

## RW-120 DOUBLE FEED INDUCTION GENERATOR SYSTEM EXPERIMENT SET



The system is used for observation and experimenting the behaviour of modern wind power stations with double-fed induction generators with asynchronous motor, Wind force and mechanical design effects are simulated with components and provided software solutions.

This set is used to investigate the design and operation of modern wind power stations. The set consists of a prime motor that moves a double-feed induction generator (as a generator for the wind power plant).

### System Components:

- Mobile metallic carriage trolley table, stands and racks for mounting and carrying the overall system and below modules:
- Asynchronous 3-phase generator with double feed and motor unit
- Control Module and inverter
- Fault Ride Through Module

- Computer controlled servo machine training
- Incremental encoder
- Universal power supply
- Connections for data acquisition
- Softwares and PC for monitoring, adjusting and simultaneous display of system components
- Other auxiliary connections, wirings, modules and cabling if needed for operation of the equipment.

To implement doubly-fed induction generator, the system have a main motor connected to an asynchronous three-phase generator and overall system controller for monitoring the operation.

The asynchronous three-phase generator have a nominal power of 0.8kW and speed of 1.500 rpm.

The main motor power is 0,8 kW and have a speed of 1500 rpm. The primary voltage is 3x400V. The generator and motor system have a controller unit for implementing dynamic and static four-quadrant operation and also to display operational values such as speed and torque.

The brake is self-cooled asynchronous servo brake with resolver. Resolver resolution is 65000 pulses/revolution.

Operation of the motor and double-feed asynchronous generator are realised with a control module integrated into the system. The control module have a schematic layout display of the system.

The connection voltage of the control module is 3x300V.

The control module have a shaft encoder, digital and analog outputs.

The control module enables operation of the double-feed asynchronous generator in under-synchronous and over-synchronous mode.

The control module is able to realise automatic mains synchronisation.

The reactive and active power, frequency, voltage are controlled.

Excess energy from the DC bus is dissipated.

The module have integrated brake chopper which supports fault simulations.

There is a Fault Ride Through module for simulating symmetrical and asymmetrical fault cases. It emulate responses to wind power plant faults and provides adjustments to controller parameters.

Fault Ride Through module have 4 level adjustable voltage drop feature.

Symmetrical and asymmetrical grid faults are simulated via Fault Ride Through module.

Fault ride through analysis with adjustable start angle is possible.

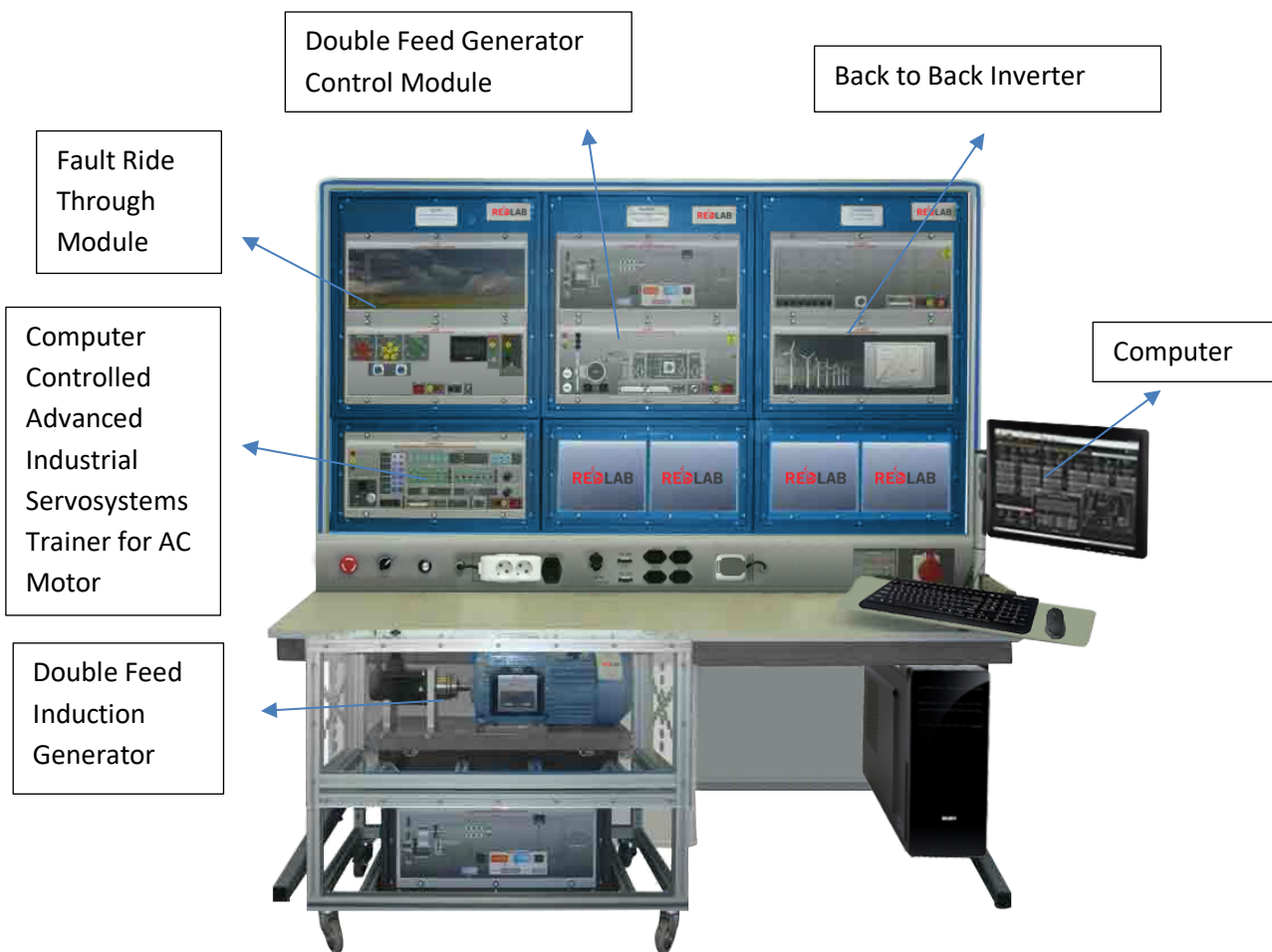
There is a graphical display integrated into the panel.

For the fault simulator, the lower limit of the adjustable power failure duration is 50 ms and the upper limit is 500 ms.

Fault simulator have a connection voltage of 3x400V.

There is a computer controlled servo machine testing/training system with software for examining electrical machines and drives. It visualize as minimum the velocity, position and torque of the motor.

The software ensures simultaneous display of measured and calculated values. The recorded/stored variables can be recalled for observation and comparison. The system ensure that the user can control parameters involved in the process in real time.



Operating with various wind forces including pitch control, definition and emulation of wind power and wind profiles are possible with the software

The encoder have 4.000 rpm.

There is an additional software solution for an interactive teaching for theoretical concepts about the systems. It include practical exercises, evaluation methods and assessment tools. Software ensure to create, edit and carry out practical exercises, tests, exams and calculations.

All cables, modules, data acquisition system, software and related accessories required for fully operation of the system are provided. The components are integrated to each other over the carriage trolley and monitored via software.

Coloured safety measurement cables with 4mm safety plugs and coupling guard mechanism are provided.

### **This set includes the following modules:**

- Double Feed Induction Generator.
- Double-feed Generator Control Module.
- Fault Ride Through Module.
- Back to Back Inverter.
- Computer Controlled Advanced Industrial Servo systems Trainer (for AC Motors).
- Computer Control+Data Acquisition+Data Management Software (SCADA).

The training equipment is delivered along with all necessary power supplies and signal sources. These power supplies fit in design, outputs and power ranting to the listed training equipment. It come with safety sockets (for all outputs above 40 V). All outputs are protected by fuses and other safety devices.

The system comply with CE Marking and conformity declarations are provided

Symbols for the relevant equipment or circuit diagrams conforming to latest DIN/ISO standards are screen-printed on the front panel of the modules. If necessary, front panels are supplemented with color graphics or photographs at applicable locations on the panels/modules.