

LEEI-15 Apparatus of Measuring Liquid Conductivity



LEEI-15, Apparatus of Measuring Liquid Conductivity, is designed with rich physical thoughts, innovative experimental method, and ample contents of training hands-on ability. It can be used for basic physics experiment as well as for scientific research of measuring liquid conductivity.

The key device of the apparatus is a mutual inductive sensor with empty core for the measurement of liquid conductivity. It consists of two inductive coils which are wound on two high permeability Iron-based alloy rings made of nano-materials respectively. The sensor uses a low frequency sine signal and the inductive electrode does not contact with the tested liquid, so no polarization is generated around the sensor. Based on this kind of sensor, the apparatus can measure liquid conductivity with high accuracy.

- Rich physical thoughts
- Innovative experimental method
- Ample hands-on training contents

Using this apparatus, students can:

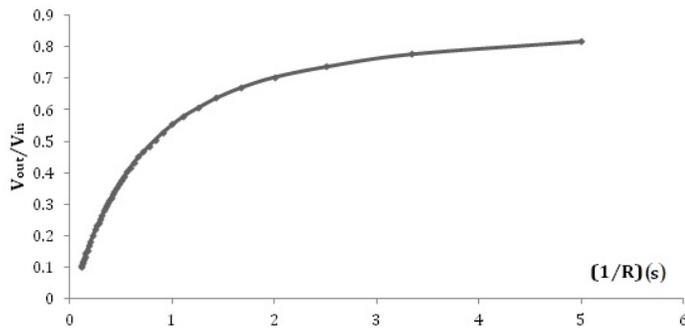
1. Understand and demonstrate the working principle of the mutual inductive liquid conductivity sensor; acquire the relationship between the sensor output voltage and liquid conductivity; and understand the important physical concepts and laws such as Faraday's law of electromagnetic induction, Ohm's law and the principle of the transformer.
2. Calibrate the mutual-inductive liquid conductivity sensor with precision standard resistors.
3. Measure the conductivity of the saturated saline solution at room temperature.
4. Acquire the relationship curve between the conductivity and temperature of the salt water solution (optional).

Specifications

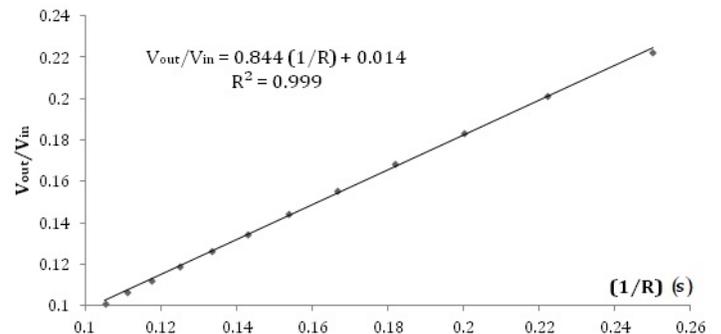
Description	Specifications
Experiment power supply	AC sine wave, 1.700 ~ 1.900 V, continuously adjustable, frequency 2500 Hz
Digital AC voltmeter	range 0 -1.999 V, resolution 0.001 V
Sensor	mutual inductance consisting of two inductive coils wound on two high permeability iron-based alloy rings
Precision standard resistance	0.1 Ω and 0.9 Ω, each 9 pcs, accuracy 0.01%
Power consumption	< 50 W

Parts

Item	Qty
Main electric unit	1
Sensor assembly	1 set
1000 mL measuring cup	1
Connection wires	8
Power cord	1
Instruction manual	1 (Electronic version)



Relationship plot of V_{out}/V_{in} and $1/R$



Straight line fitting at linear region of left plot