

PS100**Salient Pole Generator**

Provides typical generator performance characteristics for experiments in generation, synchronising and paralleling, and load sharing



- Self-contained teaching module – ideal for class and project work
- Generator and prime mover included in the base of the control console
- Includes supplies, circuit protection, internal load banks, instruments and controls
- Simulated power transmission line for realistic tests
- Synchronising by synchroscope and three-lamp method
- Built-in industrial-standard digital protection relay gives wide range of functions – module also includes extra socket for additional relay to give even more experiments
- Part of TecEquipment's Modular Power System range – can connect to other parts of the system for even more experiments
- Manual or automatic generator excitation
- Detailed mimic diagram and clear labelling to help students' understanding
- Includes work surface and cable racks for convenient and efficient use

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- An ISO 9001 certified company

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Salient Pole Generator

Description

Part of the Modular Power System range, the Salient Pole Generator explores the principles and characteristics of salient pole generators.

The module contains everything needed for salient pole generator experiments including resistive, capacitive and inductive load banks. The open and flexible design is ideal for lecturers to create their own experiments, as well as student project work.

To allow realistic investigations, the characteristics of the prime mover and generator are similar to industrial turbine and generator sets.

For protection tests, current transformers (CTs) in the test circuits connect to the protection relay fitted to the upper control panel.

The user connects and sets the protection relay to detect line and earth currents, voltage and frequency faults. The relay also monitors and measures fault events and disturbances for fault analysis. The user sets the relay from its local control panel, or by a cable link to a suitable computer (computer not included) and software (included). When the user applies a circuit fault, the relay opens circuit-breakers in the test circuits. The circuit-breakers also include hand-operated switches and lamps. The lamps show whether the circuit-breakers are open or closed.

The control and protection circuits work when the generator is unsynchronised and synchronised to the mains electrical supply. When the generator is synchronised, the user can operate a variable quadrature droop for reactive power regulation.

The prime mover and generator set is two coupled machines mounted on a common bedplate in the base of the control console. Manual or automatic voltage regulation (AVR) excitation controls the output voltage of the generator. When the generator is in overrun mode, resistors dissipate the reverse power. A vector drive controls the speed of the prime mover and allows investigations into load flow in positive and negative directions. An integral shaft encoder allows load angle analysis.

Transducers with BNC connections allow voltage and current waveform measurement, display and analysis using an external oscilloscope (not supplied).

For more experiments in protection, the unit has an extra socket to connect an additional protection relay (available separately).

Supplied with the equipment is a set of shrouded leads for the user to connect the test circuits together.

The unit includes an emergency switch, a mains supply isolator and protection fuses.

A set of sockets links the module to other parts of TecEquipment's Modular Power System (available separately). The Modular Power System allows experiments on power generation, transformation, transmission, distribution, utilisation and protection.

Standard Features

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

Experiments

- A.C. generator output voltage and frequency control
- Voltage, speed and field current characteristics
- Generator open-circuit test
- Short-circuit test
- Non-inductive load test
- Normal and sudden short-circuit tests
- Zero-power factor test
- Synchronising and parallelling
- Control of real and reactive power
- Protective relays

Extra experiments when used with the other parts of the Modular Power System:

- Transformation
- Transmission
- Distribution
- Utilisation and protection

Recommended Ancillaries

- Power Factor Load Bank (PS230)
- Oscilloscope (OS2)

Additional relays:

- Overcurrent and Earth Fault Relay (PS251)
- Differential Protection Relay (PS252)
- Directional/Non-directional Overcurrent Relay (PS253)
- Feeder Management Relay (PS254)

Other Modular Power System units:

One or more of the other units in the Modular Power System range:

- Transformer Trainer (PS110)
- Transmission Line Simulator (PS120)
- Distribution Trainer (PS130)
- Switched Busbar Module (PS150)

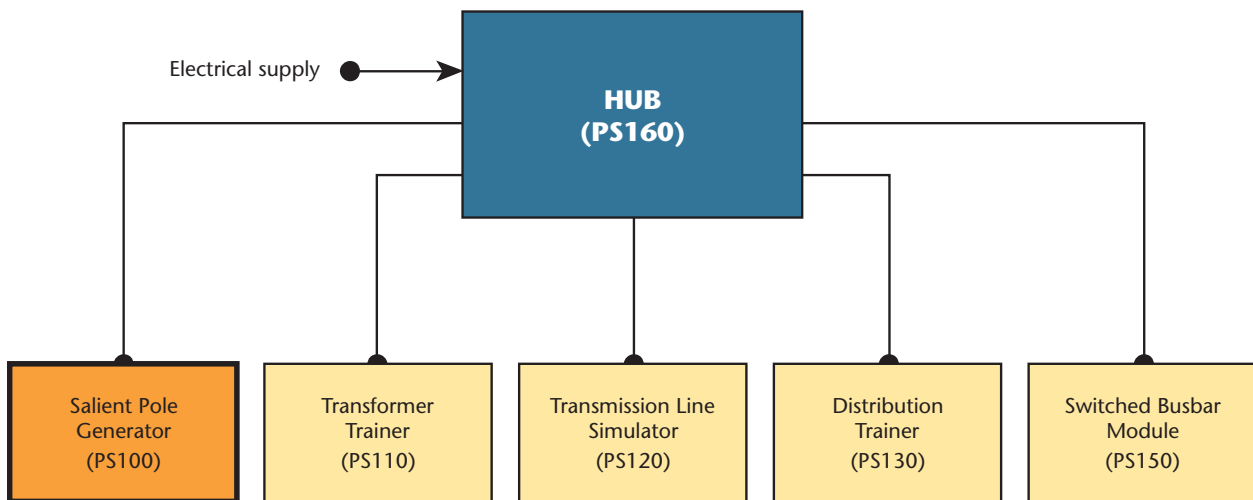
Also, to help connect two or more units of the Modular Power System, TecEquipment recommends that you use the Modular Power System Hub (PS160).

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The Modular Power System



Essential Services

The module can connect directly to an electrical supply as a stand-alone unit, or it can be powered from the optional PS160 Hub.

Electrical supply (stand-alone):

Three-phase 400 V, 16 A, 50 Hz
or 220 V, 60 Hz (specify on order)

Electrical supply (for the PS160 Hub):

Three-phase 380/415 V, 32 A, 50 Hz or 60 Hz (specify on order)

Floor space needed:

Approximately 3 m x 2 m of solid, level floor

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:

1850 mm x 1870 mm x 960 mm and 850 kg

Packed volume and weight:

5.0 m³ and 1050 kg

Generator:

6.5 kVA maximum (operated at a nominal 2 kVA), 0.8 pf, four-pole, three-phase salient pole a.c. generator. 50 Hz, 1500 rev.min⁻¹ and 60 Hz, 1800 rev.min⁻¹. Automatic voltage regulator (AVR) or manually excited.

Prime mover:

7.5 kW, four-pole, three-phase induction motor. Includes a shaft encoder and cooling fan. Driven by a four-quadrant a.c. vector drive.

Instruments:

- Prime mover power and speed
- Multi-function meter for a.c. measurements (voltage, current, power factor, power, VAR and VA)
- Load angle meter
- Generator excitation voltage and current
- Synchroscope and three lamps
- Incoming running voltage and frequency

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