Experimental Data Acquisition System

GEOGRAPHY SENSORS

The Composition of Geography Sensors:

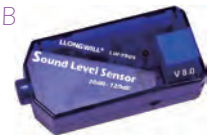
O_2 sensor (details on P34), pH sensor (details on P24), relative humidity sensor (details on P36), sound level sensor, CO_2 sensor, air pressure sensor, flow rate sensor, wind speed sensor, salinity sensor, soil temperature sensor, soil humidity sensor, surface temperature sensor, GPS sensor, and E-compass sensor (details on P21).

Air Pressure

LW-W3103
Range:550~1060hPa
Resolution: 0.1ppm

Sound Level

LW-Y805
Range:20dB~120dB
Resolution: 0.1dB

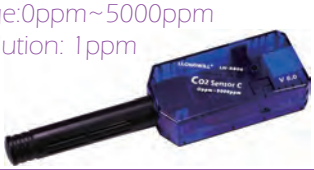


GPS

LW-W3115
Range:
E 0~180° W 0~180°
S 0~90° N 0~90°
Resolution: 0.00001°

CO_2

LW-B806
Range:0ppm~5000ppm
Resolution: 1ppm



Surface Temperature

LW-W3112
Range: -50℃~+130℃
Resolution: 0.1℃

Flow Rate

LW-W3116
Range: 0m/s~4m/s
Resolution: 0.01m/s

Soil Temperature

LW-W3113
Range: -40℃~+60℃
Resolution: 0.1℃

Wind Speed

LW-W3106

Range:
0.3m/s~45m/s
Resolution: 0.1m/s

Soil Moisture

LW-W3111
Range: 0~100%
Resolution:
0.1%

Salinity

LW-C815
Range: 0~10ppt
Resolution:
0.001ppt

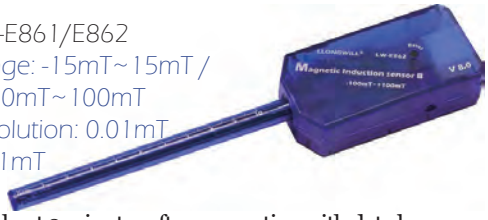
Building Digital Geographic Measuring Tool Kits

With the geographic sensors, you can build digital geographic measuring tool kit. It combines certain geographical data collection, transfer, storage and statistical analysis together, and it mainly consists of following five parts:

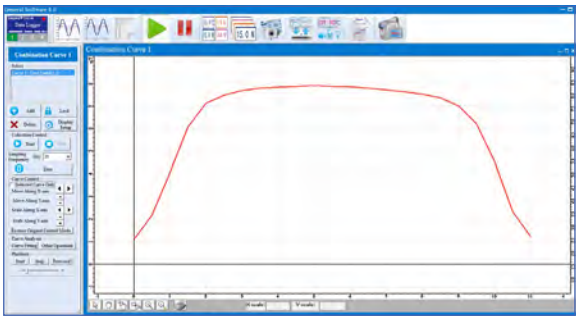
► Sensors——see the introduction on the left.
► Data logger——data logger equips the wired interface and wireless interface .
► Computer or Pad Terminal and data display module (detailes on P5 for more details).
► Digital Geographic Field Kit software.
► Accessories ——a charger, connecting wires, a portable power supply, data cables, and sensor cables.

Magnetic Induction

LW-E861/E862
Range: -15mT~15mT / -100mT~100mT
Resolution: 0.01mT / 0.1mT



· Preheat 2 minutes after connecting with data logger
· Start the measurement after the reading is stable
· Keep far away from strong magnet after use
· The absolute value of the reading is the component of MII at the measuring point, parallel to the probe direction
· When the reading is positive, it means the component direction is towards the probe head, otherwise, the component direction is towards the probe tail.



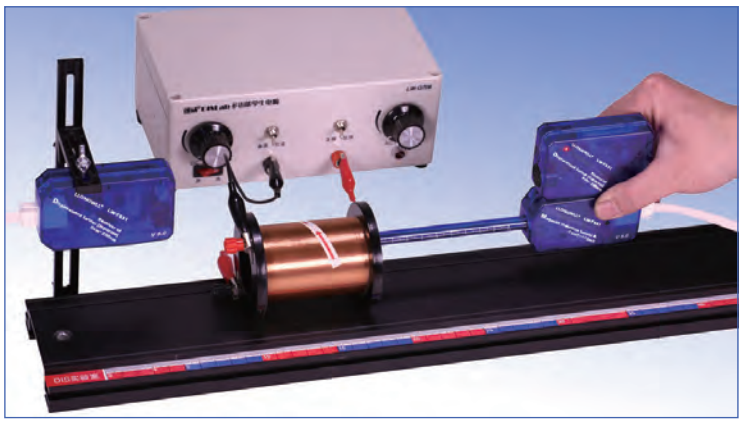
Study on the magnetic field distribution in the electrified solenoid, results as above

Typical Applications:

Measurement of the magnetic induction intensity of electric solenoid; Faraday's Law; study on the geomagnetic field by using magnetic induction sensor; measure the rotational speed; study on the magnetic induction intensity of magnetic; study on uniform magnetic field; study on the relationship between magnetic induction intensity of electrified solenoid and current.

Study on the Internal Magnetic Field of the Electrified Solenoid

The Electrified solenoid is a common-used experiment apparatus in electromagnetism, whose internal magnetic field distribution has specific teaching significances. Students would have a better understanding of generation conditions of “uniform magnetic field” and the knowledge of Electromagnetic Induction Law through the comparison of internal magnetic field distribution between general solenoid and special solenoid with a certain number of coil turns as well as solenoid with certain length-to-diameter ratio.



E-compass

LW-E864
Range: 0~359°
Resolution: 1°

Typical Applications:

· Geomagnetic orientation
· Study on geomagnetic declination

G-M

LW-R801
Range: 0~40000 pulse/minute
Measure the pulse number caused by β,γ radiation

Typical Applications:

Measurement of background counting rate; radiation shielding; measurement of radioactivity of building materials

pH

LW-C801
Range: 0~14
Resolution: 0.01

· Measure the pH value of solution

pH B

LW-C807
Range: 0~14
Resolution: 0.01

· Measure the pH value of solution
· Characteristic of quick response

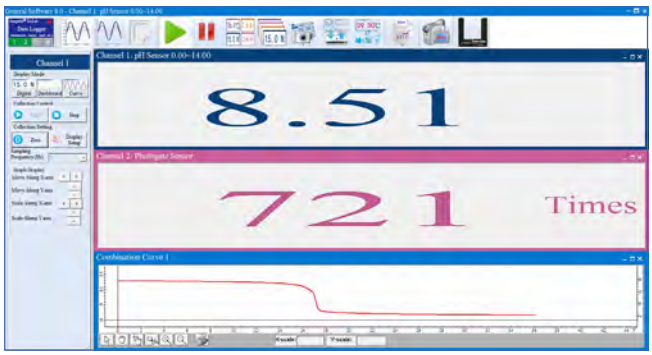
NEW

Notes in Using pH Sensor:

• The glass bulb of front end of electrode shall be immersed in the solution completely;
• Sensor electrode shall be rinsed before and after usage and before measuring different liquids. Cleaning method: wash electrodes with distilled water then gently dry the electrodes with absorbent tissues; No rubbing the electrode to avoid damaging;
• Ensure that there is sufficient activated fluid with ingredient of activated fluid is 3.3mol/L KCl solution, in the sealing cap. Users should fill regularly with self-prepared electrode activated fluid by themselves according to the ingredient.

Typical Applications:

Acid-base neutralization titration (as blow); determination of acetic acid ionization equilibrium constant; simulation of acid rain formation; pH measurement of different drinking water; effect of temperature on the ionization equilibrium of acetic acid; acid rain monitoring.



The results of Acid-base Neutralization Titration by using pH sensor

Measure the pH value of fruit juice by using pH sensor

Study on photosynthesis of terrestrial plants and the experiment result of increasing oxygen content

O_2

LW-B801
Range: 0~100%
· Measure O_2 content in air

Measuring O_2 content in forest with O_2 sensor

Study on the relationship between the duration of holding breath and the oxygen content in exhaled gas

Typical Applications:

The relationship between breath holding time and oxygen content in exhaled air; testing of exhaled air component and comparison with outside air; seed germination; photosynthesis of terrestrial plant; respiration of terrestrial plant; respiration of animal; respiration of saccharomycete; influence of different plants to surrounding environment.

Relative Humidity

LW-B807
Range: 0~100%
Resolution: 0.1%
· Measure water vapour content in air

Measuring the ambient relative humidity using relative humidity sensor and sensor data display module

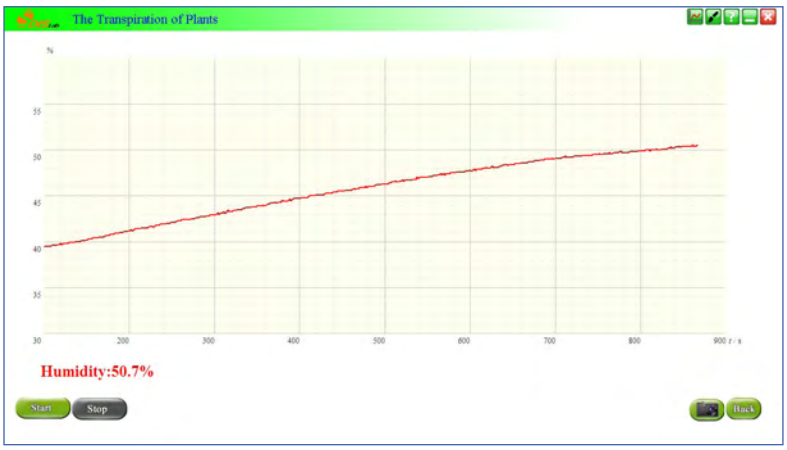
The optimum humidity environment for people's daily activities as below:

Housing environment: 40%～70%RH
The optimum environment for disease prevention and cure:40%～55%RH
Storage environment of books and cultural relics:40%～60%RH
Storage of cotton and wooltextiles: 40%～60%RH
Storage of confectionery: 50%～60%RH
Storage of fruits and vegetables: 50%～70%RH

Experiment Example-Transpiration:

► Principle: Transpiration is the process that moisture being scattered into atmosphere in state of vapor from live plant surface (mainly leaf). Plant transpiration can be verified with change of relative humidity in sealed container tested by a relative humidity sensor.
► Apparatus: data logger, relative humidity sensor, green plant, sealed gas liquid container etc.
► Results: See graph above and graphs on the right.

Transpiration experiment of plants (figure above) and results (figure below)



Typical Applications:

Plant transpiration; difference between exhaled air and outside air; influence of different plants to surrounding environment; regulation of body perspiration to body temperature; influence of AC dehumidification to indoor humidity etc. The sensor proble can be easily put into the sealing container to obatian experiment data precisely.