

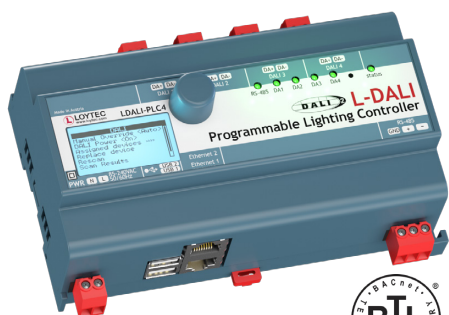
- ✓ BACnet
- ✓ CEA-709
- ✓ KNX
- ✓ DALI
- M-Bus
- ✓ OPC



# Programmable DALI Controller

## LDALI-PLC2/LDALI-PLC4

Datasheet #89055224



The LDALI-PLC2/PLC4 controllers are powerful, programmable lighting controllers, which can be programmed by L-STUDIO. With Alarming, Scheduling, Trending and e-mail notification (AST™) the LDALI-PLC2/PLC4 controller is a perfect solution for DALI lighting systems with application requirements not covered by the standard application of the non-programmable L-DALI controllers.

### DALI Network Interface

L-DALI Controllers act as a DALI-Master in the DALI network and can interact with DALI-2 multi-sensors and buttons in Multi-Master mode. The LDALI-PLC2/PLC4 is equipped with 2/4 independent DALI channels. Up to 64 DALI or DALI-2 based luminaries per DALI channel can be controlled individually or via 16 groups. All luminaries are monitored for lamp or ballast defect. In addition up to 64 DALI-2 input devices are supported per DALI channel. Each input device can be equipped with push buttons, sliders, occupancy and light sensors.

### Built-In DALI Bus Power Supply

The LDALI-PLC4 comes with a built-in DALI bus power supply, which can supply each DALI channel with a guaranteed supply current of 116 mA. An external DALI bus power supply can be added to top up the supply current to 232 mA. External power supplies are available for up to four DALI channels. The LDALI-PLC2 provides a DALI-bus power supply with guaranteed supply current of 230mA per channel. The internal DALI bus power can be switched on and off via web interface or LCD UI. Thanks to the switching power supply, these devices can handle input voltages from 85 – 240 V AC, 50/ 60 Hz.

### Local Operation and Override

The L-DALI Controllers come with a built-in backlit display (128x64) and a jog dial for local operation and override. Using the local operation, maintenance tasks (DALI device replacement, burn-in mode, etc.) can be executed without the need of any software tool.

### Programmable

The LDALI-PLC2/PLC4 can be programmed using the L-STUDIO programming tool. It can be programmed using IEC 61499 for integration into the L-ROC system and IEC 61131 for stand-alone operation.

### IEC 61131 lighting control library available

A library containing standard lighting control functionality is available. It supports various lighting control strategies, presence and lux level based. Several parameters can be used to configure the application for almost any use case. User specific program extensions are possible as well.

### Connectivity

The LDALI-PLC2/PLC4 controller provides connectivity functions to concurrently integrate CEA-709 (LonMark Systems), BACnet, KNX, and Modbus subsystems. LonMark Systems can be integrated via IP-852 (Ethernet/IP). BACnet integration is supported through BACnet/IP (Ethernet/IP) or BACnet MS/TP (RS-485), KNXnet/IP and Modbus TCP via Ethernet/IP.

The gateway functionality allows data communication between all communication technologies available on the device. Different technology data points are mapped through Local Connections on the device. The mapping of different technology data points on distributed devices is supported by Global Connections.

Each L-DALI Controller is equipped with two Ethernet ports. It can either be configured to use the internal switch to interconnect the two ports or every port is configured to work in a separate IP network.

When the Ethernet ports are configured for two separate IP networks, one port can be connected for instance to a WAN (Wide Area Network) with enabled network security (HTTPS) while the second port can be configured to be connected

- Functions
- L-WEB, L-STUDIO
- L-ROC
- L-INX
- L-IOB
- Gateways
- L-VIS, L-STAT
- LPAD-7,
- L-DALI
- Routers, NIC
- Interfaces
- Accessories

to an insecure network (LAN) where the standard building automation protocols like BACnet/IP, BACnet/SC, LON/IP, or Modbus TCP are present. These devices also feature fire-wall functionality to isolate particular protocols or services between the ports.

Using the internal switch, a daisy chained line topology of up to 20 devices can be built, which reduces costs for network installation. The IP switch also allows the setup of a redundant Ethernet installation (ring topology), which increases reliability. The redundant Ethernet topology is enabled by the Rapid Spanning Tree Protocol (RSTP), which is supported by most managed switches.

The L-DALI Controllers provide fully featured AST™ functionality (Alarming, Scheduling, and Trending) and can be integrated perfectly into the L-WEB System.

### IoT Integration

The IoT function (Node.js) allows connecting the system to almost any cloud service, either for uploading historical data to analytics services, telemetry using MQTT, delivering alarm messages to alarm processing services or operating parts of the control system over a cloud service (e.g., scheduling based on Web calendars or booking systems). Processing Internet information such as weather data in forecast-based control is also possible. Finally, the JavaScript kernel also allows implementing serial protocols to non-standard equipment in primary plant control.

### Device Configuration via Tool or Web Interface

The device configuration, commissioning, and parameterization is done either with the configuration tool software or via the integrated web server.

### EnOcean, SMI and LIOB/IP

Wireless EnOcean sensors and buttons can be integrated via the optional L-ENO EnOcean interface. For sunblinds the LSMI-804 extension module allows the integration of up to four SMI channels. Physical I/Os can be integrated through L-IOB I/O Modules via LIOB-IP.

### Advanced DALI Functions

- **DALI Sensors**

The L-DALI Controllers support the integration of DALI-2 multi-sensors for presence detection and light level recognition. In addition to the LOYTEC multi-sensors LDALI-MS2/MS2-BT/MS4-BT, DALI-2 sensors of many well-known manufacturers can be used. For asset tracking in office buildings with the LOYTEC multi-sensors (LDALI-MS2-BT / LDALI-MS4-BT), a LIC-ASSET license is required.

- **DALI Buttons**

For manual operation, DALI-2 push button couplers, like the LDALI-BM2, DALI-2 operation panels, and IR remote controls can be integrated into the system. The function executed when a button is pressed is programmable in the program logic. In addition the feedback feature for pushbutton instances according to IEC 62386-332 is supported.

- **DALI Relay Modules**

Standard loads in the power grid can be controlled via DALI using DALI relay modules, like the LDALI-RM5, LDALI-RM6 and LDALI-RM8.

- **DALI Color Control**

The L-DALI allow controlling DALI luminaires with color control functionality (DT8). Both, tunable white (Tc) and full RGB color control (RGBWAF and xy-coordinate) are supported. Changing the light colour is possible via scenes or controlled via the program logic.

- **Auto Burn-In for fluorescent Lamps**

Fluorescent lamps must be operated about 100 hours with 100 % brightness before they may be dimmed. This burn-in process is monitored by L-DALI for each lamp. After 100 hours burn-in time, the lamp's constant light control is enabled.

• **Automatic Test of Emergency Lighting Systems**

In DALI emergency lighting systems based on IEC 62386-202, L-DALI can be used for testing the system. The results can be logged.

• **Collection of important Operational Parameters**

For maximum transparency in the lighting system, L-DALI can record the operating hours of each lamp and also the energy consumption (calculated).

• **DALI Device Replacement made easy**

Defective DALI ballasts can easily be replaced directly on the L-DALI Controller (LCD and jog dial) or via the web interface. No software tool is necessary.

**Features**

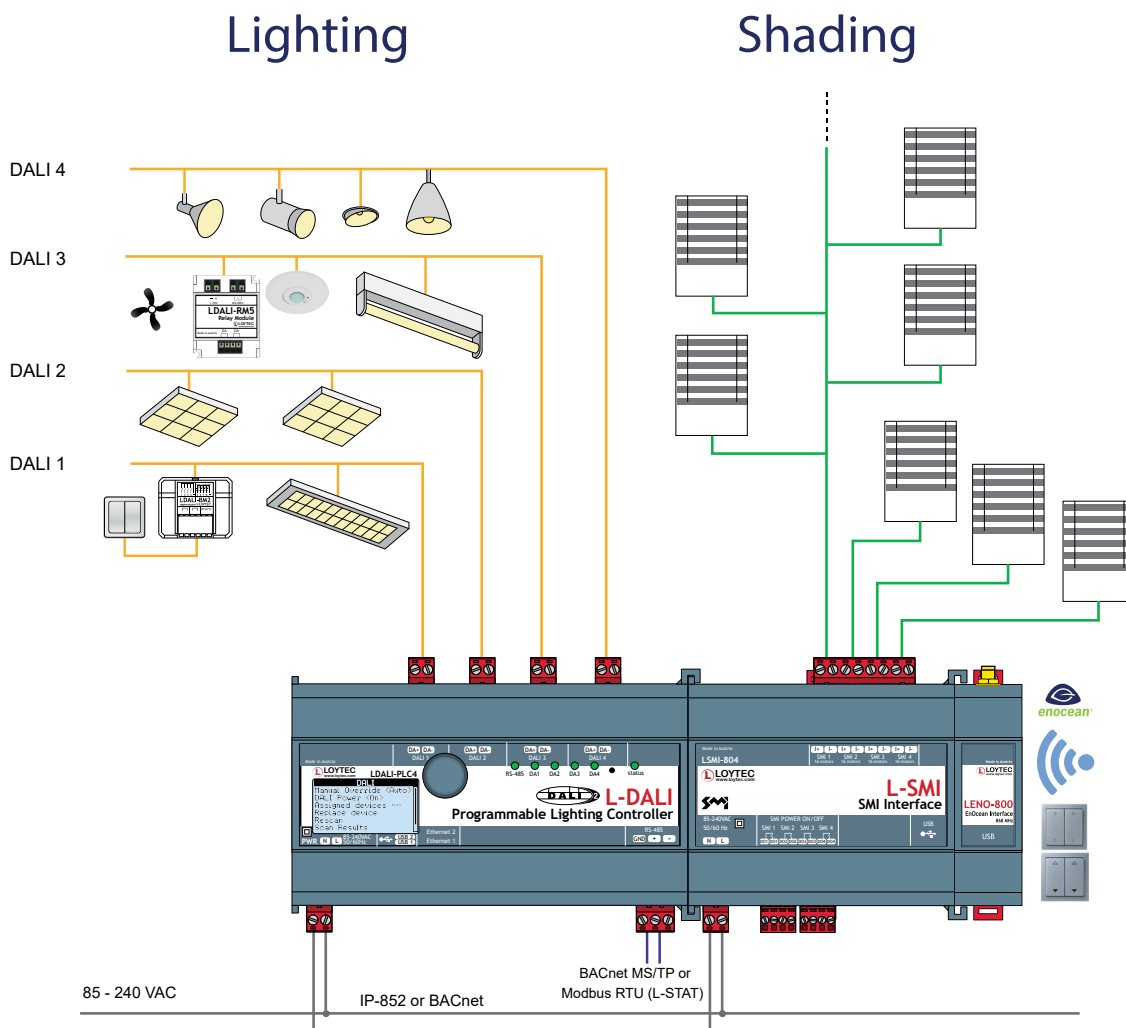
- Programmable with L-STUDIO IEC 61131-3 and IEC 61499
- Supports up to 64 DALI ballasts and 16 DALI groups per DALI channel
- Supports up to 64 input devices overall per channel
- Up to 16 DALI sensors per DALI channel are supported
- Up to 64 DALI button modules per DALI channel are supported
- Integrated DALI bus power supply
- DALI-2 certified
- Manual operation using the jog dial and local access to information about device status and data points in clear text and symbols
- 128x64 graphic display with backlight
- Built-in web server for device configuration
- Test and assignment of DALI devices on the web interface
- Replacement of DALI devices without additional software tools via LCD and jog dial
- Supports the control of standard loads in the power grid via LDALI-RM5/RM6/RM8 Relay Modules
- Supports DALI-2 devices (drivers and input devices)
- Support DALI color control (DT8 tunable white & full color control)
- Supports lamp burn-in mode
- Supports periodic testing of DALI emergency lights
- Integrated DALI Protocol Analyzer
- Physical inputs and outputs with L-IOB I/O Modules
- Compliant with CEA-709, CEA-852, and ISO/IEC 14908 Standard (LonMark System)
- Support of dynamically created or static NVs
- Support of user-defined NVs (UNVTs) and Configuration Properties (SCPTs, UCPTs)
- KNXnet/IP
- Gateway functions including Smart Auto-Connect™
- Modbus TCP and Modbus RTU/ASCII
- Compliant with ANSI/ASHRAE 135-2012 and ISO 16484-5:2012 standard
- Supports BACnet/IP, BACnet/SC or BACnet MS/TP
- BACnet Client Function (Write Property, Read Property, COV Subscription)
- B-BC (BACnet Building Controller) functionality, BTL certified
- Alarming, Scheduling, and Trending (AST™) locally or embedded in L-WEB (building management)
- Node.js support for easy IoT integration (e.g. Google calendar, MQTT, Alexa & friends, multimedia equipment,...)
- Event-driven e-mail notification
- Supports Local and Global Connections
- Built-in OPC XML-DA and OPC UA server
- Stores customized graphical pages
- Visualization of customized graphical pages through LWEB-900 (building Management), LWEB-803 (Monitoring and Control), or LWEB-802 (Web Browser)
- Stores user-defined project documentation
- Dual Ethernet/IP interface
- Supports SMI (Standard Motor Interface) through LSMI-804
- Connection to EnOcean wireless devices via LENO-80x Interface
- Supports WLAN through LWLAN-800 Interface
- Supports LTE through LTE-800 Interface
- Supports RS-232 through LRS232-802 Interface
- Configurable Bluetooth beacons and services: indoor navigation, asset tracking (requires LIC-ASSET license) and access to LWEB-900 room control solution

**Runtime licenses**

Type	LDALI-PLC2	LDALI-PLC4
Programming, Tools	L-STUDIO (IEC 61131-3 and IEC 61499 based), L-INX Configurator and configuration via web interface	
License	L-STUDIO: included	

# Programmable DALI Controller

## LDALI-PLC2/LDALI-PLC4



Specifications		
Type	LDALI-PLC2	LDALI-PLC4
Dimensions (mm)	159 x 100 x 75 (L x W x H), DIM035	
Installation	DIN rail mounting following DIN 43880, top hat rail EN 50022	
Power supply	85-240 V AC, 50/60 Hz, typ. 14W (4W + 2 x 5W DALI)	85-240 V AC, 50/60 Hz, typ. 14W (4W + 4 x 2.5W DALI)
Operating conditions	0 °C to 40 °C, 10 – 90 % RH, noncondensing, degree of protection: IP40, IP20 (terminals)	
Interfaces	2 x Ethernet (100Base-T): OPC XML-DA, OPC UA, LonMark IP-852, BACnet/IP*, BACnet/SC*, LIOB-IP, KNXnet/IP, Modbus TCP (Master or Slave), HTTP, FTP, SSH, HTTPS, Firewall, VNC, SNMP  * Either BACnet/IP, BACnet/SC or BACnet MS/TP	1 x RS-485 (ANSI TIA/EIA-485): BACnet MS/TP*, or Modbus RTU/ASCII (Master or Slave)  2 x USB-A: WLAN (needs LWLAN-800), EnOcean (needs LENO-80x) SMI (needs LSMI-804), LTE (needs LTE-800)
DALI channels	2	4
Integrated DALI bus power supply (per channel data)	16 VDC 230 mA guaranteed supply current*** 250 mA max. supply current	16 VDC 116 mA guaranteed supply current*** 125 mA max. supply current
Max. number of Rooms/Segments	16	32

\*\*\*With high DALI traffic (e.g. during DALI-scan) increased current consumption may occur depending on the devices connected. Therefore, according to IEC62386-101 it is recommended to take an additional current of at least 20% for dynamic processes into account in system design.

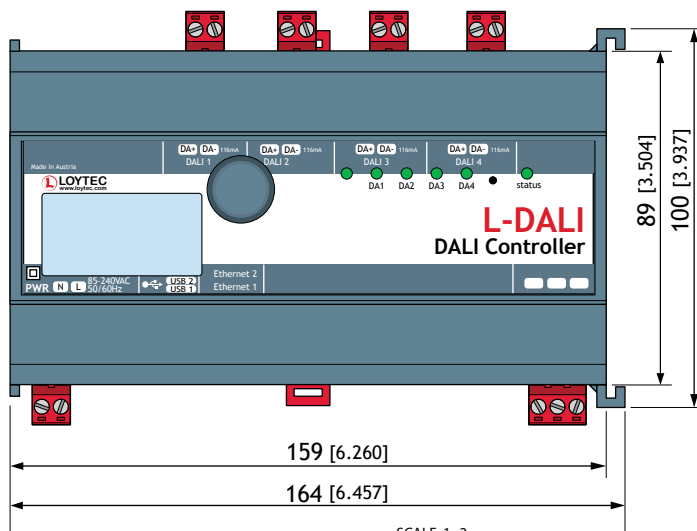
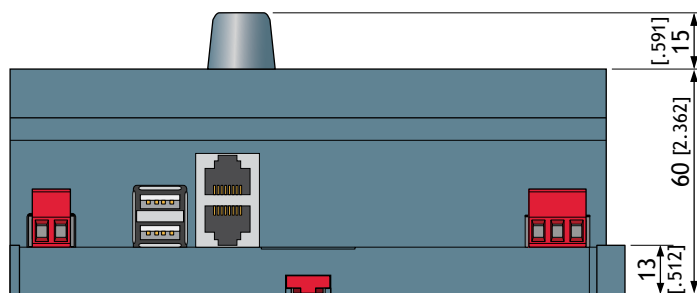
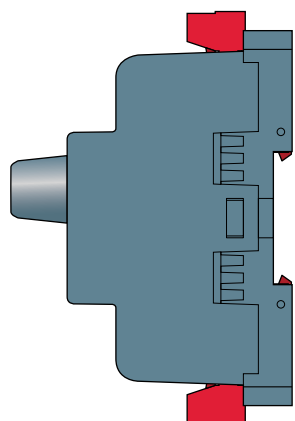
Resource limits			
Total number of data points	30 000	LonMark Alarm Servers	1
OPC data points	10 000	E-mail templates	100
BACnet objects	2 000 (analog, binary, multi-state)	Math objects	100
BACnet client mappings	5 000	Alarm logs	10
BACnet calendar objects	25	KNXnet/IP data points	1 000
BACnet scheduler objects	100 (64 data points per object)	Connections (Local / Global)	2 000 / 250
BACnet notification classes	32	Number of L-WEB clients	32 (simultaneously)
Trend logs (BACnet or generic)	512 (13 000 000 entries, ≈ 200 MB)	L-IOB I/O Modules	24
Total trended data points	2 000	Number of EnOcean devices	100
CEA-709 network variables (NVs)	1 000	EnOcean data points	1 000
CEA-709 Alias NVs	2 000	DALI ballasts per channel	64
CEA-709 External NVs (polling)	2 000	DALI groups per channel	16
CEA-709 address table entries	1 000 (non-ECS mode: 15)	DALI sensors per channel	16
LonMark Calendars	1 (25 calendar patterns)	DALI button modules per channel	64
LonMark Schedulers	100		

Order number	Product description
LDALI-PLC2	Programmable DALI Controller, 2 DALI channels, integrated DALI power supply
LDALI-PLC4	Programmable DALI Controller, 4 DALI channels, integrated DALI power supply
L-STUDIO	Development and integration platform for programmable LOYTEC controllers
LIC-ASSET	Add-on Software License to activate asset tracking (for LDALI-ME20x-U, LDALI-3E10x-U, LDALI-PLCx, LROC-400, LROC-401, LIOB-AIR20, LIOB-591)
LDALI-PWR2-U	DALI power supply unit for 2 DALI channels
LDALI-PWR4-U	DALI power supply unit for 4 DALI channels
LDALI-MS2	DALI-2 multi-sensor (presence detection, illuminance sensor, IR receiver, temperature sensor,
LDALI-MS2-BT	DALI multi-sensor (presence detection, illuminance sensor, IR receiver, temperature sensor, humidity sensor, 3 digital inputs, Bluetooth), up to 12 m mounting height
LDALI-MS4-BT	DALI multi-sensor (presence detection, illuminance sensor, IR receiver, temperature sensor, humidity sensor, 3 digital inputs, Bluetooth, flat lense), up to 5 m mounting height
LDALI-BM2	Quadruple DALI pushbutton coupler
LDALI-RM5	DALI Relay Module 10 A, Analog Interface 1 – 10 V
LDALI-RM6	DALI Relay Module 10 A, Analog Interface 1 – 10 V, "spud-mount"
LDALI-RM8	DALI Relay Module, 8-channel
LENO-800	EnOcean Interface 868 MHz Europe
LENO-801	EnOcean Interface 902 MHz USA/Canada
LENO-802	EnOcean Interface 928 MHz Japan
LWLAN-800	Wireless LAN Interface IEEE 802.11 bgn
LSMI-804	Standard Motor Interface for 64 motors, 4 SMI channels via USB
LTE-800	LTE Interface
LRS232-802	USB to 2 x RS-232 Interface
LSTAT-800-G3-Lx	Room Operator Panel, black front, white enclosure, Modbus, temperature, rel. humidity, ext. switch/NTC, IR receiver, Buttons (Lx)
LSTAT-801-G3-Lx	Room Operator Panel, front black, white enclosure, Modbus, temperature, rel. humidity, ext. switch/NTC, occupancy, IR receiver, Buttons (Lx)
LSTAT-802-G3-Lx	Room Operator Panel, front black, white enclosure, Modbus, temperature, rel. humidity, ext. switch/NTC, occupancy, IR receiver, CO2, Buttons (Lx)
LSTAT-800-G3-L20x	Room Operator Panel, white front, white enclosure, Modbus, temperature, rel. humidity, ext. switch/NTC, IR receiver, Buttons (Lx)
LSTAT-801-G3-L20x	Room Operator Panel, white front, white enclosure, Modbus, temperature, rel. humidity, ext. switch/NTC, occupancy, IR receiver, Buttons (Lx)
LSTAT-802-G3-L20x	Room Operator Panel, white front, white enclosure, Modbus, temperature, rel. humidity, ext. switch/NTC, occupancy, IR receiver, CO2, Buttons (Lx)
LSTAT-80x-CUSTOM	One-time customization cost for L-STAT custom design, including 2 working samples

## Dimensions of the devices in mm and [inch]

### DIM035

- LDALI-3E101-U
- LDALI-3E102-U
- LDALI-3E104-U
- LDALI-ME201-U
- LDALI-ME204-U
- LDALI-PLC2
- LDALI-PLC4



The products of LOYTEC electronics GmbH are subject to constant development. Therefore, LOYTEC reserves the right to modify technical specifications at any time without prior notice. The most recent datasheet can be downloaded from [www.loytec.com](http://www.loytec.com).