
PRACTICAL ELECTRICAL METERING, MEASUREMENT AND INSTRUMENT TRANSFORMERS FOR ENGINEERS AND TECHNICIANS



YOU WILL LEARN HOW TO:

- Understand the importance of proper measurement
- Identify different types of measuring instruments
- Appreciate the role of instrument transformers in measurement
- Use and apply metering devices and principles of operation
- Maintain, commission and test measuring equipment
- Understand future technologies in measuring instruments

WHO SHOULD ATTEND:

- Instrumentation and Control Engineers
- Consulting Engineers
- Electrical Engineers
- Project Engineers
- Maintenance Engineers
- Power System Protection Engineers
- Building Service Designers
- Data Systems Planners and Managers
- Electrical and Instrumentation Technicians

The Workshop

Measurement of electrical parameters is necessary to know the status of a power system and for protection against abnormal incidents such as short circuits and earth faults. Accurate measurements are also important for tariff metering since large sums of money can be involved in these transactions and is therefore in the interest of both suppliers and consumers of electrical energy. This course discusses the details of instrument transformers including their construction, ratings and specifications. Various measuring devices such as instruments and transducers, their operating principles and applications will be covered as well.

Pre-requisites

Some working knowledge of basic electrical equipment is required, although this will be covered at the beginning of the course. Real-life experience with such equipment and hands-on testing will enable the workshop to be placed in context.

Practical Sessions

This is a practical, hands on workshop enabling you to work through practical exercises which reinforce the concepts discussed.

The Program

INTRODUCTION TO ELECTRICAL MEASUREMENT

- Introduction to electrical measurement
- Need of measurement in electrical installations
- Why accuracy is important in measurement
- Different types of measuring devices used for measuring
- Transducers and their principle of operation
- Instrument transformers and principles
- Purpose of instrument transformers

VOLTAGE TRANSFORMERS (PT OR VT)

- Basic electrical theory of voltage transformers
- Types and categories of voltage transformers
- How voltage transformers are used for measurement
- Characteristics and classes of voltage transformers
- Standards for voltage transformers
- Hazards with voltage transformers
- Accuracy checks on voltage transformers
- Applications of voltage transformers

CURRENT TRANSFORMER (CT)

- Basic electrical theory of current transformers
- How current transformers are used for measurement
- Characteristics and classes of current transformers
- Comparison of a metering CT and a protection CT
- Standards for current transformers
- Hazards with current transformers
- Accuracy of current transformers
- Applications of current transformers

METERING DEVICES AND PRINCIPLES

- Different types of meters
- Classification of meters
- Measurement principles
- Alternating current system and peak value, RMS value
- Active and reactive power
- Circuit configurations (direct and through instrument transformers)
- Ammeters and voltmeters
- Frequency meter
- Power factor meters
- Power and energy meters
- Measurement of current, power and frequency
- Integrating instruments
- Registering instruments
- Recording instruments
- Digital instruments
- Instrument mounting and wiring

TRANSDUCERS

- Types of transducers depending on principle, active and passive
- How measurement is carried out with transducers
- Power transducers and their use
- Average responding transducers
- RMS responding transducers
- Use of interposing transformers
- Applications of transducers

APPLICATIONS IN PRACTICAL SYSTEMS (CIRCUIT CONNECTIONS)

- Traffic metering and control and indication metering
- Metering code
- Parameters monitored and purpose
- Tariff metering arrangements
- Importance of accurate and reliable metering
- Standards applicable with stress on accuracy

COMMISSIONING, TESTING AND MAINTENANCE OF MEASURING SYSTEMS

- Testing of a voltage transformer
- Testing of current transformers
- Testing of transducers
- Commissioning of voltage transformers
- Commissioning of current transformers
- Commissioning of transducers
- Maintenance of current transformers, voltage transformers and transducers
- Special emphasis on accuracy checks

THE FUTURE OF MEASURING TECHNOLOGY

- Smart metering
- Technology behind smart metering
- Benefits of smart metering
- AMR and metering for smart grids

