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### CONFIGURATIONS

## INTRODUCTION

The houses and all the other buildings that the man has erected for his own activities (offices, schools, shops, factories, etc.) have been and still are in continuous progress. In fact, so many improvements have been added during the years to reach, in particular, the following objectives: higher safety, possibility to live more comfortably, possibility to better perform your job and your activities.

The traditional installation system for buildings has been for years mainly concentrated on the distribution and control of the electrical energy, but today this is not sufficient any more. In modern systems the requirements have changed and have multiplied, mainly for what concerns advantage, flexibility, centralized and decentralized controls, intelligent connections of different operating sections and systems, communication easiness, environmental compatibility and minimization of the use of energy and of the operating costs.

A traditional electrical plant with such characteristics is more complex and involves a higher number of components with the relevant consequences: a tangle of cables, a wide range of non compatible equipment and components, a demanding design work and, most of all, an expensive system.

Therefore, a traditional plant is practically inadequate to fully satisfy such requirements, at minimum design and operating costs.

The home automation system offers the right solution.

This type of system, custom tailored to respond to the most current requirements relevant to the electrical plant, needs just a single bipolar conductor through which all the end users connected to the bus communicate among them.

The products are compatible and interoperating among them and, therefore, can live together in the system even if they come from different manufacturers.

The controls, the signals, the necessary data for the supervision and all the parameters of the plant have as a single transmission media a "single bipolar cable", the bus cable.

Such circumstance implies a drastic reduction of the times for laying the conductors and all that is needed for their installation.

The functionality of the plant is then determined by means of a software package, through which the single components all connected in parallel to the single necessary bipolar line gain their "individuality", that is can be identified one by one, through an address, that is the identification number of the device, and a "conscience" of their tasks, that is the personalized operating program for the type of plant where they are installed.

The consequences of what has been done are immediate:

- \* the components are of general use and are personalized through a suitable software
- \* the tuning of the functions according to the needs of the user can be performed at the end of the installation
- \* modifications subsequent to the installation can be performed from any point of the plant and at any time without interrupting its functionality

Another advantage that is not immediately evident, but that must be considered in the right perspective is the possibility of realizing a remarkable energy saving by distributing the energy where and when it is needed, by interrupting it at the end and by supplying it according to a suitable time program.

The devices used in the system must be able to perform the same functions for the automatic management of the buildings, both commercial and residential.

The performed functions are the following:

- control of the light
- control of the shutters
- control of the heating
- management of the loads
- display, information, operator control, monitoring and detection
- interfaces and other systems

De Lorenzo has designed a laboratory for the study of the home automation technology that allows the student a practical training, based on the performance of guided experiments.

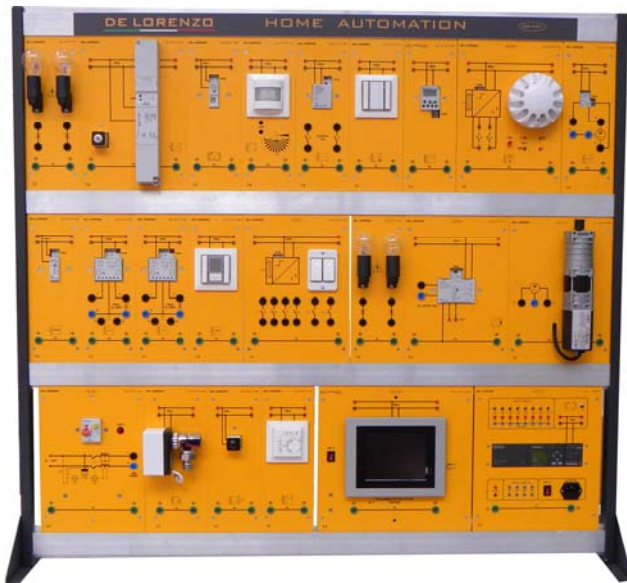
For this laboratory, industrial type components have been educationally adapted by using the modular panel system that allows their step by step assembling from the simplest circuit to the most complex systems.

Starting from the basic principles the student follows an educational path that takes him, with the aid of highly educational manuals, to the study of the most complex circuits in a gradual and systematic way.

The study subjects include the following categories:

EIB1	Lighting plant
EIB2	Shutter control plant
EIB3	Safety plant
EIB4	Heating/air conditioning plant
EIB5	Scenery module
EIB6	Plant with PLC, touch panel & time switch

For all the categories the manuals include practical exercises by using standard components. Each experiment describes step by step from the design and configuration to the commissioning of the system.



Contemporarily to the training objectives, the student will find important information on how to use the management software with relevant terminologies which are required for the assembling of the systems.

In particular, the manual “Lighting plants” groups four exercises:

- On/Off type lighting plant
- Manual light regulation plant
- Automatic light regulation plant
- On/Off lighting and light regulation plant through remote control

For each of the other categories the manual describes the plant and, through guided exercises, allows the student to reach a certain familiarity with the different components of the system.

In particular, the shutter actuator for the shutter control plant, movement and alarm/smoke sensors for the safety plant, the ambient thermostat with the valve actuator and the messages/values visualizer for the heating/air conditioning plant and, at last, the scenery module that allows the saving and restoring of several sceneries where light values defined by 8 dimmer channels can be handled.

## The modules

The system is basically “decentralized” and implies the absence of a control board that contains all the data of the plant; each device is composed of an “intelligent” part (a microprocessor) that contains all the instructions for its operation, hence:

- its name (physical address)
- what it has to do (functions implemented through the software)
- with what it has to do it (still through the software)

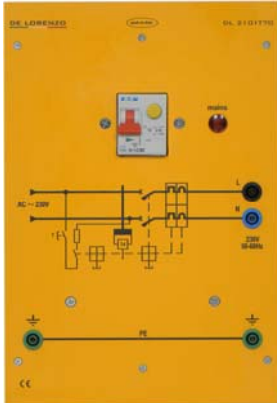
The system uses as a “bus” a dedicated cable to which the different compatible devices can be connected, without a particular logic; it is obvious that this represents a remarkable advantage both at the time of the installation and when expansions of the plant are needed.

The system transfers the data in serial form; the transmission is balanced in base band. The transmission speed is 9600 baud.

The laboratory includes the following modules:

## The Modules

### SINGLE PHASE POWER UNIT



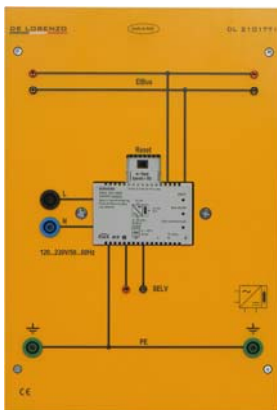
**DL 2101T70**

Residual current circuit breaker with overload protection for connection to the single-phase mains.

#### **Technical specifications**

Rated current  $I_n = 16$  A  
 Rated voltage  $U_n = 230$  Vac  
 Minimum operating voltage  $U_{min} = 100$  V  
 Sensitivity  $I_d = 30$  mA  
 Output terminals L and N, with pilot lamp.

### POWER SUPPLY



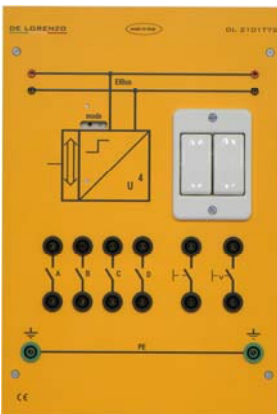
**DL 2101T71**

The power supply unit provides and monitors the power necessary for the system operation with safety extra low voltage: the integrated choke prevents the data telegrams from short-circuiting on the bus line. It has a voltage and current regulation and is therefore short-circuit proof; it can supply DC 24V power from an additional pair of terminals.

#### **Technical specifications**

Power supply:  $120 \div 230$  Vac, 50-60 Hz  
 Output voltage (Bus): 29 Vdc  
 Short-circuit current: limited to 1.5 A  
 Output voltage (SELV): 29 Vdc (no choke)

### PUSH-BUTTON INTERFACE



**DL 2101T72**

The push-button interface is a binary input and output device with four channels; each of them may be used either as an input for potential-free switch/push button contacts or as an output for control of a light emitting diode (LED). The module is complete with two single-pole switches to operate very easily on it showing the interfacing possibilities with a traditional domestic plant.

#### **Technical specifications**

Power supply: Bus line  
 Inputs: 4 binary channels

## DOUBLE PUSH-BUTTON



**DL 2101T74**

This module has four switch buttons that, horizontally aligned, may be used as a pair of buttons (e.g. for defined switching/dimming, or control of shutters and blinds), or as single buttons for sending values, single-button switching/dimming or single button control of blinds.

### **Technical specifications**

Power supply: Bus line via bus coupling unit.

## SMOKE DETECTOR



**DL 2101T75**

It uses an optical beam to search for smoke. This type of detector reacts most quickly to smoldering fires that release relatively large amounts of smoke.

### **Technical specifications**

Power supply: 18÷30 Vdc

Standby consumption: 50µA. Alarm current: 25mA

Auto test periodic functioning: two LEDs (360° of visibility)

Proper operation: flashing of both LEDs with 40 sec break

Pre-alarm: blinking of both LEDs.

Alarm: power LED with memory

Degraded chamber: blinking of a single LED

Repeat alarm output type: open-collector 100mA max.

Normally closed relay output

## TEMPERATURE CONTROLLER



**DL 2101T76**

The room temperature controller is especially designed for usage in rooms which are heated and/or cooled and whose temperatures are controlled depending on up to four room operating modes (comfort mode, pre-comfort mode, energy-savings mode and protection mode). It can be used as a two point control (thermostat) or as a continuous controller (P or PI controller).

### **Technical specifications**

Power supply: Via the bus transceiver module

Measuring range: 0 ÷ +40°C

## PRESENCE DETECTOR AND BRIGHTNESS SENSOR



**DL 2101T79**

This device is a presence/motion detector with integrated constant light level control. It communicates via KNX with actuators or other KNX devices. The detector signal can be analyzed via two separate communication channels, termed motion detector and presence detector. Another main application is the automatic control of the lighting on an office workplace. It contains an independent light sensor with integrated 2-level light control (switching) and constant light level control (dimming).

### **Technical specifications**

Power supply via bus line KNX

Current drain: approx. 10 mA

Presence detection type: passive infrared (PIR)

Range: horizontal 360°, vertical approx. 105°, 288 sectors

Brightness measurement type: contrast

Range: 20...1000 Lux

Different installation heights (from 2.5m to 5.0m)

## BINARY OUTPUT



**DL 2101T80**

The binary output is a device that can switch two separate groups of electric devices via its two outputs.

Each of the outputs can be assigned various tasks depending on the application program used: i.e. the binary output consists of the device (HW) and its application program (SW).

### **Technical specifications**

Power supply: Bus line

Outputs: 2 volt-free contacts

Rated voltage: 230 Vac, 47÷63 Hz

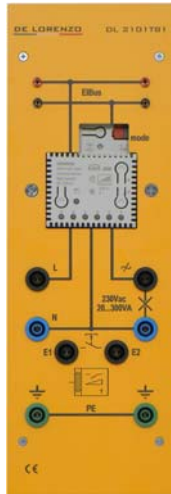
Switching current at 24 Vdc:

10 A (resistive load), 4 A (inductive load)

Switching power: 1 kW (incandescent lamp) or 500 W (fluorescent lamp)



## UNIVERSAL DIMMER



**DL 2101T81**

The universal dimmer can dim a group of electrical loads via its output. It is possible to assign various functions to the output such as switching lamps on and off, dimming up and down or setting them to a specific brightness value. Two further inputs are available for switching and dimming the output in direct mode.

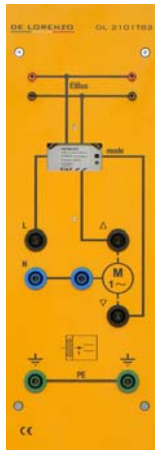
### **Technical specifications**

Power supply: Bus line

Load output:

rated voltage 230 Vac, rated current 1.3 A

## SHUTTER ACTUATOR



**DL 2101T82**

The shutter switch is a switching actuator that can raise or lower a blind drive and turn the slats open or close gradually by its volt free contacts. One channel is available for the connection and control of one motor. The volt free contacts (one relay) can be assigned various tasks depending on the application program used.

### **Technical specifications**

Power supply: Bus line

Output: 1 channel (volt-free contacts)

Load voltage: 230 Vac, 50/60 Hz

Switching current at 24 Vdc: 6 A (resistive load)

## VALVE ACTUATOR



**DL 2101T83**

The valve actuator is used for controlling the valve opening/closing following the continuous regulation signal emitted by the temperature controller.

### **Technical specifications**

Power supply: Bus line

Absorbed power: 240 mW

Valve opening: min. 1 mm, max. 4 mm

Operating cycle: 25 s/mm

## INFRARED TRANSMITTER/RECEIVER & DECODER



**DL 2101T84**

For wireless control of actuators. The IR remote control transmits infrared signals received by the IR-receiver and downloaded to the IR-decoder, which transforms these signals into appropriate bus telegrams.

### **Technical specifications of transmitter**

Power supply: 2 alkaline batteries LR03/AAA, 1.5 V  
 Wavelength 890 nm. Range: approx. 20 m  
 Transmission frequency: 455 kHz  
 Adjustable channels: 16 of 64.

### **Technical specifications of receiver/decoder**

Power supply: Bus line  
 System reception field: 5 cm ÷ 8 m  
 Remote control, focused beam: max. 20m

## SCENE/EVENT CONTROLLER



**DL 2101T85**

The scene/event controller, with its application program, can define and process either scenes control and event programs; the user can program and recall up to eight scenes and can construct also up to eight event programs.

### **Technical specifications**

Power supply: Bus line  
 Sceneries: 1...4 (groups for each scenery 1...8)  
 Stored values: 8 max. with 8 bits or 1 bit (max. 4 with 8 bits and max. 2 with 1 bit)  
 Sceneries recall: 1...4 sceneries via push-button or transmitter

## TEXT DISPLAY/CLOCK SWITCH



**DL 2101T89**

The following display and operating functions can be configured: switching, switching with forced control, dimming, sun protection control, recall and save scenes, sending and displaying values, display of values and text/operating messages. Alarm messages are displayed on special alarm pages. It is additionally equipped with a weekday switching function for up to 40 timer tasks.

These commands can be configured for each of the 8 configurable control functions.

### **Technical specifications**

Power supply: via the KNX bus line  
 Current consumption: 6,8/8,6 mA (without/with display background lighting)  
 8 capacitive touch buttons  
 Dot-matrix LCD for HMI



### USB INTERFACE



DL 2101T90

The interface allows to connect a Personal Computer for addressing, parameter setting, visualizing, logging and diagnosing bus connected devices.

**Technical specifications**

Power supply: via USB from PC.

Transmission rate: 9600 bit/s between interface and system, USB 1.1 full speed between PC and Interface (max. 12Mbit/s).

### SOCKETS WITH LAMPS



DL 2101T91

Two sockets for lamps complete with two incandescent lamps: 40 W/220 V.

### VENETIAN DRIVE



DL 2101T92

Venetian blind drive with built-in limit switches and thermal overload protection.

Possibility of inching mode for adjusting the angle of the slats.

**Technical specifications**

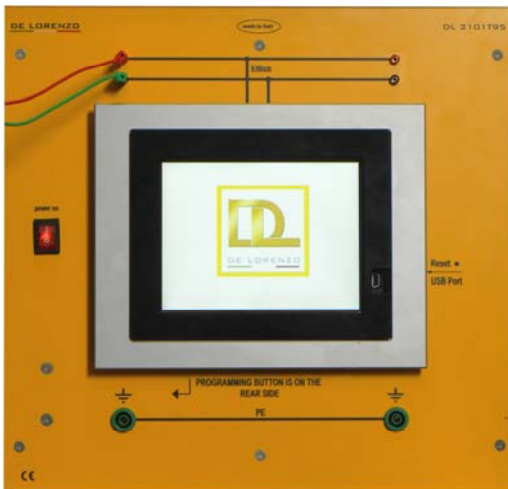
Power supply: 230 V, 50 Hz

Rated current: 0.45 A.

Power: 100 W

Torque: 4Nm

## COLOUR TOUCH PANEL



**DL 2101T95**

The colour touch panel is a multi-functional display/control device. In conjunction with its application program, the touch panel can be used to display and control up to 110 functions of at least 20 control and display pages. Four different design templates can be selected for the display and operator interface.

### **Technical specifications**

Display: TFT 5.7", 320 x 240 pixels (¼ VGA), color depth 263 K (R, G, B 6-bit), 218 colors, touch screen with LED background lighting.

USB interface for loading images and symbols (socket mini type B)

Power supply: via the Bus line or 230 Vac

## PLC LOGO! and COMMUNICATION MODULE



**DL 6BK1**

The PLC can be programmed directly from the panel or from PC. It is composed of 8 digital inputs and 4 relay outputs. The digital inputs can be simulated by means of switches or can be externally inserted through the connection terminals. The CM communication module has been conceived as slave to allow its interaction with the system.

### **Technical specifications**

Power consumption from power supply: max. 25 mA

Power consumption from Bus line: 5 mA

Switch for programming the system

Virtual digital inputs (I): max. 16

Virtual digital outputs (Q): max. 12

Virtual analogue inputs (AI): max. 8

Virtual analogue outputs (AQ): max. 2

Group addresses : max. 64

Associations: max. 64

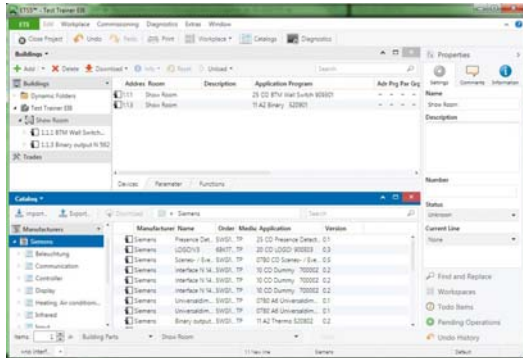
## VOLTAGE ADAPTATION MODULE



**DL 2101T70VT**

Module to be used in case of voltage in the country of destination different from 230 Vac.

**PROGRAMMING SOFTWARE**



**DL SW-ETS**

Configuration tool software to design and configure intelligent home and building control installations. It focuses on all users of the system, from the beginner up to the skilled and experienced partner or installer. It supports you in the realization of home and building automation projects in various phases and tasks as project planning and design, commissioning, project-documentation, diagnostics and troubleshooting.

**THREE-LEVEL FRAME**



**DL 2100-3M**

Metal frame for fitting the modules of the laboratory.

**CONNECTING LEADS**



**DL 1155EIB**

Set of connecting leads.

## CONFIGURATIONS

CODE	DESCRIPTION	1	2	3	4	5	6	TOTAL
DL 2101T70	SINGLE PHASE POWER UNIT	1	1	1	1	1	1	1
DL 2101T71	POWER SUPPLY	1	1	1	1	1	1	1
DL 2101T72	PUSH-BUTTON INTERFACE	1		1				1
DL 2101T74	DOUBLE PUSH-BUTTON	1	1			1	1	1
DL 2101T75	SMOKE DETECTOR			1				1
DL 2101T76	TEMPERATURE CONTROLLER				1			1
DL 2101T79	PRESENCE/BRIGHTNESS	1		1				1
DL 2101T80	BINARY OUTPUT	1		1			1	1
DL 2101T81	UNIVERSAL DIMMER	1				2		2
DL 2101T82	SHUTTER ACTUATOR		1					1
DL 2101T83	VALVE ACTUATOR				1			1
DL 2101T84	INFRARED T/R	1						1
DL 2101T85	SCENE/EVENT CONTROLLER					1		1
DL 2101T89	TEXT DISPLAY/CLOCK SWICHTH				1		1	1
DL 2101T90	USB INTERFACE	1	1	1	1	1	1	1
DL 2101T91	SOCKETS WITH LAMPS	2		1		1	1	2
DL 2101T92	VENETIAN DRIVE		1					1
DL 2101T95	COLOUR TOUCH PANEL						1	1
DL 6BK1	PLC/COMM. MODULE						1	1
DL SW-ETS	SOFTWARE ETS	1	1	1	1	1	1	1
	PERSONAL COMPUTER	1	1	1	1	1	1	1
DL 2100-3M	FRAME	1	1	1	1	1	1	1
DL 1155EIB	CONNECTING LEADS	1	1	1	1	1	1	1

DL 2101T70VT - VOLTAGE ADAPTATION MODULE - in case of voltage different from 230 Vac

1 = LIGHTING PLANTS

2 = SHUTTER CONTROL PLANT

3 = SAFETY PLANT

4 = HEATING PLANT

5 = SCENERY MODULE

6= PLANT WITH PLC, TOUCH PANEL & TIME SWITCH