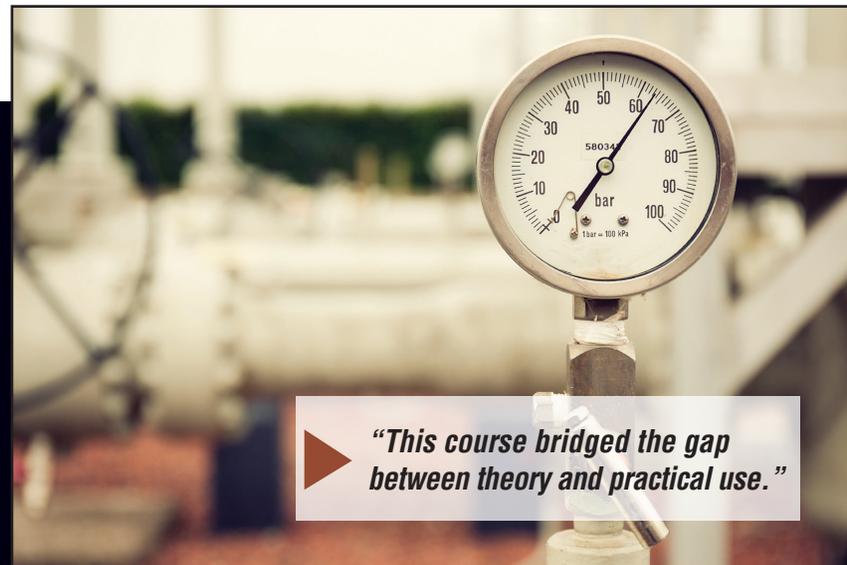


**Learn About:**

- Manipulated, controlled, and measured variables of typical industrial processes
- Convert pressure, level, flow, or temperature variables into pneumatic or electrical values
- Identify electrical variables that are used by instruments to determine values
- Use and calibrate instruments and transmitters using ISA industrial consensus standard techniques
- Identify and use the ANSI/ISA-S5.1 consensus industrial standard process symbols
- Troubleshoot to the device level using the Process and Instrumentation Diagram and/or the Instrument Loop Diagram
- Perform calculations to find process control parameters using a single loop controller configured in Proportional, Proportional and Integral, Proportional and Derivative, or Proportional and Integral and Derivative modes
- Use several different strategies to effectively tune a process controller

# Basic INSTRUMENTATION Process Measurement & Control™

## A 2-Day Course for Building, Plant and Facility Maintenance



▶ *“This course bridged the gap between theory and practical use.”*

## Doing away with the “Replace-part-when-broken” maintenance strategy & learning how to get desired results from your equipment

- Reserve your space now! **CALL 1-877-978-7246**
- Check us out online at [live.tpctraining.com](http://live.tpctraining.com) for a complete listing of all seminars coming to your area
- This seminar is also available as an **Online Simulcast** or can be brought **On-Site** to your facility



## SEMINAR OVERVIEW

Proper troubleshooting and maintenance of plant systems & equipment to reduce downtime and save money requires more than just replacing parts when they get broken. In fact, a “replace-part-when-broken” strategy for maintaining equipment is frequently the most expensive approach you can take. To be effective, maintenance technicians who fix equipment must know why a part needs to be changed out in the first place. In this instrumentation, process measurement and control seminar students will learn what, where and how to measure parameters for the proper monitoring and control of their equipment. When something breaks, they’ll now know why. With this understanding, they will be able to work much more efficiently on the industrial systems and processes for which they are responsible. A sound knowledge in instrumentation and control is certain to result in better-qualified technicians and fewer equipment failures.

## WHAT YOU WILL TAKE HOME

- Comprehensive classroom materials
- A Personalized Training Certificate with 0.8 TPC Training Continuing Education Units for each day attended, 1.6 for both days.
- All the information you need from asking our instructors specific questions about your own unique equipment or facility.

## CONTINUING EDUCATION

Upon completion of this seminar, the student will receive a Certification of Completion and .8 TPC Training CEUs per day attended. Most employers and many government agencies accept TPC Training CEUs to fulfill their continuing education requirements. If the student needs CEUs to renew a state license, please contact us at 303-867-5039 to ensure the state licensing board has approved the seminar. If we are currently not approved by your state licensing board, we are happy to begin the process as long as we receive your request at least one month before the training date.

## TRAINING PHILOSOPHY

TPC Training’s curriculum is designed to provide complete coverage of essential industrial maintenance skills, across a full range of electrical training, HVAC, plant management, and mechanical & industrial topics. Our “see, touch, do” instructional approach allows us to impart practical skills in an intensive format.

The most vital part of our seminar format is the coverage that goes beyond the course outline. Our small class sizes allow each instructor to tailor the course to address students’ individual needs, concerns, and experience levels. Our instructors deliver content with hands-on exercises, demonstrations role-playing, visuals, and case study discussions.

## DISCUSSION TOPICS

### Introduction to Process Control

- On/Off
- Proportional
- Integral
- Derivative

### Pneumatic Control

- Operation of the nozzle and flapper valve
- Bellows receiver unit

### Electronic Control

- Resistance
- Capacitance
- Inductance
- Voltage

### Measurement of “Pressure”, “Level”, “Flow”, and “Temperature”

- Units and Standards
- Construction and Operation
- Calibration

### Selected Analytical Measurements

- Electrical Conductivity
- Chemistry 101
- Acids
- Bases
- pH
- Redox Potentials
- ORP Measurement
- Ion Activity Measurement

### Industrial Process Control Symbols

- Understanding ANSI/ISA-S5.1 process control symbols
- Understanding and Drawing Process and Instrumentation Diagrams
- Understanding and Drawing Loop Diagrams
- Troubleshooting industrial control systems

### Control Valves

- Purpose and use of control valves, actuators, and positioners
- Significance of valve coefficients and sizing considerations

### Proportional & Integral Control Concepts

- First Order Lag calculations
- How to calculate Dead Time
- Adding Manual Reset to Proportional Control
- Additional Process Dynamics
- The dynamic behavior of control valves
- Tuning PI controllers

### PID Controllers

- Open Loop Tuning Methods
- Closed Loop Tuning Methods
- Common Industrial Applications

### Applications for Use in Your Own Facility

## SEMINAR FEE & AGENDA

This 2-day course is just \$1195 (Earn 1.6 CEUs)

7:30 am	Registration
8:00 am	Class Begins
12:00 -1:00 pm	Lunch (on your own)
4:30 pm	Class Ends

## NO RISK REGISTRATION & MONEY-BACK GUARANTEE

You can reserve your space in the class at any time and cancel without penalty. Cancellations made more than 14 days prior to the seminar may be refunded or rescheduled. Cancellations made within 14 days may be rescheduled for any future topic and/or date. If you’re not satisfied with the course, we’ll promptly refund your payment.

## JOIN OUR CLASSROOM SEMINARS FROM VIRTUALLY ANYWHERE

[live.tpctraining.com/simulcast](http://live.tpctraining.com/simulcast)

Our simulcast option allows students to connect to a live classroom seminar via a web link, with the ability to participate fully in the classroom dialogue, exercises, and Q&A. Online participants get all the benefits of the full classroom experience, plus the convenience of remote access.

### Features include

- Two full days of live, interactive instruction from a TPC Training instructor
- All classroom materials in PDF format
- Certificate of completion for 16 hours of live training
- Full technical support to ensure your online experience is a rewarding one

## BRING THE TRAINING ON-SITE TO YOUR FACILITY

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Every public seminar class in our Course Catalog can be conducted on-site, with the same expert instructors. To arrange an on-site training, call or email us at onsite@tpctraining.com.

### Some Advantages of On-Site Training

- Cost Savings — Save time and travel costs by keeping workers on-site
- Customized Content — Tailor the seminar to your facility and equipment
- Flexibility — Accommodate multiple shifts and different start and end times

