

Fundamentals of industrial instrumentation and process control

[Science](#), [Physics](#)



Instrumentation and process control can be traced back many millennia. Some of the early examples are the process of making fire and instruments using the sun and stars, such as Stonehenge. The evolution of instrumentation and process control has undergone several industrial revolutions leading to the complexities of modern day microprocessor-controlled processing. Today's technological evolution has made it possible to measure parameters deemed impossible only a few years ago. Improvements in accuracy, tighter control, and waste reduction have also been achieved.

This book was specifically written as an introduction to modern day industrial instrumentation and process control for the two-year technical, vocational, or degree student, and as a reference manual for managers, engineers, and technicians working in the field of instrumentation and process control. It is anticipated that the prospective student will have a basic understanding of mathematics, electricity, and physics. This course should adequately prepare a prospective technician, or serve as an introduction for a prospective engineer wishing to get a solid basic understanding of instrumentation and process control. Instrumentation and process control involve a wide range of technologies and sciences, and they are used in an unprecedented number of applications. Examples range from the control of heating, cooling, and hot water systems in homes and offices to chemical and automotive instrumentation and process control. This book is designed to cover all aspects of industrial instrumentation, such as sensing a wide range of variables, the transmission and recording of the sensed signal, controllers for signal evaluation, and the control of the manufacturing

process for a quality and uniform product. Chapter 1 gives an introduction to industrial instrumentation.

Chapters 2 through 4 refresh the student's knowledge of basic electricity and introduce electrical circuits for use in instrumentation. Sensors and their use in the measurement of a wide variety of physical variables—such as level, pressure, flow, temperature, humidity, and mechanical measurements—are discussed in Chapters 5 through 10. The use of regulators and actuators for controlling pressure, flow, and the control of the input variables to a process are discussed in

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