

PS200

Thyristor and Diode Converters

A mobile unit that teaches the principles and applications of thyristors, diodes and converters in power circuits



- Single and three-phase experiments
- Includes supplies, circuit protection and instruments
- Shows the principles of basic electronic drives for further experiments in electric motor speed control
- Single and three-phase rectification circuits
- Internal or external thyristor firing control source
- Selectable gate pulse monitor connection to compare firing pulse with output waveforms
- Variable thyristor firing delay for studies of harmonics and effect of firing delay on output waveforms
- Transducers included for transient waveform monitoring
- Includes multi-tapped transformers to investigate different power supply characteristics

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- An ISO 9001 certified company

PS200

Thyristor and Diode Converters

Description

The Thyristor and Diode Converters unit is a versatile teaching aid. It contains all the parts needed to explore the principles and applications of thyristors, diodes and converters.

The control panel has clear mimic diagrams with shrouded sockets that connect to the different parts of the circuits. The parts include thyristors, diodes, inductors and transformers.

Students use shrouded leads (included) to connect circuits and perform many experiments. These include the characteristics of diodes, gate firing of thyristors and rectification using half-wave and full-wave techniques.

The multi-tapped transformers give a choice of single and three-phase a.c. voltages for connection to the diodes and thyristors. A centre-tapped interphase transformer shows the effect of reducing a.c. circulating currents in rectifier circuits. A load inductor shows the effect of inductance when smoothing the a.c. ripple in rectifier circuits.

Students use the extra fuses on the control panel to protect the load side of their circuits.

For thyristor experiments, students can select an external or internal source to trigger the gates of the thyristors. A variable control delays the gate firing pulse for clear demonstrations of the effect of firing delay on harmonics and output waveforms. Transducers allow students to connect an oscilloscope (available separately) to show and compare the gate pulses with the output waveforms.

Supplied with a comprehensive manual with descriptions, power electronic circuit and drive theory, and experiment procedures. The open structure of the equipment, allows users to create additional experiments to extend the scope of investigations, including project work.

Experiments

- Single-phase diode rectifier circuits
- Polyphase half-wave diode rectifier circuits
- Double three-phase star diode rectifier circuits
- Three-phase diode bridge full-wave rectifier circuits
- Single and three-phase fully controlled thyristor bridge circuits
- Half-controlled bridge rectifier circuits
- Single-phase a.c. control using thyristors
- Rectifier output smoothing methods
- Harmonics generated by rectifier circuits
- Commutation effects in single-phase rectifiers
- Commutation effects in polyphase rectifiers
- Inverted operation of a rectifier
- A.C. power components with rectifiers
- D.C. motor speed control using rectifiers (when used with a suitable d.c. motor – not supplied)
- Rectifiers in parallel and series

Standard Features

- Supplied with comprehensive user guide
- Two-year warranty
- Made in accordance with the latest European Union directives

Essential Ancillaries

- Portable Resistive Loadbank (PS231)
- Portable Inductive Loadbank (PS233)
- Two-Channel Oscilloscope (OS2)

Essential Services

Electrical supply:

380 V/415 V/220 V three-phase

4 kVA, 50 Hz or 60 Hz (specify on order)

Operating Conditions

Operating environment:

Well ventilated laboratory environment

Storage temperature range:

-25°C to +55°C (when packed for transport)

Operating temperature range:

+5°C to +40°C

Operating relative humidity range:

80% at temperatures < 31°C decreasing linearly to 50% at 40°C

Sound Levels

Less than 70 dB(A)

Specifications

Nett dimensions and weight: 1500 mm x 1400 mm x 600 mm and 350 kg

Packed volume and weight: 2.5 m³ and 700 kg

Transformers (three off):

- 1 kVA single phase – primary tapped at 220 V and 380 V. Two secondary windings, both at 52 V. One secondary winding tapped at 8 V. Each secondary winding protected by an ultra-fast blow fuse.

Semiconductors:

- 6 x power diodes 25 A and 600 V (approximately)
- 6 x power thyristors 19 A and 600 V (approximately)

Other wound components:

- 10 mH load inductor, tapped at 5 mH
- 52 mH interphase transformer, centre-tapped

Transducers:

- 2 x voltage transducers 1 V out = 40 V in
- 3 x current transducers 1 V out = 2 A in

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