

≡ THYRISTOR AND DIODE TRAINER

PSL60

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



KEY FEATURES

- Fully equipped for both single and three-phase experiments
- 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 and oscilloscope included for waveform monitoring
- Supplied with resistive and inductive loads (PSA50 and PSA60)
- Includes multi-tapped transformers to investigate different power supply characteristics

LEARNING OUTCOMES*

- Single-phase and polyphase diode rectifier circuits
- Single and three-phase fully controlled thyristor bridge circuits
- Single-phase AC control using thyristors
- Rectifier harmonics, output smoothing methods and inverted operation
- Commutation effects in polyphase and single-phase rectifiers

KEY SPECIFICATIONS

- Six diodes
- Six thyristors
- Three multi-tapped transformers
- One interphase transformer
- Internal and external thyristor firing control
- Two resistive loads
- One inductive load
- Oscilloscope

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DESCRIPTION

The Thyristor and Diode Trainer is a versatile teaching aid. It explores the principles and applications of thyristors, diodes and converters.

The control panel has clear mimic diagrams with shrouded sockets. Students use shrouded leads (included) to connect the different parts of the circuits. The parts include thyristors, diodes, inductors, transformers and smoothing capacitors. A mix of standard analogue meters and a multifunction digital meter measure the currents and voltages in the circuits.

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

Fast-blow fuses on the control panel protect the load side of experiment circuits. Students use controls on the lower panel to adjust AC supply voltage and ballast resistance during experiments.

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 (included) to show and compare the gate pulses with the output waveforms.

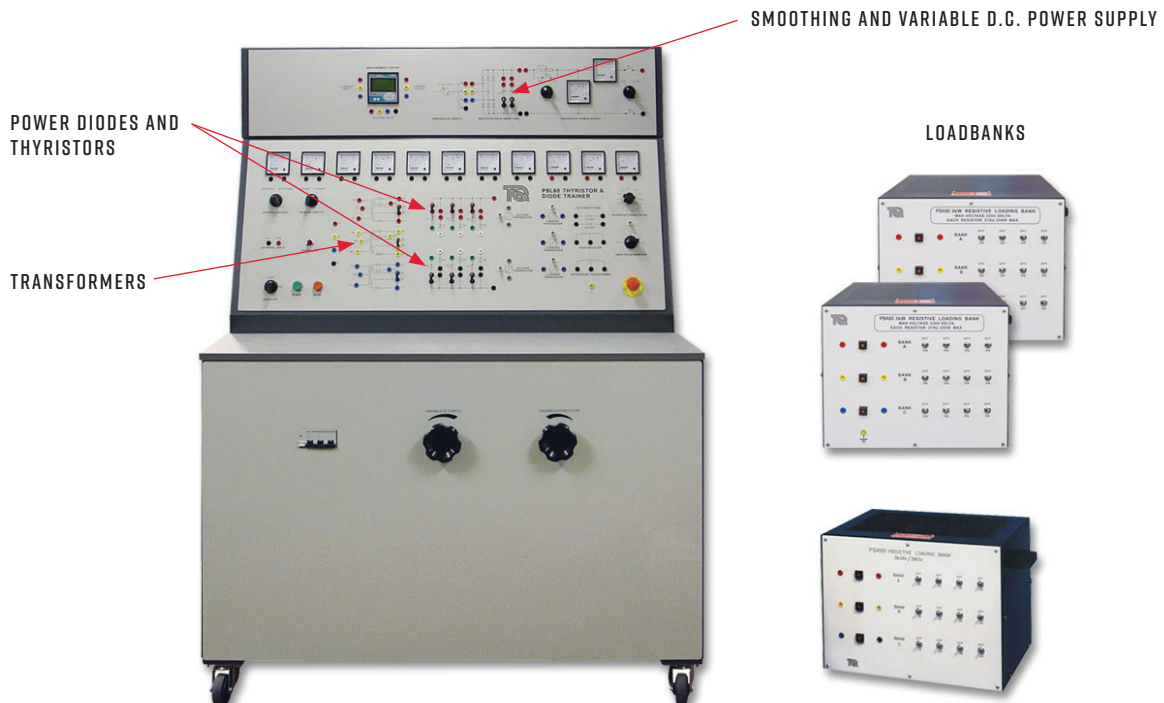
TecEquipment supply this product with three loadbanks: two resistive (PSA50) and one inductive (PSA60). It also includes a two-channel oscilloscope (OS2).

*ADDITIONAL EXPERIMENTS

- DC motor speed control using rectifiers (when used with a suitable d.c. motor – not supplied)
- Rectifiers in parallel and series (needs 2 off PSL60 units)

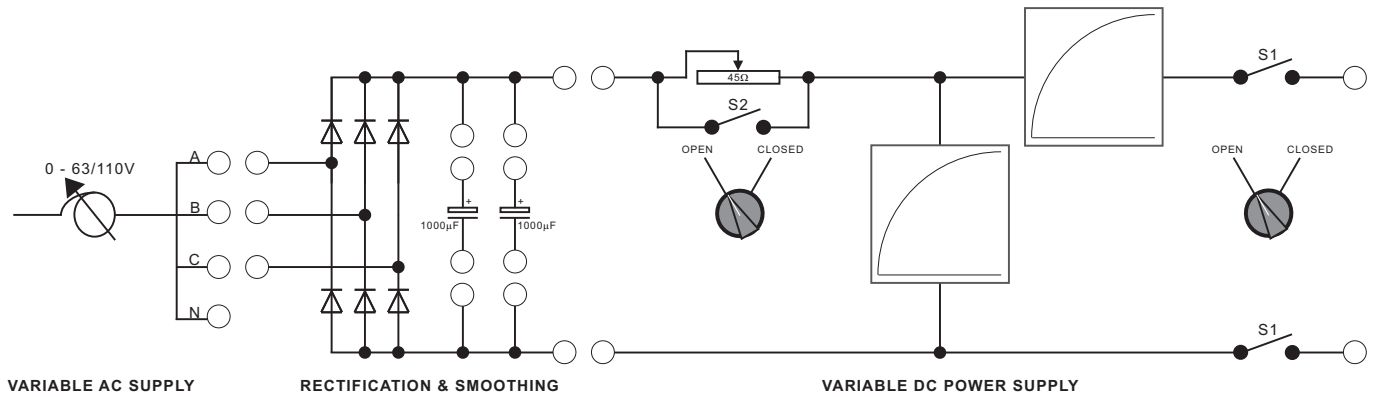
STANDARD FEATURES

- Supplied with comprehensive user guide
- Five-year warranty
- Made in accordance with the latest European Union directives
- ISO9001 certified manufacturer



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MAIN PANEL CIRCUITS (SCHEMATIC)



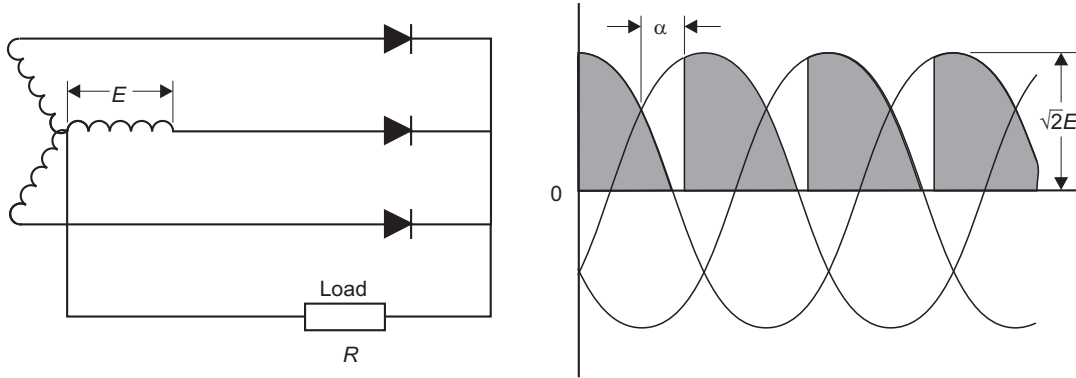
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TYPICAL WORK ASSIGNMENTS

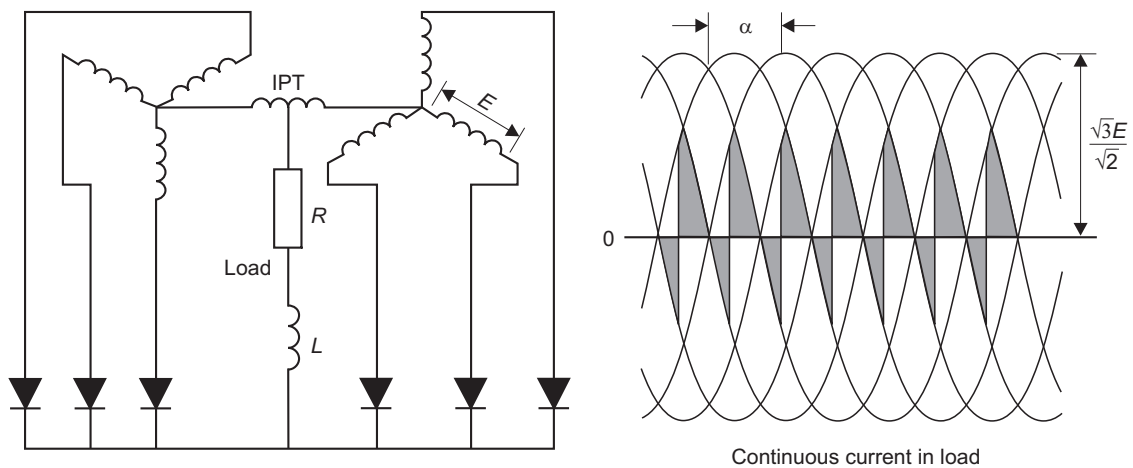
THREE-PHASE, HALF-WAVE CIRCUIT

This test applies a resistive, then inductive load to a three-phase supply using three diodes to give half-wave rectification.



DOUBLE THREE-PHASE STAR DIODE RECTIFIER CIRCUIT

This test connects two three-phase half-wave rectifier circuits in parallel using the interphase transformer to produce a full-wave output.



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DETAILED SPECIFICATIONS

TecEquipment is committed to a programme of continuous improvement; hence we reserve the right to alter the design and product specification without prior notice.

NETT DIMENSIONS AND WEIGHT (PSL60):

1750 mm high x 1320 mm wide x 870 mm front to back and 431 kg

APPROXIMATE PACKED VOLUME AND WEIGHT (PSL60):

4.8 m³ and 650 kg

LOADBANKS:

Refer to separate datasheets (PSA50 and PSA60)

OSCILLOSCOPE:

Two channel

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
- 6 x power thyristors

OTHER WOUND COMPONENTS:

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

TRANSDUCERS:

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

ESSENTIAL SERVICES

ELECTRICAL SUPPLY:

Three-phase 5 kVA, 50 Hz or 60 Hz (specify on order)

50 Hz needs 380 – 440 VAC

60 Hz needs 200 – 240 VAC

OPERATING CONDITIONS

OPERATING ENVIRONMENT:

Laboratory

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)