Wind turbine energy

WIND TURBINE SIMULATOR - NETWORK INJECTION



EOLYP is a test bench dealing with the study of the hyper synchronous activity of a wind turbine for its electricity production aspects, excluding the mechanical aspects. Due to noise pollution and draughts, which are incompatible with a classroom environment, the propeller has been replaced by a variable speed drive motor.

The functional diagram presents the operating principle. The safety components placed in the electrical cabinet are not represented to simplify reading. The propeller, for which the operator adjusts the speed, drives the generator from 0 to 1800 rpm. One sensor placed on the shaft, returns rotation speed and torque information to the console which displays this information (EOLYP2 only). The generator is connected to the public three-phase network via a centralized measurement system, communicating via RJ45 via an embedded web page displaying:

- active, reactive, and apparent power
- phase-to-phase voltage
- current
- power factor
- polar diagram

The practical exercises show that, depending on the drive speed, the generator consumes or produces energy, thus highlighting hypersynchronous and hyposynchronous operation. The voltage/current phase shift also varies with rotation speed. The adjustable capacitor bank allows the cos φ to be adjusted to around 1 depending on the speed and power output.

The model is delivered fully wired and functional.









COMPRISES

- 1 frame on casters, dim. 1200x750mm height : 1820mm. Weight: 143kg.
- 1 asynchronous motor 1.5 kVA
- 1 generator
- 1 torque sensor (EOLYP2 only)
- 1 command console
- 1 electrical cabinet
- 1 network coupling unit

GENERATOR FEATURES

- Generator: 3 x 400VAC Asynchronous motor.
- Active power injected into the network: 0 to 1.2kVA
- Generator efficiency: 78%
- Speed variation: 0 to 1800 rpm

ELECTRICAL CABINET FEATURES Inside

- 30 mA circuit breakers & thermal-magnetic and thermal circuit breakers.
- 4kVA speed controller with control unit on the console.
- stepped capacitors battery

On the front

- 1 emergency stop circuit breaker
- 1 switch disconnector
- 1 stop/Start button with push button
- 4 switches triggering the capacitors to rectify the cosp
- 2 indicator lights show a thermal fault on the motor and generator

