Overview Of Iec 61850 And Benefits

Communication and Computing Systems
Critical Infrastructure Protection
ECWS 2021 20th European Conference on Cyber Warfare and Security
Distributed Energy Resources in Microgrids
Smart Grids
Telecommunications
Instrument Engineers' Handbook
Networking Communication and Data Knowledge
Engineering
Instrument Engineers' Handbook
Volume 3
Electric Power Substations
Engineering
Advances in Computing, Communication and Control
Cyberphysical Smart Cities
Infrastructures
The Introduction of IEC 61850 and Its Impact on Protection and Automation Within Substations
Communication Challenges and Solutions in the Smart Grid
Smart Grid Initiatives and Technologies
Smart Power Distribution Systems
From Smart Grid to Internet of Energy
IEC 61850
Distributed Power Resources
Energy Informatics
Future Communication Technology and Engineering
Microgrid Design and Operation
Toward Smart Energy in Cities
Internet of Energy
Handbook
IEC 61850
Demystified
Cyber Physical Systems Approach to Smart Electric Power Grid
Digitalization of Power Markets and Systems
Using Energy Informatics
Microgrid Architectures, Control and Protection Methods, and Manufacturing
Power Quality
Substation Automation Systems
The Electric Power Engineering Handbook - Five Volume Set
Transportation and Power Grid in Smart Cities
Introduction to IEC 61850 and Its Applicability in a Power System Model
IEC 61850
Horizontal Goose
Communication and Overview
Introduction to Power Utility Communications
Computing and Combinatorics
Security
Standardisation
Research
IEC 61850-Based Smart Substations
Security and Privacy in Smart Grids
Presenting the work of prominent researchers working on smart grids and related fields around the world, Security and Privacy in Smart Grids identifies state-of-the-art approaches and novel technologies for smart grid communication and security. It investigates the fundamental aspects and applications of smart grid security and privacy and reports on the latest advances in the range of related areas—making it an ideal reference for students, researchers, and engineers in these fields. The book explains grid security development and deployment and introduces novel approaches for securing today's smart grids. Supplying an overview of recommendations for a technical smart grid infrastructure, the book describes how to minimize power consumption and utility expenditure in data centers. It also: Details the challenges of cybersecurity for smart grid communication infrastructures Covers the regulations and standards relevant to smart grid security Explains how to conduct vulnerability assessments for substation automation systems Considers smart grid automation, SCADA system security, and smart grid security in the last mile The book's chapters work together to provide you with a framework for implementing effective security through this growing system. Numerous figures, illustrations, graphs, and charts are included to aid in comprehension. With coverage that includes direct attacks, smart meters, and attacks via networks, this versatile reference presents actionable suggestions you can put to use immediately to prevent such attacks.

Substation Automation Systems: Design and Implementation aims to close the gap created by fast changing technologies impacting on a series of legacy principles related to how substation secondary systems are conceived and implemented. It is intended to help those who have to define and implement SAS, whilst also conforming to the current industry best practice standards. Key features: Project-oriented approach to all practical aspects of SAS design and project development. Uniquely focusses on the rapidly changing control aspect of substation design, using novel communication technologies and IEDs (Intelligent Electronic Devices). Covers the complete chain of SAS components and related equipment instead of purely concentrating on the intelligent electronic devices and communication networks. Discusses control and monitoring facilities for auxiliary power systems. Contributes significantly to the understanding of the standard IEC 61850, which is viewed as a “black box” for a significant number of professionals around the world. Explains standard IEC 61850 – Communication networks and systems for power utility automation – to support all new systems networked to perform control, monitoring, automation, metering and protection functions. Written for practical application, this book is a valuable resource for professionals operating within different SAS project stages including the: specification process; contracting process; design and engineering process; integration process; testing process and the operation and maintenance process.

This book constitutes the refereed proceedings of the 20th International Conference on Computing and Combinatorics, COCOON 2014, held in Atlanta, GA, USA, in August 2014. The 51 revised full papers presented were carefully reviewed and selected from 110 submissions. There was a co-organized workshop on computational social networks (CSoNet 2014) where 8 papers were accepted. The papers cover the following topics: sampling and randomized methods; logic, algebra and automata; database and data structures; parameterized complexity and algorithms; computational complexity; computational biology and computational geometry; approximation algorithm; graph theory and algorithms; game theory and cryptography; scheduling algorithms and circuit complexity and CSoNet.

Conferences Proceedings of 20th European Conference on Cyber Warfare and Security

The objective of this textbook is to introduce students and professionals to fundamental principles and techniques and emerging technologies in energy informatics and the digitalization of power markets and systems. The book covers such areas as smart grids and artificial intelligence (AI) and distributed ledger technology (DLT), with a focus on information and communication technologies (ICT) deployed to modernize the electric energy infrastructure. It also provides an overview of the smart grid and its main components: smart grid applications at transmission, distribution, and customer level, network requirements with communications technologies, and standards and protocols. In addition, the address emerging technologies and trends in next-generation power systems, i.e., energy informatics, such as digital green shift, energy cyber-physical-social systems (E-CPSS), energy IoT, energy blockchain, and advanced optimization. Future aspects of digitalized power markets and systems will be discussed with real-world energy informatics projects. The book is designed to be a core text in upper-undergraduate and graduate courses such as Introduction to Smart Grids, Digitalization of Power Systems, and Advanced Power System Topics in Energy Informatics.

This book documents recent advances in the field of modeling, simulation, control, security and reliability of Cyber-Physical Systems (CPS) in power grids. The aim of this book is to help the reader gain insights into working of CPSs and understand their potential in transforming the power grids of tomorrow. This book will be useful for all those who are interested in design of cyber-physical systems, be they students or researchers in power systems, CPS modeling software developers, technical marketing professionals and business policy-makers.
The present volume aims to provide an overview of the current understanding of the so-called Critical Infrastructure (CI), and particularly the Critical Information Infrastructure (CII), which not only forms one of the constituent sectors of the overall CI, but also is unique in providing an element of interconnection between sectors as well as often also intra-sectoral control mechanisms. The 14 papers of this book present a collection of pieces of scientific work in the areas of critical infrastructure protection. In combining elementary concepts and models with policy-related issues on one hand and placing an emphasis on the timely area of control systems, the book aims to highlight some of the key issues facing the research community.

This book constitutes the refereed proceedings of the Second International Conference on Security Standardisation Research, SSR 2015, held in Tokyo, Japan, in December 2015. The 13 papers presented in this volume were carefully reviewed and selected from 18 submissions. They are organized in topical sections named: bitcoin and payment; protocol and API; analysis on cryptographic algorithm; privacy; and trust and formal analysis.

This book provides a comprehensive review of the IEC 61850 standard and outlines the modelling and implementation of the standard using object-oriented approaches. In addition to covering general information about the IEC 61850 communication standard, the book also describes a research project that was carried out for the implementation of the IEC 61850 standard as a concrete application layer protocol above a middleware layer specifically designed and implemented in a real-time communication processor environment to support all the communication needs required by the standard.

Focuses on the basics of the conventional Communication and Protection protocol (MODBUS and IEC-103) and the latest IEC 61850 Standard used in Substation Automation. Explains the basics of IEC 61850 and its implementation for substation automation systems as well as providing an analysis of horizontal GOOSE communication between IEDs in bay level.

Learn to deploy novel algorithms to improve and secure smart city infrastructure. Cyberphysical Smart Cities Infrastructures: Optimal Operation and Intelligent Decision Making, accomplished researchers Drs. M. Hadi Amini and Miadreza Shafie-Khah deliver a crucial exploration of new directions in the science and engineering of deploying novel and efficient computing algorithms to enhance the efficient operation of the networks and communication systems underlying smart city infrastructure. The book covers special issues on the deployment of these algorithms with an eye to helping readers improve the operation of smart cities. The editors present concise and accessible material from a collection of internationally renowned authors in areas as diverse as computer science, electrical engineering, operation research, civil engineering, and the social sciences. They also include discussions of the use of artificial intelligence to secure the operations of cyberphysical smart city infrastructure and provide several examples of the applications of novel theoretical algorithms. Readers will also enjoy: Thorough introductions to fundamental algorithms for computing and learning, large-scale optimizations, control theory for large-scale systems Explorations of machine learning and intelligent decision making in cyberphysical smart cities, including smart energy systems and intelligent transportation networks In-depth treatments of intelligent decision making in cyberphysical smart city infrastructure and optimization in networked smart cities Perfect for senior undergraduate and graduate students of electrical and computer engineering, computer science, civil engineering, telecommunications, information technology, and business, Cyberphysical Smart Cities Infrastructures is an indispensable reference for anyone seeking to solve real-world problems in smart cities.

From Smart Grid to Internet of Energy covers novel and emerging metering and monitoring technologies, communication systems, and technologies in smart grid areas to present a valuable reference for readers from various engineering backgrounds. Considering relevant topics on the essentials of smart grids and emerging wireless communication systems, such as IEEE 802.15.4 based novel technologies, cognitive radio networks and Internet of Energy, this book offers a discussion on the emerging trends and research direction for communication technologies. The book includes research concepts and visualization of smart grids and related communication technologies, making it a useful book for practicing network engineers. Includes global case studies and examples of communications systems integrated with smart grids Presents literature surveys for a wide variety of smart grids, wired and wireless communication technologies, big data, privacy and security Covers all aspects of IoT systems and discusses the differences between IoT and Smart Grids

This timely new book is a cutting edge resource for engineers involved in the electric utility industry. This one-of-a-kind resource explores the planning, design, and deployment of communications networks, including fiber, microwave, RF, and Ethernet in electric utility spaces as related to Smart Grid. Readers are presented with an introduction to power utility communications, providing a thorough overview of data transmission media, electrical grid, and power grid modernization. Communication fundamentals and fiber-optic radio system design are also covered. Network performance and reliability considerations are discussed including channel protection, system latency, and cyber and grid security. Clear examples and calculations are presented to demonstrate reliability and availability measures for fiber-optic systems.

Distributed Power Resources: Operation and Control of Connecting to the Grid presents research and development, lists relevant technologies, and draws on experience to tackle practical problems in the operation and control of distributed power. Key problems are identified and interrogated, as are requirements and application methods, associated power conversion tactics, operational control protections, and maintenance technologies. The title gives experimental verification of the technologies involved in several demonstration projects, including an active multi-resource distribution grid, and a high-density distributed resources connecting ac/dc hybrid power grid. The book considers the development of distributed photovoltaic power, wind power, and electric vehicle energy storage. It discusses the characteristics of distributed resources and the key requirements and core technologies for plug-and-play applications. Considers the state-of-the-art in distributed power resources and their connection to the grid Leverages practical experience and experimental data to solve problems of operation and control Provides analysis of plug-and-play applications for distributed power supplies Presents relevant technology and practical experience to industry Explores potential new technologies in distributed power resources

With the increasing worldwide trend in population migration into urban centers, we are beginning to see the emergence of the kinds of mega-cities which were once the stuff of science fiction. It is clear to most urban planners and developers that accommodating the needs of the tens of millions of inhabitants of those megalopolises in an orderly and uninterrupted manner will require the seamless integration of and real-time monitoring and response services for public utilities and transportation systems. Part speculative look into the future of the world’s urban centers, part technical blueprint, this visionary book helps lay the groundwork for the communication networks and services on which tomorrow’s “smart cities” will run. Written by a uniquely well-qualified author team, this book provides detailed insights into the technical requirements for the wireless sensor and actuator networks required to make smart cities a reality.
The Internet of Energy (IoE), with the integration of advanced information and communication technologies (ICT), has led to a transformation of traditional networks to smart systems. Internet of Energy Handbook provides updated knowledge in the field of energy management with an Internet of Things (IoT) perspective. Features Explains the technological developments for energy management leading to a reduction in energy consumption through topics like smart energy systems, smart sensors, communication, techniques, and utilization Includes dedicated sections covering varied aspects related to renewable sources of energy, power distribution, and generation Incorporates energy efficiency, optimization, and sensor technologies Covers multidisciplinary aspects in computational intelligence and IoT Discusses building energy management aspects including temperature, humidity, the number of persons involved, and light intensity This handbook is aimed at graduate students, researchers, and professionals interested in power systems, IoT, smart grids, electrical engineering, and transmission.

Distributed Energy Resources in Microgrids: Integration, Challenges and Optimization unifies classically unconnected aspects of microgrids by considering them alongside economic analysis and stability testing. In addition, the book presents well-founded mathematical analyses on how to technically and economically optimize microgrids via distributed energy resource integration. Researchers and engineers in the power and energy sector will find this information useful for combined scientific and economical approaches to microgrid integration. Specific sections cover microgrid performance, including key technical elements, such as control design, stability analysis, power quality, reliability and resiliency in microgrid operation. Addresses the challenges related to the integration of renewable energy resources Includes examples of control algorithms adopted during integration Presents detailed methods of optimization to enhance successful integration.

Instrument Engineers’ Handbook – Volume 3: Process Software and Digital Networks, Fourth Edition is the latest addition to an enduring collection that industrial automation (AT) professionals often refer to as the “bible.” First published in 1970, the entire handbook is approximately 5,000 pages, designed as standalone volumes that cover the measurement (Volume 1), control (Volume 2), and software (Volume 3) aspects of automation. This fourth edition of the third volume provides an in-depth, state-of-the-art review of control software packages used in plant optimization, control, maintenance, and safety. Each updated volume of this renowned reference requires about ten years to prepare, so revised installments have been issued every decade, taking into account the numerous developments that occur from one publication to the next. Assessing the rapid evolution of automation and optimization in control systems used in all types of industrial plants, this book details the wired/wireless communications and software used. This includes the ever-increasing number of applications for intelligent instruments, enhanced networks, Internet use, virtual private networks, and integration of control systems with the main networks used by management, all of which operate in a linked global environment. Topics covered include: Advances in new displays, which help operators to more quickly assess and respond to plant conditions Software and networks that help monitor, control, and optimize industrial processes, to determine the efficiency, energy consumption, and profitability of operations Strategies to counteract changes in market conditions and energy and raw material costs Techniques to fortify the safety of plant operations and the security of digital communications systems This volume explores why the holistic approach to integrating process and enterprise networks is convenient and efficient, despite associated problems involving cyber and local network security, energy conservation, and other issues. It shows how firewalls must separate the business (IT) and the operation (automation technology, or AT) domains to guarantee the safe function of all industrial plants. This book illustrates how these concerns must be addressed using effective technical solutions and proper management policies and practices. Reinforcing the fact that all industrial control systems are, in general, critically interdependent, this handbook provides a wide range of software application examples from industries including: automotive, mining, renewable energy, steel, dairy, pharmaceutical, mineral processing, oil, gas, electric power, utility, and nuclear power.

Discover the foundations and main applications of telecommunications to smart grids In Smart Grid Telecommunications, renowned researchers and authors Drs. Alberto Sendin, Javier Matanza, and Ramon Ferrus deliver a focused treatment of the fundamentals and main applications of telecommunications technologies in smart grids. Aimed at engineers and professionals who work with power systems, the book explains what smart grids are and where telecommunications are needed to solve their various challenges. Power engineers will benefit from explanations of the main concepts of telecommunications and how they are applied to the different domains of a smart grid. Telecommunication engineers will gain an understanding of smart grid applications and services, and will learn from the explanations of how telecommunications need to be adapted to work with them. The authors aim to offer a simplified vision of smart grids with rigorous coverage of the latest advances in the field, while avoiding some of the technical complexities that can hinder understanding in this area. The book offers: Discussions of why telecommunications are necessary in smart grids and the various communication services and systems relevant for them An exploration of foundational telecommunication concepts, ranging from system-level aspects, such as traffic engineering, signaling, protocol stacks, to communications channel transmission and reception aspects, covering modulations, bandwidth, multiple access, signal to noise ratio, interference, transmission media impairations, and more Examinations of telecommunication-related smart grid services and systems, including SCADA, protection and teleprotection, smart metering, substation and distribution automation, synchrophasors, Distributed Energy Resources, electric vehicles, microgrids, etc. A treatment of wireless and wired telecommunication technologies, like DWDM, Ethernet, IP, MPLS, PONs, PLC, BPL, 3GPP cellular 4G and 5G technologies, Zigbee, Wi-SUN, LoRaWAN, Sigfox, etc., addressing their architectures, characteristics, and limitations Ideal for engineers working in power systems or telecommunications as network architects, operations managers, planners, or in regulation-related activities, Smart Grid Telecommunications is also an invaluable resource for telecommunications network and Smart Grid architects.

This book constitutes the refereed proceedings of the 4th D-A-CH Conference on Energy Informatics, D-A-CH EI 2015, held in Karlsruhe, Germany, in November 2015. The 18 revised full papers presented were carefully reviewed and selected from 36 submissions. The papers are organized in topical sections on distributed energy sources and storage, smart meters and monitoring, research lab infrastructures, electric mobility, communication and security, and modeling and simulation.

This book is a collection of accepted papers that were presented at the International Conference on Communication and Computing Systems (ICCCS-2016), Dronacharya College of Engineering, Gurgaon, September 9–11, 2016. The purpose of the conference was to provide a platform for interaction between scientists from industry, academia and other areas of society to discuss the current advancements in the field of communication and computing systems. The papers submitted to the proceedings were peer-reviewed by 2-3 expert referees. This volume contains 5 main subject areas: 1. Signal and Image Processing, 2. Communication & Computer Networks, 3. Soft Computing, Intelligent System, Machine Vision and Artificial Neural Network, 4. VLSI & Embedded System, 5. Software Engineering and Emerging Technologies.

This proceedings brings together eighty seven selected articles presented at the joint conferences of the 6th International Conference on Electrical and Control Engineering (ICECE2015) and the 4th International conference on Materials Science and Manufacturing (ICMSM2015), which was held in Shanghai, China, during August 14–15 2015. ICECE2015 and ICMSM2015 provide an excellent international platform for researchers to share the state-of-art research results and fork collaborations amongst the researchers from different part of the world. The proceedings collected the latest research results and applications funded by Chinese government agencies in Electrical Engineering, Control Engineering, Wireless Communication, Computer Networks, Computer Science, Materials Engineering and other related topics. It is a kaleidoscope
reflecting the Chinese research and development efforts in the above 6 areas. All submitted papers were subjected to strict peer-reviewing by 2-4 expert referees. The papers have been selected for this volume because of quality and the relevance to the conference. Contents:Control Engineering/Electronics Engineering/Wireless Communication and Computing Networks/Computer Science and Application/Materials Science and Engineering/Construction Materials and Civil Engineering/Readership: Researchers and professionals in electrical and electronics engineering, material engineering and computer networks.

With the growth of renewable energy sources, microgrids have become a key component in the distribution of power to localized areas while connected to the traditional grid or operating in a disconnected island mode. Based on the extensive real-world experience of the authors, this cutting-edge resource provides a basis for the design, installation, and day-by-day management of microgrids. Professionals find coverage of the critical aspects they need to understand, from the initial planning and the selection of the most appropriate technologies and equipment, to optimal management and real-time control. Moreover, this forward-looking book places emphasis on new architectures of the energy systems of the future. Written in accessible language with practical examples, the book explains advanced topics such as optimization algorithms for energy management systems, control issues for both on-grid and island mode, and microgrid protection. Practitioners are also provided with a complete vision for the deployment of the microgrid in smart cities.


This comprehensive overview of 61850 standard/protocol focuses on implementation, taking the reader through the development and concepts of IEC 61850. This includes the initial work by General Motors (Manufacturing Automation Protocol), EPRI (UCA 1.0 and UCA 2.0), IEEE (TR 1550), and IEC 61850. The standard is a significant piece of many IIoT (industrial internet of things) strategies for substations. The book discusses and documents the basic research and theory of guaranteed multicast done for IEC 61850 GOOSE as well as the shift from variable technology to object-oriented technology. The layering principles, as well as the structure, of IEC 61850 are discussed in detail as well as the actual communication profiles that have been created to support substations/distribution automation, distributed energy resources, and synchrophasors. Real applications will be discussed as well as the future direction of the standard. The author is a technical co-editor of IEC 61850 standard and a leader in US implementations, having been involved with the technology from its inception.

This book presents intuitive explanations of the principles of microgrids, including their structure and operation and their applications. It also discusses the latest research on microgrid control and protection technologies and the essentials of microgrids as well as enhanced communication systems. The book provides solutions to microgrid operation and planning issues using various methodologies including planning and modelling; AC and DC hybrid microgrids; energy storage systems in microgrids; and optimal microgrid operational planning. Written by specialists, it is filled in innovative solutions and research related to microgrid operation, making it a valuable resource for those interested in developing updated approaches in electric power analysis, design and operational strategies. Thanks to its in-depth explanations and clear, three-part structure, it is useful for electrical engineering students, researchers and technicians.

This SpringerBrief discusses the rise of the smart grid from the perspective of computing and communications. It explains how current and next-generation network technology and methodologies help recognize the potential that the smart grid initiative promises. Chapters provide context on the smart grid before exploring specific challenges related to communication control and energy management. Topics include control in heterogeneous power supply, solutions for backhaul and wide area networks, home energy management systems, and technologies for smart energy management systems. Designed for researchers and professionals working on the smart grid, Communication Challenges and Solutions in the Smart Grid offers context and applications for the common issues of this developing technology. Advanced-level students interested in networking and communications engineering will also find the brief valuable.

This book constitutes the refereed proceedings of the International Conference on Advances in Computing Communications and Control, ICAC3 2011, held in Mumbai, India, in January 2011. The 84 revised full papers presented were carefully reviewed and selected from 266 submissions. The book addresses issues such as AI, as neural networks, computer graphics, data warehousing and mining, distributed computing, geo information and statistical computing, learning algorithms, system security, virtual reality, cloud computing, service oriented architecture, semantic web, coding techniques, modelling and simulation of communication systems, network architecture, network protocols, optical fiber/microwave communication, satellite communication, speech/image processing, wired and wireless communication, cooperative control, and nonlinear control, process control and instrumentation, industrial automation, controls in aerospace, robotics, and power systems.

This book presents a solid theoretical foundation of the modern mitigation technologies employed in the power quality arena, and provides an overview of the most recent challenges in this field. The book introduces the advanced concepts associated with power quality to engineers and students. It will make an excellent reference for facility electrical power engineers and maintenance technicians.

Future Communication Technology and Engineering is a collection of papers presented at the 2014 International Conference on Future Communication Technology and Engineering (Shenzhen, China 16-17 November 2014). Covering a wide range of topics (communication systems, automation and control engineering, electrical engineering), the book includes the
This book constitutes the refereed proceedings of the 17th International GI/ITG Conference on Measurement, Modelling and Evaluation of Computing Systems and Dependability and Fault-Tolerance, MMB & DFT 2014, held in Bamberg, Germany, in March 2014. The 21 papers presented (2 invited papers, 3 tool papers and 16 full papers) were carefully reviewed and selected from numerous submissions. MMB & DFT 2014 covered all aspects of performance and dependability evaluation of systems including networks, computer architectures, distributed systems, workflow systems, software, fault-tolerant and secure systems. The conference also featured 3 satellite workshops namely the International Workshop on Demand Modeling and Quantitative Analysis of Future Generation Energy Networks and Energy-Efficient Systems, FGENET 2014; the International Workshop on Modelling, Analysis and Optimization of Social Networks and their Applications, SOCNET 2014 and the 2nd Workshop on Network Calculus, WoNeCa 2014.

Instrument Engineers' Handbook – Volume 3: Process Software and Digital Networks, Fourth Edition is the latest addition to an enduring collection that industrial automation (AT) professionals often refer to as the “bible.” First published in 1970, the entire handbook is approximately 5,000 pages, designed as standalone volumes that cover the measurement (Volume 1), control (Volume 2), and software (Volume 3) aspects of automation. This fourth edition of the volume provides an in-depth, state-of-the-art review of control software packages used in plant optimization, control, maintenance, and safety. Each updated volume of this renowned reference requires about ten years to prepare, so revised installments have been issued every decade, taking into account the numerous developments that occur from one publication to the next. Assessing the rapid evolution of automation and optimization in control systems used in all types of industrial plants, this book details the wired/wireless communications and software used. This includes the ever-increasing number of applications for intelligent instruments, enhanced networks, Internet use, virtual private networks, and integration of control systems with the main networks used by management, all of which operate in a linked global environment. Topics covered include: Advances in new displays, which help operators to more quickly assess and respond to plant conditions Software and networks that help monitor, control, and optimize industrial processes, to determine the efficiency, energy consumption, and profitability of operations Strategies to counteract changes in market conditions and energy and raw material costs Techniques to fortify the safety of plant operations and the security of digital communications systems This volume explores why the holistic approach to integrating process and enterprise networks is convenient and efficient, despite associated problems involving cyber and local network security, energy conservation, and other issues. It shows how firewalls must separate the business (IT) and the operation (automation technology, or AT) domains to guarantee the safe function of all industrial plants. This book illustrates how these concerns must be addressed using effective technical solutions and proper management policies and practices. Reinforcing the fact that all industrial control systems are, in general, critically interdependent, this handbook provides a wide range of software application examples from industries including: automotive, mining, renewable energy, steel, dairy, pharmaceutical, mineral processing, oil, gas, electric power, utility, and nuclear power.

Data science, data engineering and knowledge engineering requires networking and communication as a backbone and have wide scale of implementation in engineering sciences. Keeping this ideology in preference, this book includes the insights that reflect the advances in these fields from upcoming researchers and leading academicians across the globe. It contains high-quality peer-reviewed papers of advanced research on recent advancement in Computer, Communication and Cybersecurity (RACCCS 2016), held at Jamardon Rai Nagar Rajasthan Vidyapeeth University. Udaipur, India, during 25–26 November 2016. The volume covers variety of topics such as Advanced Communication Networks, Artificial Intelligence and Evolutionary Algorithms, Advanced Software Engineering and Cloud Computing, Image Processing and Computer Vision, and Security. The book will help the perspective readers from computer industry and academia to derive the advances of next generation communication and computational technology and shape them into real life applications. The use of electric power substations in generation, transmission, and distribution remains one of the most challenging and exciting areas of electric power engineering. Recent technological developments have had a tremendous impact on all aspects of substation design and operation. With 80% of its chapters completely revised and two brand-new chapters on energy storage and Smart Grids, Electric Power Substations Engineering, Third Edition provides an extensive updated overview of substations, serving as a reference and guide for both industry and academia. Contributors have written each chapter with detailed design information for electric power engineering professionals and other engineering professionals (e.g., mechanical, civil) who want an overview or specific information on this challenging and important area. This book: Emphasizes the practical application of the techniques and introduces effective use of graphics and photographs to visually convey the book’s concepts Provides applicable IEEE industry standards in each chapter Is written by industry experts who have an average of 25 to 30 years of industry experience Presents a new chapter addressing the key role of the substation in Smart Grids Editor John McDonald and this very impressive group of contributors cover all aspects of substations, from the initial concept through design, automation, and operation. The book’s chapters—which delve into physical and cyber-security, commissioning, and energy storage—are written as tutorials and provide references for further reading and study. As with the other volumes in the Electric Power Engineering Handbook series, this book supplies a high level of detail and more importantly, a tutorial style of writing and use of photographs and graphics to help the reader understand the material. Several chapter authors are members of the IEEE Power & Energy Society (PES) Substations Committee and are the actual experts who are developing the standards that govern all aspects of substations. As a result, this book contains the most recent technological developments in industry practice and standards. Watch John D. McDonald talk about his book A volume in the Electric Power Engineering Handbook, Third Edition. Other volumes in the set: K12642 Electric Power Generation, Transmission, and Distribution, Third Edition (ISBN: 9781439856284) K12648 Power Systems, Third Edition (ISBN: 9781439856338) K13917 Power System Stability and Control, Third Edition (ISBN: 9781439832004) K12643 Electric Power Transformer Engineering, Third Edition (ISBN: 9781439856291)

IEC 61850-Based Smart Substations: Principles, Testing, Operation and Maintenance systematically presents principles, testing approaches, and the operation and maintenance technologies of such substations from the perspective of real-world application. The book consists of chapters that cover a review of IEC 61850 based smart substations, substation configuration technology, principles and testing technologies for the smart substation, process bus, substation level, time setting and synchronization, and cybersecurity. It gives detailed information on testing processes and approaches, operation and monitoring technologies, and insights gained through practical experience. As IEC 61850 based smart substations have played a significant role in smart grids, realizing information sharing and device interoperation, this book provides a timely resource on the topics at hand. Contributors to the overall understanding of standard IEC 61850, analyzing principles and features Introduces best practices derived from hundreds of smart substation engineering applications Summarizes current research and insights gained from practical experience in the testing, operation and maintenance of substation projects in China Gives systematic and detailed information on testing technology Introduces novel technologies for next-generation substations Smart Power Distribution Systems: Control, Communication, and Optimization explains how diverse technologies work to build and maintain smart grids around the globe. Yang, Yang and Li present the most recent advances in the control, communication and optimization of smart grids and provide unique insight into power system control, sensing and communication, and optimization technologies. The book covers
control challenges for renewable energy and smart grids, communication in smart power systems, and optimization challenges in smart power system operations. Each area discussed focuses on the scientific innovations relating to the approaches, methods and algorithmic solutions presented. Readers will develop sound knowledge and gain insights into the integration of renewable energy generation in smart power distribution systems. Presents the latest technological advances in electric power distribution networks, with a particular focus on methodologies, approaches and algorithms Provides insights into the most recent research and developments from expert contributors from across the world Presents a clear and methodical structure that guides the reader through discussion and analysis, providing unique insights and sound knowledge along the way

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