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ELECTRIC MACHINES – UNILAB – 1 kW



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STARTING RHEOSTAT	DL 1017RHD3
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LOADS AND RHEOSTATS

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CUT-AWAY MACHINES



SINGLE-PHASE MOTORS

SPLIT-PHASE MOTOR



DL 1028

Single-phase squirrel cage asynchronous motor; possible operation with either permanent or only for starting external capacitor.

Technical features:

- Power: 1.1 kW (0.6 kW)
- Voltage: 220 V
- Current: 9.5 A (7.0 A)
- Speed: 2880 rpm (2850 rpm), 50 Hz

Accessories:

DL 1028AC	STARTING CAPACITOR UNIT
DL 1028AR	STARTING RESISTOR UNIT
DL 1028AL	STARTING INDUCTOR UNIT

CAPACITOR MOTOR



DL 1028C

Single-phase squirrel cage asynchronous motor with splitted phases and running capacitor.

Technical features:

- Power: 1.1 kW (0.64 kW)
- Voltage: 220 V
- Current: 6.5 A (6.2 A)
- Speed: 2750 rpm (2850 rpm), 50 Hz
- Capacitor: 36 μ F
- Cos ϕ : 0.98 (0.70)

UNIVERSAL MOTOR



DL 1029

Single-phase collector motor with inductor winding in series to the winding of the rotor; able to operate either with ac or dc power supply.

Technical features:

- Power: 0.3 kW ac / 0.55 kW dc
- Voltage: 170 V ac / 190 Vdc
- Current: 6 A ac / 4.5 A dc
- Speed: 3300 rpm, 50 Hz

REPULSION MOTOR



DL 1029R

Single-phase collector motor with short-circuited rotor.

Technical features:

- Power: 0.3 kW
- Voltage: 220 V
- Current: 3.6 A
- Speed: 3000 rpm, 50 Hz



THREE-PHASE ASYNCHRONOUS MOTORS

SQUIRREL CAGE THREE-PHASE ASYNCHRONOUS MOTOR



DL 1021

Induction motor with three-phase stator winding and squirrel cage buried in the rotor.

Technical features:

- Power: 1.1 kW
- Voltage: 220 /380 V Δ/Y
- Current: 4.3 / 2.5 A Δ/Y
- Speed: 2870 rpm, 50 Hz

Accessories:

DL 2035 STAR/DELTA STARTER

SLIP RING THREE-PHASE ASYNCHRONOUS MOTOR



DL 1022

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

Technical features:

- Power: 1.1 kW
- Voltage: 220/380 V Δ/Y
- Current: 4.7 / 2.7 A Δ/Y
- Speed: 3450 rpm, 50 Hz

Accessories:

DL 1017RHD3 STARTING RHEOSTAT

DL 1022RHD3 STARTING AND SYNCHRONIZATION

THREE-PHASE 2-SPEED SQUIRREL CAGE ASYNCHRONOUS MOTOR



DL 1027

2 or 4 pole induction motor with Dahlander-type three-phase stator winding and squirrel cage rotor.

Technical features:

- Power: 0.9/1.1 kW
- Voltage: 380 V
- Current: 2.5/3.3 A
- Speed: 1420/2830 rpm, 50 Hz

Accessories:

DL 2036 POLE SWITCHING UNIT

SCHRAGE MOTOR



DL 1027S

Variable speed three-phase motor, rotor feeding, shunt excitation and adjustable brushes.

Technical features:

- Power: 0.25 - 1.85 kW
- Voltage: 380 V
- Current: 3.1 - 4.6 A
- Speed: 500 - 2350 rpm, 50 Hz



DIRECT CURRENT MACHINES

DIRECT CURRENT MOTOR COMPOUND EXCITATION



DL 1023

It can be also used as a generator.

Technical features:

- Power: 1.1 kW
- Voltage: 220 V
- Speed: 3600 rpm
- Excitation: 180 V / 0.27 A

Accessories:

DL 1017RHD STARTING RHEOSTAT
DL 1017RHE EXCITATION RHEOSTAT

DIRECT CURRENT MOTOR SERIES EXCITATION



DL 1023S

It can be also used as a generator.

Technical features:

- Power: 1.1 kW
- Voltage: 220 V
- Speed: 2800 rpm

Accessories:

DL 1017RHD STARTING RHEOSTAT
DL 1017RHES EXCITATION RHEOSTAT

DIRECT CURRENT MOTOR SHUNT EXCITATION



DL 1023P

It can be also used as a generator.

Technical features:

- Power: 1.1 kW
- Voltage: 220 V
- Speed: 3000 rpm
- Excitation: 190 V / 0.28 A

Accessories:

DL 1017RHD STARTING RHEOSTAT
DL 1017RHE EXCITATION RHEOSTAT



ELECTRIC MACHINES – UNILAB – 1 kW



DIRECT CURRENT MACHINES

DIRECT CURRENT GENERATOR COMPOUND EXCITATION



DL 1024

It can be also used as a motor.

Technical features:

- Power: 0.75 kW
- Voltage: 220 V
- Current: 3.4 A
- Speed: 3450 rpm
- Excitation: 160 V / 0.2 A

Accessories:

DL 1017RHE EXCITATION RHEOSTAT

DIRECT CURRENT GENERATOR SERIES EXCITATION



DL 1024S

It can be also used as a motor.

Technical features:

- Power: 0.75 kW
- Voltage: 220 V
- Current: 3.75 A
- Speed: 3000 rpm

Accessories:

DL 1017RHES EXCITATION RHEOSTAT

DIRECT CURRENT GENERATOR SHUNT EXCITATION



DL 1024P

It can be also used as a motor.

Technical features:

- Power: 0.75 kW
- Voltage: 220 V
- Current: 3.4 A
- Speed: 3000 rpm
- Excitation: 200 V / 0.25 A

Accessories:

DL 1017RHE EXCITATION RHEOSTAT

DIRECT CURRENT POLIEXCITED MACHINE



DL 1024R

Suitable for series, shunt or compound excitation motor or generator.

Accessories:

DL 1017RHD STARTING RHEOSTAT

DL 1017RHE EXCITATION RHEOSTAT FOR SHUNT OR COMPOUND CONFIGURATION

DL 1017RHES EXCITATION RHEOSTAT FOR SERIES CONFIGURATION



THREE-PHASE SYNCHRONOUS MACHINES

THREE-PHASE SYNCHRONOUS MACHINE



DL 1026A

Machine with smooth inductor and three-phase stator armature winding for operation either as an alternator or as a synchronous motor.

Technical features:

- Power:
Alternator: 1.1 kVA
Motor: 1 kW
- Voltage: 220/380 V D/Y
- Current: 2.9/1.7 A D/Y
- Speed: 3000 rpm
- Excitation: 180 V / 0.47 A

Accessories:

DL 1026RHD3 STARTING AND SYNCHRONIZATION RHEOSTAT
DL 1030 PARALLEL BOARD

RELUCTANCE MOTOR



DL 1026R

Three-phase synchronous motor with squirrel cage rotor without dc excitation.

Technical features:

- Power: 0.5 kW
- Voltage: 220/380 V D/Y
- Current: 3.6/2.1 A D/Y
- Speed: 1500 rpm, 50 Hz



TRANSFORMERS

SINGLE-PHASE TRANSFORMER



DL 1093

Core-type transformer with split windings.
It can also be used as an auto-transformer.

Technical features:

As a transformer

- Rated power: 500 VA
- Primary voltages: 220/380 V
- Secondary voltages: 2 x 110 V

As an auto-transformer

- Rated power: 500 VA
- Voltage: 220/380 V
- Frequency: 50/60 Hz

THREE-PHASE TRANSFORMER



DL 1080

Column-type transformer with split windings.
It can also be used with a single-phase supply.

Technical features:

- Rated power: 1kVA
- Primary voltage: 2 x 190V (phase)
- Secondary voltage: 2 x 70V (phase)
- Frequency: 50/60 Hz



BRAKING SYSTEMS

EDDY-CURRENT BRAKE



DL 1019M

Smooth roll rotor and salient pole stator.

Provided with water level, arms, weight and balance weight for measuring the output torque of the motor.

Possibility of assembling a load cell.

Technical features:

- Maximum supply voltage: 250 Vdc
- Maximum speed: 4000 rpm
- Maximum power in S3: 1.4 kW

POWDER BRAKE



DL 1019P

Electromagnetic brake.

Provided with water level, arms, weight and balance weight for measuring the output torque of the motor.

Possibility of assembling a load cell.

The brake includes an axial cooling fan that is supplied by the mains voltage.

Technical features:

- Maximum supply voltage: 20 Vdc
- Maximum speed: 4000 rpm
- Maximum torque: 20 Nm

DC DYNAMOMETER



DL 1025

Direct current generator in which the frame is free to swing around its axis.

Provided with water level, arms, weight and balance weight for measuring the output torque of the motor.

Possibility of assembling a load cell.

Technical features:

- Maximum power: 1.1 kW
- Electric power: 0.75 kW
- Voltage: 220 Vdc
- Current: 3.4 A
- Maximum speed: 3000 rpm

Accessories:

DL 1017R RESISTIVE LOAD



ELECTRIC MACHINES – UNILAB – 1 kW



POWER SUPPLY MODULES

Suitable for supplying fixed and variable alternating current and fixed and variable rectified direct current, in order to easily carry out all the tests on electrical machines of the UNILAB laboratory and in general in an electric measurement laboratory. Provided with start push-button with remote control switch, stop push-button, key-unlocked emergency mushroom head pushbutton and differential magneto-thermal protection on the main sockets. Connector for the overspeed protection of the motors. The control devices and the safety connecting terminals, according to the IEC standards, are arranged on the front.

DL 1013M2

Output voltages:

Variable ac 3x0-430 V, 5 A / 3x0-240 V, 8 A

Fixed ac 3x380 V + N, 16 A / 3x220 V, 8 A

Standard fixed ac 220 V, 10 A

Variable dc 0-240 V, 10 A / 0-225 V, 1 A

Fixed dc 220 V, 10 A

Power supply 3x380 V + N, 50/60 Hz

DL 1013M3

Output voltages:

Variable ac 3x0-440 V, 4.5 A / 3x0-240 V, 8 A

Fixed ac 3x380 V, 4.5 A / 3x220 V + N, 16 A

Standard fixed ac 127 or 220 V, 10 A

Variable dc 0-240 V, 10 A / 0-225 V, 1 A

Fixed dc 220 V, 10 A

Power supply 3x220 V + N, 50/60 Hz



DL 1013M1

Output voltages:

Variable ac 3x0-440 V, 5 A (programmable)

3x0-240 V, 10 A (programmable)

Fixed ac 3x380 V + N, 16 A

Standard fixed ac 220 V, 10 A

Variable dc 0-290 V, 12 A (programmable)

0-225 V, 1 A

Fixed dc 220 V, 10 A

Power supply 3x380 V + N, 50/60 Hz

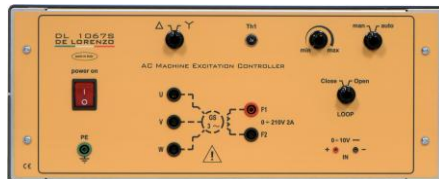


ELECTRIC MACHINES – UNILAB – 1 kW



POWER SUPPLY MODULES

MOTOR-DRIVEN POWER SUPPLY UNIT WITH AUTOMATIC REGULATION



DL 1067S

Suitable for power supplying with variable voltage the braking systems and the excitation of the machines through manual or automatic operation.

Technical features:

- DC output: 0 to 210 V, 2 A
- Automatic regulation of excitation to keep a constant voltage
- Power supply: 220 V, 50/60 Hz

RECTIFIED POWER SUPPLY UNIT



DL 1054

Suitable for power supplying with variable voltage the braking systems and the excitation of the machines.

Technical features:

- Output: 0÷120V, 2 A or 0÷220V, 1 A.
- Power supply: single-phase from mains

POWER SUPPLY FOR THE POWDER BRAKE



DL 1030S

Suitable for power supplying with variable voltage the powder brake.

Technical features:

- Output: 0÷10V, 2 A or 0÷20V, 2 A
- Power supply: single-phase from mains



MEASURING UNITS

ELECTRICAL POWER DIGITAL MEASURING UNIT



DL 10065N

Measurement in direct current of: voltage, current, power and energy.
Measurement in alternate current of: voltage, current, power, active energy, reactive energy, apparent energy, cosphi and frequency.

Technical features:

- DC voltage: 300 Vdc
 - DC current: 20 Adc
 - AC voltage: 450 Vac
 - AC current: 20 Aac
 - Power: 9000 W
- Power supply: single-phase, 90-260 V, 50/60 Hz
Communication: RS485 with MODBUS RTU protocol

TORQUE MEASURING UNIT



DL 2006CN

Suitable to measure the motor output torque through a load cell arranged on the braking system.

Technical features:

- Power supply: single-phase from mains
- Digital readout and analogue output proportional to the measured value

MECHANICAL POWER DIGITAL MEASURING UNIT



DL 10055N

For direct measurement of motor output torque through load cell and of rotating speed through optical transducer, with mechanical power display; provided with direct current variable power supply for the excitation of the brakes or of the dynamometer.

Digital readout of the measured quantities.

Connector for overspeed protection of the motors through the connection to the power supply module.

Ambient temperature sensor and probe for measuring the temperature of the motor.

Communication: RS485 with MODBUS RTU protocol.

Technical features:

- Torque: suitable for measuring the maximum torque of the laboratory through the load cell
- Speed: suitable for measuring the maximum speed of the machines of the laboratory
- Power: suitable for measuring the maximum power of the machines of the laboratory
- Dc output: 0-220 V, 2 A
- Power supply: single-phase from mains



ELECTRIC MACHINES – UNILAB – 1 kW



LOAD CELL



DL 2006E

Resistance electronic strain-gauge with 150 N range, to be mounted on the braking system to measure the mechanical torque.

ELECTRONIC TACHOMETER



DL 2025DN

Suitable to measure the revolving speed through tachometric or optical transducer mounted on the machine.
Digital readout and analogue output proportional to the measured value.
Complete with built-in connector for overspeed protection to be connected to the power supply unit.

Power supply: single-phase from mains

OPTICAL TRANSDUCER



DL 2031M

Suitable to measure the revolving speed through a slotted optical switch with encoder disc, that can be also used for stroboscopic measurements.
Connector for the transfer of the signal to the electronic tachometer DL 2025DN.

Prearranged for its assembling on the machines of the laboratory

CONTACT TACHOMETER



DL 2026

Suitable for measuring the revolving speed with digital readout.

Technical features:

Measuring range: 0 to 19,999 rpm.

Power supply: 4 x 1.5 V batteries (UM 3), included

OPTICAL TACHOMETER

DL 2026R

Suitable to angular speed measure with a digital indicator.

Technical features:

Measure range: 50 to 19,999 RPM

Power supply: 4 1.5 V batteries (UM3), included

Completed with 5 reflector sensors



ELECTRIC MACHINES – UNILAB – 1 kW



MULTIFUNCTION DIGITAL SYSTEM (MDS)



DL 55060T

Electrical and mechanical measurement module.

The unit allows the following measurements:

Electrical measurements:

- AC: voltage 10÷450V, current 0.3÷20A, active power, reactive power, apparent power, power factor, cosphi, frequency, etc.
- DC: voltage <600V, current 0.3÷20A, power.

Mechanical measurements:

- Torque (0÷500 Nm), speed (0÷4000 rpm), mechanical power.

HMI (Human-Machine Interface) touch panel 7".

Available connections: RS 485, Ethernet, USB.

Communication Protocol: MODBUS RTU.

Possibility of remote control with PC, tablet or Smart Phone through an Ethernet network.

Possibility to connect to a printer, mouse, keyboard or pen drive to export data through a USB port.

Power supply: 90-260VAC, 50/60Hz

MECHANICAL POWER DIGITAL MEASURING SYSTEM



DL 50050TR – DL 50050TR1

Digital meter.

Placed between two machines, it allows measuring the torque, the shaft power and the speed.

Technical features:

- Power Supply: 220 - 240 V AC 1-phase, 50-60 Hz
- Nominal torque: - 17.50 Nm - + 17.50 Nm
- Nominal shaft power: -5.50 kW - +5.50 kW
- Nominal speed: -3000 rpm - + 3000 rpm
- Max. mechanical torque: 25 Nm
- Tacho feedback output: 14 V DC / 1000 rpm
- Baud Rate: 9600 kB / 19200 kB
- Data acquisition protocol: Modbus RTU 8N1

TACHOGENERATOR



DL 2065RM

Transducer that provides a voltage proportional to the angular velocity.

It is basically a direct current generator whose excitation circuit is composed of a permanent magnet, so that the flux is constant, coaxially mounted on the machine under test.

Technical features:

Constant of the tachogenerator: $K_T = 0.03 \text{ V/rpm}$

At $n = 3000 \text{ rpm}$, $V = 90 \text{ V f.s.}$



MOTOR CONTROLLERS

SPEED CONTROL OF AC MOTORS



DL 2309A1

The objective of this unit is to demonstrate the PWM technique for piloting a three-phase inverter used for the variable frequency control of the speed in a three-phase asynchronous motor. Digital control inverter programmable from keyboard with on screen guide. The speed control can be realized through manual control of a potentiometer or through closed loop tachometric control. The acceleration and deceleration ramps can be separately regulated from 5 to 15 seconds approx. Inversion of the sense of rotation. Instrument for the rotation speed.

Technical features:

- Power : 1.5 kW
- Maximum output voltage: 3 x 220 V adjustable
- Rated current : 7A
- Output frequency: 0 to 240 Hz
- V/F ratio: constant up to the basic frequency.
- Constant voltage operation for higher frequencies.
- Direct current braking.
- Protections against minimum/maximum supply voltage, thermal protection and limitation of the output current.
- Power supply: single-phase from mains

Accessories:

DL 1021 SQUIRREL CAGE THREE-PHASE ASYNCHRONOUS MOTOR
DL 1019M EDDY-CURRENT BRAKE
DL 2031M OPTICAL TRANSDUCER
DL 1013A BASE

SPEED CONTROL OF DC MOTORS



DL 2308A

Single-phase fully controlled thyristor bridge for the open and closed loop speed regulation of a separate excitation motor (1 kW).

Three control loops: speed, current and armature voltage.

Potentiometers for speed setting, current limitation and armature voltage drop compensation. Potentiometers for gain setting of speed and current regulators, with time constant set in 3 steps.

Provided with acceleration and deceleration ramps. Analogue meters for speed, voltage and current indication. Manual or automatic control through microcomputer provided with A/D and D/A converters with 0 to 10 V input-output

Technical features:

- Power: 1 kW
- Rotor current: 10 A max
- Tachometer input: 9 V at 3000 rpm
- Fixed excitation voltage: 220 Vdc, 1 A
- Variable excitation voltage: 0-220 Vdc, 0.8 A
- Power supply: single-phase from mains, galvanically insulated.

Accessories:

DL 2307/8M MOTOR/GENERATOR GROUP OF MACHINES

Alternative:

DL 1023 DIRECT CURRENT MOTOR COMPOUND EXCITATION
DL 1024P DIRECT CURRENT GENERATOR SHUNT EXCITATION
DL 2031M OPTICAL TRANSDUCER
DL 1013A BASE



ELECTRIC MACHINES – UNILAB – 1 kW



SPEED CONTROL OF DC MOTORS



DL 2315

Semi-controlled single phase bridge. Suitable for the control of the speed of independently excited dc motors. The control is performed by regulating the conduction period of a single-phase semi-controlled thyristor bridge both in open and closed loop. The controller consists of three control loops: speed, current and armature voltage.

Technical features:

- Power of the motor: 1.1 kW max.
- Power of the converter: 1.8 kW
- Armature voltage: $0 \div 180$ V
- Armature current: 10 A max.
- Fixed excitation voltage: 220 Vdc, 1 A
- Excitation voltage: 200 V, 1 A

Accessories:

DL 1023P SHUNT EXCITATION MOTOR

DL 1017R RESISTIVE LOAD

DL 1019M EDDY CURRENT BRAKE

DL 1013A UNIVERSAL BASE

DL 1054 POWER SUPPLY FOR THE BRAKE

Recommended:

DL 2315T ISOLATION TRANSFORMER

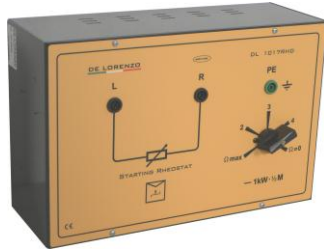


ELECTRIC MACHINES – UNILAB – 1 kW



ACCESSORIES

STARTING RHEOSTAT



DL 1017RHD

Step-variable rheostat for the half torque starting of the dc motors of the laboratory.

STARTING RHEOSTAT



DL 1017RHD3

Step-variable three-phase rheostat for the half torque starting of the slip ring motors of the laboratory.

EXCITATION RHEOSTAT



DL 1017RHE

Suitable for the shunt excitation of the dc machines and of the synchronous machines of the laboratory.

EXCITATION RHEOSTAT



DL 1017RHES

Suitable for the series excitation of the dc machines of the laboratory.

STARTING AND SYNCHRONIZATION UNIT



DL 1022RHD3

Starting rheostat for the three-phase slip ring induction motors and excitation device for the synchronization of the motor with the mains.



ELECTRIC MACHINES – UNILAB – 1 kW



STARTING AND SYNCHRONIZATION UNIT



DL 1026RHD3

Starting rheostat for the three-phase synchronous machines and excitation device for the synchronization with the mains.

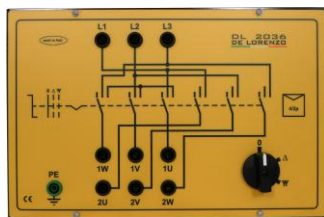
STAR/DELTA STARTER



DL 2035

Star/delta starter for the three-phase squirrel-cage induction motors

POLE CHANGING UNIT



DL 2036

Switch to change the number of poles in Dahlander type motors.

CAPACITOR UNIT



DL 1028AC

Set of capacitors for either starting or steady-state running of the split-phase motor.

RESISTOR UNIT



DL 1028AR

Auxiliary resistor for the starting of the split-phase motor.

INDUCTOR UNIT

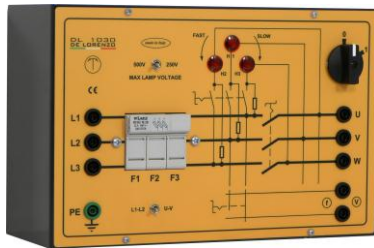


DL 1028AL

Auxiliary inductor for the starting of the split-phase motor.



PARALLEL BOARD



DL 1030

Rotating light synchronoscope, complete with the accessories that are required to perform the parallel connection between synchronous generators or between the alternator and the mains.

FLYWHEEL



DL 1041

Used in the deceleration tests on rotating machines for the calculation of the mechanical iron and copper losses at different excitations.

THREE-PHASE TRANSFORMER



DL 1020

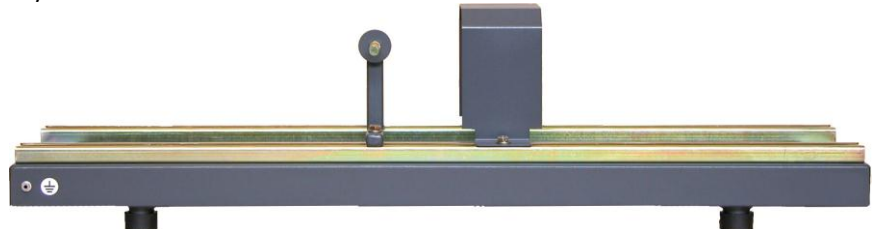
Used for the fine regulation of the voltage in the short circuit test of an induction motor.

UNIVERSAL BASE

DL 1013A

Duralumin alloy varnished structure mounted on anti-vibration rubber feet, provided with slide guides for the fixing of one or two machines and with a coupling guard.

Complete with a device for the locking of the rotor of the slip ring asynchronous machines in the short circuit test.



UNIVERSAL BASE

DL 1013B

Duralumin alloy varnished structure mounted on anti-vibration rubber feet, provided with slide guides for the fixing of up to three machines, and in particular of the Schrage motor, and with a coupling guard.

Complete with a device for the locking of the rotor of the slip ring asynchronous machines in the short circuit test.



ELECTRIC MACHINES – UNILAB – 1 kW



CONNECTING LEADS



DL 1155A-SC

With safety plugs.

- 5 red leads, diameter 4 mm., length 25 cm., section 0.75 mm²
- 5 black leads, diameter 4 mm., length 25 cm., section 0.75 mm²
- 5 red leads, diameter 4 mm., length 200 cm., section 0.75 mm²
- 5 black leads, diameter 4 mm., length 200 cm., section 0.75 mm²
- 5 red leads, diameter 4 mm., length 50 cm., section 2.5 mm²
- 5 black leads, diameter 4 mm., length 50 cm., section 2.5 mm²
- 4 red leads, diameter 4 mm., length 100 cm., section 2.5 mm²
- 4 black leads, diameter 4 mm., length 100 cm., section 2.5 mm²
- 4 red leads, diameter 4 mm., length 200 cm., section 2.5 mm²
- 4 black leads, diameter 4 mm., length 200 cm., section 2.5 mm²
- 2 yellow-green leads, diameter 4 mm., length 50 cm., section 2.5 mm²
- 2 yellow-green leads, diameter 4 mm., length 100 cm., section 2.5 mm²
- 2 yellow-green leads, diameter 4 mm., length 200 cm., section 2.5 mm²



ELECTRIC MACHINES – UNILAB – 1 kW



LOADS AND RHEOSTATS

LOADS AND RHEOSTATS UNIT



DL 1017

Suitable for single- and three-phase capacitive, resistive and inductive step-variable loads.

Complete with half torque step variable starting rheostats for three-phase and direct current motors and with linear excitation rheostat.

- Maximum power: 3 x (275 VAR cap + 400 W + 300 VAR ind)

CAPACITIVE LOAD



DL 1017C

- Single or three-phase capacitive step-variable load
- Max. power: 3 x 275 VAR
- Max voltage: 220/380 V Δ/Y

RESISTIVE LOAD



DL 1017R

- Single or three-phase resistive step-variable load.
- Max power: 3 x 400 W
- Max voltage: 220/380 V Δ/Y

INDUCTIVE LOAD



DL 1017L

- Single or three-phase inductive step-variable load.
- Max. power: 3 x 300 VAR
- Max voltage: 220/380 V Δ/Y

MOTOR-DRIVEN RESISTIVE LOAD



DL 2096

Suitable for realizing resistive single or three-phase resistive loads through manual or automatic operation.

Technical features:

- Resistance: 3 x (1320 - 120) Ω
- Current: 3 x 1.8 A
- Power supply: single-phase from mains



ELECTRIC MACHINES – UNILAB – 1 kW



SOFTWARE FOR THE ELECTRICAL MACHINES LABORATORY - DL 8330SW



This software covers all the study subjects and the experiment activities that are performed in a computer controlled electrical machines laboratory. It works with the following types of machines:

- **Single-phase and three-phase transformers**
- **Direct current machines**
- **Synchronous machines**
- **Asynchronous machines**

It is divided in 2 sections hereunder described:

- **Educational section:**

In this section we illustrate, through pdf pages, the test to be performed by providing all the relevant information:

- General diagram of the test
- Insertion of the instruments
- Operation modes
- Quantities to be acquired by the instruments and quantities to be calculated
- Characteristic graphs for the test

- **Operation section:**

In this section we illustrate how the instruments must be connected and how to start the program for controlling the execution of the test.

The above program provides:

- a Control Window, that allows to insert the name of the student and the characteristic data of the machine; moreover it contains the controls to operate during the automatic and semi—automatic tests;
- a Window with the diagram of the measurement system, that contains the block diagram of the measurement system, with the indications of the quantities coming from the instruments, updated in real time;
- a Spreadsheet Window that contains an electronic sheet where the values of the measurements taken during the execution of the tests are collected;
- once the test is completed, it is possible to open several Graph Windows, where it is possible to visualize in graphical form the data that have been gathered.

During the AUTOMATIC execution of the test the user controls the start of the test and the program automatically varies the conditions of the system and acquired the interesting quantities. In this case it is necessary to use an interface module (DL 1893) and motor driven modules that are controlled through computer; it is also necessary, of course, to have digital measurement modules for the experiment data acquisition and transfer.

During the SEMI-AUTOMATIC execution of the test the user manually sets up the value of the quantities of the system (through non motor driven power supplies, variac , etc.) and controls the acquisition of the interesting variables through the program. The software allows a complete graphic processing of the results that have been obtained. It is possible to open at the same time several different graphs. These graphs can be of two types: time graphs (showing the behaviour with time of the interesting quantities) or XY type graphs where it is possible to select the quantities to show in the X and Y axes. Moreover, the software allows printing all the data of the test for what concerns: data of the student and of the machine under test, data from the electronic spreadsheet, graphs.



ELECTRIC MACHINES – UNILAB – 1 kW



On the static and rotating electrical machines it is possible to perform the following tests:

TRANSFORMERS

- No load-test
- Short circuit-test
- Measurement of the winding resistance
- Measurement of the transformation ratio
- Direct test
- Calculation of the conventional efficiency

DIRECT CURRENT MACHINES

- Measurement of the internal resistance
- Calculation of the conventional efficiency of a dc generator
- Magnetization characteristic of a dc generator
- External characteristic of a dc generator
- Regulation characteristic of a dc generator
- No load test of a dc motor
- Direct test of a dc motor with an electromagnetic brake
- Direct test of a dc motor with a dynamometer

SYNCHRONOUS MACHINES

- Short-circuit characteristics
- Magnetization characteristics
- Measurement of the winding resistance
- External characteristics
- Regulation characteristics
- No-load test of a synchronous machine as a motor
- Parallel of a synchronous machine with the mains
- Diagram of the “V” curve of a synchronous motor

ASYNCHRONOUS MACHINES

- No-load test of a three-phase asynchronous motor
- Short-circuit test of a three-phase asynchronous motor
- Measurement of the internal Resistance of a three-phase asynchronous motor
- Measurement of the transformation ratio of a three-phase asynchronous motor
- Direct test of a three-phase asynchronous motor with an electromagnetic brake
- Direct test of a three-phase asynchronous motor with a dynamometer

Required PC configuration:

- Operating system: Windows
- USB Port for the connection to the Interface Unit DL 1893
- CD-ROM driver

DATA ACQUISITION / CONTROL

UNIT



DL 1893

- Power supply from USB, < 100mA
 - 2 relay outputs
 - 2 analogue outputs, serial 8 bit D/A converter
- Output: -10/+10 V
- 8 analogue inputs, 12 bit A/D converter
- Input: -10/+10 V
- Max speed of conversion: 10 kHz

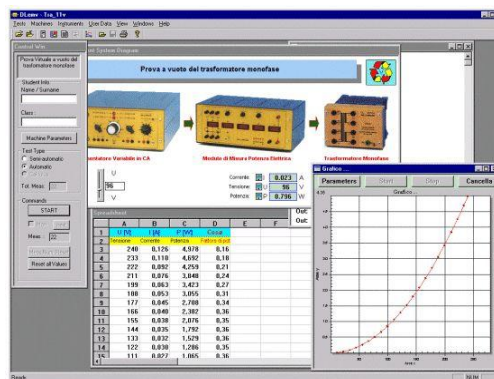


ELECTRIC MACHINES – UNILAB – 1 kW



SOFTWARE FOR THE ELECTRICAL MACHINES VIRTUAL LABORATORY

DL EMV



This e-Training Package transforms the Computer to an Electrical Machines Laboratory, where it is possible to perform all the educational activities which are related to the study and the experiments on the machines, without the need to have any hardware: everything is virtually simulated by PC.

It covers the following types of machines:

- Single-phase and three-phase transformers
- Direct current machines
- Synchronous machines
- Asynchronous machines

It is divided in 3 sections as follows:

- **Study:**

In the section relevant to the study of the electrical machines the following subjects are illustrated by means of the Internet World Wide Web hyper textual technique:

- their operating principle
- their basic structure
- their characteristics

In this section multimedia tools (drawings, images, photos) and hypertextual techniques are widely used to illustrate the various components of the electrical machines and to provide, every time, the simplest path for the use of the information.

- **Design:**

In the section relevant to the design, we simulate, virtually by PC, the process of designing and manufacturing the electrical machine.

Once inserted the main design parameters (e.g., rated power, rated current, frequency, etc.), the computer proceeds step by step to dimensioning the machine. Drawings of the electrical and mechanical details and cross-sections of the inside complete this section to illustrate in detail the construction process.

All the data (set up parameters and calculated results) can be saved in a personal file that forms an electrical database. The data can then be used for the practical realization of the machines.

For each machine it is necessary to input the design parameters while the manufacturing parameters are consequently calculated. All these parameters are used for the performance of the tests and for the actual realization of the electrical machine, if so required.

- **Operating tests:**

In the section relevant to the operating tests the program simulates, on the computer, the performance of the typical tests on the designed machine: no-load test, short-circuit test load test etc.

This allows an immediate check on the design targets of the machine, without actually constructing the machine.

In this phase the machine can be virtually coupled to other machines in the database (for instance for the load test). Each test is complete with the relevant description that illustrates the purpose of the test and the relevant operating mode.

During the execution of the test it is possible to check on the monitor the values of the quantities which are acquired by means of virtual instrumentation and it is possible to draw the typical graphs, by selecting the interesting quantities.



CUT-AWAY MACHINES

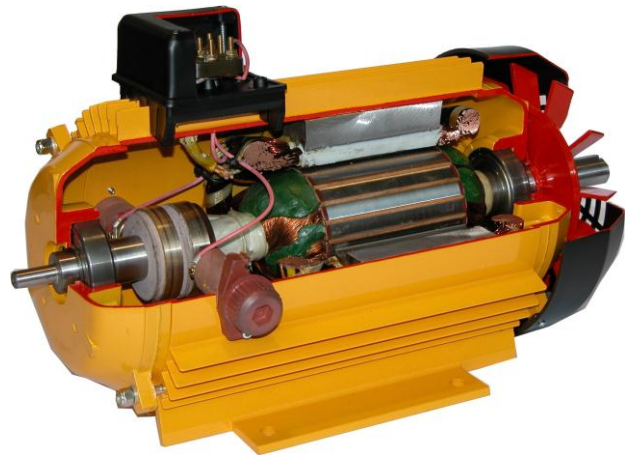
De Lorenzo is able to provide the machines of the laboratory also in a cut-away version.

To order them, just add to the code of the machine the suffix SEZ (for example: if DL 1021 is the code of the machine, DL 1021SEZ is the code of the same machine in the cut-away version).

Examples:



DL 1021SEZ



DL 1026ASEZ



DL 1028CSEZ



DL 1029RSEZ