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Automation Experts

Resources for Technicians



ISA Press

Resources for Technicians

As a technician, you know what kind of resources you need – comprehensive, detailed, easy-to-use references that help you stay on top of the critical issues facing you in the workplace. The resources below are designed to fit your needs. Written by subject matter experts, these titles will give you the insight you need to become more successful in your field.



Table of Contents

Automation Network Selection	3
Basic Math for Process Control	3
Calibration: A Technician's Guide	3
Condensed Handbook of Measurement and Control, 2nd Edition	4
Control System Documentation: Applying Symbols and Identification, 2nd Edition	4
Control System Safety Evaluation and Reliability, 2nd Edition	4
Electrical Instruments in Hazardous Locations, 4th Edition	5
Fundamentals of Process Control Theory, 3rd Edition	5
Good Tuning: A Pocket Guide	5
Industrial Ethernet, 2nd Edition	6
ISA Handbook of Measurement Equations and Tables	6
Loop Checking: A Technician's Guide	6
Maintenance of Instruments & Systems, 2nd Edition	7
Measurement and Control Basics, 3rd Edition	7
Preventive Maintenance, 3rd Edition	7
Process Control: A Primer for the Non-specialist.....	8
Programmable Controllers, 4th Edition	8
Reading a P&ID.....	8
Safety Shutdown Systems: Design, Analysis, and Justification	9
Start-Up: A Technician's Guide	9
Successful Instrumentation and Control Systems Design.....	9
Troubleshooting: A Technician's Guide.....	10
Tuning of Industrial Control Systems, 2nd Edition	10
Understanding Distributed Processor Systems for Control	10

A complete collection of resources awaits you at our Web site: www.isa.org/shopisa.

Automation Network Selection

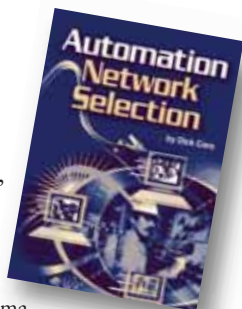
Dick Caro

Are you trying to make sense of all the different industrial automation networks on the market today? Whether you're a novice industrial network user or someone who simply needs to brush up on the technology, Automation Network Selection will help you better understand and select the "right" network for a given application.

Industry expert Dick Caro walks you through the various industrial networks (e.g., sensor, fieldbus, control, safety buses, and so on) and then gives you a perspective on the typical applications for industrial automation network technology. The emphasis is on the intended application for each network, rather than on the network protocol that is more typically discussed in most textbooks.

With many projects requiring more than one network application, finding the network that best fits your needs is no easy task. This book will help get you started on the right path.

- PRICE: ISA Member \$49.00; List \$55.00 ■ ISBN: 1-55617-861-1 ■ WEIGHT: 1 lb.
- www.isa.org/networkselect ■ COPYRIGHT: 2004

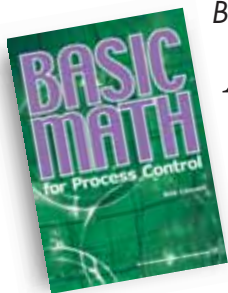


Basic Math for Process Control

Bob Connell

A practical tutorial on the mathematics essential to the process control field, written by an experienced process control engineer for practicing engineers and students. A quick-and-easy review of the mathematics common to the field, including chapters on frequency response analysis, transfer functions and block diagrams, and the Z-N approximation. A handy desk reference for process control engineers - a helpful aid to students in mathematics courses.

- PRICE: ISA Member \$39.00; List \$45.00 ■ ISBN: 1-55617-813-1 ■ WEIGHT: 1 lb.
- www.isa.org/basicmath ■ COPYRIGHT: 2003



Calibration: A Technician's Guide

Mike Cable

This comprehensive review of calibration provides an excellent foundation for understanding principles and applications of the most frequently performed tasks of a technician. Topics addressed include terminology, bench vs. field calibration, loop vs. individual instrument calibration, instrument classification systems, documentation, and specific calibration techniques for temperature, pressure, level, flow, final control, and analytical instrumentation. The book is designed as a structured learning tool with questions and answers in each chapter. An extensive appendix containing sample P&IDs, loop diagrams, spec sheets, sample calibration procedures, and conversion and reference tables serves as very useful reference. If you calibrate instruments or supervise someone that does, then you need this book.

- PRICE: ISA Member \$69.00; List \$79.00 ■ ISBN: 1-55617-912-X ■ WEIGHT: 1 lb.
- www.isa.org/calibrate ■ COPYRIGHT: 2005



Condensed Handbook of Measurement and Control, 2nd Edition

N.E. Battikha

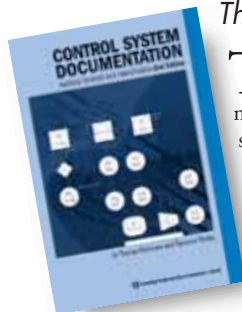
Selecting and implementing measurement and control devices for process automation applications is made easier with this best-selling reference. Newly updated, this clear and concise handbook provides quick access to ISA symbology, instrument and control valve selection criteria, and conversion guidelines, with new sections on analyzers, programmable electronic systems, alarm and trip systems, control centers, enclosures, and engineering documentation. Whether you are an experienced engineer, technician, sales person, or project manager, or new to the field, you will better understand how to assess, compare, and select the various methods of measurement and control with this valuable and economical handbook in your library.



- PRICE: ISA Member \$65.00; List \$74.00
- ISBN: 1-55617-850-6
- WEIGHT: 2 lbs.
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Control System Documentation: Applying Symbols and Identification, 2nd Edition

Thomas McAviney and Raymond Mulley



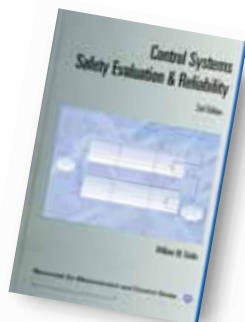
This updated ISA classic provides the symbols and identification commonly used throughout the process industries. It contains sample P&IDs and numerous examples of symbols and tagging concepts. It provides most of the symbols and identifiers that are unique to instrumentation and gives practical examples of their use. This update reflects changes in documentation and the evolution of control systems engineering and design work over the past decade. It is the intent of the authors to help people communicate ideas and concepts through the use of symbols and identifiers. Ideal for engineers, managers, salespeople, technicians, and students, this book will improve and strengthen communications among not only instrumentation specialists but all interested professionals.

- PRICE: ISA Member \$66.00; List \$72.00
- ISBN: 1-55617-896-4
- WEIGHT: 1 lb.
- www.isa.org/symbolsandid
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Control System Safety Evaluation and Reliability, 2nd Edition

W. M. Goble

This book provides a collection of tools to help the control engineer evaluate the safety and reliability of automated systems. Fault Tree Analysis (FTA), Reliability Block Diagrams (RBD), Failure Modes and Effects Analysis (FMEA) and Markov modeling methods are described with many examples. The key issues including component failure modes, on-line diagnostics, common cause, software reliability and operational safety are discussed along with design rules for building better systems. Safety Instrumented Systems (SIS) analysis techniques needed to meet new regulations are covered from sensor to final element. Reference material including sample failure rates, a glossary of terms, probability math review and data tables are supplied in a number of appendices.



- PRICE: ISA Member \$74.00; List \$85.00
- ISBN: 1-55617-636-8
- WEIGHT: 3 lbs.
- www.isa.org/safetyevaluation
- COPYRIGHT: 1998

Electrical Instruments in Hazardous Locations, 4th Edition

E.C. Magison

An encyclopedia of electrical safety, this latest edition features expanded treatment of theory and principles to provide a foundation for addressing some of the questions that arise when no standard or regulation exists. Also includes more practical examples of applying principles in real situations, including global operations and applications.

- PRICE: ISA Member \$88.00; List \$98.00 ■ ISBN: 1-55617-638-4 ■ WEIGHT: 3 lbs.
- www.isa.org/hazardlocations ■ COPYRIGHT: 1998



Fundamentals of Process Control Theory, 3rd Edition

P.W. Murrill



ISA's all-time best-selling book is now updated and expanded, offering a way for you to teach yourself the complexities of process control theory. This classic has been praised for its clear presentation of the principles of process automation and its excellent overview of advanced control techniques. More than just a reference book, it's a complete course on the subject, with exercises and answers to work through. Both theoretical and practical, this guide allows readers to teach themselves the fundamental scientific principles that govern process control, particularly feedback control. Its 15 self-study units provide a solid foundation in theory, as well as a discussion of recent technologies such as computer-integrated manufacturing, statistical process control, and expert systems. New chapters focus on the conceptual framework for an application, offering a practical understanding of the theory,

along with specific illustrations on how concepts are implemented. Appendices include a glossary of terms, graphic symbols for process measurement and control, and solutions to all exercises.

- PRICE: ISA Member \$78.00; List \$88.00 ■ ISBN: 1-55617-683-X ■ WEIGHT: 2 lbs.
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Good Tuning: A Pocket Guide

G.K. McMillan

Every practicing instrument, process control, and process engineer will want to have this practical and to the point pocket guide on good tuning. A portable, concise summary of all the practical considerations for tuning loops including step-by-step descriptions of the best field-proven tuning procedures, a table of typical tuning settings, a summary of valve performance problems, logic diagrams for troubleshooting, and over 30 rules-of-thumb. The quick reference guide also includes a discussion of how the tuning changes with the type of process, loop, and advanced regulatory control. Wherever you have data and tuning access, it enables you to estimate the settings for configuring new loops to review and improve the tuning of existing loops.

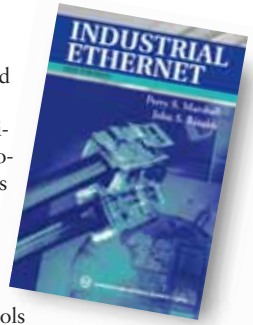
- PRICE: ISA Member \$32.00; List \$38.00 ■ ISBN: 1-55617-726-7 ■ WEIGHT: 1 lb.
- www.isa.org/tuningpocket ■ COPYRIGHT: 2000



Industrial Ethernet, 2nd Edition

Perry S. Marshall and John S. Rinaldi

This revised best-seller is a convenient installation, troubleshooting, and reference tool on one of the hottest topics in automation and process control. It will help you understand important Ethernet and TCP/IP terminology and provide important information about the new industrial protocols. You will quickly gain a solid grasp of Ethernet basics, the constraints of the industrial environment, and the specialized requirements of machine control. Practical reference charts and technical tips make this book an ideal quick reference source at your project meetings and on the job. New topics covered in the book include signaling types, Web services, power over Ethernet, and an expanded focus on Ethernet protocols and addressing as well as wireless Ethernet. The last part of the book provides installation, maintenance, troubleshooting, and security tips. After reading this book, you will be able to plan industrial Ethernet installations with realistic expectations, make knowledgeable purchasing decisions, and identify and prevent common causes of failure.



- **PRICE:** ISA Member \$49.00; List \$59.00 ■ **ISBN:** 1-55617-892-1 ■ **WEIGHT:** 1 lb.
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ISA Handbook of Measurement Equations and Tables

W.H. Cubberly

Packed with valuable information, this handbook provides the essentials for choosing the proper selection, installation, and use of measurement devices. A timeless reference source used by thousands.

- **PRICE:** ISA Member \$74.00; List \$89.00 ■ **ISBN:** 1-55617-486-1 ■ **WEIGHT:** 1 lb.
■ www.isa.org/measurehandbook ■ **COPYRIGHT:** 1993



Loop Checking: A Technician's Guide

Harley M. Jeffery

In today's competitive markets, manufacturers strive to continually improve manufacturing performance to meet their business needs and goals. As process control loops have a major impact on a plant's financial performance, focusing on loop performance is critical. This technician's guide defines loop checking in the broader scope of control loop performance in addition to the more traditional terms of the plant startup. It discusses general methods and practices that can be applied across many processes/industries. Featured topics include: loop checking basics, factory acceptance testing, wiring and loop checks, performance benchmarking, and sustaining performance.

- **PRICE:** ISA Member \$46.00; List \$52.00 ■ **ISBN:** 1-55617-910-3 ■ **WEIGHT:** 1 lb.
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Maintenance of Instruments & Systems, 2nd Edition

L. D. Goettsche

This new enlarged and updated edition of ISA's best-selling maintenance handbook provides comprehensive coverage of maintenance requirements for pneumatic and electrical/electronic devices as well as expanded coverage of DCS systems, analytical instrumentation, fiber optics, and smart instruments. Coverage is organized by device to make finding the information quick and easy, making this an excellent reference for both the novice and the experienced technician. In this edition, special emphasis is given to documentation requirements and safety issues along with updated coverage of newly issued regulations and standards.

- PRICE: ISA Member \$109.00; List \$125.00
- ISBN: 1-55617-879-4
- WEIGHT: 2 lbs.
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Measurement and Control Basics, 3rd Edition

T.A. Hughes



Ideal for classroom use or self-study, this best-selling text has provided thousands of students, technicians, salespeople, and others with a practical introduction to the technologies, systems, and strategies involved in industrial measurement and control. The third edition takes the same proven intuitive approach of previous editions in covering process control basics; electrical and electronic fundamentals; digital system basics; pressure measurement; flow measurement; level measurement; temperature measurement; analytical measurement and control; final control elements; and process control computers. New features include coverage of advanced control-loop tuning methods; magnetostrictive displacement pressure transducers; infrared, microwave, nuclear, radar and thermal level instruments; radiation, optical, and infrared pyrometers; oxidation-reduction potential measurement; and completely updated sections on PLCs, PC-based control, and HMIs.

- PRICE: ISA Member \$79.00; List \$89.00
- ISBN: 1-55617-764-X
- WEIGHT: 2 lbs.
- www.isa.org/mandcbasics
- COPYRIGHT: 2002

Preventive Maintenance, 3rd Edition

J.D. Patton, Jr.

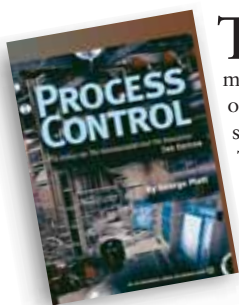
This new enlarged and updated edition of a best-selling classic shows how the investment in a preventive maintenance (PM) program repays a company in longer equipment life, smoother operation, planning, and scheduling. It includes enhanced techniques and insights along with new chapters dealing with computerized PM systems. PM means all actions intended to keep durable equipment in good operating equipment and avoid failures. The PM advantage is that you will pay less now to do planned work when production is not pushing versus very expensive emergency repairs that may be required under disruptive conditions and cause production to halt and lose revenue. Good PM saves money over a product's life cycle. The book addresses major types of maintenance; advantages and disadvantages of PM; designing a PM program; economics of PM; nondestructive testing; scheduling; metrics; data issues; and much more.

- PRICE: ISA Member \$68.00; List \$75.00
- ISBN: 1-55617-875-1
- WEIGHT: 1 lb.
- www.isa.org/preventivemaintenance
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Process Control: A Primer for the Non-specialist and the Newcomer, 2nd Edition

George Platt



The source for basic understanding of process control and instrumentation principles and applications for engineers, executives, sales representatives, managers, and others new to process control for over 15 years. The elements of process control and measurement are described simply and with examples so that even a non-technical person can understand the essential principles. This 2nd Edition introduces new topics and discusses recent developments in the field of process control, including a new chapter on fuzzy logic.

■ **PRICE:** ISA Member \$39.00; List \$45.00 ■ **ISBN:** 1-55617-633-3 ■ **WEIGHT:** 1 lb.
■ www.isa.org/controlprimer ■ **COPYRIGHT:** 1998

Programmable Controllers, 4th Edition

Thomas A. Hughes

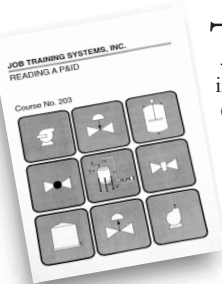
This newly revised edition of Programmable Controllers discusses all phases of programmable controller applications from systems design and programming to installation, maintenance, and start-up. Used as a resource by thousands of technicians and engineers, this applications-based book provides a clear and concise presentation of the fundamental principles of programmable controllers for process and machine control. Increased coverage of all five standard PLC programming languages – Ladder Diagram, Function Block Diagram, Sequential Function Chart, Instruction List, and Structured Text – and the addition of numerous programming applications and examples clearly explain each programming language.



■ **PRICE:** ISA Member \$89.00; List \$97.00 ■ **ISBN:** 1-55617-899-9 ■ **WEIGHT:** 2 lbs.
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Reading a P&ID

Job Training Systems



This self-study workbook offers a concise course in how to read and understand Piping and Instrumentation Drawings (P&IDs). These drawings, also known as Process and Instrumentation Diagrams, or Process and Control Diagrams, are essential to many industrial operations. After completing the workbook you should be able to identify symbols and function labels commonly found on P&IDs, describe how system components are related, and trace process stream flow and control loop functions.

Included are sample P&IDs, reference material explaining ISA symbology, answers to the problems, and a demonstration exercise that pulls together the skills taught in the course. The workbook, which has been reviewed for compliance with ISA standards and practices, covers the following subjects: Information on a typical P&ID, master sheets, symbols, instruments, line designations, tracing process flow, and controlling process operations.

■ **PRICE:** ISA Member \$55.00; List \$65.00 ■ **ISBN:** RPIDWBOOK ■ **WEIGHT:** 1 lb.
■ www.isa.org/readpandid ■ **COPYRIGHT:** 1999

Safety Shutdown Systems: Design, Analysis, and Justification

Paul Gruhn, Harry L. Cheddie



This book is ideal for instrumentation and control system engineers in the process industries who are responsible for designing, installing, and maintaining safety shutdown systems. Managers, sales professionals, technicians, and engineers employed by end-users, engineering firms, system integrators, and consultants can all benefit from the material presented here. The authors wrote this book because of the increased realization that today's engineering systems—and the computers used to control them—are capable of large-scale destruction. When even a single accident could be disastrous, the luxury of learning from experience no longer exists. The book is a practical how-to text on the analysis, design, application and installation of safety shutdown systems.

- PRICE: ISA Member \$69.00; List \$79.00
- ISBN: 1-55617-665-1
- WEIGHT: 2 lbs.
- www.isa.org/safetyshutdown
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Start-Up: A Technician's Guide

Diane Harris

When new plants or systems go online, the control systems technician faces special challenges. Harris explores and explains the crucial role of a technician in this process. This book offers you a clear overview of typical start-up responsibilities. From the first team meeting to the last round of tuning and loop checking, Harris uses her extensive experience with process control plants to walk you through the issues and skills typically required. Each chapter includes self-study learning objectives, practice questions and exercises, answers, and listings of relevant standards. Written with the technician in mind, it is a non-mathematical, application-oriented book that provides an overview of the scope of duties a technician must perform in real-world situations.



- PRICE: ISA Member \$39.00; List \$48.00
- ISBN: 1-55617-677-5
- WEIGHT: 1 lb.
- www.isa.org/startup
- COPYRIGHT: 2000

Successful Instrumentation and Control Systems Design

Michael D. Whitt



Whether you're designing a new instrumentation and control (I&C) system, or upgrading an existing control system, you need a well-conceived design package – the engineering deliverables and the design process that creates them. This book gives you a roadmap to understanding the design process, the elements of a successful project, the specific issues to address in a well-designed I&C system, and the engineering products that enable practical design and successful maintenance. As nearly \$65 billion worth of automation systems near the end of their traditional life cycle, the necessity of understanding the design process has never been more critical to engineers, technicians, and management – this book will help you achieve that understanding. Complementing this book is an optional CD-ROM, which

contains Microsoft Excel files for use in designing a project as well as approximately 200 figures, charts, and forms presented in the book for use as training or presentation aids.

- PRICE: ISA Member \$79.00; List \$89.00
- ISBN: 1-55617-844-1
- WEIGHT: 2 lbs.
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Troubleshooting: A Technician's Guide

William L. Mostia



Troubleshooting loops and systems is something all technicians must do, but few truly master. Mostia draws on his experience as a process engineer and maintenance expert to provide a detailed look at the skills and knowledge required for troubleshooting. Interspersed with a wealth of practical detail and real-world examples are no-nonsense discussions of what a good troubleshooter needs to know, including basic principles of electricity and physics; essentials of data communications and logic; causes of failures; and techniques that engineers and technicians use to track failures down. Here, too, are hints and troubleshooting aids, basic maintenance concepts, and information about training. Finally, Mostia provides examples of troubleshooting problems in mechanical systems, process connections, pneumatic systems, electrical systems, electronic systems, and valves. He explores calibration, programmable electronic systems, communication circuits, transient problems and software.

■ **PRICE:** ISA Member \$44.00; List \$52.00 ■ **ISBN:** 1-55617-705-4 ■ **WEIGHT:** 1 lb.
■ www.isa.org/troubleshoot ■ **COPYRIGHT:** 2000

Tuning of Industrial Control Systems, 2nd Edition

A. B. Corripio

This book takes a practical, but systematic, approach to tuning, providing insight into tuning procedures (rather than simply a series of formulas to be memorized). Corripio gives helpful rules of thumb to speed the learning process during field training. The text discusses common techniques for measuring the dynamic response of a process and choosing appropriate performance criteria. Other chapters cover selection and tuning of feedback control modes, including computer- and microprocessor-based controllers, and advanced modes. This edition includes numerous examples, including the effect of hysteresis in flow control loops, averaging and tight level control, cascade control of a jacketed chemical reactor, feedforward control of a heater, and loop interaction and ration control in a blender. Also included is an introduction to a model reference control and a chemical reactor control example to illustrate it.

■ **PRICE:** ISA Member \$79.00; List \$89.00 ■ **ISBN:** 1-55617-713-5 ■ **WEIGHT:** 2 lbs.
■ www.isa.org/tuningsystems ■ **COPYRIGHT:** 2001



Understanding Distributed Processor Systems for Control

Samuel M. Herb, P.E.



This book addresses the challenges of the process control effort, recognizing that factory automation systems are no longer isolated entities and that the systems and their functions are indeed merging. Discrete, continuous, and batch can be performed together or by the same system used in diverse applications. The book is intended for readers involved in factory automation systems, as well as readers who may know a little about distributed processor systems, but may not necessarily be exposed to the technologies and issues discussed in industry. The author looks at past technologies and how their concepts have grown to encompass additional new and exciting nuances of current high technology.

■ **PRICE:** ISA Member \$88.00; List \$98.00 ■ **ISBN:** 1-55617-645-7 ■ **WEIGHT:** 4 lbs.
■ www.isa.org/distributedcontrol ■ **COPYRIGHT:** 1999



ISA Certification for Technicians

Technicians realize that, in this tight job market, a key element to being hired, or being promoted, is the ability to demonstrate competency and credibility. By becoming an ISA Certified Control Systems Technician® (CCST®), you can:

- **Improve your career opportunities.** CCST certification helps you stand out from the crowd when being considered for promotions and other career openings.
- **Receive opportunities for greater earnings.** Certification may demonstrate that you are prepared for additional responsibilities.
- **Enjoy professional recognition and accomplishment.** Certification earns the respect of your peers and employer.

How to Get Certified:

1. Visit www.isa.org/CCST to learn more about eligibility requirements, test dates, exam format and application deadlines.
2. Submit your application and choose an exam date.
3. Using the resources in this catalog and the study guides below, prepare to take the exam.
4. Pass the exam and become an ISA CCST!

CCST® Study Guide, Level I

ISA

Designed for technicians, the CCST Study Guide provides assistance in preparing for ISA's CCST Level I Exam. Divided into four domains (calibration, loop checking, troubleshooting, start-up), the study guide parallels the structure of the exam.

- **PRICE:** ISA Member \$29.00; List \$39.00 ■ **ISBN:** 1-55617-573-6 ■ **WEIGHT:** 1 lb.
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CCST® Study Guide, Level II

ISA

To help prepare you for the Level II exam, this Study Guide provides three sample problems of the types presented on the exam. Knowledge in these domains is required for this exam: calibration, loop checking, troubleshooting, start-up, maintenance/repair, and project organization.

- **PRICE:** ISA Member \$29.00; List \$39.00 ■ **ISBN:** 1-55617-629-5 ■ **WEIGHT:** 1 lb.
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CCST® Study Guide, Level III

ISA

The Level III Study Guide provides a selective, representative sample of questions like those that make up the Level III CCST examination. The questions are divided into the seven performance domains covered on the exam: calibration, loop checking, troubleshooting, start-up, maintenance/repair, project organization, and administration.

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