed Recorder module for gathering valuable data, while the powerful Mimic module provides screens (MMIs) which give the operator direct plant control.

Continuous development places MicroScan in the leading position as a bench mark upon which other packages are measured.

### Example showing MicroScan SCADA:



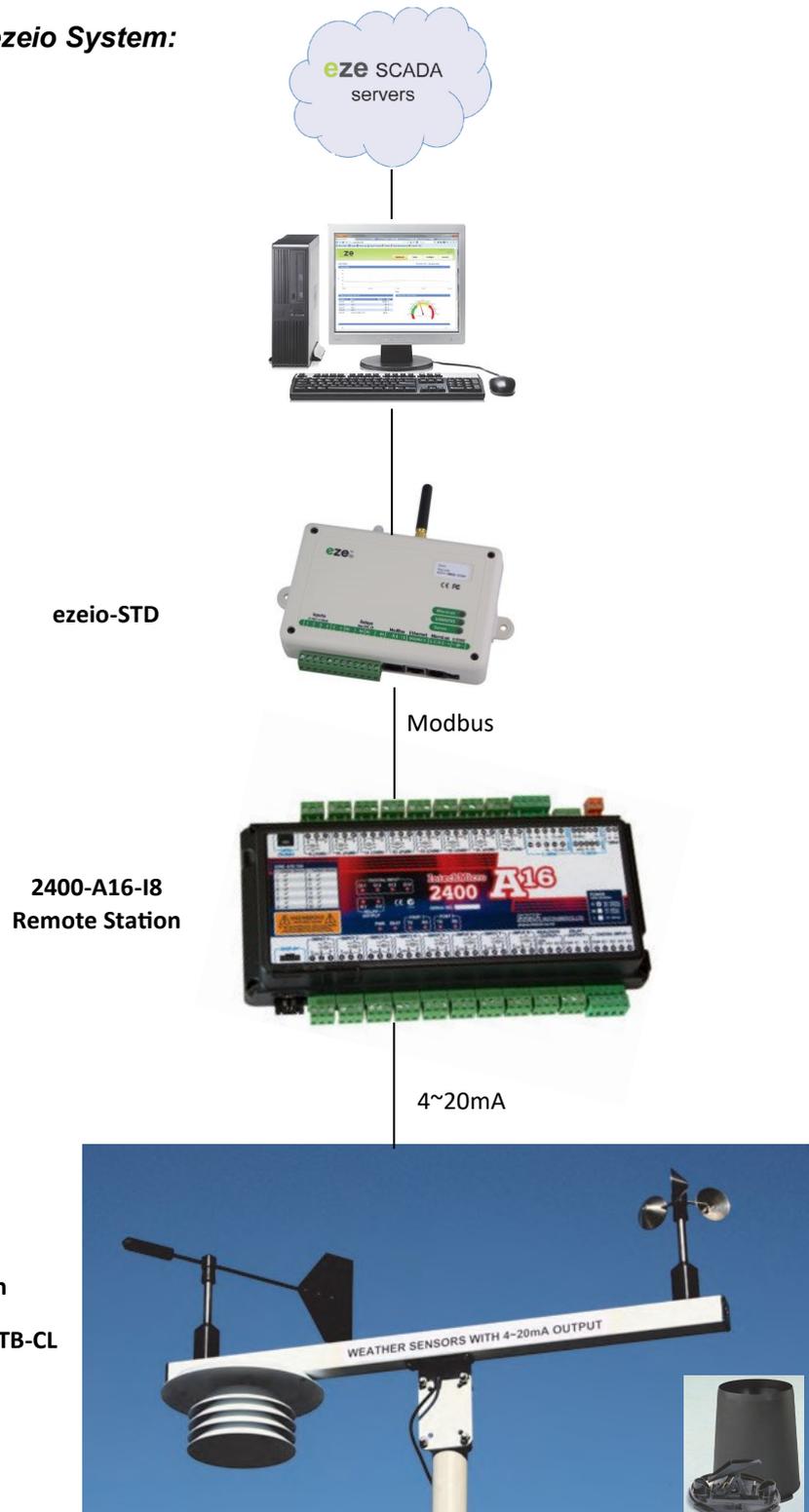
# Eze System - Cloud Based Monitoring

The eze System is suitable for a wide range of measuring, logging and alarm applications – from temperature, level, flow, analytical pH etc, energy, run & fault conditions, door switches and security and so on. The system is designed to be easy to install and deploy in anything from single sites to hundreds spread out over a wide area and across the globe.

The ezeio controller communicates with sensors and meters locally, and securely with the cloud service <https://ezecontrol.com> via the Internet.

The ezeio controller is designed to be easy to set up. There are two models of the controller, having different connectivity options. Both models have Ethernet LAN connectivity, [2400-A16 support](#), Modbus, four analogue inputs and two relays. The ezeio-GSM model also has GSM/3G cellular connectivity available.

## Example showing ezeio System:



# ZigBee Series - Wireless Monitoring

Example showing ZigBee modules:

PC Running  
MicroScan SCADA



USB/RS232

2400-IS  
Converter



RS485/422

Z-2400-RBT  
Base Module



4.0km Max

(Reduces to 50m typical with major obstruction)

Z-2400-A2I  
Input Module



RS485

2400-A16-I8  
Remote Station



4~20mA

Weather Station  
WS3-WD-THP-RAIN-TB-CL

