

# PSS3

## Second Generator

***A self-contained motor and generator set that connects to TecEquipment's Power System Simulator (PSS1) for extra experiments in central and embedded generation***



- Self-contained motor (prime mover) and generator set, for use with and powered by TecEquipment's Power System Simulator (PSS1)
- Includes synchroscope and prime mover controls to synchronise with the grid supply and generator of the Power System Simulator
- Can connect to TecEquipment's Power System Simulator SCADA (Supervisory Control and Data Acquisition) Package (PSS2) to simulate 'real world' power system control and monitoring
- Distribution and generator transformers included, with variable tapplings for even more experiments in power transformation
- Includes different generator excitation methods for advanced studies
- Generator earth point has removable link and earthing resistor for generator earth fault and neutral voltage studies
- Built-in industry-standard digital protection relays for the generator and generator bus

- TecEquipment Ltd, Bonsall Street, Long Eaton, Nottingham NG10 2AN, UK
- **T** +44 115 972 2611 • **F** +44 115 973 1520 • **E** info@tecquipment.com • **W** www.tecquipment.com
- An ISO 9001 certified company

# PSS3

## Second Generator

### Description

A self-contained motor and generator set that operates as a second generator for TecEquipment's Power System Simulator (PSS1). It provides extra experiments and studies into power generation.

The motor (prime mover) and generator set consists of two coupled machines mounted in the base of the control console. Manual or different types of automatic excitation control the output of the generator. A vector drive controls the speed of the motor. Digital meters show the conditions of the prime mover and generator.

The relays show students how actual generators are protected and the different ways that they are protected. Students can set the relays from their control panels. The relays also include sockets to link them to a suitable computer (computer not included) for more detailed programming, if needed. The relays operate the circuit-breakers around the second generator. The circuit-breakers also include hand-operated switches, and lamps. The lamps show whether the circuit-breaker is open or closed.

The Second Generator links to the Power System Simulator at the higher voltage (transmission) level to simulate central generation, for example main power stations.

The Second Generator links to the Power System Simulator at the lower voltage (utilisation) level to simulate embedded generation directly to a load, for example a generator at a factory or hospital.

Multi-function digital meters connect directly to the generator output and to the utilisation and distribution outputs to show the conditions of all three phases.

### Experiments

Extends the range of experiments possible with TecEquipment's Power System Simulator to include:

- Central and embedded generation
- Synchronising and paralleling with another three-phase source (mains or generator)
- Load sharing
- Stiff/weak systems
- Circulating current monitoring
- Three-source systems: connecting the generator at the central generation or embedded generation level
- Automatic voltage regulator operation in constant reactive power and constant power factor modes

### Standard Features

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

### Essential Ancillaries

- Power System Simulator (PSS1)

### Recommended Ancillaries

- Power System Simulator SCADA Package (PSS2)

### Essential Services

*Electrical supply:* Powered from the Power System Simulator (PSS1)

*Floor space needed:* Approximately 3 m x 3 m of solid, level floor, located within 4 m of the right-hand end of the Power System Simulator

### Operating Conditions

*Operating environment:* 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:* 2100 mm long x 2000 mm high x 1500 mm front to back. Allow an extra 500 mm to its left side for power connections, and an extra 1500 mm at the back when access doors are open.

*Packed volume and weight:* 5 m<sup>3</sup> and 1500 kg

*Generator and motor:*

- 6 kVA maximum (operated at a nominal 2 kVA), four-pole salient pole a.c generator. Brushless, with automatic and manual excitation.
- 7 kVA maximum induction motor with shaft encoder and electronic four-quadrant a.c vector drive control.

*Relays:*

- Generator bus protection: overcurrent and earth fault
- Generator protection: over speed and under speed, overvoltage and overcurrent, and loss of mains (from rate of change of frequency and voltage vector shift)

*Meters:*

- 2 x multi-function meters to show voltage, current and power
- 4 x digital meters to show generator excitation voltage and current, prime mover speed and generator load angle

*Distribution transformer:*

- 220 V to 110 V delta-to-delta (Dd) with adjustable primary tapplings and an earthing transformer to the secondary windings

*Generator transformer:*

- 220 V to 220 V delta-to-star (Dy) with adjustable secondary tapping and an earth link for the secondary star point

- TecEquipment Ltd, Bonsall Street, Long Eaton, Nottingham NG10 2AN, UK
- **T** +44 115 972 2611 • **F** +44 115 973 1520 • **E** info@tecquipment.com • **W** www.tecquipment.com
- An ISO 9001 certified company

