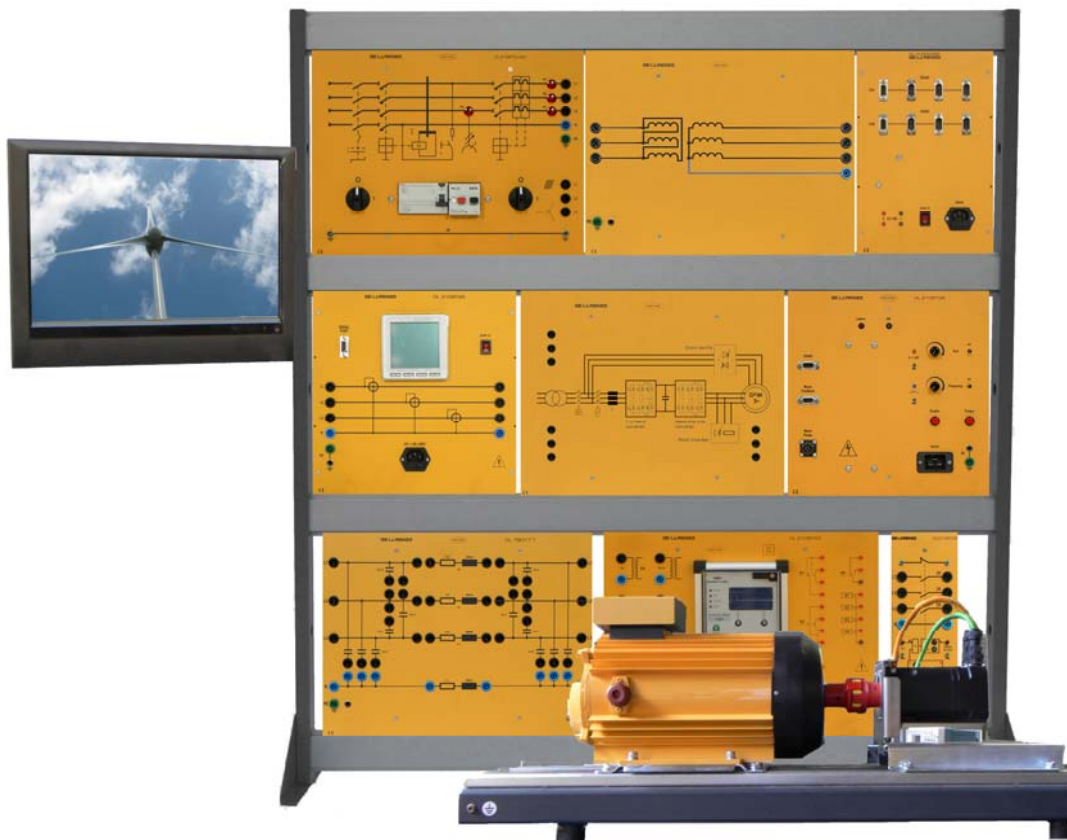


## DL WPP - Wind Power Plants



The picture is indicative

This trainer allows the students to study the functions and operations of a modern wind power plant simulating the effects of the wind force and their effects on the plant.

This system operates through a brushless machine and the simulation software and the double-feed asynchronous machine allows a practical and effective approach to this trainer.

The trainer has a modular structure that will grant teachers and students extreme flexibility during the study of the related topics and the performance of the experiments.

An interactive multimedia software is also available to allow performing the experiments set-up as well as the visualization and management of the collected data through PC.

The control unit of this trainer allows controlling and operating a speed-variable double-feed asynchronous generator. Thanks to this control unit it is possible to simulate and investigate the operating principles of this topic.

This control unit allows approaching and theoretically in depth analyzing the following topics:

- Operation of the double-feed asynchronous generator;
- Integrated power switch for switching the generator on line;
- Reactive and active power, frequency and voltage control;
- Mains synchronization.

This trainer is complete with the relevant software that can control and set the several operations of the system; with this software it is possible to adjust the wind speed and profile and to examine the effects on the operating functions of a real wind power plant. Another important feature of this software is related to the possibility to control, parameterize and visualize the obtained data.

In particular, with this software it is possible to perform the following activities:

- Measurement, calculation and graphic representation of many mechanical and electrical operating parameters.
- Selection of the set-point values for reactive and active power.
- Definition and simulation of wind power and profiles.
- Interactive experiments set-up.
- Values and graphs can be stored.
- Experiments instructions can be viewed directly from the software.
- Possibility to print documents for easy hardcopy printing of experiments instructions with solutions.

With this wind power plant trainer it is possible to perform the following experiments:

- Study of functions and operations of a modern wind power plant.
- Study of the physical fundamentals related to wind power.
- Study of the generator functions with varying wind force levels and regulated output voltage and frequency.
- Determination of optimum operating points depending on variation of wind conditions.
- Practicing and training on wind turbines.

## DL 2108T26

### BRUSHLESS CONTROLLER with MOTOR

Study of the automatic control for a brushless motor

- Control and operation of a brushless motor in voltage

The system allows the study of the operation of a brushless motor of a typical industrial process automation.

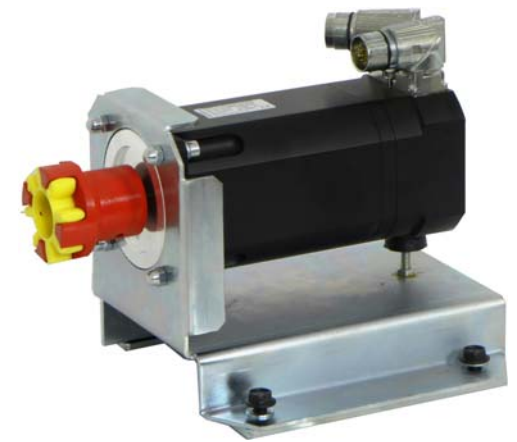
The student has the opportunity to learn to control and parameterize an automatic operation.

The control and monitoring system is done through a software that can:

- Set system parameters
- Draw graphic curves
- Monitor real-time system (torque, speed, etc.)

#### Specifications

- 1kW power brushless motor with electronic encoder
- Control of the system in frequency and voltage
- Mechanical braking system for the analysis of the torque
- Encoder outputs for the analysis of speed
- Display system for controlling and monitoring events
- Button start and stop action and automatic stop intervention in case of alarm
- Complete software for PC interfaced to the system via RS485



## DL 1022

### SLIP RING THREE-PHASE ASYNCHRONOUS MOTOR

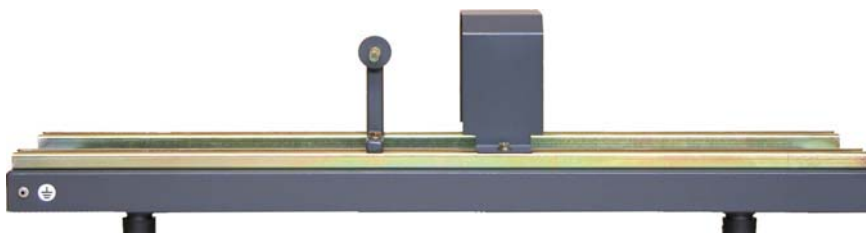
Induction motor with both stator and rotor three-phase windings.

- Power: 1.1 kW
- Voltage: 220/380 V  $\Delta/Y$
- Current: 4.3/2.5 A  $\Delta/Y$
- Speed: 2830 rpm, 50Hz



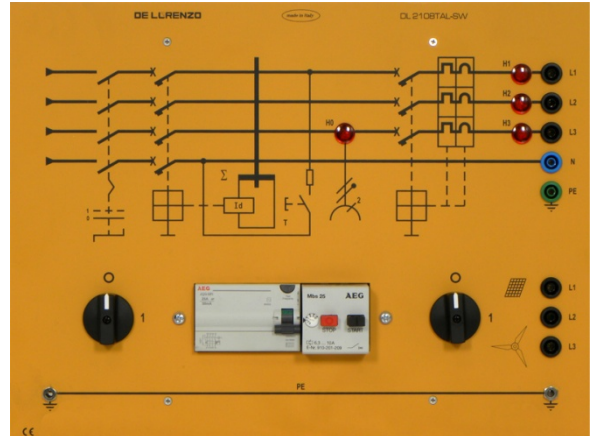
## DL 1013A BASE

Duralumin alloy varnished structure mounted on anti-vibration rubber feet, provided with slide guides to fix one or two machines and with coupling guard.



## DL 2108TAL-SW THREE PHASE SUPPLY UNIT

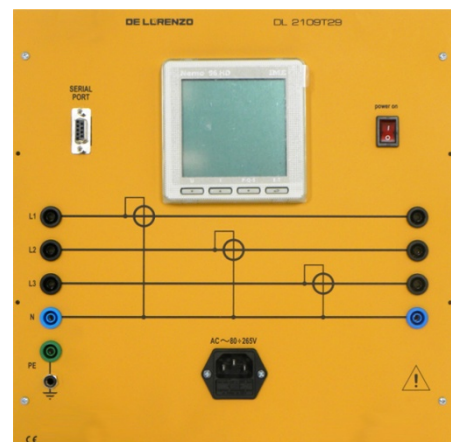
Power supply unit for three-phase connection with 4-pole cam mains switch.  
25 A current operated earth leakage circuit breaker, sensitivity 30 mA.  
Three-phase indicator lamps.  
Output through 5 safety terminals: L1, L2, L3, N and PE.  
Switch for simulation of wind or photovoltaic energy power source.



## DL 2109T29 THREE-PHASE POWER METER

Microprocessor controlled three-phase power analyzer.  
Measurement of voltages, currents, frequencies, active power, reactive power, apparent power.

- Input voltage: 450 V (max 800 Vrms)
- Input current: 5 A (max 20 Arms)
- Operating frequency:  $47 \div 63$  Hz
- Auxiliary supply: single-phase from mains



## DL 2108T27 DOUBLE FEED ASYNCHRONOUS GENERATOR



## DL 2108T28 INVERTER FOR INDUCTION 3-PHASE MOTORS

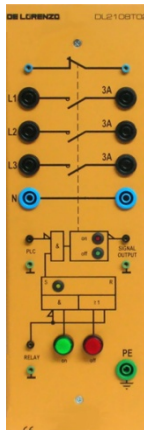




## DL 2108T02 POWER CIRCUIT BREAKER

Three-phase power circuit breaker with normally closed auxiliary contact.

- Contact load capability: 400 Vac, 3 A
- Supply voltage: single-phase from mains



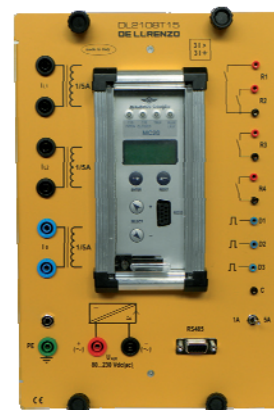
## DL HUBRS485F – DL SCADA COMMUNICATION MODBUS + SOFTWARE SCADA



## DL 2108T15 COMBINED OVER-CURRENT AND EARTH-FAULT RELAY

Over current and Earth Fault relay with programmable time-current curves suitable for protection of power distribution systems with insulated, resistance earthed or compensated neutral.

- Rated input current selectable 1A or 5A, 50/60 Hz
- Three Phase-Fault elements
- Three Earth Fault elements
- Breaker Failure protection
- Trip Circuit Breaker control via serial port
- Time tagged multiple event recording
- Oscillographic wave form capture
- Modbus RTU / IEC870-5-103 Communication Protocols



## DL 2100-3M FRAME



## DL 1155WPP KIT OF CONNECTING LEADS

