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WORK BENCHES WITH CIVIL AND INDUSTRIAL INSTALLATION KITS

The main feature of these work benches is their high flexibility and autonomy; they do not need a main distribution control panel, but just a cable to supply them the mains voltage.
Designed to allow the performance of wiring experiments in the area of civil and industrial installations, they offer the maximum work versatility in the laboratory. Thanks to the fast hook-up system for the panels on which the student makes his circuit, it is possible to store all the works that have not been completed in a single lesson and leave the frame free for other students.
The supporting structure is made of tubular, fire varnished and rustproof steel, while a large bilaminated wooden surface can be used for tools and wiring accessories. Furthermore, the workbench is provided with compensator feet to offset unevenness of the floor. The power supplies are provided by means of a vertical module placed by the side of the work panels and all the supplies are protected according to current regulations..
On request, it is possible to add to the bench a series of accessories, such as: drawers, chest of drawers, central cabinets, socket-holders, work panels and containers to house the panels.

The picture shows the DL 1101 work bench together with the DL 1100C, panel with 12 junction boxes.

DL 1101
TWO PLACE WORK BENCH WITH 2 INDEPENDENT SUPPLIES

For each side the following power supplies are provided:

- 1 three-phase + N + T, 16A output on 36A safety terminals according to IEC 61010-1; protection through differential, magneto-thermal, 4-pole, 16A automatic switch, pilot lamp and key switch for teacher control.
- 2 outputs on 10/16 A single-phase mains sockets, protection through differential, magneto-thermal, 16A automatic switch and pilot lamp.
- 1 output isolated from the mains, 0-12-24Vac, 4 A on isolated terminals, protection through magneto-thermal, automatic switch.
- 1 optical and acoustic circuit tester on isolated terminals, protection through fuse.

Dimensions: 100x80x175 cm. Height from ground to work surface: 90 cm.

WORK FRAMES

DL 1103
FOUR PLACE WORK BENCH WITH 4 INDEPENDENT SUPPLIES

For each side the following power supplies are provided:

- 2 three-phase + N + T, 16A outputs on 36A safety terminals according to IEC 61010-1; protection through differential, magneto-thermal, 4-pole, 16A automatic switch, pilot lamp and key switch for teacher control.
- 4 outputs on 10/16 A single-phase mains sockets, protection through differential, magneto-thermal, 16A automatic switch and pilot lamp.
- 2 outputs isolated from the mains, 0-12-24Vac, 4 A on isolated terminals, protection through magneto-thermal, automatic switch.
- 2 optical and acoustic circuit testers on isolated terminals, protection through fuses.

Dimensions: 200x80x175 cm. Height from ground to work surface: 90 cm.

The picture shows the DL 1103 work bench together with the DL 1100B, wooden panel, the DL 1100D, grid panel and the DL 1100C6, panel with 6 junction boxes, plus some components.

The picture shows one of the two power supply module for the DL 1104.

DL 1104
FOUR PLACE WORK BENCH WITH 2 INDEPENDENT SUPPLIES

For each side the following power supplies are provided:

- 1 three-phase + N + T, 16A output on 36A safety terminals according to IEC 61010-1; protection through differential, magneto-thermal, 4-pole, 16A automatic switch, pilot lamp and key switch for teacher control.
- 2 outputs on 10/16 A single-phase mains sockets, protection through differential, magneto-thermal, 16A automatic switch and pilot lamp.
- 1 output isolated from the mains, 0-12-24Vac, 4 A on isolated terminals, protection through magneto-thermal, automatic switch.
- 1 optical and acoustic circuit tester on isolated terminals, protection through fuse.

Dimensions: 200x80x175 cm. Height from ground to work surface: 90 cm.

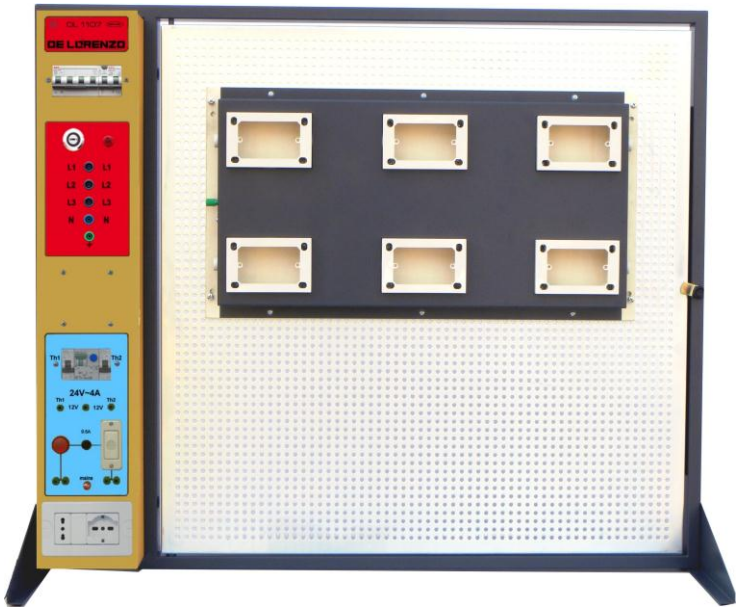
DL 1106
TWO PLACE WALL WORK BENCH WITH 1 SUPPLY

It provides the following power supplies:

- 1 three-phase + N + T, 16A output on 36A safety terminals according to IEC 61010-1; protection through differential, magneto-thermal, 4-pole, 16A automatic switch, pilot lamp and key switch for teacher control.
- 2 outputs on 10/16 A single-phase mains sockets, protection through differential, magneto-thermal, 16A automatic switch and pilot lamp.
- 1 output isolated from the mains, 0-12-24Vac, 4 A on isolated terminals, protection through magneto-thermal, automatic switch.
- 1 optical and acoustic circuit tester on isolated terminals, protection through fuse.

Dimensions: 200x80x175 cm. Height from ground to work surface: 90 cm.

The picture shows the DL 1106 work bench together with the DL 1100B, wooden panel and the DL 1100C, panel with 12 junction boxes.



The picture shows the DL 1107 work bench together with the DL 1100C6, panel with 6 junction boxes.

DL 1107
SINGLE PLACE BENCH-TOP WORK FRAME WITH 1 SUPPLY

Simplified version to be placed and fixed on a table already available in the laboratory. Very flexible and with limited dimensions, it offers a viable solution when the space is small. Its characteristics are identical to the other versions, but it cannot be provided with drawers, chests of drawers, cabinets and socket holders.

It provides the following power supplies:

- 1 three-phase + N + T, 16A output on 36A safety terminals according to IEC 61010-1; protection through differential, magneto-thermal, 4-pole, 16A automatic switch, pilot lamp and key switch for teacher control.
- 2 outputs on 10/16 A single-phase mains sockets, protection through differential, magneto-thermal, 16A automatic switch and pilot lamp.
- 1 output isolated from the mains, 0-12-24Vac, 4 A on isolated terminals, protection through magneto-thermal, automatic switch.
- 1 optical and acoustic circuit tester on isolated terminals, protection through fuse.

Dimensions: 100x55x85 cm.

ACCESSORIES

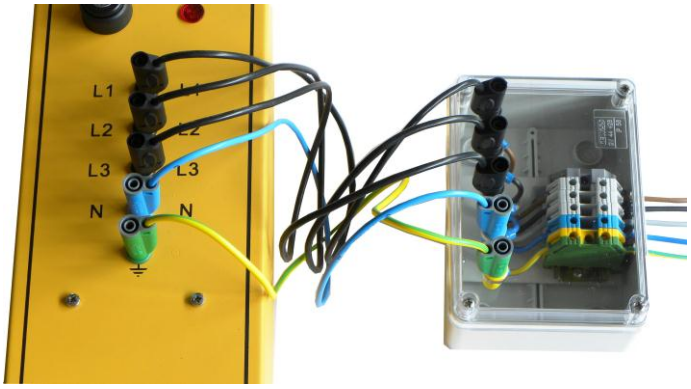
DL 1001A2 DRAWER
Single drawer in steel plate,
fire-varnished and with key-lock.
Dimensions: 40x38x13 cm.

DL 1001C2 CHEST OF TWO DRAWERS
Chest of two drawers in steel plate, fire-varnished and with key-lock.
Dimensions: 40x38x22 cm.

DL 1001D2 CHEST OF THREE DRAWERS
Chest of three drawers in steel plate,
fire-varnished and with key-lock.
Dimensions: 40x38x32 cm.

DL 1001DF3 SOCKET HOLDER
Socket holder with three 10/16A sockets.

DL 1100A TOOL KIT
Tool kit for electricians, suitable for wiring.
Dimensions: 25x10x6 cm.



DL 1100SD JUNCTION BOX
Particularly suggested for the safety of the student. This accessory is necessary for the safe connection of the mains voltage between the safety terminals of the power supply board of the work bench and the circuit that the student has wired on the mobile panel. The student, after connecting the circuit under test to the terminals of the junction box, will make the final connection to the mains through the 5 safety leads supplied with the module.

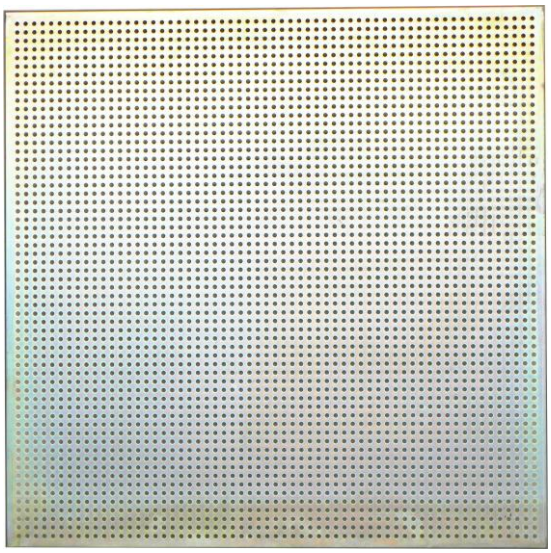
PANELS

DL 1100B WOODEN PANEL
Multi-layer wooden panel with metal corners for fast assembling on the work bench, suitable for the wiring of civil installations at sight.
Dimensions: 80x80x2 cm.

DL 1100C TWELVE JUNCTION BOXES PANEL
Multi-layer wooden panel with metal corners for fast assembling on the work bench, suitable for the in-wall wiring of civil installations, provided with 12 interconnected junction boxes; it simulates a wall on which it is possible to connect the different modules that can be found in civil installations, such as switches, deviators, buzzers, sockets, etc. Provided with side outlets, it can easily be connected to external units, such as lamp holders, entry phones, etc.
Dimensions: 80x80x7 cm.

DL 1100C6 SIX JUNCTION BOXES PANEL
Multi-layer wooden panel to be mounted on the panels DL 1100D or DL 1100E, suitable for the in-wall wiring of civil installations, provided with 6 interconnected junction boxes; it simulates a wall on which it is possible to connect the different modules that can be found in civil installations, such as switches, deviators, buzzers, sockets, etc. Provided with side outlets, it can easily be connected to external units, such as lamp holders, entry phones, etc.
Dimensions: 65x35x6 cm.

PANELS

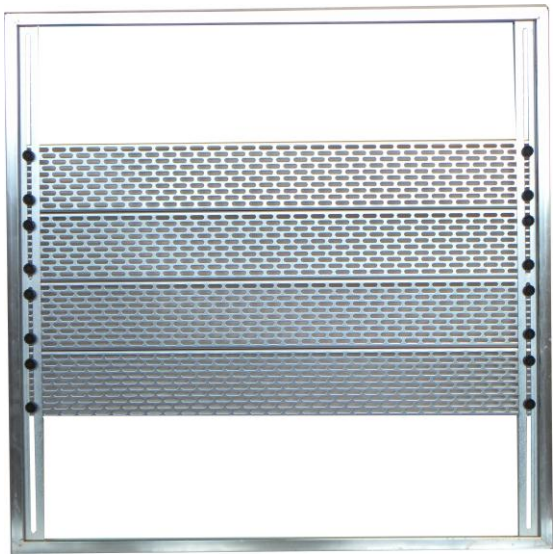


DL 1100D GRID PANEL

Perforated sheet panel, thickness 1.6mm., hole diameter 6mm., centers 12mm. Suitable for remote controls of industrial installations; the assembling of the components is easy and fast, as well as the fixing of the panel to the work bench by means of the holes at the corners. The panel is properly treated to be rust proof and then zinc-coated.
Dimensions: 80x80x2 cm.

DL 1100E STRIP PANEL

Metal frame complete with 4 vertically moveable slotted strips. Suitable for assembling industrial installations, it can be easily adapted to the fixing centers to centers of the components to be wired. The frame is properly treated to be rust proof and then zinc-coated.
Dimensions: 80x80x4 cm.



DL 1100N PANEL HOUSING CABINET

Container for panels with hinged doors, suitable for housing up to 6 panels with unfinished wiring. Made in polished steel plate and fire-varnished after rust-proof treatment; provided with central key lock.
Dimensions: 125x89x88 cm.

DL 1100H CABINET

Two-faced, 4 compartment central cabinet with key lock for DL 1101, DL 1103 and DL 1104 work benches.
Dimensions: 36x76x72 cm.

MOTORS

DL 10115AV
SQUIRREL CAGE THREE-PHASE ASYNCHRONOUS MOTOR
Induction motor with three-phase stator winding and squirrel cage buried in the rotor. Performance B3 bench type.
Nominal power: 180W
Voltage: 380/660V, 50Hz (upon request, 220/380V, 60Hz) (delta/star connection)

DL 2102A
SLIP RING THREE-PHASE ASYNCHRONOUS MOTOR
Induction motor with slip ring rotor, complete with manual braking device and incorporated three phase starting rheostat.
Nominal power: 370W
Voltage: 380/660V, 50Hz (upon request, 220/380V, 60Hz) (delta/star connection)

DL 2102D DHALANDER TWO SPEED MOTOR
Three phase induction motor two speeds squirrel cage. performance B3 bench type.
Nominal power: 250/370W
Voltage: 380V, 50Hz (upon request, 220V, 60Hz) (delta/star connection)

CIVIL INSTALLATIONS KIT

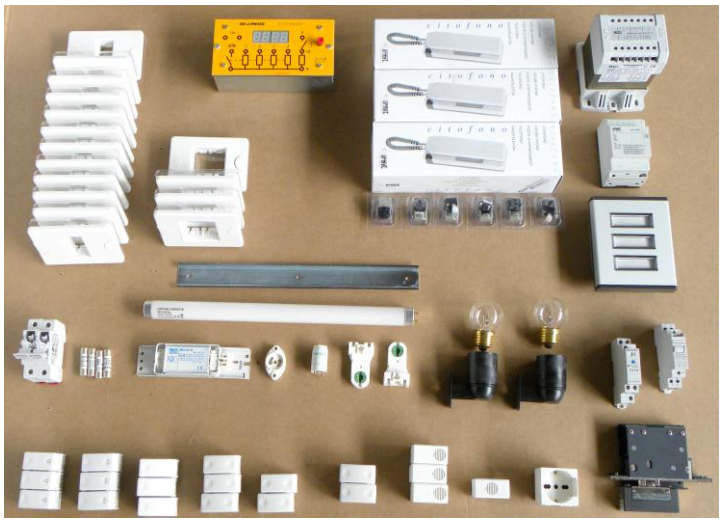
Kit of components that are commonly used in domestic installations, complete with a manual of practical experiments to allow students a direct, personalized and progressive learning. The components have been chosen as a function of the objectives of the teaching manual, to allow students an autonomous course in the performance of the single tests and to help them overcoming the gradual difficulties that they will find while passing from an experiments to the next one.
Furthermore, a brief, but effective questionnaire can be used to check whether the information that are necessary for the understanding of the suggested diagrams have been properly acquired.
The graphic symbols that have been utilized for the drawing of the electric diagrams comply with the *CEI* rules and with the international standard *IEC.*
The experiments have been subdivided by specific subjects and distributed in different kits, each covering the various topics that can be found in domestic installations.

DL 2101 CIVIL INSTALLATIONS

Kit of components with experiment manual with 21 experiments including brief theoretical mentions and practical diagrams of the main circuits that are used in civil installations.
Each experiment has a well defined target and shows the electric diagram and the material that is necessary for assembling the installation.
The kit is composed of: 3 general purpose pushbuttons, 3 bell pushbuttons, 3 door opener pushbuttons, 3 switches, 2 change-over switches, 2 reversing switches, 1 mains socket, 3 bells, 1 buzzer, 2 fuse holders complete with fuses, 1 stairs light timing relay, 1 pulse relay, 2 lamp holders complete with incandescent lamps, 1 fluorescent lamp complete with lamp holder, starter and choke, 1 electric lock, 1 external pushbutton panel with 3 pushbutton, 1 signaling panel with 4 displays, 3 wall-type entry phones complete with buzzer and 3 pushbutton, 1 power supply for the entry phone, 1 transformer mains/2x12V, 1 piece of DIN section, 1 set of screws to fix the components, 2 containers.

With this kit it is possible to perform the following experiments:

- A1 Single-point controlled lighting system
- A2 Single-point controlled lighting system with socket
- A3 Switch-controlled two-lamps lighting system
- A4 Two-point controlled lighting system
- A5 Three-point controlled lighting system
- A6 Four-point controlled lighting system
- A7 Circuit breaking-relay controlled lighting system
- A8 Switching-relay controlled lighting system
- A9 Time-relay controlled lighting system
- A10 Hot cathode fluorescent lamp system
- B1 Signaling installations
- B2 Single-control signaling system
- B3 Reciprocal control signaling system
- B4 Display indicator and reset pushbutton signaling system
- B5 Ringing plant with doors and main entrance control
- B6 Electric lock bell system
- C1 Two reciprocal call house-phones at short distance
- C2 Two reciprocal call house-phones at long distance
- C3 Coupled two house-phones system
- C4 Main house-phone and two shunted house-phones system
- C5 Intercommunicating house-phone system



Suggested accessories: DL1100A, DL 1100D, DL 1100C6, DL 1100SD

CIVIL INSTALLATIONS KIT

DL 2101A LIGHTING INSTALLATIONS

Kit of components with experiment manual with 10 experiments including brief theoretical mentions and practical diagrams of the main circuits that are used in lighting installations for civil buildings.
Each experiment has a well defined target and shows the electric diagram and the material that is necessary for assembling the installation.
The kit is composed of: 3 general purpose pushbuttons, 3 switches, 2 change-over switches, 2 reversing switches, 1 mains socket, 2 fuse holders complete with fuses, 1 stairs light timing relay, 1 pulse relay, 2 lamp holders complete with incandescent lamps, 1 fluorescent lamp complete with lamp holder, starter and choke, 1 transformer mains/2x12V, 1 piece of DIN section, 1 set of screws to fix the components, 1 container.

With this kit it is possible to perform the following experiments:

- A1 Single-point controlled lighting system
- A2 Single-point controlled lighting system with socket
- A3 Switch-controlled two-lamps lighting system
- A4 Two-point controlled lighting system
- A5 Three-point controlled lighting system
- A6 Four-point controlled lighting system
- A7 Circuit breaking-relay controlled lighting system.
- A8 Switching-relay controlled lighting system
- A9 Time-relay controlled lighting system
- A10 Hot cathode fluorescent lamp system

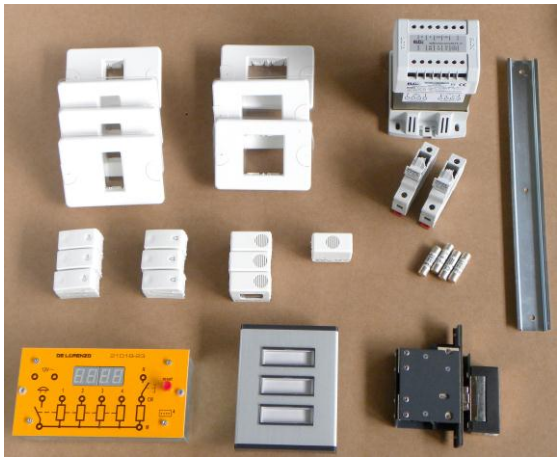
Suggested accessories: DL 1100A, DL 1100C, DL 1100SD

DL 2101B SIGNALING INSTALLATIONS

Kit of components with experiment manual with 6 experiments including brief theoretical mentions and practical diagrams of the main circuits that are used in acoustic and light signaling installations for civil buildings.
Each experiment has a well defined target and shows the electric diagram and the material that is necessary for assembling the installation.
The kit is composed of: 3 bell pushbuttons, 3 door opener pushbuttons, 3 bells, 1 buzzer, 2 fuse holders complete with fuses, 1 electric lock, 1 external pushbutton panel with 3 pushbuttons, 1 signaling panel with 4 displays, 1 transformer mains/2x12V, 1 piece of DIN section, 1 set of screws to fix the components, 1 container.

With this kit it is possible to perform the following experiments:

- B1 Signaling installations .
- B2 Single-control signaling system.
- B3 Reciprocal control signaling system.
- B4 Display indicator and reset pushbutton signaling system
- B5 Ringing system with doors and main entrance control.
- B6 Electric lock bell system



Suggested accessories: DL 1100A, DL 1100C6, DL 1100D, DL1100SD

DL 2101C INTERCOM SYSTEM KIT

Kit of components and didactic manual which includes 5 experiments with brief theoretical mentions and practical schemes of basic circuits available in the intercom systems of the civil buildings. Each experiment has its own finalized aims, and always lists the electric scheme and the necessary material to perform the system.
The kit is composed of 3 wall standard house phones complete with buzzer and 3 pushbuttons, 1 intercom system power supply module, 1 piece of DIN section, 1 set of screws to fix the components, 1 container.

With this kit it is possible to perform the following experiments:

- C1 Two reciprocal call house-phone at short distance.
- C2 Two reciprocal call house-phone at long distance.
- C3 Coupled two house-phone system
- C4 Main house-phone and two shunted house-phones system
- C5 Intercommunicating house-phone system

Suggested accessories: DL 1100A, DL 1100B, DL1100SD

DL 2101D HOTEL SIGNALLING SYSTEMS

Kit of components for the simulation of the hotel signaling system, complete with teaching manual containing 2 experiments, with brief theoretical mentions and practical schemes on the basic circuits available in the hotel signaling plant. Each experiment has well defined aim and always show the electrical scheme and all the material necessary to perform the plant.
The kit is composed of 8 general purpose pushbuttons, 6 latching relays, 9 signaling lamps, 1 buzzer, 1 transformer mains/2x12V, 1 piece of DIN section, 1 set of screws to fix the components, 1 container.

With this kit it is possible to perform the following experiments:

- D1 Audience request system.
- D2 Hotel system

Suggested accessories: DL 1100A, DL 1100D, DL 1100C9, DL 1100SD

CIVIL INSTALLATIONS KIT

DL 2101E CIVIL AND HOTEL INSTALLATION SYSTEMS

Kit of components and teaching manual including 26 experiments with brief theoretical mentions and practical schemes of the main circuits available in civil buildings and hotels installations.

Each experiment has a well defined target and always shows the electrical scheme and the necessary material to perform the plant.

The kit is composed of 8 general purpose pushbuttons, 3 bell pushbuttons, 3 opening door pushbuttons, 9 signaling lamps, 3 switches, 2 change-over switches, 2 reversing switches, 1 mains socket, 3 bells, 1 buzzer, 6 latching relays, 2 fuse holders with fuses, 1 stairs light timing relay, 1 pulse relay, 2 lamp holders with incandescent lamps, 1 fluorescent lamp complete with lamp holder, starter and choke, 1 electric lock, 1 push-button panel with 3 pushbuttons, 1 panel with 4 displays, 3 wall type entry phones complete with buzzers and 3 pushbuttons, 1 power supply for the entry phone, 1 transformer mains/2x12V, 1 piece of DIN section, 1 set of screws to fix the components, 2 containers.

With this kit it is possible to perform the following experiments:

- A1 Single-point controlled lighting system.
- A2 Single-point controlled lighting system with socket.
- A3 Switch-controlled two-lamps lighting system.
- A4 Two-point controlled lighting system
- A5 Three-point controlled lighting system.
- A6 Four-point controlled lighting system.
- A7 Circuit breaking-relay controlled lighting system.
- A8 Switching-relay controlled lighting system
- A9 Timed-relay controlled lighting system.
- A10 Hot cathode fluorescent lamp system.
- B1 Signaling installations.
- B2 Single-control signaling system.
- B3 Reciprocal control signaling system.
- B4 Display indicator and reset pushbutton signaling system.
- B5 Ringing plant with doors and main entrance control.
- B6 Electric lock bell system.
- C1 Two reciprocal call house-phone at short distance.
- C2 Two reciprocal call house-phone at long distance.
- C3 Coupled two house-phone system.
- C4 Main house-phone and two shunted house-phones system.
- C5 Intercommunicating house-phone system.
- D1 Audience request system.
- D2 Hotel system.

Suggested accessories: DL1100A, DL 1100D, DL 1100C9, DL 1100SD

INDUSTRIAL INSTALLATIONS KIT

Kit of components commonly used in industrial installations accompanied by a manual of practical experiments.
The experiments were designed to allow the student a direct learning, individualized and progressive.
The choice of the components is determined by the educational objectives proposed by the manual which allow the student an independent path in the performance of individual tests and prepares him to overcome the difficulties that arise in the gradual change from one test to the next.
It is also proposed a brief but effective questionnaire in order to verify the acquisition of the information necessary to the understanding of the described scheme.
The symbols used to execute the electrical schemes correspond to the *CEI*, unified to the international standard *IEC.*

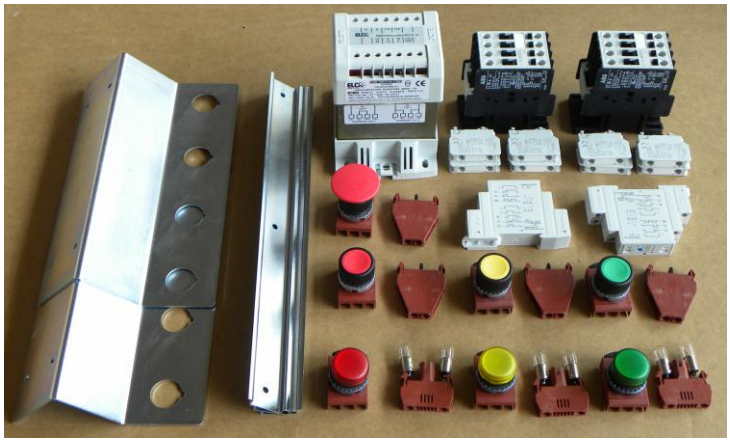
DL 2102B KIT FOR BASIC INDUSTRIAL ELECTRIC PLANTS

Kit of components and teaching manual with 10 experiments including brief theoretical mentions and practical schemes relevant to the main circuits used in electrical industrial plants.
Each experiment has clear objectives aimed and presents the electric scheme and the necessary material to execute the plant.

The kit is composed of: 1 transformer mains/2x12V, 1 emergency pushbutton with NO+NC contact, 3 lamp holders, red, yellow and green with lamp 24V, 3 pushbuttons, red, yellow and green with NO+NC, 1 on and off -delay time relay, 2 meters with 2 NO+NC contacts, 1 couple of lamp holders squares, 3 pieces of DIN section, 1 set of screws to fix the components, 1 container.

With this kit it is possible to perform the following experiments:

- E1 Operator interface
- E2 Contactors
- E3 OR logic operator
- E3 AND logic operator
- E3 NOT logic operator
- E4 Self-holding contactor
- E5 Interlocking among contactors
- E6 Sequential control contactors
- E7 OR exclusive operator
- E11 On delay time relay
- E12 Off delay time relay
- E14 Solid state relay.



Suggested accessories: DL 1100A, DL 1100D or DL 1100E, DL 1100SD

DL 2102C1 COMPLETE KIT FOR INDUSTRIAL ELECTRIC INSTALLATION

Kit of components and teaching manual with 19 experiments including brief theoretical mentions and practical schemes of the main circuits in use in the industrial electric installations.
Each experiments has aims finalized and shows electric scheme and material necessary to perform the plant.
The kit is composed of: 1 transformer mains/2x12V, 1 emergency pushbuttons with NO+NC contact, 3 lamp holders, red, yellow and green with 24V lamp, 3 pushbuttons, red, yellow and green with NO+NC contact, 2 multifunction on-off delay time relay, 4 contactors with 2 NO+NC contacts, 1 thermal relay complete with support, 1 fuse holder complete with fuses, 1 couple of lamp holders squares, 3 pieces of DIN section, 1 set of screws to fix the components, 1 container.

With this kit it is possible to perform the following experiments:

- E1 Operator interface
- E2 Contactors
- E3 OR logic operator
- E3 AND logic operator
- E3 NOT logic operator
- E4 Self-holding contactor
- E5 Interlocking among contactors
- E6 Sequential control contactors
- E7 OR exclusive operator
- E8 Thermal relay
- E9 Manual star/delta starting
- E10 Manual reversing circuit
- E11 On delay time relay
- E12 Off delay time relay
- E13 Sequential control
- E14 Solid state relay.
- E15 Pulse generator.
- E16 Automatic star/delta starting
- E19 Star/delta starting with reversing circuit
- E20 Plugging braking
- E24 Reversing circuit time relay

To perform E8, E9, E10, E16, E19, E20, E24 tests it is necessary to have a squirrel cage three phase asynchronous motor with the same characteristics of our DL 10115AV motor in the laboratory.

Suggested accessories: DL 1100A, DL 1100D or DL 1100E, DL 1100SD, DL 10115AV

INDUSTRIAL INSTALLATIONS KIT

DL 2102C2 COMPLETE KIT FOR INDUSTRIAL ELECTRIC INSTALLATION

Kit of components and teaching manual 23 experiments including brief theoretical mentions and practical scheme if the main circuits in use in the industrial electric installations
Each experiment has a well defined target and shows the electric scheme and the necessary material to perform the plant.

The kit is composed of: 1 transformer mains/2x12V, 1 emergency pushbuttons with NO+NC contact, 3 lamp holders, red, yellow and green with 24V lamp, 3 pushbuttons, red, yellow and green with NO+NC contact, 2 multifunction on-off delay time relay, 5 contactors with 2 NO+NC contacts, 1 thermal relay complete with support, 1 fuse holder complete with fuses, 1 couple of lamp holders squares, 3 pieces of DIN section, 1 set of screws to fix the components, 1 container.

With this kit it is possible to perform the following experiments:

- E1 Operator interface
- E2 Contactors
- E3 OR logic operator
- E3 AND logic operator
- E3 NOT logic operator
- E4 Self-holding contactor
- E5 Interlocking among contactors
- E6 Sequential control contactors
- E7 OR exclusive operator
- E8 Thermal relay
- E9 Manual star/delta starting
- E10 Manual reversing circuit
- E11 On delay time relay
- E12 Off delay time relay
- E13 Sequential control
- E14 Solid state relay
- E15 Pulse generator
- E16 Automatic star/delta starting
- E17 Manual starting with rotor resistance
- E18 Automatic starting with rotor resistance
- E19 Star/delta starting with reversing circuit
- E20 Plugging braking
- E21 Pole changing circuit, Dahlander connection
- E22 Pole changing reversing circuit Dahlander connection
- E24 Reversing circuit time relay

To perform E17, E18 tests it is necessary to have a slip ring three phase asynchronous motor with the same characteristics of our DL 2102A motor in the laboratory.
To perform E21, E22 tests it is necessary to have a three phase two speed asynchronous motor Dahlander type, with the same characteristics of our DL 2102D motor in the laboratory.

Suggested accessories: DL 1100A, DL 1100D or DL 1100E, DL 1100SD, DL 2102A, DL 2102D.