



LOYTEC

Products

Product Catalog 2019/2020



LOYTEC Product Overview

LWEB-900 Building Management System



User Interface

L-VIS
L-WEB
L-STAT

I/O Controller

L-IOB

Lighting Control

L-DALI

Room Automation

L-ROC
L-INX
L-IOB
L-KNX

Energy Management, Metering

L-INX
L-IOB
L-MBUS

HVAC Control

L-INX
L-IOB
L-MBUS
L-MPBUS

Gateways

L-GATE
L-INX
L-DALI

Network Infrastructure

L-IP
L-Switch
NIC

LON	BACnet	KNX	EnOcean	DALI	SMI	Modbus	M-Bus	MP-Bus	OPC	Programmable	IoT
✓	✓					✓			✓		✓
✓	✓		✓	✓				✓	✓	✓	✓
✓	✓		✓	✓	✓	✓			✓		✓
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
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Functions



Functions



LOYTEC offers a wide range of products for various applications in building automation. Those application-centric products often combine an entire set of different functions on one single device (L-INX Automation Servers, IP-capable L-IOB I/O Modules and Controllers, L-ROC Room Controllers, L-GATE Gateways, L-VIS Touch Panels). This enables a given product to be used for different tasks. For example, the L-GATE as a typical gateway also has the ability to host a graphical user interface to dynamically visualize a site or record historic data in trend logs. L-INX Automation Servers are primarily programmable controllers but can also be used as gateways depending on the available protocols.

We have high quality standards in research, development, and production of our products. In order to offer the same high standards to our customers, the programmable controllers may only be purchased by trained staff of companies that are enrolled in the LOYTEC Competence Partner Program.

For all functions, LOYTEC ensures common workflows for configuration and operation. The workflow for configuration of certain functions is the same, regardless which device is used. This applies for integration in different communication network technologies,

creating schedules, alarm conditions, trend logs, and even for the design of graphical projects. For an efficient workflow the user can – depending on the network technology – create single data points or entire device templates via a network scan or file import. The use of a single configuration tool for a range of product models such as the L-INX Automation Servers, L-IOB I/O Modules, L-IOB I/O Controllers, and L-GATE Gateways, reduces the learning curve notably when working with LOYTEC products.

The combination of different functions on a single device and the common workflows for configuration and operation offer a maximum of flexibility when selecting LOYTEC products for various application requirements. On the following pages we give an overview on the offered functions. For more detailed information on the presented functions please refer to the respective product manuals, which are available for download on our web site. The functions are represented by symbols, which are referred to by the respective product descriptions later in the catalog.

AST™ Functions

The acronym AST™ stands for the combination of alarming (alarm management), scheduling, and trending (historic data recording) functions, which are available as automation functions on LOYTEC devices (L-INX Automation Servers, IP-capable L-IOB I/O Controllers, L-ROC Room Controllers, L-GATE Gateways, L-VIS Touch Panels). The AST™ functions can therefore be distributed into the field and are available exactly where they are needed in a building automation system. AST™ functions can be seamlessly integrated with the L-WEB building management software. Also graphical user interfaces like LWEB-802/803, the building management system LWEB-900 and the L-VIS Touch Panels provide access to the distributed AST™ functions.

Alarming (Alarm Management)



On a LOYTEC device it is possible to define alarm conditions for each data point. This can be done independently of the underlying communication technology (CEA-709, BACnet, DALI, M-Bus, Modbus, KNX, etc.) or the underlying, physical data point of a L-IOB I/O Module.

Alarms generated by these alarm conditions are reported to a generic alarm server, which is also independent of the network technology. The alarm server collects alarm records and is the interface for remote access to those local alarms. Alarm records contain information on the alarm source data point, the alarm value, an alarm message, alarm type (off-normal, limit, fault), alarm priority, and alarm state (alarm active, acknowledged, inactive). The alarm message of the record can be user-defined and extended by variable placeholders.

LOYTEC devices with a BACnet interface support BACnet alarms with intrinsic reporting. BACnet alarm servers are mapped to BACnet notification class (NC) objects. Alarm conditions can be defined for analog input, output, and value objects (AI, AO, AV), for binary input, output, and value objects (BI, BO, BV) and for multi-state input, output, and value objects (MSI, MSO, MSV). More than this, alarm records from generic alarm servers can be reported to BACnet alarm servers and can be exposed to notification class objects. This allows the reporting of alarm conditions from other communication technologies to BACnet. Using client mappings, LOYTEC devices can also access remote BACnet notification class objects, for instance to receive alarms from third-party devices.

LOYTEC devices for LonMark Systems (CEA-709) support the transmission of alarms via the LonMark node object's nvoAlarm (SNVT_alarm) and nvoAlarm_2 (SNVT_alarm_2). This allows other devices that support the LonMark alarm notifier profile to receive alarms sent by LOYTEC devices. The acknowledgement of alarms in the LonMark alarm server is defined in the LonMark specification and works with the RQ_CLEAR_ALARM mechanism. Alarms from generic alarm servers can be reported to the LonMark alarm server (mapped to the LonMark node object). This way alarm conditions of data points from other network technologies can be reported to a LonMark System.

Alarms of the different alarm servers can be displayed in LWEB-900, LWEB-802/803, L-VIS Touch Panels or in the device's integrated web interface using the built-in web server.

The alarming feature also includes the recording of alarm transitions in an alarm log on the LOYTEC device. The alarm log works as a ring buffer and its size can be configured. The alarm log can be viewed on the web interface of the LOYTEC device and be exported to a CSV file. The alarm log can also be transmitted as a CSV file e-mail attachment or be downloaded from the device via FTP access.

Scheduling



Scheduling refers to changing the value of data points on a timely basis using a time schedule. The schedule contains a weekly schedule, exception days (e.g. holidays), and date periods (e.g. vacation time). The scheduling feature works locally on LOYTEC devices and can be enabled depending on an enable data point.

All LOYTEC devices supporting the scheduling function feature a built-in battery-buffered Real Time Clock (RTC). Schedules can change the state of a binary data point or the value of an analog data point. This occurs independently of the underlying communication technology (CEA-709, BACnet, DALI, M-Bus, Modbus, KNX, etc.) or the underlying, physical data point of a L-IOB I/O Module.

Generic schedulers – like generic trends and alarms – can be created, that are neither CEA-709 nor BACnet objects. They are beneficial for creating technology-independent applications. Generic schedulers can write to any technology as well as data point favorites and are the ideal solution if configured via LWEB-900 only.

LOYTEC devices with a BACnet interface use the standardized BACnet schedule and calendar object to map the schedule. A separate BACnet schedule object is created for each schedule. BACnet calendar objects are used for defining exception days. The BACnet schedule object allows scheduling of a single value at a time (multistate, analog, or binary). More than one scheduled value or different data types at a time are not possible. Using the client mapping function, it is possible to access remote BACnet scheduler objects. This allows reading and modifying schedules of third-party devices.

LOYTEC devices for LonMark Systems (CEA-709) support CEA-709 schedulers and CEA-709 calendars via standard LonMark objects. For CEA-709 schedules, more than one data point can be configured, possibly of different data type, for which a set of different values can be scheduled at a time.

Schedules are executed autonomously on LOYTEC devices. The schedules and scheduled values can be viewed and configured in LWEB-900, LWEB-802/803, L-VIS Touch Panels, or on the device's web interface using the built-in web server. The distributed schedules on LOYTEC devices can be managed by the LWEB-900 Building Management System. LWEB-900 allows grouping schedules, building a hierarchical structure, and configuring schedules efficiently.

Trending (Historic Data Logging)



Generic trend logs are technology-independent and allow the recording of historic data values over time. The recording of data point values occurs at fixed intervals, on a defined change-of-value, or is triggered by a trigger data point. Recording intervals can be aligned to the wall-time. For example, different trend logs with 15 minutes intervals can record synchronously aligned to the top of the hour. For each data point, a change-of-value condition can be defined on the LOYTEC device. Trends operate independently of the underlying communication technology (CEA-709, BACnet, DALI, M-Bus, Modbus, KNX, etc.) or the underlying, physical data point of a L-IOB I/O Module. Trend logs can record local and remote data points of other, distributed devices. The capacity of a trend log and the storage mode (linear or ring buffer) can be configured. Devices that support SD cards or have a USB port also allow the storage of trend log data on external memory. The time of backing up trend logs can be triggered by the user on the LCD display or by defined, automatic trigger conditions.

LOYTEC devices with a BACnet interface can also use BACnet trend log objects for historic data recording. These objects can be accessed over the BACnet network and expose trend data to other BACnet devices and operator workstations (OWS). Each BACnet trend log object can record data for a single data point only. The recorded data point is limited to the BACnet technology, either to a local BACnet object or to a remote BACnet object (configured by a client mapping).

LOYTEC devices for LonMark Systems (CEA-709) use generic trend logs. There exists no LonMark functionality that allows transparent LonMark access to trend log data.

Trend log data of the different trend log objects can be displayed by LWEB-900, LWEB-802/803 and L-VIS. Trend data can be viewed either in a table view or in a trend graph. In addition, the LWEB-900 server allows long-term storage of the historic trend data. For doing so, the recorded data is periodically read out from the device and stored in a database. If no permanent IP connection should exist between the L-WEB server and the respective LOYTEC devices, the devices can be configured to send trend data automatically as an e-mail attachment to the L-WEB server. Trend data can also be exported as a CSV file (via FTP access), or stored to SD card or USB memory, if the device supports it.

For certain applications, historic values of a given base data point, both recent and far into the past, can be of interest. This can be accomplished with historic filters. They allow processing historic values of the base data point according to a filter function. One or more such functions can be defined per base data point. The result of the historic filter is written to "historicFilter" property relations. For each historic filter function, a time period can be defined at which the base value is sampled, e.g., every first of the month at midnight, and how many samples ago. Historic filters can be created for any analog, binary, or multi-state data point. It is not necessary to create a trend log.

Functions

Communication

IoT



The Internet of Things has brought forward an off-spring of devices with Web-based interfaces, such as Multimedia projectors, A/V systems, Smart-TVs, or smart light bulbs. LOYTEC's groundbreaking JavaScript-based IoT integration allows to integrate them all. In short: If you can control it via app, you can integrate it into the building automation system or touch panel interface.

Typical applications are meeting rooms or auditoriums with scene control of lighting and shading, integration of third-party devices, and operation of multi-media equipment by the touch of a single button. Similar products from the consumer sector like a Sonos® audio system, Philips Hue lights or Alexa and friends can be connected to the LOYTEC building control system. Some LOYTEC devices require the L-IOT1 software license.

The IoT function allows connecting the system to almost any cloud service, either for uploading historical data to analytics services, 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.

Benefits:

- Easy integration of multi-media equipment into the building control system
- Connect consumer products like Sonos®, Philips Hue, Alexa and friends
- Uploading data to cloud services for further processing
- Scheduling based on Web applications (e.g., Google Calendar)
- Implementing custom serial protocols

E-mail Notification



The integrated e-mail client allows for the transmission of messages based on a timely basis or triggered by events. Message texts can be multi-line and consist of static text and variable placeholders, which are evaluated at the time of transmission and insert values into the text. Furthermore, alarm logs and trend logs can be automatically transmitted as e-mail attachments in CSV file format.

The number of transmitted e-mails can be limited. Using a trigger data point, the e-mail transmission can be invoked on a timely basis or event-based. In case an e-mail could not be delivered, retransmissions are tried every 30 minutes up to 24 times.

SMS Notification



Together with the LTE-800 interface the transmission of SMS directly from the device becomes possible. SMS can contain configurable text and variable placeholders that resolve to data point content at the time of transmission. SMS can be sent on a timely basis or triggered by events such as alarms. This makes it easy to add an SMS alarm notifier to the device. The transmission of SMS can be limited to burst and long-term transmission rates.

Ethernet (Ethernet Switch)



Ethernet summarizes a variety of networking technologies, software (protocols) and hardware (cable, hubs, interface cards, etc.) for wired, local area networks (LANs). Originally published in 1983 as the IEEE 802.3 standard, Ethernet has evolved to today's most used LAN technology. As a packet-switched network, Ethernet belongs to the layers 1 and 2 of the ISO/OSI layer model and defines addressing and media access. Ethernet is a common basis for networking protocols such as TCP/IP and UDP/IP and is able to multiplex several application protocols at the same time (e.g. HTTP, FTP, IP-852, BACnet/IP, KNXnet/IP).

LOYTEC devices with an Ethernet interface use 100Base-T (Fast Ethernet) at 100 Mbit/s and an RJ45 jack.

LOYTEC devices featuring two Ethernet ports 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 to an insecure network (LAN) where the standard building automation protocols like BACnet/IP, LON/IP, or Modbus TCP are present. These devices also feature firewall functionality of course 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.

Network Security and VPN*



Integral part of the LOYTEC hardware is a configurable firewall, which can be enabled and configured over the built-in web server, over OPC XML-DA, or OPC UA. The built-in web server is accessed via the secure HTTPS protocol. A pre-installed certificate allows a quick setup and can later be replaced by a locally generated certificate or by a certificate issued by a certification authority. Data communication is encrypted by TLS encryption methods. The use of secure certificates prevents man-in-the-middle attacks. Furthermore, the OPC UA server provides a secure alternative to OPC XML-DA. It uses the installed server certificate and authorizes OPC clients by certificates.

LOYTEC devices can also be operated as part of a virtual private network (VPN) based on the OpenVPN technology. In a VPN setup, the device connects to a VPN server with an authenticated VPN certificate. The VPN provides a secured network channel that can carry any of the IP-based protocols. In combination with a VPN server on a public address, VPN devices can be accessed without having a public address. This provides a secure alternative to NAT forwarding and makes secure access to remote sites very simple.

BACnet



BACnet (Building Automation and Control networks) is a standardized communication protocol for building automation (ISO 16484: Building automation and control systems – Part 5: Data communication protocol). It was developed at the end of the 1980s by the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE). Communication in the network is modeled on BACnet objects, which are exposed as server objects by a BACnet device. Other BACnet devices connect as clients to those BACnet server objects. The network integration is accomplished by vendor-specific configuration tools.

LOYTEC devices with a BACnet interface expose data via BACnet server objects (binary, analog, multi-state) and communicate through client mappings. Change-of-value (COV) events can trigger the transmission of values. The AST™ functions are available for BACnet scheduler, calendar, trend log, and notification class objects. Devices are connected to the BACnet network over BACnet MS/TP (twisted pair based on RS-485) or BACnet/IP (100Base-T Ethernet). BACnet objects are created in the LOYTEC Configurator tool using EDE import, online network scan, or manual creation.

As a default, BACnet objects use the ASCII character encoding on the device. This applies to the properties object name, object description, active/inactive text, state text, etc. Most third-party tools are compatible with this setting. To support international character sets, LOYTEC devices can be switched to use the encodings ISO 8895-1 (good for most Western Europe) or UCS-2 (good for Unicode character sets used in Japan).

All LOYTEC products with the BACnet/IP interface can act as BACnet time masters. It is possible to use the BACnet services TimeSynchronization and UTCTimeSynchronization in order to send out time synchronization events. This happens after a power-on reset of the device, when the system time is changed, or periodically. The system time on IP-based LOYTEC devices can be synchronized via NTP (Network Time Protocol), which allows the LOYTEC device – as a BACnet time master – to synchronize all registered BACnet devices in the network to the NTP time.

LOYTEC BACnet routers and BACnet devices with an integrated router can also function as a BACnet MS/TP slave proxy. A slave proxy answers BACnet Who-Is broadcast requests sent to slave devices on the MS/TP bus on behalf of them with appropriate I-Am packets. This covers the shortcoming of BACnet slave devices, which by definition cannot initiate communication by themselves. Using this feature, it is possible to find MS/TP slave devices in a BACnet network scan, which would not be possible without the slave proxy. LOYTEC BACnet routers, BACnet devices with an integrated router and L-GATE Gateways also have a built-in BACnet broadcast management device (BBMD) for managing BACnet/IP Internetworks that span across IP routers. BACnet models without the router function can register as a foreign device (FD) with other BBMDs.

BACnet devices with the BACnet MS/TP interface provide an additional remote MS/TP protocol analyzer. BACnet MS/TP packets are captured and can either be transmitted online to a Wireshark analyzer (sniffer program for analyzing network protocols available free of charge) or stored offline as a capture file on the device. This file can be downloaded over the web interface and opened later in Wireshark.

Other BACnet details such as the BACnet standardized device profile, the supported BIBBs (BACnet Interoperability Building Blocks) and the object properties are specified in the respective PICS (Protocol Implementation Conformance Statement) document. Apart from this, most LOYTEC devices are BTL-certified products that support the BACnet Building Controller (B-BC) profile (see also the related product descriptions).

BACnet Operator Workstation (B-OWS)



A BACnet Operator Workstation is designed to provide an operator with all the information and editing ability needed for managing a system on a daily basis. In addition to viewing and editing selected BACnet object, an Operator Workstation can display trends, schedules, and other specialized objects. It can also display reports and graphics. A BACnet Operator Workstation will notify the operator that an alarm has occurred, lets the operator acknowledge the alarm, provides a summary of alarms, and allows to adjust the alarm thresholds of analog objects.

* VPN will be available in Q3 2019.

Functions

CEA-709



By the end of the 1990s, LON (Local Area Network) was standardized by the Consumer Electronics Association (CEA) under the title "Control Network Protocol" as CEA-709. Today, the CEA-709 protocol is a recognized international communication standard, namely ISO/IEC 14908. LOYTEC is highly experienced in the CEA-709 technology. LOYTEC developed its own technology to make devices talk on CEA-709 networks. LOYTEC technology includes chip sets and also the fully featured ORION Protocol stack which executes the CEA-709 protocol on powerful 32-bit micro controllers. All LOYTEC devices supporting CEA-709 connectivity make use of this powerful technology. Communication Objects (Network Variables) and functional profiles, standardized by LonMark International (www.LonMark.org), describe the communication interface of a LonMark device. Configuration properties (CPs) allow downloading and modification of device parameters. Network integration is accomplished by a network management tool, which is independent of the hardware manufacturer (e.g. NL220 or LonMaker®) and is used for device installation and creation of bindings between network variables, which are stored in a database. This allows for a clear separation between the application and the communication relations in the network. Configuration tools specific to LonMark nodes integrate as plug-ins into the network management tool and allow for fast and simple device configuration.

LOYTEC devices can be used in LonMark Systems with standard network variable types (SNVT) or user-defined network variable types (UNVT). The NVs can be created as static or dynamic network variables. Additionally, network variables of other LonMark nodes can be brought in via "external NVs", which are polled in a cyclical manner and written explicitly, without allocating and binding static or dynamic NVs on the LOYTEC device. LOYTEC devices also offer direct access to configuration properties of other LonMark nodes (using LonMark file transfer or read memory access methods). Both standard configuration property types (SCPTs) and user-defined configuration property types (UCPTs) are supported. Network variables are created in the Configurator tool (plug-in) by importing from a XIF file, scanning an LNS database, scanning a network online, or by manual creation. The AST™ functions alarming (alarm management) and scheduling are supported by using the respective LonMark profiles. Historic trend data can be logged by generic trend logs, which are technology-independent. Connectivity to the LonMark System is provided via IP-852 (100Base-T Ethernet) or TP/FT-10 channel with twisted pair or power line link. A sub-group of the LOYTEC devices is also LonMark certified (see product details).

DALI



DALI (Digital Addressable Lighting Interface) is a protocol for lighting control. It is standardized in Annex E of IEC 60929 and in the IEC 62386 standard. DALI is used as a lighting control sub-system for dimming and switching ballasts with a DALI interface. The ballasts can be controlled and queried independently via DALI short addresses. Also DALI groups can be freely assigned for controlling lighting scenes. The bi-directional communication allows DALI ballasts to report operational parameters and errors. Although DALI buttons and DALI multi-sensors are not covered by the DALI standard, they are interoperable depending on the manufacturer. The DALI standard specifies the testing of emergency lighting systems with a DALI interface. In a DALI system, the DALI master controls and queries the DALI devices in a master/slave manner. The multi-master capability also allows multiple DALI masters on the channel.

LOYTEC devices with a DALI interface can be integrated in a DALI network as DALI masters with a constant light controller (CLC) function. The configuration is done via the built-in web interface or for some models via the Configurator tool. AST™ functions for alarming (alarm management), scheduling, and trending (historical data recording) are also supported. As a DALI master, the devices can be installed autonomously. For the integration in building automation systems, the LOYTEC DALI master is equipped either with a BACnet interface or an interface to LonMark Systems.

DALI-2



The newer DALI-2 standard also covers switches, multi-sensors, bus power supplies, and control systems in addition to luminaires or ECGs. DALI-2 devices must be certified by the Digital Illumination Interface Alliance (DiiA) to be entitled to carry the DALI-2 logo. The DALI-2 certification promises significantly improved interoperability and additional functionality compared to older DALI systems on the market (version 1). LOYTEC recommends to use preferably DALI-2 certified devices. DALI and DALI-2 devices can be used simultaneously within one DALI channel.

EnOcean



EnOcean is a radio protocol for wireless products in building automation and is defined in the international standard ISO/IEC 14543-3-10. Switches, like sensors with EnOcean technology just need little energy for sending short radio signals. The energy is mainly produced from piezoelectricity during switching (energy harvesting), the energy of solar panels, or Peltier elements. This energy is sufficient for a batteryless, hence maintenance free operation of the sender. The wireless protocol is geared to transfer information energy efficiently yet highly reliable. Frequency bands with regional differences are used. Europe: 868.3 MHz, US/Canada: 902 MHz (also 315 MHz), and Japan: 928 MHz.

For the integration of EnOcean radio switches and sensors into LOYTEC devices with EnOcean support, an EnOcean interface of the LOYTEC product family L-ENO is necessary. The L-ENO interface is simply connected via a USB cable. Also the energy for the EnOcean interface is supplied via USB likewise automatic detection.

Functions

KNX



KNX is a communication protocol for building automation, which has been standardized internationally as ISO/IEC 14543-3 "Home Electronic Systems". KNX is used in the field of home automation and commercial building automation as well. In a KNX network, sensors and actuators are assigned to a set of communication objects. A communication object represents a value of a given type, for instance a temperature, a switch state, or a set point. The communication objects communicate via group addresses. Sensors transmit a message containing the current value to all actuators, which are member of the same group. In order to make devices of different manufacturers interoperable, the communication objects use a pre-defined set of standardized data point types (DPTs). Network integration in a KNX system is accomplished by a vendor-independent installation tool based on a database (ETS – Engineering Tool Software).

LOYTEC devices are integrated into the KNX system by exporting the database of communication objects from the Engineering Tool Software (ETS4/ETS5). ETS projects are imported by the LOYTEC Configurator tool. After the import of the KNX project, an overview of all available KNX data points is displayed. The desired data points for use can be chosen from this list. Later changes to the ETS project can be tracked and synchronized the same way. Once KNX data points have been integrated, they can be used for AST™ functions. The alarming (alarm management) is based on generic alarm servers. Scheduling of KNX data points is done using generic schedulers. Historic trend data of KNX data points can be logged by generic trend logs. The device communicates with the KNX system on KNX TP1 (twisted pair using an external KNX coupler) and on KNXnet/IP (Ethernet).

M-Bus



The M-Bus (Meter-Bus) is an established European standard (EN 13757-2, EN 13757-3) for remote meter reading. The M-Bus is a serial bus and employs a master/slave architecture. The M-Bus master can request data from several slaves (meters) on the network. The data transfer from master to slave is a voltage-modulated signal. The transfer from slave to master is a current-modulated signal. M-Bus devices can be bus-powered. The maximum number of nodes, which can be powered on the bus, depends on the M-Bus transceiver.

LOYTEC devices with M-Bus support are M-Bus masters and require an external transceiver for the integration of M-Bus meters. M-Bus data points can be created from an online network scan or offline by using M-Bus device templates, which have been previously created. The assignment of primary addresses to the M-Bus devices can be done in the Configurator tool. AST™ functions for alarming (alarm management), scheduling, and trending (historic data recording) also apply to M-Bus data points. Especially the historic data logging and cyclic polling of values is optimized for M-Bus meters.

Modbus (TCP, RTU)



Modbus is an open protocol and a de facto standard in the industry, which is based on a master/slave architecture. It was originally designed at the end of the 1970s for exchanging data between PLCs. Today, Modbus is still a widely used interface for integrating field devices into a system. Modbus devices communicate over a serial interface or over TCP/IP. Modbus TCP specifies communication over TCP/IP and is part of the IEC 61158 standard. Modbus devices use registers for data exchange, which are characterized by register type, address, and length. In addition, data type and byte order need to be specified in order to interpret Modbus data. The configuration is done by vendor-specific tools.

LOYTEC devices with a Modbus interface provide two communication methods: Modbus TCP (Ethernet TCP/IP) and Modbus RTU (Remote Terminal Unit, based on RS-485). A Modbus interface can be operated either as a master or as a slave. The supported register types are: Read Discrete Inputs (2), Read Coils (1), Write Coils (5), Read Input Registers (4), Read Holding Registers (3), Write Holding Registers (6). For third-party integration, the vendor's datasheet needs to be consulted in order to manually create a configuration. The Modbus technology does not offer a method for scanning this information online, as it is known from other technologies. For Modbus devices that are online, the manual configuration can however be tested via an online test function. By looking at the extracted values, the respective data points can then be configured accordingly. Modbus device templates can be created, which allows the re-use of Modbus configurations and reduces errors in configuration. AST™ functions for alarming (alarm management), scheduling, and trending (historic data recording) also apply to Modbus data points.

MP-Bus



The MP-Bus controls HVAC actuators for dampers, regulator valves or VAV air volume controls. It is a master/slave bus developed by Belimo®. There are no restrictions with respect to network topology. Permissible topologies include star, ring, tree and mixed configurations. The MP-Bus (multi point bus) consists of three conductors 24 V (AC or DC), GND and the MP data line.

Functions

SMI



The Standard Motor Interface (SMI) is a bus protocol used to control SMI sunblind motors for shading. On closer examination, the SMI is a digital interface with the benefit to parallelize the connection of roller shutters and sun protection drives. Furthermore, the automation controller gets feedback from the drives and the possibility of flexible parameterization. This allows telegrams to be exchanged over the consistent interface, from the controller to the drive and vice versa. SMI drives from different manufacturers are compatible with each other. For drives that operate on mains voltage, the drive and controller are connected by a 5-core cable which both supplies power and transmits data. Distances of even up to 350 m between the controller and drive are possible. Up to 16 drives per SMI channel can be connected. In this way, the hardware expense is reduced significantly in comparison with today's conventional technology, and the drive status can be queried by the sun protection controller.

The roller shutters and sun protection installations with SMI-drives can also be set up for operation without using a controller. The SMI drive has a setup mode. This mode can be activated using simple push buttons. The standard interface is also available for low-voltage drives. This means that interior sun protection installations can also be controlled intelligently and accurately. Low-voltage drives can be recognized by the SMI LoVo symbol.

OPC XML-DA



OPC is a de facto standard for interoperable communication in the automation industry, which is also often used for data exchange between management level and automation level in building automation. OPC is a set of different specifications and versions, which can be implemented independently of each other.

LOYTEC devices that support OPC have a built-in OPC server following the OPC XML-DA specification. When integrating the different communication technologies (CEA-709, BACnet, DALI, M-Bus, Modbus, KNX, etc.), OPC tags are automatically created without additional engineering effort and exposed via a web services. The OPC server provides data access via web services according to XML-DA, which are available over the same TCP port as the built-in web server. The OPC server exposes simple data points and complex AST™ functions as OPC tags for alarming (alarm management), scheduling, and trending (historic data recording). Since the OPC XML-DA standard does not specify corresponding tags for these functions, the OPC XML-DA server uses groups of OPC tags for exposing AST™ functions. Because web services are built for being routed across the Internet, the built-in OPC XML-DA server uses basic authentication for protection against unauthorized write access. Authentication requires the operator user and the respective password.

The L-WEB System uses OPC XML-DA communication (web services) for data exchange with LOYTEC devices. This allows for a hassle-free communication in the Intranet or Internet across firewalls and NAT routers. Also third-party applications such as SCADA systems can communicate as OPC XML-DA clients over the Intranet or Internet and access the built-in OPC server in a simple and secure way. The embedded OPC servers do not require extra PC hardware and can be distributed in the IP network.

OPC UA



The OPC server on LOYTEC devices, which support security, also features the OPC UA binary protocol, that exposes the same OPC tags as the OPC XML-DA server. OPC UA offers superior security features and also slimmer data transfers.

CEA-709 Router Function



The CEA-709 router function allows the transparent connection of two LonMark channels in a LonMark System. One of the channels can be a LonMark IP-852 (Ethernet/IP) channel. LOYTEC devices featuring IP-852 routing have a built-in IP-852 configuration server to configure and manage all IP-852 members on the channel.

BACnet Router Function



The BACnet router function allows the transparent connection of one BACnet/IP channel and one BACnet MS/TP channel. In addition, the router function implements a BACnet Broadcast Management Device (BBMD) and features Foreign Device support. For MS/TP slave devices it acts as a slave proxy.

Functions

Remote Access



LOYTEC devices offer remote access functions, which differ depending on the device model. All device settings can be modified, data point values can be queried, and configuration parameters can be modified. Apart from this, backup and restore of the device configuration is available. The same applies to parameters. Access to AST™ functions for alarming (alarm management), scheduling, and trending (historic data recording) is also supported, including reading out alarm logs and trend logs from the device via file transfer. The devices offer various analysis functions and statistical data for troubleshooting the used communication protocols. Programmable LOYTEC devices also provide online test functions for developing application programs.

Remote Network Interface (RNI)



The Remote Network Interface (RNI) function is available, if the LOYTEC device is configured to operate on the TP/FT-10 channel. In this mode, the LOYTEC device appears as a LOYTEC network interface and thus enables remote access to the TP/FT-10 channel over an Ethernet/IP connection. The network interface can be used together with LNS-based tools such as NL220 or LonMaker®, or as a native LOYTEC network interface. Furthermore, the RNI offers the “remote LPA” (LOYTEC Protocol Analyzer) feature for remote troubleshooting.

Wireless Local Area Network (WLAN)



WLAN refers to a local wireless radio network compliant to the common Standard IEEE 802.11. It extends all protocols of the wired Ethernet of corresponding LOYTEC devices to a wireless communication.

For network integration into a WLAN, the corresponding LOYTEC devices need to be connected with an L-WLAN interface via USB. The USB bus supplies the L-WLAN device with energy and enables an automatic detection. It is also possible to connect the LOYTEC device with an existing WLAN Access Point, create a WLAN Access Point, or build up a Mesh network according to the IEEE standard 802.11s. The relatively new and emerging standard for Mesh networks offers numerous advantages. A major benefit of a mesh network is its autonomy. Devices which are configured as mesh point devices unite autonomously to one network in which Mesh points communicate via other Mesh points. To encrypt a WLAN network, the encryption methods WEP, WPA, and WPA2 are available. The Mesh network is encrypted via simultaneous authentication of equals (SAE), comparable to WPA2.

LTE



The LTE function refers to supporting mobile communication standards for LTE, UMTS/HSPA+ and GSM/GPRS/EDGE. It is approved for the regions:

GCF* (Global), Verizon*/AT&T*/FCC*/PTCRB* (North America), CE* (Europe), RCM* (Australia), IC* (Canada), Anatel* (Brazil), IFETEL* (Mexico), CCC* (China), NCC* (Taiwan), KC* (South Korea), JATE*/TELEC* (Japan), NBTC* (Thailand), ICASA* (South Africa), FAC* (Russia)

The corresponding LOYTEC devices require the LTE-800 Interface connected to a USB port, which provides for an easy and simple solution to connect remote sites together via a VPN network and expose defined on-site services. The LTE interface can also be used to send SMS directly. Typical LTE applications include remote management, energy monitoring, site visualization, SMS alarm notification.

* Under development

Gateway

Gateway Function



The gateway functions allow data exchange between all available communication technologies. This is accomplished by using “connections” which connect data points of different technologies with each other. Both “1-to-n” and “m-to-1” connections are supported. Connections can contain simple or complex calculations. Different engineering units of connected data points are automatically converted. Connections can easily be created using templates. They are distinguished into local and global connections. Connections can be created manually or automatically using the Smart Auto-Connect™ feature of the Configurator tool. Especially the automated creation of connections reduces engineering effort and helps preventing configuration errors.

The Smart Auto-Connect™ feature works on a selection of source data points and creates target data points and the respective connections. In principle, Smart Auto-Connect™ can work with all available communication technologies as sources. However, only select technologies can be used as targets. Depending on the availability on the device model, data points can be created for the following technologies: CEA-709 (static NVs), BACnet (server objects), Modbus (slave registers) and user registers. A remarkable feature in this context is the automatic mapping of network variables to BACnet objects according to CEN/TS 15231:2005.

Functions

Local Connection



A "local connection" is used for connecting data points of different networking technologies, which are integrated on a single LOYTEC device.

Global Connection



"Global connections" provide similar functions as local connections, but can span across an IP network between two or more LOYTEC devices. A global connection creates a data cloud with a system-wide name. Data points which are added to a global connection can send values into the cloud or receive values from the cloud. This is entirely independent from the installation location or the original communication technology.

L-IOB I/O

L-IOB I/O Modules extend the L-INX Automation Servers, IP-capable L-IOB I/O Controllers, and L-ROC Room Controllers by adding physical inputs and outputs. Models with different I/O configurations and communication interfaces are available. L-IOB I/O Modules with LIOB-Connect can be directly connected in a daisy-chain. Those L-INX Automation Servers and L-ROC Room Controllers that support this feature, automatically detect which I/O modules are connected and map the corresponding data points. All L-INX and L-ROC models provide an additional way for connecting and integrating L-IOB I/O Modules via LIOB-FT (twisted pair) and L-IOB IP (Ethernet). L-IOB IP I/O Controllers are limited to the use of one additional L-IOB IP I/O Module.

LIOB-Connect



The LIOB-Connect port of a L-INX or L-ROC device allows connecting LIOB-10x Modules and provides a power and communication path without additional cabling. Regardless of the L-IOB type, up to 24 L-IOB I/O Modules are supported. This makes up to 24 LIOB-10x devices possible in a daisy chain. The first four LIOB-10x can be connected directly. Starting with the fifth LIOB-10x, the LIOB-Connect chain needs to be divided into two (or more) segments using LIOB-A4 and LIOB-A5 adapters.

Parameterization of the I/O modules is done by the Configurator software or over the web interface of the L-INX or L-ROC device. All parameter data is stored on the L-INX Automation Server or the L-ROC Room Controller and can be downloaded to the L-IOB Modules again if needed. When replacing a L-IOB Module, it is detected and integrated again automatically.

LIOB-FT



The LIOB-FT port allows operation of remote LIOB-15x Modules. These are connected by twisted pair cabling of up to 500 m length in free topology or more than 500 m in bus topology. The maximum number of supported LIOB-15x Modules depends on the L-INX Automation Server model, the L-IOB IP I/O Controller model, or the L-ROC Room Controller model.

Parameterization of the I/O Modules is done by the Configurator software or over the web interface of the L-INX, L-IOB IP or L-ROC device. All parameter data is stored on the L-INX Automation Server, the L-IOB IP I/O Controller, or the L-ROC Room Controller and can be downloaded to the L-IOB Modules again when needed. When replacing a L-IOB Module, it is detected and integrated again automatically.

LIOB-IP



The LIOB-IP port allows operation of remote LIOB-45x and LIOB-55x Modules. These are connected over Ethernet/IP (100Base-T). The maximum number of supported Modules depends on the L-INX Automation Server model, the L-IOB IP I/O Controller model, or the L-ROC Room Controller model. Communication across NAT routers is not supported.

Parameterization of the I/O Modules is done by the Configurator software or over the web interface of the L-INX, L-IOB IP, or L-ROC device. All parameter data is stored on the L-INX Automation Server, the L-IOB IP I/O Controller, or the L-ROC Room Controller and can be downloaded to the L-IOB Modules again if needed. When replacing a L-IOB Module, it is detected and integrated again automatically.

Local I/Os



All L-IOB I/O Controllers are equipped with local I/Os. The usage of local I/Os is completely transparent to the application. For the device's logic program, it does not matter if the I/Os are local or remote. Parameterization of the Local I/Os is done by the Configurator software or over the web interface of the L-IOB I/O Controllers.

Programming Functions

IEC 61131 – L-LOGICAD



The development of an application program is done in the graphical programming environment L-LOGICAD (IEC 61131-3 standard), which offers programming languages using function blocks (FBs) or structured text (ST). It is possible to mix programming languages within the same project. The IEC 61131-3 programming software allows an online test of the application over the Ethernet/IP network or the TP/FT-10 channel (depending on the hardware). IEC 61131-3 applications can be modified without interrupting execution. L-LOGICAD offers a variety of tools for diagnosis and debugging, commissioning, and additional service function blocks (e.g. force update). Errors can be detected early when developing the function plan in the integrated, graphical offline simulation. Oscilloscope and logic analyzer functions allow a timely display of the respective values. Apart from this, watch pages can be added for visualization and modification of run-time values. L-LOGICAD can access all data points and parameters on the device and process them in the logic program. The program operates independently of the underlying communication technology or the underlying L-IOB I/Os respectively.

IEC 61499 – L-STUDIO



The application project is created with the graphical programming system L-STUDIO (IEC 61499 standard), which allows programming using function blocks (FBs). In L-STUDIO, the programming environment comprises the entire project, where each controller in the IP network is treated as a computing resource with data points. L-STUDIO deploys the application to the networked controllers and creates the connections between them automatically. Event-oriented execution of the program allows for fast reaction times. As a novel approach to automation we name this "Cloud Control". An arbitrary set of functions can be mapped to a cloud of controllers. The strictly object-oriented programming method allows for efficient reuse of previously implemented functions. A variety of debugging and watch functions allows for building-wide troubleshooting during run-time.

IEC 61131 – L-STUDIO



L-STUDIO has established itself as an integration platform for the L-ROC system for individual room control installations. With the new version L-STUDIO 3.0, LOYTEC is now taking the next step and extending the programming function by a development environment in accordance with the industry standard IEC 61131.

Mathematical Functions



Math objects with user-defined formulas can execute mathematical functions on data points. A math object uses a number of data points as input variables (v_1, v_2, \dots, v_n) and calculates a result according to the formula. The result is written as an output to a number of data points. The calculation is executed each time one of the input data points changes its value. A result is calculated only if all inputs have a valid value.

Device Management

Backup / Restore



Depending on the device model, there exist several possibilities to backup and restore a device configuration. In principle, all LOYTEC devices with a built-in web server offer the backup and restore function on the web interface. Also the Configurator tools provide this function for their respective device models. When using the L-WEB System, backups of device configuration can be created on a timely basis (e.g. once a day) and restored easily when needed. Devices with SD card support and USB port allow a device backup onto external storage. In this case, the backup and restore function is operated locally on the LCD display. In all cases, the LOYTEC device is restored with all data points, dynamic NVs and bindings, BACnet server objects and client mappings, etc. The device appears again as commissioned and online and is fully functional in the network. In case an LNS-based tool is used, the LNS device needs to be replaced, which can be done at a later time.

Functions

Device Manager



LWEB-900 gives a clear overview of the status of all devices and provides detailed information for each device (e.g. device type, name, IP address, firmware version, configuration file, program file, etc.). A firmware update can be performed for individual devices or groups of devices. A backup feature ensures a regular backup of all relevant device configurations. If a defective device needs to be replaced, the configuration can be easily restored. Depending on the device hardware, the restore operation can be initiated either from the LCD UI of the device or from the LWEB-900 Client.

Device Configuration



LWEB-900 manages and configures all LOYTEC devices based on a central database. The required device configuration software can be opened directly in LWEB-900 and the configuration files are stored in the data base.

AKS – Identification Keys



Each data point is uniquely identified by its name and path. With LWEB-900, you can define your own identification key schema and assign identification keys (IK) to each data point. The IK schema can be exported and imported into other LWEB-900 projects.

SNMP



The built-in SNMP server (Simple Network Management Protocol) provides network management information of a device that can be used by customary IT tools. Via a configurable SNMP agent, status information and statistics with standard MIBs (Management Information Bases), system registers, and all OPC-exposed data points can be read and monitored, and also alarms can be sent.

Visualization / Operate and Monitor

Local Manual Operation



The LOYTEC device is equipped with a graphical LCD display (128x64) and a jog dial, which can be used for monitoring, testing, and configuration. The backlight is automatically turned off after 30 minutes of jog dial inactivity. Access to the display can be protected by a PIN code. The display can show the current device configuration and allows its modification. All basic settings (IP address, BACnet ID, etc.) can be made on the LCD display.

Apart from configuration, L-INX Automation Servers and L-GATE Gateways with a graphical LCD display allow operating trend data backup to external storage (SD card or USB stick) and backup/restore of the entire device configuration. Also the state of the integrated data points can be displayed and modified. Remote access to the LCD display over an Ethernet/IP connection is made possible by the VNC protocol.

In L-IOB I/O Modules and Controllers, the graphical LCD display allows – apart from modifying the configuration – access to physical I/O data points and parameters. The data point state is displayed as a value and engineering unit, as a status text, or showing dynamic symbols. Inputs and outputs can be switched to manual mode on the display and thus be decoupled from the physical input or the output value from the logic application.

VNC



The VNC (Virtual Network Computing) service offers password-protected remote access to the LOYTEC device. VNC employs a client-server model. The VNC server is a built-in component of the LOYTEC device. A great variety of free or commercial VNC clients is available on the market for different platforms. Which functions and views are exposed over VNC depends on the device.

Web Server for Device Configuration



The web interface on LOYTEC devices with a built-in web server provides an alternative to the Configurator tool for the maintenance personnel. It can be used to configure device and communication settings. It also provides extensive statistical information on the used communication protocols for analysis and troubleshooting. Backup and restore can also be operated on the web interface.

LOYTEC devices with an Ethernet/IP interface display data point values and states on the web interface coming from different communication networks or registers. The display contains a data point list, a tree view, and a breadcrumb navigation for fast access to subdirectories. The data point list shows the data point name, direction, type, data point state, the current value, and a description. All values are updated live. Data points can also be modified on the web interface.

On LOYTEC devices with L-WEB support, all available graphical user interfaces are listed on the web interface and can be started with a mouse click. LOYTEC devices with AST™ functions (Alarming, Scheduling, and Trending) offer access to those functions over the web interface.

An alarm summary page displays all currently active alarms of alarm data points, which can also be acknowledged, if configured so. The web interface also provides access to a historical alarm log, which lists alarms and acknowledgements. If an inactive, acknowledged alarm disappears from the alarm summary page, the last transition is stored in the alarm log. The content of the historic alarm log can be exported to a CSV file on the web interface.

The web interface provides a scheduler page, which allows modification of schedules and calendar entries for exception days during run-time. For existing local schedulers, the web interface supports the re-configuration of the scheduled data points. The changes become effective immediately and do not require a reboot of the device. For adding or removing data points to or from a scheduler, no reboot is necessary either.

The trend log configuration page on the web interface allows the reconfiguration of existing trend logs during run-time. This also includes the assignment of new data points. The changes become effective immediately and do not require a reboot of the device. The trended data can be exported into a CSV file over the web interface.

Graphical View



Graphical views are schematics that help to visualize and operate areas of a building. Each graphical view can consist of a large number of dynamic display elements which reflect the current status of the facilities. LWEB-900 provides the graphical view within the LWEB-900 User Interface of the software and additionally offers distributed LWEB-900 clients the same functionality of visualization through web services.

LWEB-802/803 Visualization



Most LOYTEC devices can manage and store graphical projects (L-WEB projects). These projects can be created without knowledge of any web-based language within the L-VIS/L-WEB configuration tool. Customized graphical pages with dynamic content can be shown either with LWEB-803 on Windows PCs or with LWEB-802 in a standard browser.

L-IOB I/O Controllers & Modules



L-IOB I/O Modules

The L-IOB I/O Module family of products consists of intelligent input/output devices featuring various I/O configurations. Based on LOYTEC's 32-bit L-CORE platform, the L-IOB I/O Modules provide first class performance for a wide area of applications.

Plug and play installation

The L-IOB I/O Modules can be used as I/O extensions for L-INX Automation Servers, L-ROC Room Controllers, L-IOB I/O Controllers and LIOB-AIR Controllers. The connection is done via gold-plated contacts on the side (LIOB-Connect), twisted pair (LIOB-FT), or Ethernet/IP (LIOB-IP852 or LIOB-BIP), depending on the L-IOB model.

LonMark Models

The LIOB-15x I/O Modules and LIOB-45x I/O Modules are LonMark certified I/O nodes which communicate in the LonMark system via network variables over TP/FT-10 or Ethernet/IP-852 respectively.

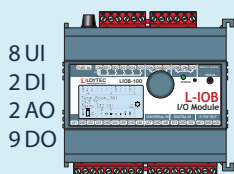
BACnet/IP Models

The LIOB-55x I/O Modules adhere to the BACnet Building Controller Profile (B-BC) and communicate over Ethernet/IP in the BACnet/IP network. The I/O data points can either be exposed through BACnet server objects or actively fetched from a BACnet server via BACnet client maps on the L-IOB I/O Modules.

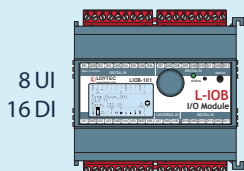
L-IOB I/O Modules

LIOB-Connect

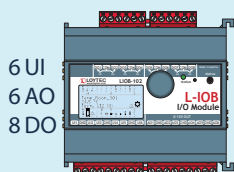
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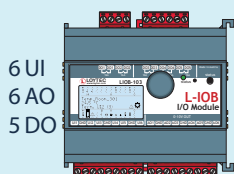
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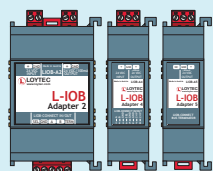
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LIOB-103

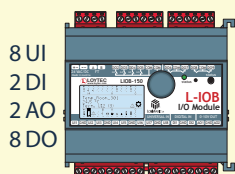


LIOB-A2/A4/A5

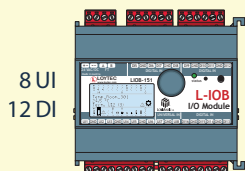


LonMark TP/FT-10

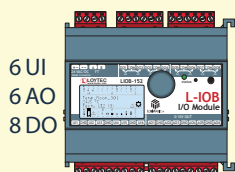
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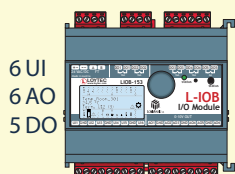
LIOB-151



LIOB-152



LIOB-153

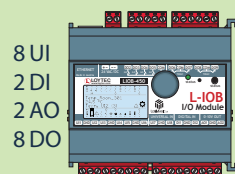


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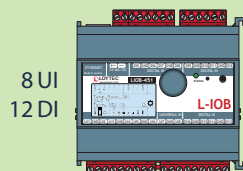


LonMark IP-852

LIOB-450



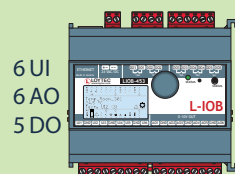
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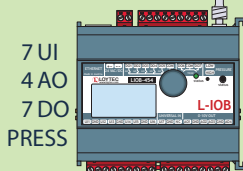
LIOB-452



LIOB-453

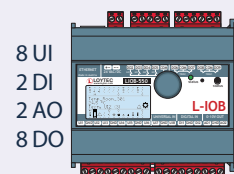


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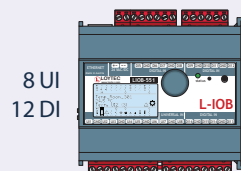


BACnet/IP

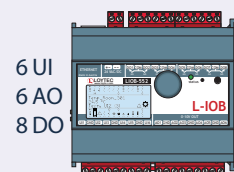
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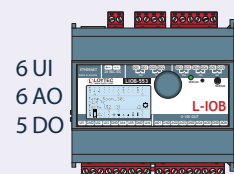
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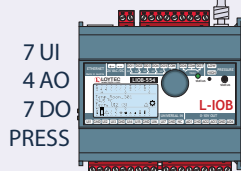
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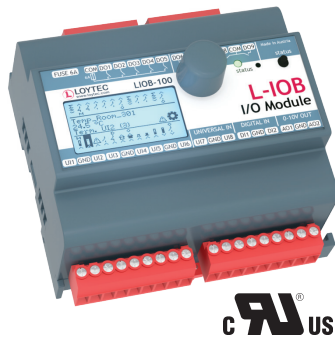


LIOB-553



LIOB-554





LIOB-10x I/O Modules extend L-INX Automation Servers, L-ROC Room Controllers, and LIOB-586/588/589 I/O Controllers with physical inputs and outputs. Several LIOB-10x models with different I/O configurations are available.

LIOB-Connect

The LIOB-10x Modules have gold-plated connectors (LIOB-Connect) to string multiple devices together and connect them to the L-INX, L-ROC or LIOB-586/588/589. The L-INX, L-ROC or LIOB-586/588/589 automatically recognize the LIOB-10x I/O Modules and provide the resulting data points.

Local Operation and Override

All L-IOB I/O Modules are equipped with an LCD display (128x64) with backlight and jog dial for manual local operation. Device and data point information is displayed in text form and via graphical symbols.

Features

- I/O module with physical inputs and outputs
- Connected to L-INX Automation Server, L-ROC Room Controller, or LIOB-586/588/589 I/O Controller via LIOB-Connect
- Manual operation using the jog dial
- 128x64 graphic display with backlight
- Local access to information about device status and data points in clear text and symbols
- Automatic integration into device configurations with L-INX, L-ROC, and LIOB-586/588/589
- Easy device replacement without any additional software

General Specifications

Dimensions (mm)	107 x 100 x 75 (L x W x H), DIM011, DIM012, DIM013, DIM014
Installation	DIN rail mounting following DIN 43880, top hat rail EN 50022
Operating conditions	0 °C to 50 °C, 10 – 90 % RH, noncondensing, degree of protection: IP40, IP20 (terminals)
Power supply	24 VDC / 24 VAC ± 10 % via L-INX, L-ROC, L-POW or LIOB-A2/A4 via LIOB-Connect
Interfaces	1 x LIOB-Connect

Specifications LIOB-Connect

Installation	Attachable (max. 4 modules) or connected with a 4-wire cable, max. 50 m			
Type	LIOB-100	LIOB-101	LIOB-102	LIOB-103
Power consumption	1.7 W 2.6 W (Relays on)	1.7 W	1.7 W 2.7 W (Relays on)	1.7 W 2.5 W (Relays on)
Universal Input (UI)	8	8	6	6
Digital Input (DI)	2	16	-	-
Analog Output (AO)	2	-	6	6
Digital Output (DO)	9 (5 x Relay 6 A, 4 x Triac 0.5 A)	-	8 (8 x Relay 6 A)	5 (5 x Relay 6 A)
Digital Output specification	Please refer to the " General Input and Output Specification of LOYTEC devices " at the end of the L-IOB section for more details.			

Order number	Product description
LIOB-100	LIOB-Connect I/O Module: 8 UI, 2 DI, 2 AO, 9 DO (5 x Relay 6 A, 4 x Triac 0.5 A)
LIOB-101	LIOB-Connect I/O Module: 8 UI, 16 DI
LIOB-102	LIOB-Connect I/O Module: 6 UI, 6 AO, 8 DO (8 x Relay 6 A)
LIOB-103	LIOB-Connect I/O Module: 6 UI, 6 AO, 5 DO (5 x Relay 16 A)
LIOB-A2	L-IOB Adapter 2 to split the LIOB-Connect bus using 4-wire cables
LIOB-A4	L-IOB Adapter 4 to split the LIOB-Connect bus using RJ45 network cables
LIOB-A5	L-IOB Adapter 5 to terminate the LIOB-Connect bus
LPOW-2415A	LIOB-Connect power supply unit, 24 VDC, 15 W
L-TEMP2	External temperature sensor (NTC10K) for use with L-IOB Universal Inputs

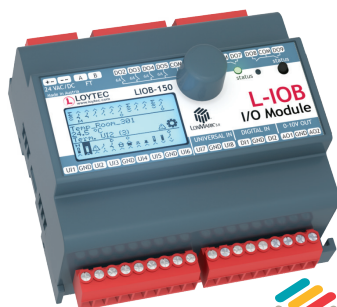
LIOB-FT I/O Module

LIOB-150/151/152/153/154 V2

Datasheet #89019920

BACnet
✓ CEA-709
KNX

Modbus
M-Bus
OPC



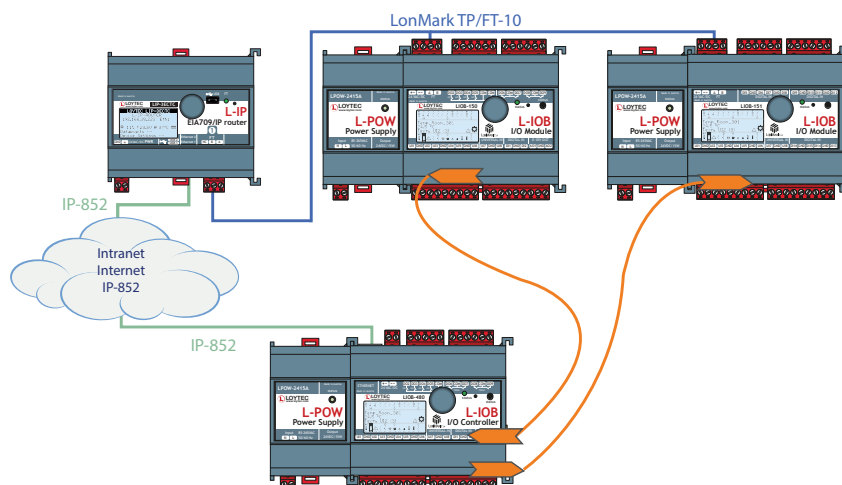
The LIOB-15x Modules are LonMark certified and communicate over TP/FT-10 in the LonMark System. They provide up to 512 address table entries (ECS mode) which eliminates all binding restrictions.

LIOB-FT mode

The LIOB-15x Modules can be switched to LIOB-FT mode using manual local operation. In LIOB-FT mode, the LIOB-15x Modules extend L-INX Automation Servers and L-ROC Room Controllers with physical inputs and outputs via plug and play.

Local Operation and Override

All L-IOB I/O Modules are equipped with an LCD display (128x64) with backlight and jog dial for manual local operation. Device and data point information is displayed in text form and via graphical symbols.



Features

- I/O module with physical inputs and outputs
- SNVT-based interface for integration on the LonMark TP/FT-10 channel
- LonMark certified
- Manual operation using the jog dial
- 128x64 graphic display with backlight
- Local access to information about device status and data points in clear text and symbols
- Compliant with CEA-709 and ISO/IEC 14908-2 standard (LonMark System)
- Connected to the L-INX Automation Server or L-ROC Room Controller via LIOB-FT
- Automatic integration into device configurations with L-INX and L-ROC
- Easy device replacement without any additional software
- LNS plug-in for device configuration in the LonMark System

LIOB-150/151/152/153/154 V2

General Specifications

Dimensions (mm)	107 x 100 x 75 (L x W x H), DIM015, DIM016, DIM017
Installation	DIN rail mounting following DIN 43880, top hat rail EN 50022
Operating conditions	0 °C to 50 °C, 10 – 90 % RH, noncondensing, degree of protection: IP40, IP20 (terminals)
Power supply	24 VDC / 24 VAC ±10 % via L-INX, L-ROC, L-POW or LIOB-A2/A4 via LIOB-Connect
Interface	1 x LonMark TP/FT-10 or LIOB-FT

Specifications LIOB-FT I/O Module (LIOB-15x)

Type	LIOB-150	LIOB-151	LIOB-152	LIOB-153	LIOB-154
Power consumption	1.7 W 2.6 W (Relays on)	1.7 W	1.7 W 2.7 W (Relays on)	1.7 W 2.5 W (Relays on)	1.7 W 2.6 W (Relays on)
Universal Input (UI)	8	8	6	6	7
Digital Input (DI)	2	12	-	-	-
Analog Output (AO)	2	-	6	6	4
Digital Output (DO)	8 (4 x Relay 6 A, 4 x Triac 0.5 A)	-	8 (8 x Relay 6 A)	5 (4 x Relay 16 A, 1 x Relay 6 A)	7 (5 x Relay 6 A, 2 x Triac 0.5 A)
Digital Output specification	Please refer to the " General Input and Output Specification of LOYTEC devices " at the end of the L-IOB section for more details.				
Differential Pressure Sensor	-	-	-	-	0–500 Pa

Resource limits

Network variables (NVs)	Fixed static NV interface
Address table entries	512 (non-ECS mode: 15)

Order number	Product description
LIOB-150	LIOB-FT I/O Module: 8 UI, 2 DI, 2 AO, 8 DO (4 x Relay 6 A, 4 x Triac 0.5 A)
LIOB-151	LIOB-FT I/O Module: 8 UI, 12 DI
LIOB-152	LIOB-FT I/O Module: 6 UI, 6 AO, 8 DO (8 x Relay 6 A)
LIOB-153	LIOB-FT I/O Module: 6 UI, 6 AO, 5 DO (4 x Relay 16 A, 1 x Relay 6 A)
LIOB-154	LIOB-FT I/O Module: 7 UI, 4 AO, 7 DO (5 x Relay 6 A, 2 x Triac 0.5 A), 1 Pressure Sensor
LPOW-2415A	LIOB-Connect power supply unit, 24 VDC, 15 W
LPOW-2415B	Power supply unit with power connector 24 VDC, 15 W
L-TEMP2	External temperature sensor (NTC10K) for use with L-IOB Universal Inputs



The LIOB-45x Modules are LonMark certified and communicate over Ethernet/IP-852 in the LonMark System. They provide up to 512 address table entries (ECS mode) which eliminates all binding restrictions.

LonMark IP-852 Channel over Ethernet

The LIOB-45x I/O Modules are equipped with two Ethernet ports including a built-in Ethernet switch. This allows for building a daisy chained line topology of up to 20 devices, which reduces costs for network installation. Dual Ethernet port devices also allow 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 LIOB-45x Modules are equipped with a web interface to query the device status. The local display can be accessed via VNC.

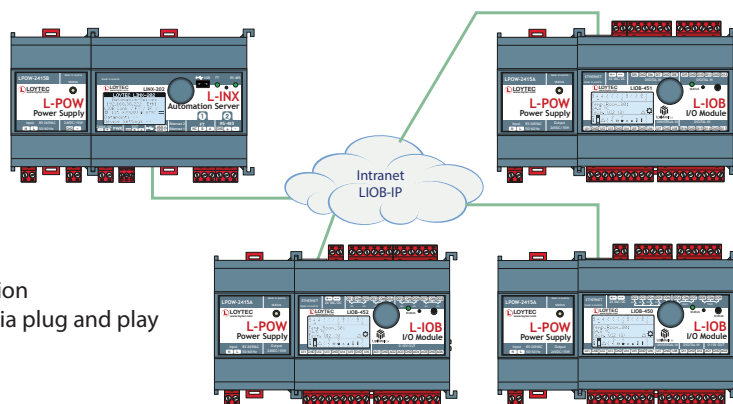
LIOB-IP Mode

The LIOB-45x Modules can be switched to LIOB-IP mode using manual local operation. In LIOB-IP mode, the LIOB-45x Modules extend L-INX Automation Servers, L-ROC Room Controllers, L-IOB I/O Controllers and LIOB-AIR I/O Controllers with physical inputs and outputs via plug and play.

Local Operation and Override

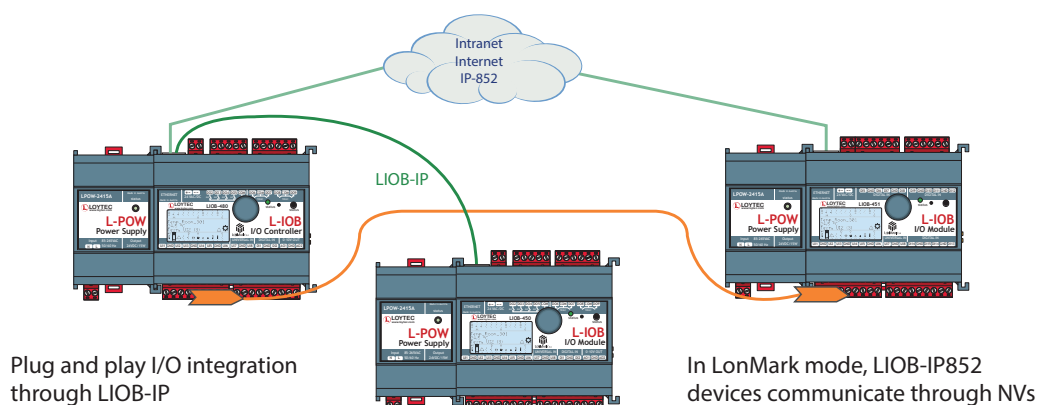
All L-IOB I/O Modules are equipped with an LCD display (128x64) with backlight and jog dial for manual local operation. Device and data point information is displayed in text form and via graphical symbols.

L-INX I/O integration
through LIOB-IP via plug and play



Features

- I/O module with physical inputs and outputs
- Dual Ethernet/IP interface
- SNVT-based interface for integration in the LonMark IP-852 channel
- LonMark certified
- Up to 512 address table entries (ECS mode)
- Manual operation using the jog dial or VNC client
- 128x64 graphic display with backlight
- Local access to information about device status and data points in clear text and symbols
- Connected to the L-INX Automation Server, L-ROC Room Controller, L-IOB I/O Controller, and LIOB-AIR I/O Controller via LIOB-IP
- Automatic integration into device configurations with L-INX, L-ROC, L-IOB I/O Controller, and LIOB-AIR
- Easy device replacement without any additional software
- Integrated web server for device configuration
- LNS plug-in for device configuration in the LonMark System



General Specifications

Dimensions (mm)	107 x 100 x 75 (L x W x H), DIM018, DIM019, DIM020, DIM021, DIM022
Installation	DIN rail mounting following DIN 43880, top hat rail EN 50022
Operating conditions	0 °C to 50 °C, 10 – 90 % RH, noncondensing, degree of protection: IP40, IP20 (terminals)
Power supply	24 VDC / 24 VAC $\pm 10\%$ via L-INX, L-ROC, L-POW or LIOB-A2/A4 via LIOB-Connect
Interface	2 x Ethernet (100Base-T): LIOB-IP, LonMark IP-852

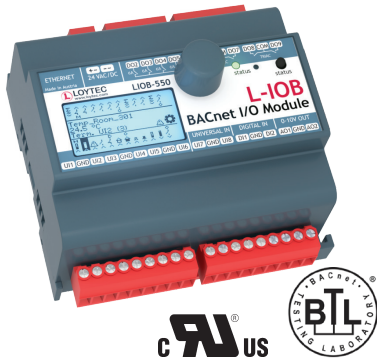
Specifications LIOB-IP852 I/O Module (LIOB-45x)

Type	LIOB-450	LIOB-451	LIOB-452	LIOB-453	LIOB-454
Power consumption	4.5 W (Relays on)	4.5 W	4.5 W (Relays on)	4.5 W (Relays on)	4.5 W (Relays on)
Universal Input (UI)	8	8	6	6	7
Digital Input (DI)	2	12	-	-	-
Analog Output (AO)	2	-	6	6	4
Digital Output (DO)	8 (4 x Relay 6 A, 4 x Triac 0.5 A)	-	8 (8 x Relay 6 A)	5 (4 x Relay 16 A, 1 x Relay 6 A)	7 (5 x Relay 6 A, 2 x Triac 0.5 A)
Digital Output specification	Please refer to the " General Input and Output Specification of LOYTEC devices " at the end of the L-IOB section for more details.				
Differential Pressure Sensor	-	-	-	-	0–500 Pa

Resource limits

Network variables (NVs)	Fixed static NV interface
Address table entries	512 (non-ECS mode: 15)

Order number	Product description
LIOB-450	LIOB-IP852 I/O Module: 8 UI, 2 DI, 2 AO, 8 DO (4 x Relay 6 A, 4 x Triac 0.5 A)
LIOB-451	LIOB-IP852 I/O Module: 8 UI, 12 DI
LIOB-452	LIOB-IP852 I/O Module: 6 UI, 6 AO, 8 DO (8 x Relay 6 A)
LIOB-453	LIOB-IP852 I/O Module: 6 UI, 6 AO, 5 DO (4 x Relay 16 A, 1 x Relay 6 A)
LIOB-454	LIOB-IP852 I/O Module: 7 UI, 4 AO, 7 DO (5 x Relay 6 A, 2 x Triac 0.5 A), 1 Pressure Sensor
LPOW-2415A	LIOB-Connect power supply unit, 24 VDC, 15 W
LPOW-2415B	Power supply unit with power connector 24 VDC, 15 W
L-TEMP2	External temperature sensor (NTC10K) for use with L-IOB Universal Inputs



The LIOB-55x Modules communicate over Ethernet/IP in the BACnet/IP network. They adhere to the BACnet Building Controller Profile (B-BC) and either expose their I/O data points through BACnet server objects or actively fetch them from a BACnet server via BACnet client maps.

According to the B-BC profile, the LIOB-55x Modules support BACnet alarming, scheduling, and trending. They are BTL tested and certified.

BACnet/IP over Ethernet

The LIOB-55x I/O Modules are equipped with two Ethernet ports including a built-in Ethernet switch. This allows for building a daisy chained line topology of up to 20 devices, which reduces costs for network installation. Dual Ethernet port devices also allow 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.

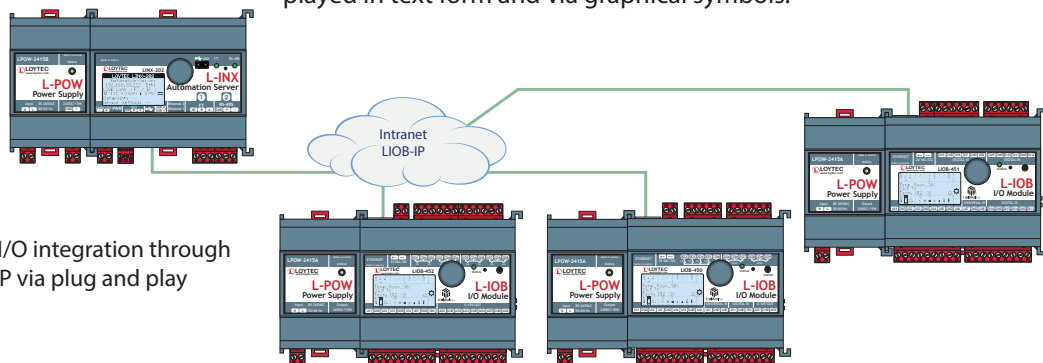
The LIOB-55x Modules are equipped with a web interface to query the device status and display or change each data point of the module. In addition to the BACnet object interface, the I/O data points are exposed by the integrated OPC server providing SSL encrypted web services (OPC XML-DA) or UA Secure Conversation (OPC UA). The local display can be accessed via VNC.

LIOB-IP Mode

The LIOB-55x Modules can be switched to LIOB-IP mode using manual local operation. In LIOB-IP mode, the LIOB-55x Modules extend L-INX Automation Servers, L-ROC Room Controllers, L-IOB I/O Controllers, and LIOB-AIR I/O Controllers with physical inputs and outputs via plug and play.

Local Operation and Override

All L-IOB I/O Modules are equipped with an LCD display (128x64) with backlight and jog dial for manual local operation. Device and data point information is displayed in text form and via graphical symbols.

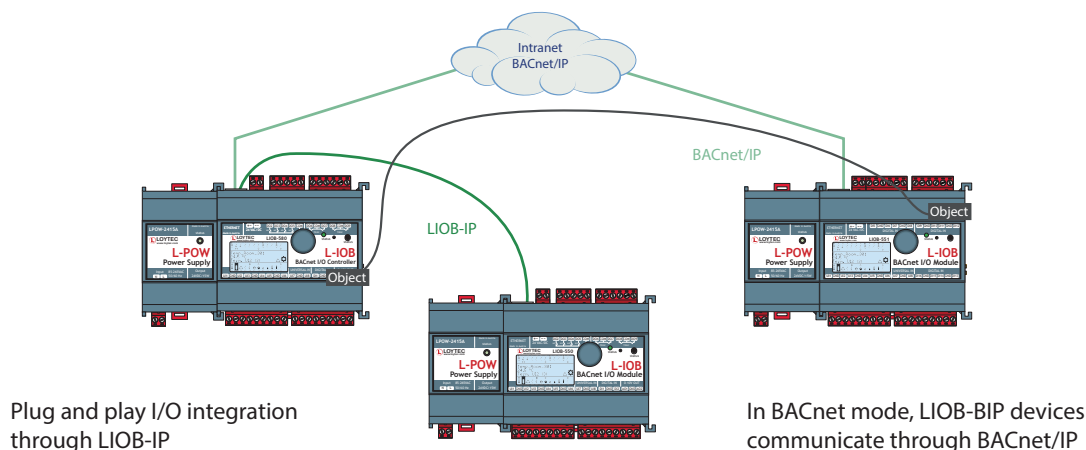


L-INX I/O integration through LIOB-IP via plug and play

Features

- I/O module with physical inputs and outputs
- Dual Ethernet/IP interface
- BACnet objects for integration in BACnet/IP channels
- BACnet Client Mappings to access to BACnet/IP objects
- Fulfills the BACnet Building Controller Profile (B-BC)
- Manual operation using the jog dial or VNC client
- 128x64 graphic display with backlight
- Local access to information about device status and data points in clear text and symbols
- Integrated web server for device configuration and monitoring data points
- Compliant with ANSI/ASHRAE 135-2012 and ISO 16484-5:2012 standard
- B-BC (BACnet Building Controller) functionality, BTL certified
- Supports BACnet Alarming, Scheduling, and Trending
- Connected to the L-INX Automation Server, L-ROC Room Controller, L-IOB I/O Controller, and LIOB-AIR I/O Controller via LIOB-IP
- Automatic integration into device configurations with L-INX, L-ROC, L-IOB I/O Controller, and LIOB-AIR
- Easy device replacement without any additional software
- Built-in OPC XML-DA and OPC UA server
- Math objects to execute mathematical operations on data points

LIOB-550/551/552/553/554 V2



General Specifications

Dimensions (mm)	107 x 100 x 75 (L x W x H), DIM018, DIM019, DIM020, DIM021, DIM022
Installation	DIN rail mounting following DIN 43880, top hat rail EN 50022
Operating conditions	0 °C to 50 °C, 10–90 % RH, noncondensing, degree of protection: IP40, IP20 (terminals)
Power supply	24 VDC / 24 VAC \pm 10 % via L-INX, L-ROC, L-POW or LIOB-A2/A4 via LIOB-Connect
Interface	2 x Ethernet (100Base-T): OPC XML-DA, OPC UA, LIOB-IP, BACnet/IP

Specifications LIOB-BIP I/O Module (LIOB-55x)

Type	LIOB-550	LIOB-551	LIOB-552	LIOB-553	LIOB-554
Power consumption	4.5 W (Relays on)	4.5 W	4.5 W (Relays on)	4.5 W (Relays on)	4.5 W (Relays on)
Universal Input (UI)	8	8	6	6	7
Digital Input (DI)	2	12	-	-	-
Analog Output (AO)	2	-	6	6	4
Digital Output (DO)	8 (4 x Relay 6 A, 4 x Triac 0.5 A)	-	8 (8 x Relay 6 A)	5 (4 x Relay 16 A, 1 x Relay 6 A)	7 (5 x Relay 6 A, 2 x Triac 0.5 A)
Digital Output specification	Please refer to the "General Input and Output Specification of LOYTEC devices" at the end of the L-IOB section for more details.				
Differential Pressure Sensor	-	-	-	-	0–500 Pa

Resource limits

OPC data points	100	BACnet notification classes	32
BACnet objects	1 per I/O	Trend logs (BACnet or generic)	10 (130 000 entries, \approx 2 MB)
BACnet client mappings	20	Total trended data points	10
BACnet calendar objects	10	Alarm logs	5
BACnet scheduler objects	5	Connections (Local / Global)	200 / 100
Math objects	20		

Order number	Product description
LIOB-550	LIOB-BIP I/O Module: 8 UI, 2 DI, 2 AO, 8 DO (4 x Relay 6 A, 4 x Triac 0.5 A)
LIOB-551	LIOB-BIP I/O Module: 8 UI, 12 DI
LIOB-552	LIOB-BIP I/O Module: 6 UI, 6 AO, 8 DO (8 x Relay 6 A)
LIOB-553	LIOB-BIP I/O Module: 6 UI, 6 AO, 5 DO (4 x Relay 16 A, 1 x Relay 6 A)
LIOB-554	LIOB-BIP I/O Module: 7 UI, 4 AO, 7 DO (5 x Relay 6 A, 2 x Triac 0.5 A), 1 Pressure Sensor
LPOW-2415A	LIOB-Connect power supply unit, 24 VDC, 15 W
LPOW-2415B	Power supply unit with power connector 24 VDC, 15 W
L-TEMP2	External temperature sensor (NTC10K) for use with L-IOB Universal Inputs

General Input and Output Specification of LOYTEC devices

Datasheet #89049120

UI – Universal Input

UIs are universal inputs for four different input types. They have an input voltage range of 0 V to 10 V, and can withstand up to 30 V. The UIs correspond to class 1 with a relative accuracy of $\pm 1\%$ (of measured value) between 1 V and 10 V, and an absolute accuracy of ± 10 mV between 0 V and 1 V. The ADC resolution is 16 bits. Galvanically isolated sensors resp. switches must be connected. Universal inputs can be configured as:

- **Binary Input (Digital Input)**

Input impedance $> 20\text{ k}\Omega$, sampling period 10 ms.

- In voltage mode, the threshold values are $< 0.8\text{ V}$ for low level and $> 2\text{ V}$ for high level.
- In resistance mode, the threshold values are $< 1.9\text{ k}\Omega$ for low level and $> 6.7\text{ k}\Omega$ for high level.

Between the threshold values, the resulting level of the UI is not defined.

- **Voltage Metering 0-10 V**

Input Impedance $> 20\text{ k}\Omega$, sampling period $< 1\text{ s}$.

- **Current loop 4-20 mA**

Input Impedance $> 20\text{ k}\Omega$, sampling period $< 1\text{ s}$. An internal shunt of $249\text{ }\Omega$ is available for some universal inputs. Otherwise, an external resistor of $249\text{ }\Omega$ must be used as a shunt.

- **Resistance Measurement**

Input Impedance $10\text{ k}\Omega$, sampling period $< 1\text{ s}$. Resistors in the range of $1\text{ k}\Omega$ to $100\text{ k}\Omega$ can be measured. For popular temperature sensors (e.g. Pt1000, NTC10K, NTC1K8, Ni1000) fixed internal translation tables are provided. For all other temperature sensors, translation tables can be defined in the configuration tool and used on the device.

The average sampling period p of analog inputs depends on the number of active (non-disabled) universal inputs n that are configured in analog mode. The formula for p is:

$$p = n \cdot 125\text{ ms}$$

This means if e.g. only two UIs are configured as analog inputs, a new sample is taken every 250 ms (on average) for each of the two inputs. The UIs configured as digital inputs are unaffected (sampling period always 10 ms) by this formula.

DI – Digital Input, Counter Input (S0-Pulse)

DIs are fast binary inputs, which can also be used as counter inputs (S0). They follow the S0 specification for electric meters and have a sampling rate of 10 ms. They change state at a load of $195\text{ }\Omega$ between the DI terminal and GND. Galvanically isolated sensors resp. switches must be connected.

AO – Analog Output

AOs are analog outputs with a signal range of 0 to 10 V (up to 12 V), a resolution of 10 bits, and a maximum output current of 10 mA (20 mA @ 12 V), short circuit proof (2 outputs at a time). The accuracy over the whole range is $\pm 100\text{ mV}$.

DO – Digital Output

The following digital outputs are available:

- Relay 6 A Output: Switching capacity 6 A, 250 VAC resp. 30 VDC. Max in-rush current 6 A, max. 600 W (resistive) @ 250 VAC.
- Relay 10 A Output: Switching capacity 10 A, 250 VAC resp. 30 VDC. Max in-rush current 10 A, max. 1600 W (resistive) @ 250 VAC.
- Relay 16 A Output: Switching capacity 16 A, 250 VAC resp. 30 VDC. Max in-rush current 80 A, max. 2000 W (resistive) @ 250 VAC.
- TRIAC Output: Switching capacity 0.5 A, 24 to 230 VAC. External relays must not be connected.

When switching higher loads than specified an interface relay must be used. A quenching circuit like a varistor or RC element must be used at the respective output of the LOYTEC device.

PRESS – Pressure Sensor

These inputs represent differential pressure sensors. They are equipped with two $3/16''$ (4.8 mm) hose connectors.

A low-angle, perspective shot of the Golden Gate Bridge, showing its iconic red-orange steel structure. The bridge spans across a body of water with white-capped waves. In the background, a hilly coastline is visible under a blue sky with scattered white clouds. The bridge's suspension cables and the intricate lattice of its deck are clearly visible.

Gateways

Gateways

L-GATE, L-INX, L-DALI



L-GATE Gateways are conceived as universal gateways to map and connect data points from different communication technologies. This mapping and connecting is summarized with the term "Connections". The configuration tool can create such connections either manually or automatically by using Smart Auto-Connect™. Local and Global Connections are distinguished. Local Connections allow connections between data points from different communication technologies located on the very same device. A Global Connection provides similar functions as a Local Connection, but can span across an IP network between two or more LOYTEC devices. A Global Connection establishes a data cloud defining a system wide name. Data points that are members of this data cloud get their input values automatically updated or can send their output values for the other cloud members to update their data point values.

The L-INX Automation Servers support the same gateway functionalities as described for the L-GATE products. Specifically the LINX-102/103 and LINX-202/203 Automation Servers can be used as very cost effective gateway solutions. The LINX-102/103 supports connectivity to LonMark Systems, Modbus, M-Bus, MP-Bus and OPC XML-DA. The LINX-202/203 supports connectivity to BACnet, Modbus, M-Bus, MP-Bus and OPC XML-DA. In addition, the L-INX Automation Servers can integrate physical I/Os through L-IOB I/O Modules. These I/O data points can also be utilized in the gateway connections.

The L-INX Automation Servers and L-GATE Gateways are configured with the very same configuration tool. Therefore the work flows are identical. The L-INX and L-GATE product offering provides a wide spectrum of gateway solutions for our customers to benefit from the variety and flexibility when picking the most suitable model.

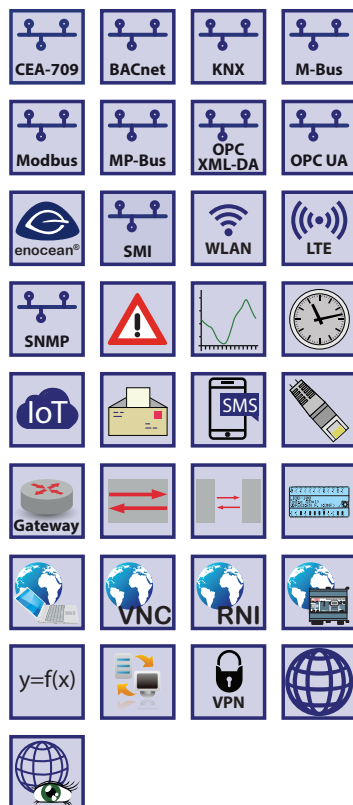
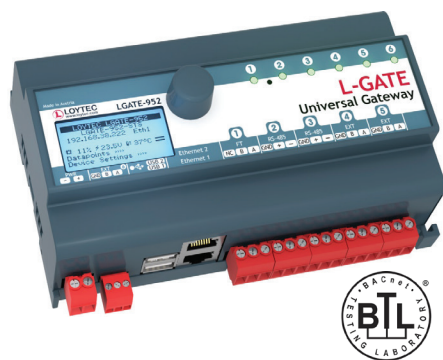
Also the L-DALI Lighting Controllers offer gateway functionality to integrate DALI lighting control systems into LonMark Systems or BACnet networks.

Features	LGATE-952	LGATE-902	LINX-102	LINX-103	LINX-202	LINX-203
LON IP-852 – TP/FT-10	X	X	X	X		
BACnet/IP – MS/TP	X	X			X	X
KNXnet/IP – KNX TP1	X	X	X	X	X	X
EnOcean	X	X	X	X	X	X
SMI	X	X	X	X	X	X
Modbus TCP – Modbus RTU	X	X	X	X	X	X
M-Bus	X	X	X	X	X	X
MP-Bus	X	X	X	X	X	X
OPC XML-DA, OPC UA Server	X	X	X	X	X	X
Dual Ethernet (switched or separated)	X	X	X	X	X	X
WLAN	X	X	X	X	X	X
LTE	X	X	X	X	X	X
IP-852 Router				X		
BACnet Router						X
LON Remote Network Interface	X	X	X			
Support of L-IOB I/O Modules			X	X	X	X
L-WEB Visualization	X	X	X	X	X	X

- ✓ BACnet
- ✓ CEA-709
- ✓ KNX

- ✓ Modbus
- ✓ M-Bus
- ✓ OPC

Datasheet #89023320



The L-GATE Gateway LGATE-952 are powerful universal gateways that can host user specific graphical pages to be used with LWEB-802/803. They can simultaneously integrate and map data points from multiple open protocols. Local operation and override is provided by the built-in jog dial and the backlit display (128x64 pixels). Device and data point information is provided by the web interface and shown on the display via symbols and in text format.

The powerful universal gateways provide connectivity functions to concurrently integrate CEA-709 (LonMark Systems), BACnet, KNX, Modbus, and M-Bus subsystems. LonMark Systems can be integrated via IP-852 (Ethernet/IP) or TP/FT-10. BACnet integration is supported through BACnet/IP (Ethernet/IP) or BACnet MS/TP (RS-485). LGATE-952 feature an integrated Remote Network Interface (RNI) to access the TP/FT-10 channel on the device via Ethernet/IP. LGATE devices implement the BACnet Building Controller (B-BC) profile, can be configured to be a BBMD and are BTL certified. In addition, the universal gateways provide connectivity to KNXnet/IP and Modbus TCP via Ethernet/IP and to Modbus RTU via RS-485. M-Bus and KNX TP1 device integration needs optional interface modules.

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. The universal gateways LGATE-952 also support Smart Auto-Connect™ – the automatic generation of connections to substantially reduce engineering efforts and cost. Optionally, mathematical objects can be applied within a connection to calculate the data point output values depending on the formula used. All technology data points are automatically created as OPC XML-DA and OPC UA data points.

Each LGATE-952 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.

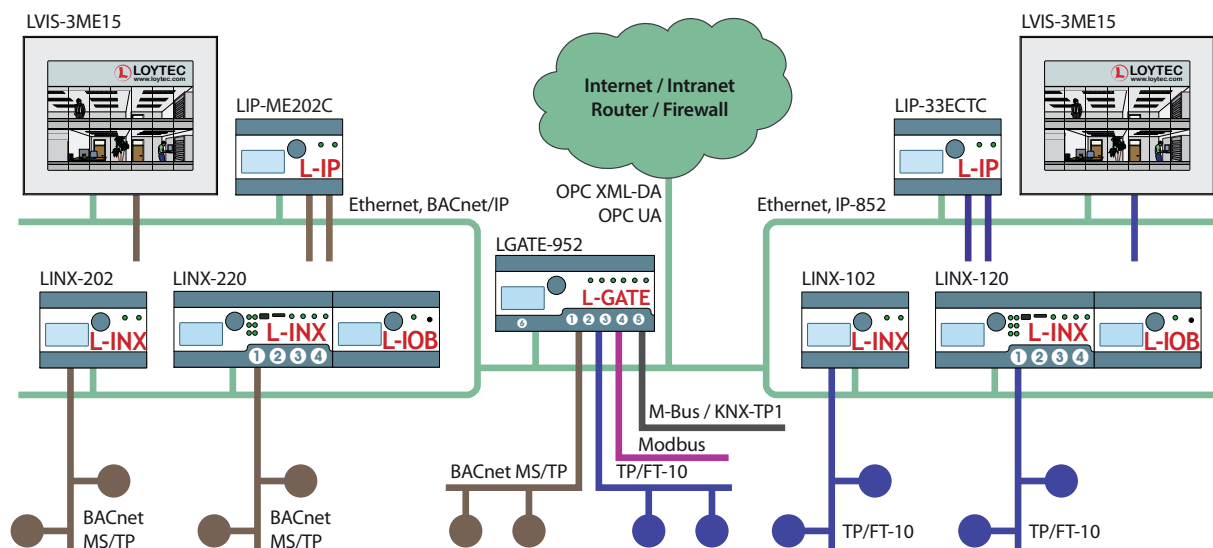
When the Ethernet ports are configured for two separate IP networks, one port can be connected for instance to a WAN (Wide Area Network) with enabled network security (HTTPS) while the second port can be configured to be connected to an insecure network (LAN) where the standard building automation protocols like BACnet/IP, LON/IP, or Modbus TCP are present. These devices also feature firewall functionality of course to isolate particular protocols or services between the ports. The built-in VPN function provides for simple VPN setup and secure access to remote sites. The LTE-800 interface enables wireless access to remote sites through a mobile carrier.

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-GATE devices 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, 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.



Features

- Universal gateway
- Compliant with ANSI/ASHRAE 135-2012 and ISO 16484-5:2012 standard
- B-BC (BACnet Building Controller) functionality
- Supports BBMD (BACnet Broadcast Management Device)
- Supports BACnet MS/TP or BACnet/IP
- BACnet Client Function (Write Property, Read Property, COV Subscription)
- BACnet Client Configuration with configuration tool (scan and EDE import)
- Compliant with CEA-709, CEA-852, and ISO/IEC 14908 Standard (LonMark System)
- Supports TP/FT-10 or IP-852 (Ethernet/IP)
- Support of dynamically created or static NVs
- Support of CEA-709 user-defined NVs (UNVTs) and Configuration Properties (SCPTs, UCPTs)
- Remote Network Interface (RNI) with 2 MNI devices
- Support of KNX/IP directly, KNX TP1 via LKNX-300 Interface
- M-Bus Master according to EN 13757-3, connection via optional M-Bus Converter (L-MBUS20 or L-MBUS80)
- Modbus TCP and Modbus RTU (Master or Slave)
- Automatic creation of Local Connections (Smart Auto-Connect™)
- Math objects to execute mathematical operations on data points
- Automatic mapping of network variables to BACnet objects in accordance with CEN/TS 15231:2005
- Alarming, Scheduling, and Trending (AST™)
- Node.js support for easy IoT integration (e.g. Google calendar, Alexa & friends, multimedia equipment,...)
- Event-driven e-mail notification
- Stores customized graphical pages
- Visualization of customized graphical pages through LWEB-900 and LWEB-802/803
- Built-in OPC XML-DA and OPC UA server
- Dual Ethernet/IP interface
- Access to network statistics
- Integrated web server for device configuration and monitoring data points
- Manual operation using the jog dial or VNC client
- Local and remote access to information about device status and data points
- 128x64 graphic display with backlight
- Configurable via Ethernet/IP or TP/FT-10
- Connection to EnOcean wireless devices via LENO-80x Interface
- Supports SMI (Standard Motor Interface) through LSMI-80x
- Supports WLAN through LWLAN-800 Interface
- Supports LTE through LTE-800 Interface
- Supports MP-Bus through LMPBUS-804 Interface
- Stores user-defined project documentation

Specifications

Type	LGATE-952
Dimensions (mm)	159 x 100 x 75 (L x W x H), DIM053
Installation	DIN rail mounting following DIN 43880, top hat rail EN 50022
Power supply	24 VDC / 24 VAC ±10 %, typ. 2.5 W
Operating conditions	0 °C to 50 °C, 10 – 90 % RH, noncondensing, degree of protection: IP40, IP20 (terminals)

Specifications

Type	LGATE-952
Interfaces	2 x Ethernet (100Base-T): OPC XML-DA, OPC UA, LonMark IP-852*, BACnet/IP**, KNXnet/IP, Modbus TCP (Master or Slave), HTTP, FTP, SSH, HTTPS, Firewall, VNC, SNMP 1 x TP/FT-10* (LonMark System) 2 x USB-A: WLAN (needs LWLAN-800), EnOcean (needs LENO-80x), SMI (needs LSMI-804), MP-Bus (needs LMPBUS-804), LTE (needs LTE-800), 2 x RS-485 (ANSI TIA/EIA-485): BACnet MS/TP** or Modbus RTU (Master or Slave) 3 x EXT: M-Bus, Master EN 13757-3 (needs L-MBUS20/80) or KNX TP1 (needs LKNX-300) or SMI (needs LSMI-800)
	* Either LonMark IP-852 or TP/FT-10 (no router)
	** Either BACnet/IP or BACnet MS/TP (no router)

Tools	L-INX Configurator
Remote Network Interface	1 RNI with 2 MNI devices

Resource limits

Total number of data points	30 000	LonMark Schedulers	100
OPC data points	5 000	LonMark Alarm Servers	1
BACnet objects	1 000 (analog, binary, multi-state)	E-mail templates	100
BACnet client mappings	1 000	Math objects	100
BACnet calendar objects	25	Alarm logs	10
BACnet scheduler objects	100 (64 data points per object)	M-Bus data points	1 000
BACnet notification classes	32	Modbus data points	2 000
Trend logs (BACnet or generic)	512 (4 000 000 entries, ≈ 60 MB)	KNX TP1 data points	1 000
Total trended data points	1 000	KNXnet/IP data points	1 000
CEA-709 network variables (NVs)	2 000	Connections (Local / Global)	2 000 / 250
CEA-709 Alias NVs	2 000	Number of L-WEB clients	32 (gleichzeitig)
CEA-709 External NVs (polling)	2 000	Number of EnOcean devices	100
CEA-709 address table entries	1 000 (non-ECS mode: 15)	EnOcean data points	1 000
LonMark Calendars	1 (25 calendar patterns)	SMI devices (per channel)	16

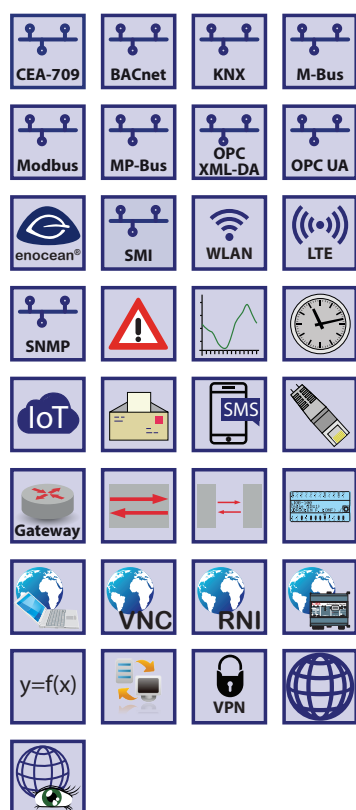
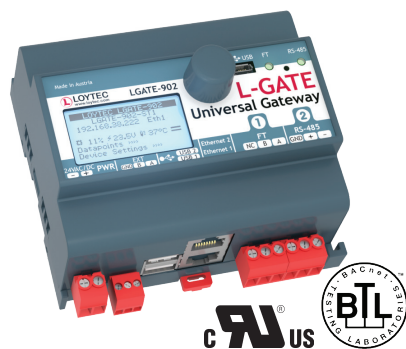
Order number	Product description
LGATE-952	Universal Gateway
LPOW-2415A	LIOB-Connect power supply unit, 24 VDC, 15 W
LPOW-2415B	Power supply unit with power connector 24 VDC, 15 W
L-MBUS20	M-Bus level converter for 20 M-Bus devices
L-MBUS80	M-Bus level converter for 80 M-Bus devices
LKNX-300	KNX interface to connect KNX TP1 devices
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 802.11bgn
LMPBUS-804	MP-Bus interface for 16 devices per channel, up to 4 channels
LSMI-800	Standard Motor Interface for 16 motors via EXT port
LSMI-804	Standard Motor Interface for 64 motors, 4 SMI channels via USB
LTE-800	USB LTE Interface

L-GATE Gateway

LGATE-902

Datasheet #89035820

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



The LGATE-902 Gateway is a powerful gateway that can host user specific graphical pages. The gateways provide connectivity functions to concurrently integrate CEA-709 (LonMark Systems), BACnet, KNX, Modbus, and M-Bus. Local operation and override is provided by the built-in jog dial and the backlit display (128x64 pixels). Device and data point information is provided by the web interface and shown on the display via symbols and in text format.

LonMark Systems can be integrated via IP-852 (Ethernet/IP) or TP/FT-10. LGATE-902 features an integrated Remote Network Interface (RNI) to access the TP/FT-10 channel on the device via Ethernet/IP. BACnet integration is supported through BACnet/IP (Ethernet/IP) or BACnet MS/TP (RS-485). LGATE-902 ist BACnet Building Controller (B-BC) BTL certified and can be configured to be a BBMD.

In addition, the gateway provides connectivity to KNXnet/IP and Modbus (RTU, TCP, Master or Slave). M-Bus and KNX TP1 device integration needs optional interface modules.

Through the built-in web server, all data points can be monitored and changed. 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. The gateway also support Smart Auto-Connect™ – the automatic generation of connections to substantially reduce engineering efforts and cost. Math objects allow to execute mathematical operations on data points. All technology data points are automatically created as OPC XML-DA and OPC UA data points.

The LGATE-902 Gateway 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.

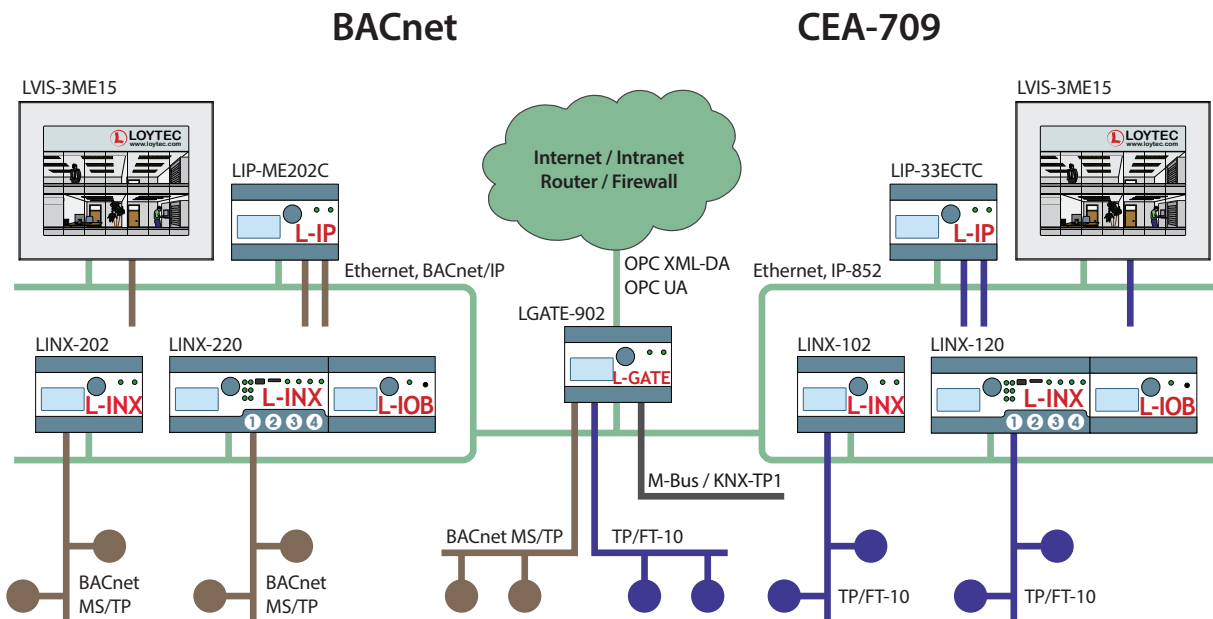
When the Ethernet ports are configured for two separate IP networks, one port can be connected for instance to a WAN (Wide Area Network) with enabled network security (HTTPS) while the second port can be configured to be connected to an insecure network (LAN) where the standard building automation protocols like BACnet/IP, LON/IP, or Modbus TCP are present. These devices also feature fire-wall functionality of course to isolate particular protocols or services between the ports. The built-in VPN function provides for simple VPN setup and secure access to remote sites. The LTE-800 interface enables wireless access to remote sites through a mobile carrier.

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-GATE devices 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, 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.



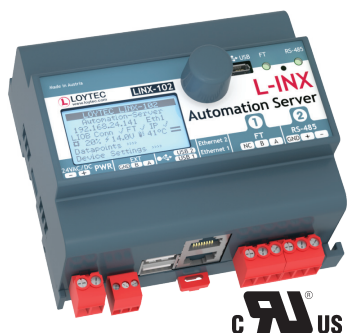
Features

- Universal Gateway for BACnet, LonMark, KNX, Modbus, M-Bus, and EnOcean
- Compliant with ANSI/ASHRAE 135-2012 and ISO 16484-5:2012 standard
- B-BC (BACnet Building Controller) functionality, BTL certified
- Supports BBMD (BACnet Broadcast Management Device)
- Supports BACnet MS/TP or BACnet/IP
- BACnet Client Function (Write Property, Read Property, COV Subscription)
- BACnet Client Configuration with configuration tool (scan and EDE import)
- Compliant with CEA-709, CEA-852, and ISO/IEC 14908 Standard (LonMark System)
- Supports TP/FT-10 or IP-852 (Ethernet/IP)
- Support of dynamically created or static NVs
- Support of user-defined NVs (UNVTs) and Configuration Properties (SCPTs, UCPTs)
- Remote Network Interface (RNI) with 2 MNI devices
- Direct connection to KNX/IP, KNX TP1 connection via LKNX-300 Interface
- M-Bus Master according to EN 13757-3, connection via M-Bus Level Converter (LMBUS-20 or LMBUS-80)
- Modbus TCP and Modbus RTU (Master or Slave)
- Automatic creation of Local Connections (Smart Auto-Connect™)
- Math objects to execute mathematical operations on data points
- Automatic mapping of network variables to BACnet objects in accordance with CEN/TS 15231:2005
- Alarming, Scheduling, and Trending (AST™)
- Node.js support for easy IoT integration (e.g. Google calendar, Alexa & friends, multimedia equipment,...)
- Event-driven e-mail notification
- Stores customized graphical pages
- Visualization of customized graphical pages through LWEB-900 and LWEB-802/803
- Built-in OPC XML-DA and OPC UA server
- Dual Ethernet/IP interface
- Access to network statistics
- Integrated web server for device configuration and monitoring data points
- Manual operation using the jog dial or VNC client
- Local and remote access to information about device status and data points
- 128x64 graphic display with backlight
- Configurable via Ethernet/IP or TP/FT-10
- Connection to EnOcean wireless devices via LENO-80x Interface
- Supports SMI (Standard Motor Interface) through LSMI-80x
- Supports WLAN through LWLAN-800 Interface
- Supports LTE through LTE-800 Interface
- Supports MP-Bus through LMPBUS-804 Interface
- Stores user-defined project documentation

Specifications			
Dimensions (mm)	107 x 100 x 75 (L x W x H), DIM045		
Installation	DIN rail mounting following DIN 43880, top hat rail EN 50022		
Power supply	24 VDC / 24 VAC ±10 %, typ. 2.5 W		
Operating conditions	0 °C to 50 °C, 10 – 90 % RH, noncondensing, degree of protection: IP40, IP20 (terminals)		
Interfaces	<div>2 x Ethernet (100Base-T): OPC XML-DA, OPC UA, LonMark IP-852**, BACnet/IP*, KNXnet/IP, Modbus TCP (Master or Slave), HTTP, FTP, SSH, HTTPS, Firewall, VNC, SNMP</div> <div>2 x USB-A: WLAN (needs LWLAN-800), EnOcean (needs LENO-80x) SMI (needs LSMI-804) LTE (needs LTE-800) MP-Bus (needs LMPBUS-804)</div> <div><i>* Either BACnet/IP or BACnet MS/TP</i> <i>** Either LonMark IP-852 or TP/FT-10</i></div> <div>1 x TP/FT-10** (LonMark system) 1 x RS-485 (ANSI TIA/EIA-485): BACnet MS/TP* or Modbus RTU (Master or Slave) 1 x EXT: M-Bus, Master EN 13757-3 (needs L-MBUS20/80) or KNX TP1 (needs LKNX-300) or SMI (needs LSMI-800)</div>		
Tools	L-INX Configurator		
Remote Network Interface	1 RNI with 2 MNI devices		
Resource limits			
Total number of data points	10 000	LonMark Schedulers	100
OPC data points	2 000	LonMark Alarm Servers	1
BACnet objects	750 (analog, binary, multi-state)	E-mail templates	100
BACnet client mappings	750	Math objects	100
BACnet calendar objects	25	Alarm logs	10
BACnet scheduler objects	100 (64 data points per object)	M-Bus data points	250
BACnet notification classes	32	Modbus data points	250
Trendlogs (BACnet or generic)	256 (4 000 000 entries, ≈ 60 MB)	KNX TP1 data points	250
Total trended data points	256	KNXnet/IP data points	250
CEA-709 network variables (NVs)	1 000	Connections (Local / Global)	1 000 / 250
CEA-709 Alias NVs	1 000	Number of L-WEB clients	32 (simultaneously)
CEA-709 External NVs (polling)	1 000	Number of EnOcean devices	25
CEA-709 address table entries	512 (non-ECS mode: 15)	EnOcean data points	250
LonMark Calendars	1 (25 calendar patterns)	SMI devices (per channel)	16
Order Number	Product Description		
LGATE-902	Universal Gateway		
LPOW-2415A	LIOB-Connect power supply unit, 24 VDC, 15 W		
LPOW-2415B	Power supply unit with power connector 24 VDC, 15 W		
L-MBUS20	M-Bus level converter for 20 M-Bus devices		
L-MBUS80	M-Bus level converter for 80 M-Bus devices		
LKNX-300	KNX interface to connect KNX TP1 devices		
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 802.11bgn		
LMPBUS-804	MP-Bus interface for 16 devices per channel, up to 4 channels		
LSMI-800	Standard Motor Interface for 16 motors via EXT port		
LSMI-804	Standard Motor Interface for 64 motors, 4 SMI channels via USB		
LTE-800	USB LTE Interface		

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

Datasheet #89035220



The L-INX Automation Servers LINX-102 and LINX-103 (successors of LINX-100, LINX-101) can host user specific graphical pages for the visualization of information from LonMark systems via LWEB-900 (Building Management) or LWEB-802/803. They can integrate physical I/Os through LIOB I/O Modules via LIOB-Connect, LIOB-FT, or LIOB-IP. Local operation and override is provided by the built-in jog dial and the backlit display (128x64 pixels). Device and data point information is shown on the display via symbols and in text format.

LonMark Systems can be integrated via IP-852 (Ethernet/IP) or TP/FT-10. In addition, the Automation Servers provides connectivity to concurrently integrate KNX, Modbus, and M-Bus and connect as a gateway data points of different technological origin. Optionally, mathematical objects can be applied within a connection to calculate the data point output values depending on the formula used. Depending on the type, the Automaton Servers feature an integrated Remote Network Interface (LINX-102) or an integrated IP-852 router providing the complete feature set of corresponding L-IP devices (LINX-103).

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. L-INX Automation Servers also support Smart Auto-Connect™ – the automatic generation of connections to substantially reduce engineering efforts and cost. All technology data points are automatically created as OPC XML-DA and OPC UA data points.

Each L-INX Automation Server 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 to an insecure network (LAN) where the standard building automation protocols like BACnet/IP, LON/IP, or Modbus TCP are present. These devices also feature firewall functionality of course to isolate particular protocols or services between the ports. The built-in VPN function provides for simple VPN setup and secure access to remote sites. The LTE-800 interface enables wireless access to remote sites through a mobile carrier.

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-INX devices 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, 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.

L-INX Automation Server

LINUX-102, LINUX-103

Features	
<ul style="list-style-type: none"> • Visualization of customized graphical pages through LWEB-900 (Building Management), LWEB-803 (Monitoring and Control), or LWEB-802 (Web Browser) • Stores customized graphical pages • Extension with physical inputs and outputs using L-IOB I/O Modules (LIOB-10x, LIOB-15x, and LIOB-45x) • 128x64 graphic display with backlight • Local and remote access to information about device status and data points • Manual operation using the jog dial or VNC client • Alarming, Scheduling, and Trending (AST™) • Node.js support for easy IoT integration (e.g. Google calendar, Alexa & friends, multimedia equipment,...) • Event-driven e-mail notification • Math objects to execute mathematical operations on data points • Integrated OPC XML-DA and OPC UA server • Dual Ethernet/IP interface • Access to network statistics • Compliant with CEA-709, CEA-852, and ISO/IEC 14908 Standard (LonMark System) • Support TP/FT-10 or IP-852 (Ethernet/IP) 	<ul style="list-style-type: none"> • Support of dynamically created or static NVs • Support of user-defined NVs (UNVTs) and Configuration Properties (SCPTs, UCPTs) • Remote Network Interface (RNI) with 2 MNI devices (LINUX-102 only) • Integrated IP-852 to TP/FT-10 Router (LINUX-103 only) • KNXnet/IP, connection to KNX TP1 through LKNX-300 Interface • M-Bus Master according to EN 13757-3, connection via optional M-Bus Converter (L-MBUS20 or L-MBUS80) • Modbus TCP and Modbus RTU (Master or Slave) • Gateway functions including Smart Auto-Connect™ • Integrated web server for device configuration and monitoring data points • Configurable via Ethernet/IP or TP/FT-10 • Connection to EnOcean wireless devices via LENO-80x Interface • Supports SMI (Standard Motor Interface) through LSMI-80x • Supports WLAN through LWLAN-800 Interface • Supports LTE through LTE-800 Interface • Supports MP-Bus through LMPBUS-804 Interface • Stores user-defined project documentation

Specifications	
Dimensions (mm)	107 x 100 x 75 (L x W x H), DIM045
Installation	DIN rail mounting following DIN 43880, top hat rail EN 50022
Power supply	24 VDC / 24 V AC ±10 %, typ. 2.5 W
Operating conditions	0 °C to 50 °C, 10 – 90 % RH, noncondensing, degree of protection: IP40, IP20 (terminals)
Interfaces	<div> <div> 2 x Ethernet (100Base-T): OPC XML-DA, OPC UA, LonMark IP-852*, LIOB-IP, KNXnet/IP, Modbus TCP (Master or Slave), HTTP, FTP, SSH, HTTPS, Firewall, VNC, SNMP 1 x LIOB-Connect 1 x TP/FT-10* (LonMark system) together with LIOB-FT </div> <div> 1 x RS-485 (ANSI TIA/EIA-485): Modbus RTU (Master or Slave) 1 x EXT: M-Bus, Master EN 13757-3 (needs L-MBUS20 or L-MBUS80) or KNX TP1 (needs LKNX-300) or SMI (needs LSMI-800) 2 x USB-A: WLAN (needs LWLAN-800), EnOcean (needs LENO-80x), SMI (needs LSMI-804) LTE (needs LTE-800) MP-Bus (needs LMPBUS-804) </div> </div> <div> LINUX-102: * Either LonMark IP-852 or TP/FT-10 LINUX-103: * Router between LonMark IP-852 and TP/FT-10 </div>
L-IOB I/O Modules	Up to 8 L-IOB I/O Modules in any combination of type LIOB-10x, LIOB-15x, and LIOB-45x
Remote Network Interface	1 RNI with 2 MNI devices (LINUX-102 only)
CEA-709 Router	1 (LINUX-103 only)
Tools	L-INX Configurator

Resource limits			
Total number of data points	10 000	Math objects	100
OPC data points	2 000	Alarm logs	10
Network variables (NVs)	1 000	M-Bus data points	1 000
Alias NVs	1 000	Modbus data points	2 000
External NVs (polling)	1 000	KNX TP1 data points	250
Address table entries	1 000 (non-ECS mode: 15)	KNXnet/IP data points	250
LonMark Calendars	1 (25 calendar patterns)	Connections (Local / Global)	1 000 / 250
LonMark Schedulers	100	Number of L-WEB clients	32 (simultaneously)
LonMark Alarm Servers	1	L-IOB I/O Modules	8
Trend logs	256 (4 000 000 entries, ≈ 60 MB)	Number of EnOcean devices	25
Total trended data points	256	EnOcean data points	250
E-mail templates	100	SMI devices (per channel)	16
MP-Bus devices (per channel)	16		

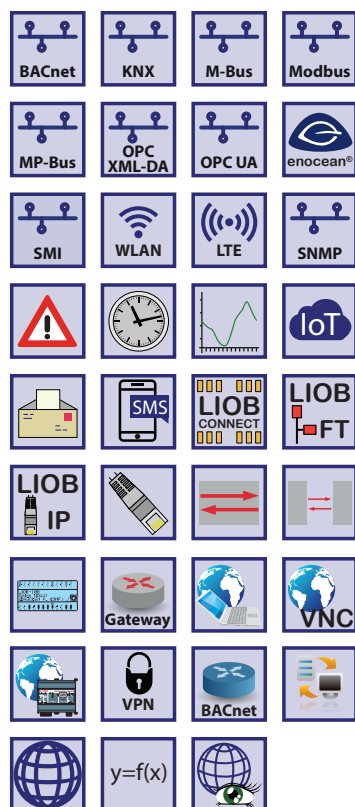
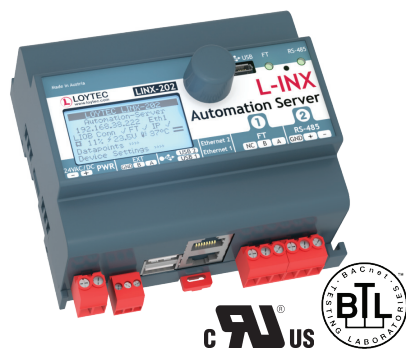
Order number	Product description
LINX-102	CEA-709 Automation Server with LIOB-Connect and built-in Remote Network Interface (RNI)
LINX-103	CEA-709 Automation Server with LIOB-Connect and built-in IP-852 Router
LIOB-A2	L-IOB Adapter 2 to split the LIOB-Connect bus using 4-wire cables
LIOB-A4	L-IOB Adapter 4 to split the LIOB-Connect bus using RJ45 network cables
LIOB-A5	L-IOB Adapter 5 to terminate the LIOB-Connect bus
LIOB-100	LIOB-Connect I/O Module: 8 UI, 2 DI, 2 AO, 9 DO (5 x Relay 6 A, 4 x Triac 0.5 A)
LIOB-101	LIOB-Connect I/O Module: 8 UI, 16 DI
LIOB-102	LIOB-Connect I/O Module: 6 UI, 6 AO, 8 DO (8 x Relay 6 A)
LIOB-103	LIOB-Connect I/O Module: 6 UI, 6 AO, 5 DO (5 x Relay 16 A)
LIOB-150	LIOB-FT I/O Module: 8 UI, 2 DI, 2 AO, 8 DO (4 x Relay 6 A, 4 x Triac 0.5 A)
LIOB-151	LIOB-FT I/O Module: 8 UI, 12 DI
LIOB-152	LIOB-FT I/O Module: 6 UI, 6 AO, 8 DO (8 x Relay 6 A)
LIOB-153	LIOB-FT I/O Module: 6 UI, 6 AO, 5 DO (4 x Relay 16 A, 1 x Relay 6 A)
LIOB-154	LIOB-FT I/O Module: 7 UI, 4 AO, 7 DO (5 x Relay 6 A, 2 x Triac 0.5 A), 1 Pressure Sensor
LIOB-450	LIOB-IP852 I/O Module: 8 UI, 2 DI, 2 AO, 8 DO (4 x Relay 6 A, 4 x Triac 0.5 A)
LIOB-451	LIOB-IP852 I/O Module: 8 UI, 12 DI
LIOB-452	LIOB-IP852 I/O Module: 6 UI, 6 AO, 8 DO (8 x Relay 6 A)
LIOB-453	LIOB-IP852 I/O Module: 6 UI, 6 AO, 5 DO (4 x Relay 16 A, 1 x Relay 6 A)
LIOB-454	LIOB-IP852 I/O Module: 7 UI, 4 AO, 7 DO (5 x Relay 6 A, 2 x Triac 0.5 A), 1 Pressure Sensor
LPOW-2415A	LIOB-Connect power supply unit, 24 VDC, 15 W
LPOW-2415B	Power supply unit with power connector 24 VDC, 15 W
L-MBUS20	M-Bus level converter for 20 M-Bus devices
L-MBUS80	M-Bus level converter for 80 M-Bus devices
LKNX-300	KNX interface to connect KNX TP1 devices
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 802.11bgn
LMPBUS-804	MP-Bus interface for 16 devices per channel, up to 4 channels
LSMI-800	Standard Motor Interface for 16 motors via EXT port
LSMI-804	Standard Motor Interface for 64 motors, 4 SMI channels via USB
LTE-800	USB LTE Interface

L-INX Automation Server

LINX-202, LINX-203

Datasheet #89035520

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



The L-INX Automation Servers LINX-202 and LINX-203 (successors of LINX-200, LINX-201) can host user specific graphical pages for the visualization of information from BACnet networks via LWEB-900 (Building Management) or LWEB-802/803. They can integrate physical I/Os through L-IOB I/O Modules via LIOB-Connect, LIOB-FT, or LIOB-IP. Local operation and override is provided by the built-in jog dial and the backlit display (128x64 pixels). Device and data point information is shown on the display via symbols and in text format.

BACnet can be integrated via BACnet/IP or BACnet MS/TP. In addition, the Automation Servers provide connectivity to concurrently integrate KNX, Modbus, and M-Bus and connect as a gateway data points of different technological origin. Optionally, mathematical objects can be applied within a connection to calculate the data point output values depending on the formula used. Depending on the type, the Automaton Servers feature a BACnet/IP router including BBMD as well as Slave-Proxy functionality (LINX-203). LINX-202 and LINX-203 are BTL certified as B-BC (BACnet Building Controller).

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. L-INX Automation Servers also support Smart Auto-Connect™ – the automatic generation of connections to substantially reduce engineering efforts and cost. All technology data points are automatically created as OPC XML-DA and OPC UA data points.

Each L-INX Automation Server 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 to an insecure network (LAN) where the standard building automation protocols like BACnet/IP, LON/IP, or Modbus TCP are present. These devices also feature firewall functionality of course to isolate particular protocols or services between the ports. The built-in VPN function provides for simple VPN setup and secure access to remote sites. The LTE-800 interface enables wireless access to remote sites through a mobile carrier.

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-INX devices 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, 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.

Features

- Visualization of customized graphical pages through LWEB-900 (Building Management), LWEB-803 (Monitoring and Control), or LWEB-802 (Web Browser)
- Stores customized graphical pages
- Extension with physical inputs and outputs using L-IOB I/O Modules (LIOB-10x, LIOB-15x, and LIOB-55x)
- 128x64 graphic display with backlight
- Local and remote access to information about device status and data points
- Manual operation using the jog dial or VNC client
- Alarming, Scheduling, and Trending (AST™)
- Node.js support for easy IoT integration (e.g. Google calendar, Alexa & friends, multimedia equipment,...)
- Event-driven e-mail notification
- Math objects to execute mathematical operations on data points
- Integrated OPC XML-DA and OPC UA server
- Dual Ethernet/IP interface
- Access to network statistics
- Compliant with ANSI/ASHRAE 135-2012 and ISO 16484-5:2012 standard
- Supports BACnet MS/TP or BACnet/IP
- BACnet Client Function (Write Property, Read Property, COV Subscription)
- BACnet Client Configuration with configuration tool (scan and EDE import)
- B-BC (BACnet Building Controller) functionality, BTL certified
- Integrated BACnet/IP to BACnet MS/TP Router including BBMD as well as Slave-Proxy functionality (LINX-203 only)
- KNXnet/IP, connection to KNX TP1 through LKNX-300 Interface
- M-Bus Master according to EN 13757-3, connection via optional M-Bus Converter (L-MBUS20 or L-MBUS80)
- Modbus TCP and Modbus RTU (Master or Slave)
- Gateway functions including Smart Auto-Connect™
- Integrated web server for device configuration and monitoring data points
- Configurable via Ethernet/IP
- Connection to EnOcean wireless devices via LENO-80x Interface
- Supports SMI (Standard Motor Interface) through LSMI-80x
- Supports WLAN through LWLAN-800 Interface
- Supports LTE through LTE-800 Interface
- Supports MP-Bus through LMPBUS-804 Interface
- Stores user-defined project documentation

Specifications

Dimensions (mm)	107 x 100 x 75 (L x W x H), DIM045	
Installation	DIN rail mounting following DIN 43880, top hat rail EN 50022	
Power supply	24 VDC / 24 VAC ±10 %, typ. 2.5 W	
Operating conditions	0 °C to 50 °C, 10–90 % RH, noncondensing, degree of protection: IP40, IP20 (terminals)	
Interfaces	<p>2 x Ethernet (100Base-T):</p> <p>OPC XML-DA, OPC UA, BACnet/IP*, LIOB-IP, KNXnet/IP, Modbus TCP (Master or Slave), HTTP, FTP, SSH, HTTPS, Firewall, VNC, SNMP</p> <p>1 x LIOB-Connect</p> <p>1 x LIOB-FT</p> <p>1 x RS-485 (ANSI TIA/EIA-485):</p> <p>BACnet MS/TP* or Modbus RTU (Master or Slave)</p> <p>LINX-202: * Either BACnet/IP or BACnet MS/TP</p> <p>LINX-203: * Router between BACnet/IP and BACnet MS/TP</p>	<p>1 x EXT:</p> <p>M-Bus, Master EN 13757-3 (needs L-MBUS20 or L-MBUS80) or KNX TP1 (needs LKNX-300) or SMI (needs LSMI-800)</p> <p>2 x USB-A:</p> <p>WLAN (needs LWLAN-800), EnOcean (needs LENO-80x) SMI (needs LSMI-804) LTE (needs LTE-800) MP-Bus (needs LMPBUS-804)</p>
L-IOB I/O Modules	Up to 8 L-IOB I/O Modules in any combination of type LIOB-10x, LIOB-15x, and LIOB-55x	
BACnet/IP Router	1 (LINX-203 only)	
Tools	L-INX Configurator	

LINX-202, LINX-203

Resource limits			
Total number of data points	10 000	Alarm logs	10
OPC data points	2 000	M-Bus data points	1 000
BACnet objects	750 (analog, binary, multi-state)	Modbus data points	2 000
BACnet client mappings	750	KNX TP1 data points	250
BACnet calendar objects	25	KNXnet/IP data points	250
BACnet scheduler objects	100 (64 data points per object)	Connections (Local / Global)	1 000 / 250
BACnet notification classes	32	Number of L-WEB clients	32 (simultaneously)
Trend logs (BACnet or generic)	256 (4 000 000 entries, ≈ 60 MB)	L-IOB I/O Modules	8
Total trended data points	256	Number of EnOcean devices	25
E-mail templates	100	EnOcean data points	250
Math objects	100	SMI devices (per channel)	16
MP-Bus devices (per channel)	16		

Order number	Product description
LINX-202	BACnet Automation Server with LIOB-Connect, B-BC
LINX-203	BACnet Automation Server with LIOB-Connect, B-BC, and built-in BACnet/IP to MS/TP Router
LIOB-A2	L-IOB Adapter 2 to split the LIOB-Connect bus using 4-wire cables
LIOB-A4	L-IOB Adapter 4 to split the LIOB-Connect bus using RJ45 network cables
LIOB-A5	L-IOB Adapter 5 to terminate the LIOB-Connect bus
LIOB-100	LIOB-Connect I/O Module: 8 UI, 2 DI, 2 AO, 9 DO (5 x Relay 6 A, 4 x Triac 0.5 A)
LIOB-101	LIOB-Connect I/O Module: 8 UI, 16 DI
LIOB-102	LIOB-Connect I/O Module: 6 UI, 6 AO, 8 DO (8 x Relay 6 A)
LIOB-103	LIOB-Connect I/O Module: 6 UI, 6 AO, 5 DO (5 x Relay 16 A)
LIOB-150	LIOB-FT I/O Module: 8 UI, 2 DI, 2 AO, 8 DO (4 x Relay 6 A, 4 x Triac 0.5 A)
LIOB-151	LIOB-FT I/O Module: 8 UI, 12 DI
LIOB-152	LIOB-FT I/O Module: 6 UI, 6 AO, 8 DO (8 x Relay 6 A)
LIOB-153	LIOB-FT I/O Module: 6 UI, 6 AO, 5 DO (4 x Relay 16 A, 1 x Relay 6 A)
LIOB-154	LIOB-FT I/O Module: 7 UI, 4 AO, 7 DO (5 x Relay 6 A, 2 x Triac 0.5 A), 1 Pressure Sensor
LIOB-550	LIOB-BIP I/O Module: 8 UI, 2 DI, 2 AO, 8 DO (4 x Relay 6 A, 4 x Triac 0.5 A)
LIOB-551	LIOB-BIP I/O Module: 8 UI, 12 DI
LIOB-552	LIOB-BIP I/O Module: 6 UI, 6 AO, 8 DO (8 x Relay 6 A)
LIOB-553	LIOB-BIP I/O Module: 6 UI, 6 AO, 5 DO (4 x Relay 16 A, 1 x Relay 6 A)
LIOB-554	LIOB-BIP I/O Module: 7 UI, 4 AO, 7 DO (5 x Relay 6 A, 2 x Triac 0.5 A), 1 Pressure Sensor
LPOW-2415A	LIOB-Connect power supply unit, 24 VDC, 15 W
LPOW-2415B	Power supply unit with power connector 24 VDC, 15 W
L-MBUS20	M-Bus level converter for 20 M-Bus devices
L-MBUS80	M-Bus level converter for 80 M-Bus devices
LKNX-300	KNX interface to connect KNX TP1 devices
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 802.11bgn
LMPBUS-804	MP-Bus interface for 16 devices per channel, up to 4 channels
LSMI-800	Standard Motor Interface for 16 motors via EXT port
LSMI-804	Standard Motor Interface for 64 motors, 4 SMI channels via USB
LTE-800	USB LTE Interface

L-VIS Touch Panels & L-STAT Room Operator Panels



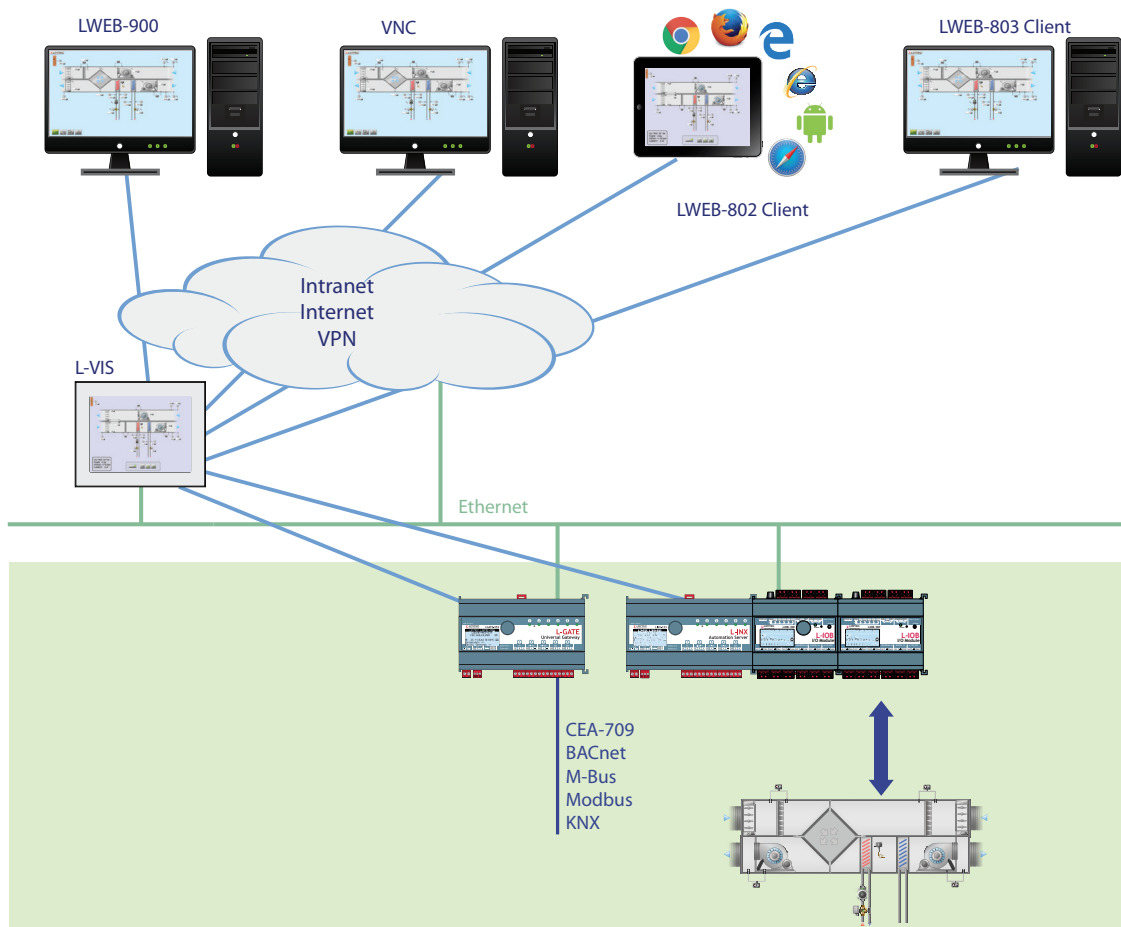
L-VIS Overview

L-VIS Touch Panels for visualization and operation of information in LonMark, BACnet, and Modbus networks are not only perfectly suitable for local operation, they also offer various remote access options that can be used simultaneously if required:

- VNC: The graphical user interface can be accessed via the built-in VNC server by a commercial or free VNC-Client.
- LWEB-803: The graphical user interface allows remote access to the graphical projects on the L-VIS Touch Panel from a Microsoft Windows PC. Communication is done by using web services – smoothly across firewalls and NAT routers.
- LWEB-802: The platform-independent graphical user interface enables remote access to the graphical projects on the L-VIS Touch Panel by a standard web browser. The use of HTML5 and JavaScript allows applying smart phones and tablets also.
- LWEB-900: L-VIS Touch Panels integrate perfectly into the L-WEB System.

Various remote access options, alarming, scheduling, trending, and e-mails sent on a timely basis or triggered by events offer amazing flexibility and versatility. Depending on the interface, L-VIS Touch Panels behave compliant to LonMark Systems or BACnet networks.

Furthermore, the L-VIS Touch Panel can be used as an OPC XML-DA client to LOYTEC devices (OPC XML-DA server) in the Ethernet/IP network. If connected to a LOYTEC device, information from KNX, Modbus and M-Bus networks can be integrated and visualized in addition to information from LonMark Systems or BACnet networks.



✓ BACnet
✓ CEA-709
KNX

✓ Modbus
M-Bus
✓ OPC

L-VIS Touch Panel

LVIS-3ME7-Gx/3ME12-A1/3ME15-A1/3ME15-Gx

Datasheet #89033420



L-VIS Touch Panels for LonMark, BACnet, and Modbus networks are ideally suited for visualization and operation of various applications in building automation. L-VIS Touch Panels visualize building systems, can be used as room operator panels, in hospital operation or isolation rooms, conference and reception areas. The fully customizable user screens can show dynamic pages that are easy to navigate. L-VIS Touch Panels make use of an extremely low power embedded controller platform and operating system. This makes L-VIS resistant against problems when re-booting after power outage and also against any viruses.

L-VIS impresses with its timeless design, harmonic integration into modern and historical architecture, and with its extremely user friendly concept. The shallow installation depth and low thermal power loss allow mounting in almost any location.

Different Sizes

L-VIS Touch Panels are available in the following variations:

LVIS-3ME7-Gx	7" Touch Display Frameless glass front and capacitive touch	800 x 480	262 144 colors
LVIS-3ME12-A1	12.1" Touch Display Aluminum frame with anodized finish	800 x 600	262 144 colors
LVIS-3ME15-A1	15" Touch Display Aluminum frame with anodized finish	1024 x 768	262 144 colors
LVIS-3ME15-Gx	15" Touch Display Frameless glass front and capacitive touch	1024 x 768	262 144 colors

IoT Integration

The IoT function (Node.js) allows connecting the system to almost any cloud service, either for uploading historical data to analytics services, 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.

Dynamic Graphical Pages

The graphical pages may consist of multiple dynamic graphical controls that show the current plant status in real time. It is also possible to access decentralized schedules, alarm servers, or trends. The graphical projects are designed with the L-VIS/L-WEB configuration tool free of charge. Without any know-how in HTML or Java, user specific graphical pages can be created. Dynamic information is shown through value or text controls, changing symbols, bar charts, trend views, alarm and event lists, or schedule controls. The L-VIS/L-WEB configuration tool allows for using most of the pixel graphic formats (GIF, JPG, BMP, TIFF, PNG, MNG, ICO), vector graphics (SVG) and alpha blending.

Playback of Audio Files and Streams

The L-VIS Touch Panel supports the playback of stereo MP3, WAV, and MP3 streams (for example webradio). The playback will be started or stopped by the respective action object. The action object is linked to one of the available audio files or to the URL of an MP3 stream. When accessing a playback via LWEB-802 or LWEB-803, it will be executed locally on the client.

Automatic Page Generation

Pages including data point names and values, alarm views, schedules, or trends can be created automatically by the L-VIS/L-WEB configuration tool. This significantly reduces engineering time and cost.

Functions

L-WEB, L-STUDIO

L-ROC

L-INX

L-IOB

Gateways

L-VIS, L-STAT

L-DALI

Routers, NIC

Interfaces

Accessories

L-VIS Touch Panel

LVIS-3ME7-Gx/3ME12-A1/3ME15-A1/3ME15-Gx

Connectivity and Data Points

The L-VIS Touch Panels support connectivity to LonMark Systems and BACnet networks. In addition, the Touch Panels provide communication to Modbus either as Master or Slave. For this purpose, Modbus TCP is supported exclusively and Modbus RTU is available via the RS-485 terminal.

L-VIS Touch Panels communicate with LonMark Systems via IP-852 (Ethernet/IP) or TP/FT-10 channels. The integrated remote network interface (Ethernet/IP) provides remote access to the TP/FT-10 channel for configuration, service and maintenance purposes.

BACnet networks are connected via BACnet/IP or BACnet MS/TP. The L-VIS Touch Panels implement the BACnet Building Controller (B-BC) profile. They include a fully featured built-in BACnet/IP to MS/TP router with BBMD (BACnet Broadcast Management Device) and slave proxy functionality.

Math objects can calculate any kind of formula using data points available on the device.

L-VIS devices are equipped with two Ethernet ports. They 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 to an insecure network (LAN) where the standard building automation protocols like BACnet/IP, LON/IP, or Modbus TCP are used. These devices also feature firewall 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-VIS devices provide fully featured AST™ functionality (Alarming, Scheduling, and Trending) and can be integrated perfectly into the L-WEB Building Management System.



LVIS-3ME7-Gx/3ME12-A1/3ME15-A1/3ME15-Gx

Features

- High resolution TFT touch display with dimmable backlight
- Anodized aluminum front frame (LVIS-3ME12-A1, LVIS-3ME15-A1) or frameless glass front and capacitive touch (LVIS-3ME7-Gx, LVIS-3ME15-Gx)
- Flush-mounting in combination with the mounting frame
- Stores customized graphical pages
- Visualization of customized graphical pages through built-in touch panel, LWEB-900 (building management), and LWEB-802/803
- Device configuration and graphical page creation with the L-VIS/L-WEB configuration tool free of charge
- Supports all popular graphic file formats such as GIF, JPG, BMP, TIFF, PNG, MNG, ICO
- Support of SVG vector graphics
- Supports alpha blending
- Supports popular font types such as TrueType, Type-1, BDF, PCF, and OTF
- Supports Unicode text and complex writing systems
- Built-in OPC UA and OPC XML-DA server
- Built-in OPC XML-DA client
- Dual Ethernet/IP interface
- Alarming, Scheduling, and Trending (AST™)
- Node.js support for easy IoT integration (e.g. Google calendar, Alexa & friends, multimedia equipment,...)
- Event-driven e-mail notification
- Math objects to execute mathematical operations on data points
- Compliant with CEA-709, CEA-852, and ISO/IEC 14908 Standard (LonMark System)
- Supports CEA-709 TP/FT-10 or IP-852 (Ethernet/IP)
- Support of dynamically created network variables or static network variables
- Support of user-defined NVs (UNVTs) and Configuration Properties (SCPTs, UCPTs)
- Remote Network Interface (RNI) with 2 MNI devices
- Compliant with ANSI/ASHRAE 135-2012 and ISO 16484-5:2012 standard
- Supports BACnet MS/TP and BACnet/IP
- BACnet Client Function (Write Property, Read Property, COV Subscription)
- BACnet Client Configuration with configuration tool (scan and EDE import)
- B-BC (BACnet Building Controller)
- Integrated BACnet/IP to BACnet MS/TP Router
- BBMD (BACnet Broadcast Management Device)
- Modbus TCP and Modbus RTU (Master or Slave)
- Integrated web server for device configuration and monitoring data points
- Access to network statistics
- Configurable via Ethernet/IP or TP/FT-10
- Playback of audio files and streams
- Supports WLAN through LWLAN-800 Interface
- Supports LTE through LTE-800 Interface



L-VIS Touch Panel

LVIS-3ME7-Gx/3ME12-A1/3ME15-A1/3ME15-Gx

Specifications			
Type	LVIS-3ME7-Gx	LVIS-3ME12-A1	LVIS-3ME15-xx
Screen size	7" (178 mm)	12.1" (307 mm)	15" (381 mm)
Dimensions (mm)	223.5 x 162 x 65 (L x W x H), DIM004	329 x 268.3 x 65 (L x W x H), DIM002	394 x 318 x 65 (L x W x H), DIM003
Dimensions cut-out (mm)	195 x 143 x 61 (L x W x H)	300 x 250 x 61 (L x W x H)	355 x 295 x 61 (L x W x H)
Display resolution	800 x 480, 262 144 colors	800 x 600, 262 144 colors	1024x 768, 262 144 colors
Interfaces	2 x Ethernet (100Base-T), Switch, OPC UA (server) and OPC XML-DA (server, client), LonMark IP-852, BACnet/IP, Modbus TCP (Master or Slave), HTTP, FTP, SSH, HTTPS, SMTP, NTP, VNC 1 x TP/FT-10 1 x RS-485 (ANSI TIA/EIA-485): BACnet MS/TP or Modbus RTU (Master or Slave) 2 x Digital Input 2 x USB-A: (LVIS-3ME15-Gx only 1 x USB-A) WLAN (needs LWLAN-800), LTE (needs LTE-800) 1 x USB-B (PC), speaker, audio output		
Remote Network Interface	1 RNI with 2 MNI devices		
Power supply	24 VDC ±10 %, 2.5 W, backlight on: 5 W	24 VDC ±10 %, 4 W, backlight on: 10 W or 85-240 V AC, 7 W, backlight on: 13 W	24 VDC ±10 %, 4 W, backlight on: 10 W or 85-240 V AC, 7 W, backlight on: 13 W
Operating conditions	+10 °C to 40 °C, 10-90 % RH, noncondensing		
Degree of protection	Front: IP54 / back: IP10		
Tools	L-VIS/L-WEB Configurator		
Resource limits			
OPC data points	10 000	BACnet calendar objects	25
Modbus data points	2 000	BACnet scheduler objects	100 (64 data points per object)
VNC clients	16	BACnet notification classes	32
Network variables (NVs)	1 000	E-mail templates	100
Alias NVs	1 000	Math objects	2 000
Address table entries	524 (non-ECS mode: 15)	Alarm logs	100
LonMark Calendars	1 (25 calendar patterns)	Trend logs	512 (4 000 000 entries, ≈ 60 MB)
LonMark Schedulers	100	Total trended data points	512
LonMark Alarm Servers	1	Connections (Local/Global)	2 000/250
BACnet server objects	512	Number of L-WEB clients	32 (simultaneously)
Order number	Product description		
LVIS-3ME7-G1	CEA-709, BACnet, and Modbus Touch Panel 7", frameless glass front and capacitive touch, silver		
LVIS-3ME7-G2	CEA-709, BACnet, and Modbus Touch Panel 7", frameless glass front and capacitive touch, black		
LVIS-3ME12-A1	CEA-709, BACnet, and Modbus Touch Panel 12.1", aluminum frame with anodized finish		
LVIS-3ME15-A1	CEA-709, BACnet, and Modbus Touch Panel 15", aluminum frame with anodized finish		
LVIS-3ME15-G1	CEA-709, BACnet, and Modbus Touch Panel 15", frameless glass front and capacitive touch, silver		
LVIS-3ME15-G2	CEA-709, BACnet, and Modbus Touch Panel 15", frameless glass front and capacitive touch, black		
LVIS-3ME15-G3	CEA-709, BACnet, and Modbus Touch Panel 15", frameless glass front and capacitive touch, white		
LVIS-FRAME7	Mounting frame for 7" Touch Panels		
LVIS-FRAME12	Mounting frame for 12.1" Touch Panels		
LVIS-FRAME15	Mounting frame for 15" Touch Panels		
LWLAN-800	Wireless LAN Interface IEEE 802.11 bgn		
LTE-800	USB LTE Interface		

L-DALI Lighting Control



L-DALI Lighting Control

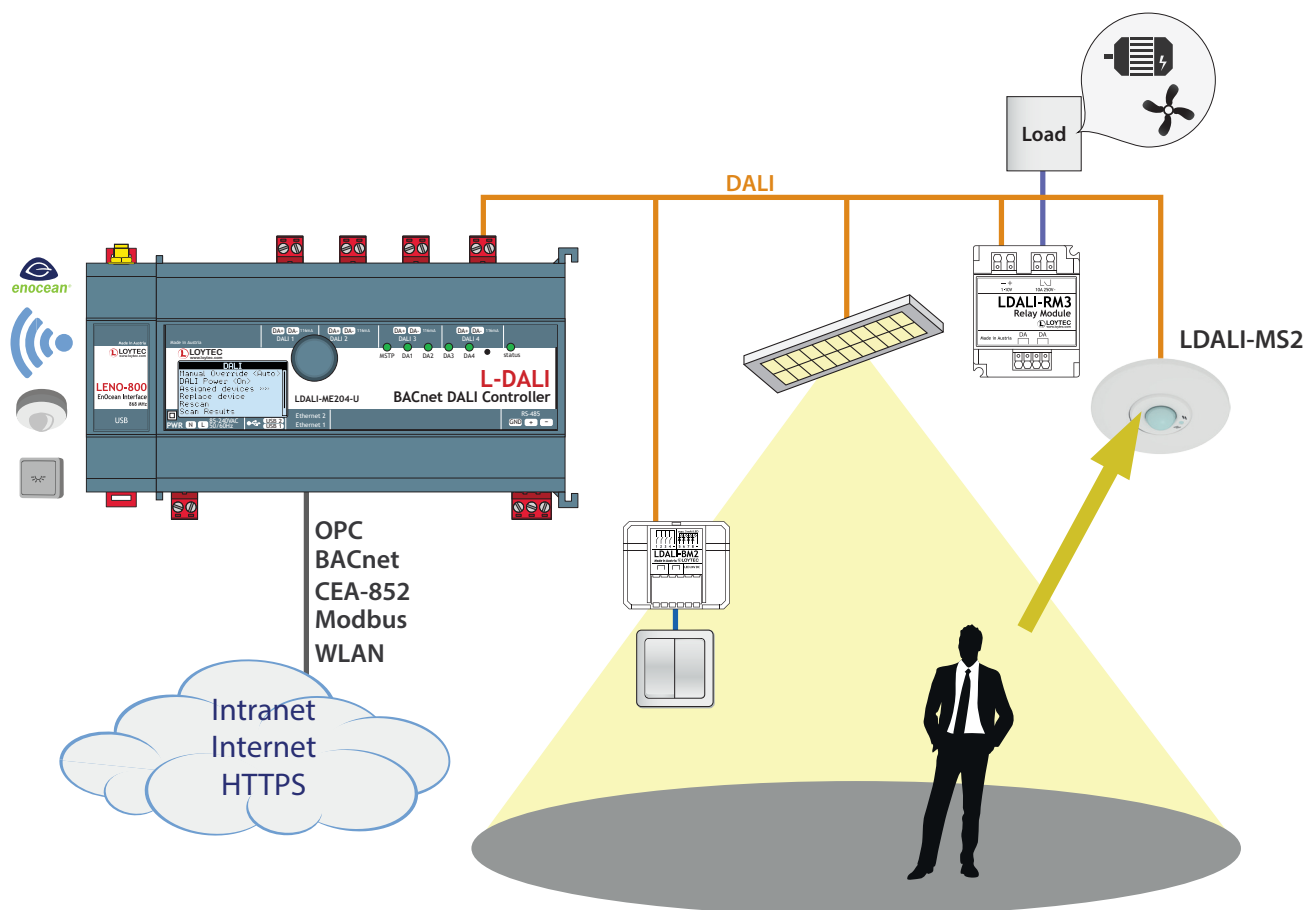
L-DALI Overview

The L-DALI product line offers the combination of DALI lighting controls functionality that leaves nothing to be desired with a powerful lighting application. It allows to incorporate the lighting system in the higher-level building automation system and an integration in the remaining automation system to realize a fully integrated room automation solution.

L-DALI controllers are multifunctional devices featuring DALI light control and gateway functionality between DALI (Digital Addressable Lighting Interface) and LonMark Systems, BACnet or Modbus Networks. Besides the integration of DALI ballasts they likewise support DALI-2 buttons e.g. LDALI-BM2 and also a variety of DALI-2 multi sensors like the LDALI-MS2 or LDALI-MS3. With the LDALI-RM3 Relay Module, standard loads in the power grid can be controlled via DALI. EnOcean push buttons and multi-sensors can be integrated using the optional L-ENO extension modules. With the LSMI-804 extension module SMI sunblinds on up to four SMI channels can be integrated in the lighting application.

The built-in web server allows for device configuration, DALI system configuration and maintenance. L-DALI controllers feature alarming, scheduling, trending (AST™) and e-mail notification functionality.

Additional features include data exchange via global connections (network-wide data exchange), a built-in DALI bus power supply, and a 128x64 graphical display for manual operation using a jog dial.

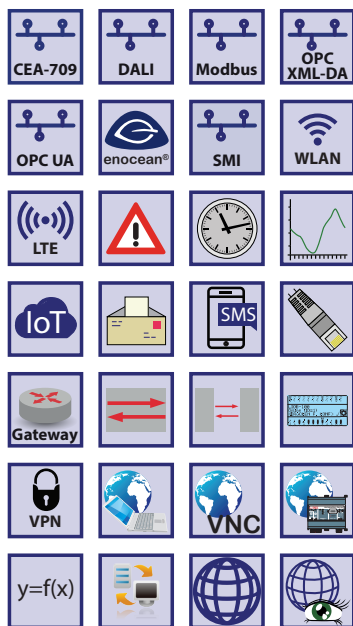


LDALI-3E101-U, LDALI-3E102-U, LDALI-3E104-U

Datasheet #89016920



CEA-709 DALI Controller



L-DALI Controllers are multifunctional devices combining constant light control, sunblind control, and gateway functions between LonMark and DALI (Digital Addressable Lighting Interface) systems. With Alarming, Scheduling, Trending, and e-mail notification (AST™) the L-DALI Controller is a perfect solution for DALI lighting systems and for a smooth DALI integration into LonMark Systems.

DALI Network Interface

L-DALI represents a DALI-Master in the DALI network which can interact with DALI-2 multi-sensors and buttons (DALI-2 input devices) in Multi-Master mode. The L-DALI lineup for LonMark Systems features 1, 2, or 4 independent DALI channels. Up to 64 DALI or DALI-2 based luminaires per DALI channel can be controlled individually or via 16 groups. All luminaires are monitored for lamp or ballast defect. In addition up to 16 DALI-2 multi-sensors and up to 64 DALI-2 button inputs are supported per DALI channel.

Built-In DALI Bus Power Supply

All L-DALI models come with a built-in DALI bus power supply. The LDALI-3E101-U and the LDALI-3E102-U can supply each DALI channel with a guaranteed supply current of 230 mA, the LDALI-3E104-U can supply 116 mA per channel. In case of the LDALI-3E104-U 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 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.

LonMark TP/FT-10 or Ethernet/IP-852 Connection

The L-DALI Controllers provide connectivity in LonMark Systems through IP-852, or TP/FT-10 as well as data exchange through Global Connections. They support comprehensive AST™ functionality (Alarming, Scheduling, and Trending) with e-mail notification. Full L-WEB integration is supported as well. The L-DALI Controllers are equipped with two Ethernet ports including a built-in Ethernet switch.

IoT Integration

The IoT function (Node.js) allows connecting the system to almost any cloud service, either for uploading historical data to analytics services, 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.

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.

Constant Light Control

The integrated Constant Light Controller (LonMark Functional Profile #3050) allows controlling local DALI ballasts and luminaires via the CEA-709 network. It supports various lighting control strategies, presence and lux level based. Several parameters can be used to configure the Constant Light Controller for almost any use case.

Sunblind Control with Constant Light Control Interaction

The integrated Sunblind Controller (LonMark Functional Profile #6111) allows intelligent controlling of blinds connected via SMI (requires LSMI-804) or the

LDALI-3E101-U, LDALI-3E102-U, LDALI-3E104-U

CEA-709 network. It offers effective sun and anti-glare protection through active slat control and slat adjustment according to the sun position. Energy efficiency is ensured by linking room occupancy with sun protection. If a room is unoccupied, the L-DALI Controller opens or closes the sunblinds depending on the thermal requirements. This allows for instance to use the heat of the sun for heating in winter while in summer, the heat from the sun is reduced by the closed blinds to reduce the cooling load.

Optionally, the sunblind and light control applications of a room or an area can be linked together. As both applications control the light available in the room this holistic approach assures maximum comfort and energy efficiency.

In addition to the constant light and sunblind control, any mathematical calculation and function or logical operation (Boolean algebra) can be created on the device and process all available data points.

Device Configuration via Tool or Web Interface

The device configuration, commissioning, and parameterization is done either with the configuration tool software (used as stand-alone tool or as LNS® plug-in) or via the integrated web server.

EnOcean, OPC and Modbus

Wireless EnOcean sensors and buttons can be integrated via the optional L-ENO EnOcean interface. To use the L-DALI with an existing SCADA solution all runtime values and parameters can be accessed via OPC (XML/DA and UA) and Modbus TCP.

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 DALI-2 multi-sensor LDALI-MS2 and LDALI-MS3, DALI-2 sensors of many well-known manufacturers can be used.

- **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. Their functionality can be configured individually. In addition to controlling lighting via DALI (dimming, scene recall, etc.) and sunblinds via SMI (up, down, etc.), button press events can be propagated in the building network, triggering other, non-lighting related building automation functions.

- **DALI Relay Modules**

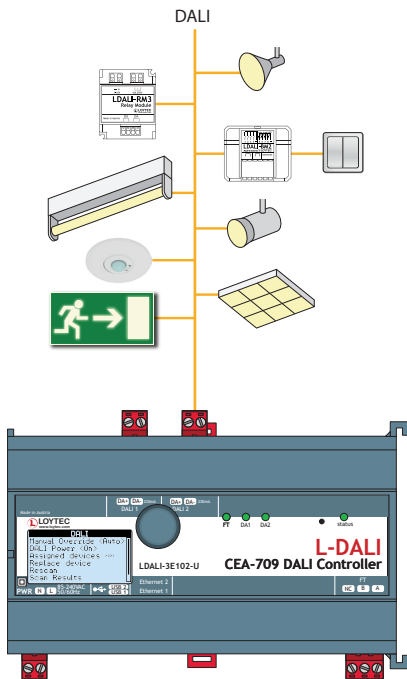
Standard loads in the power grid can be controlled via DALI using DALI relay modules, like the LDALI-RM3 or LDALI-RM4.

- **DALI Color Control**

The L-DALI allows controlling DALI luminaires with colour control functionality (DT8). Both, tunable white (Tc) and full RGB color control (RGBWAF and xy-coordinate) are supported. Light color can either be changed automatically, via manual operation (e.g. buttons) or via the network.

- **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.



LDALI-3E101-U, LDALI-3E102-U, LDALI-3E104-U

• 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.

LonMark Interface

The L-DALI Controller maps information from the DALI network to Network Variables (NVs) to control DALI ballasts or display operating states including DALI sensor occupancy and lux level information. L-DALI Controller for LonMark Systems can be connected either to an Ethernet/IP channel (LonMark IP-852) or a TP/ FT 10 channel. The provided static NV interface includes the following profiles:

- Lamp Actuator #3040
- Constant Light Controller #3050
- Light Sensor #1010
- Sunblind Controller #6111
- Occupancy Sensor #1060
- Open Loop Sensor (button) #1

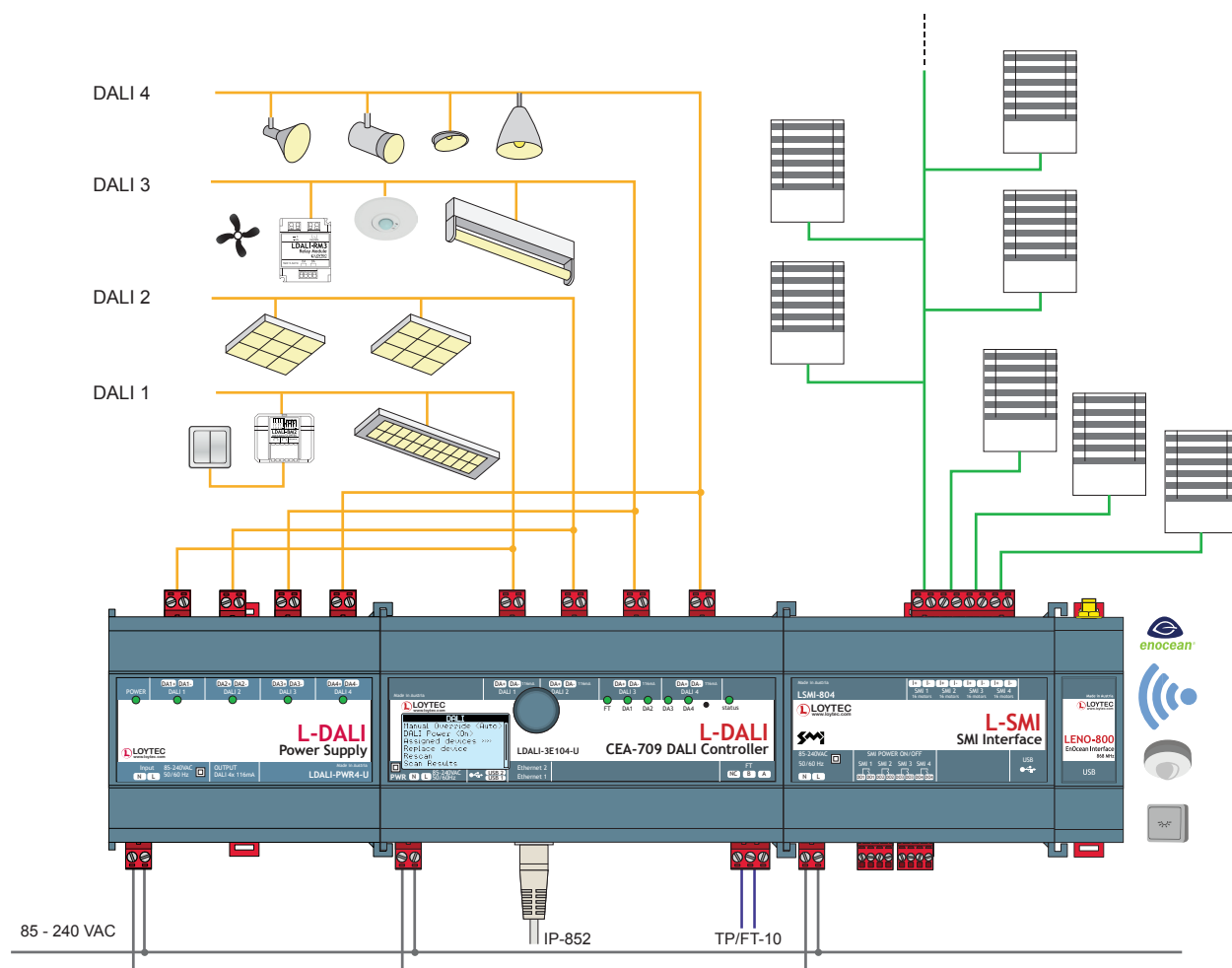
All data points are available in a tree structure on the integrated web server to be displayed or set using a web browser.

Features

- DALI integration into LonMark Systems
- Supports up to 64 DALI ballasts and 16 DALI groups per DALI channel
- Supports up to 16 DALI sensors per DALI channel
- Supports up to 64 DALI buttons per DALI channel
- Integrated DALI bus power supply*
- 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 via 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-RM3 Relay Modules
- Integrated Constant Light Controller
- Integrated Sunblind Controller
- 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
- Compliant with CEA-709, CEA-852 and ISO/IEC 14908-1 standard (LonMark System)
- Network connection either with TP/FT-10 or IP-852 (CEA-852 Ethernet)
- Alarming, Scheduling, and Trending (AST™) locally or embedded in L-WEB (building management)
- Node.js support for easy IoT integration (e.g. Google calendar, Alexa & friends, multimedia equipment,...)
- Event-driven e-mail notification
- Supports Local and Global Connections
- 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
- Built-in OPC XML-DA and OPC UA server
- Modbus TCP (Master or Slave)
- 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

* LDALI-3E102-U / LDALI-3E104-U with integrated DALI bus power supply will be available from Q3 2019.

LDALI-3E101-U, LDALI-3E102-U, LDALI-3E104-U



Specifications

Type	LDALI-3E101-U	LDALI-3E102-U	LDALI-3E104-U
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. 7.5 W	85-240 V AC, 50/60 Hz	
Operating conditions	0 °C to 40 °C, 10 – 90 % RH, noncondensing, degree of protection: IP40, IP20 (terminals)		
DALI channels	1	2	4
Integrated DALI bus power supply*	16 VDC 230 mA guaranteed supply current 250 mA max. supply current		16 VDC 116 mA guaranteed supply current 125 mA max. supply current
Interfaces	2 x Ethernet (100Base-T): OPC XML-DA, OPC UA, LonMark IP-852*, Modbus TCP, HTTP, FTP, SSH, HTTPS, Firewall, VNC, SNMP 1 x TP/FT-10* (LonMark system) 2 x USB-A: WLAN (needs LWLAN-800), EnOcean (needs LENO-80x) SMI (needs LSMI-804), LTE (needs LTE-800) * Either LonMark IP-852 or TP/FT-10		
LonMark Profile	Lamp Actuator #3040, Light Sensor #1010, Occupancy Sensor #1060, Constant Light Controller #3050, Sunblind Controller #6111 Open loop sensor (button) #1		
Tools	L-INX Configurator, and configuration via web interface		

* LDALI-3E102-U / LDALI-3E104-U with integrated DALI bus power supply will be available from Q3 2019.

LDALI-3E101-U, DALI-3E102-U, LDALI-3E104-U

Resource limits			
DALI ballasts per DALI channel	64	LonMark calendars	1 (10 patterns) per DALI channel
DALI groups per DALI channel	16	LonMark schedulers	16 per DALI channel
DALI sensors per DALI channel	16	LonMark alarm servers	1 per DALI channel
DALI push buttons per DALI channel	64	Trend logs	512 (4 000 000 entries, ≈ 60 MB)
Scene control	16 scenes per DALI group	Data points in trend log	1 000
Maths objects	100	E-mail templates	100
Alarm logs	10	Number of L-WEB clients	32 (simultaneously)
OPC data points	10 000	Modbus data points	2 000
Connections (Local/Global)	2 000 / 250	Number of EnOcean devices	100
Address table entries	512 (non-ECS mode: 15)	EnOcean data points	1 000
SMI devices (per channel)	16		
Order number	Product description		
LDALI-3E101-U	CEA-709/DALI Controller, AST, Sunblind Controller, 1 DALI channel, integrated DALI power supply		
LDALI-3E102-U	CEA-709/DALI Controller, AST, Sunblind Controller, 2 DALI channels		
LDALI-3E104-U	CEA-709/DALI Controller, AST, Sunblind Controller, 4 DALI channels		
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 multi-sensor (presence detection, lux sensor, IR receiver, temperature sensor, humidity sensor, 3 digital inputs)		
LDALI-MS3	DALI High-bay IP66 multi-sensor (presence detection, lux sensor)		
LDALI-BM2	Quadruple DALI pushbutton coupler		
LDALI-RM3	DALI Relay Module 10 A, Analog Interface 0 – 10 V and 1 – 10 V		
LDALI-RM4	DALI Relay Module 10 A, Analog Interface 0 – 10 V and 1 – 10 V, “spud-mount”		
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 802.11bgn		
LSMI-804	Standard Motor Interface for 64 motors, 4 SMI channels via USB		
LTE-800	USB LTE Interface		

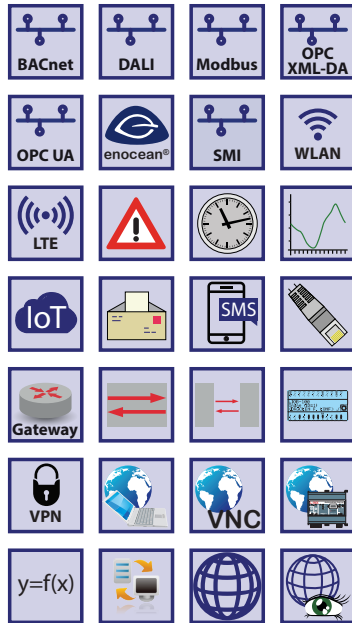
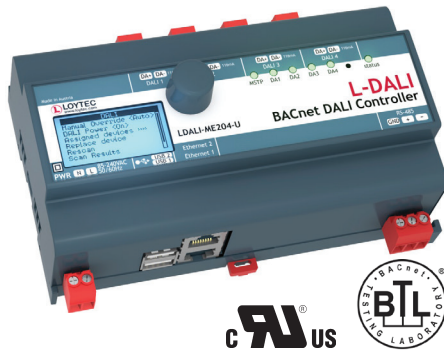
BACnet/DALI Controller

LDALI-ME204-U, LDALI-ME201-U

Datasheet #89021220

- ✓ BACnet
- ✓ CEA-709
- ✓ Modbus

- ✓ DALI
- ✓ OPC



L-DALI Controllers are multifunctional devices combining constant light control, sunblind control and gateway functions between DALI (Digital Addressable Lighting Interface) and BACnet or Modbus systems. With Alarming, Scheduling, Trending and e-mail notification (AST™) the L-DALI Controller is a perfect solution for DALI lighting systems and for a smooth DALI integration into BACnet or Modbus networks.

DALI Network Interface

L-DALI represents a DALI-Master in the DALI network which can interact with DALI-2 multi-sensors and buttons in Multi-Master mode. The LDALI-ME204-U device is equipped with 4 independent DALI channels. The LDALI-ME201-U device is equipped with 1 DALI channel. Up to 64 DALI or DALI-2 based luminaires per DALI channel can be controlled individually or via 16 groups. All luminaires are monitored for lamp or ballast defect. In addition up to 16 DALI-2 multi-sensors and up to 64 DALI-2 button inputs are supported per DALI channel.

Built-In DALI Bus Power Supply

All L-DALI models come with a built-in DALI bus power supply. The LDALI-ME201-U can supply its DALI channel with a guaranteed supply current of 230 mA, the LDALI-ME204-U can supply 116 mA per channel. In case of the LDALI-ME204-U 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 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.

BACnet Connectivity

The L-DALI Controllers feature connectivity in BACnet networks via BACnet/IP or BACnet MS/TP. They also provide data exchange through Global Connections and support comprehensive AST™ functionality (Alarming, Scheduling, and Trending). Full L-WEB integration is supported as well. The L-DALI Controllers are equipped with two Ethernet ports including a built-in Ethernet switch.

IoT Integration

The IoT function (Node.js) allows connecting the system to almost any cloud service, either for uploading historical data to analytics services, 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.

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.

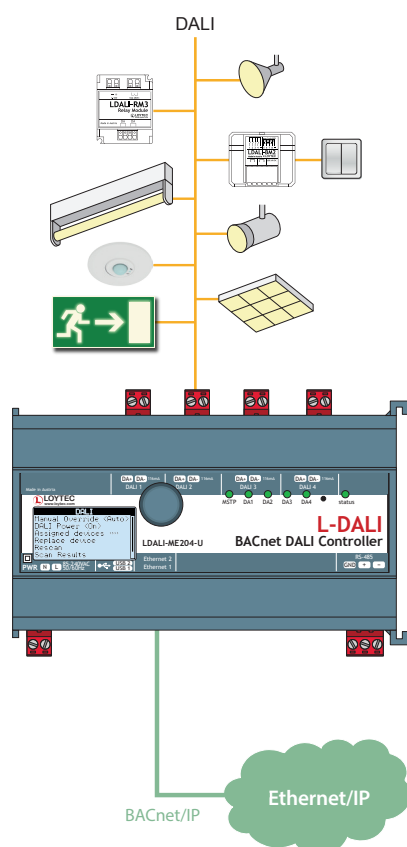
Constant Light Control

The integrated Constant Light Controller works with DALI and with BACnet devices. It supports various lighting control strategies, presence and lux level based. Several parameters can be used to configure the Constant Light Controller for almost any use case.

Sunblind Control with Constant Light Control Interaction

The integrated Sunblind Controller application allows intelligent controlling of blinds connected via SMI (requires LSMTI-804). It offers effective sun and anti-glare protection through active slat control and slat adjustment according to the sun

LDALI-ME204-U, LDALI-ME201-U



position. Energy efficiency is ensured by linking room occupancy with sun protection. If a room is unoccupied, the L-DALI Controller opens or closes the sunblinds depending on the thermal requirements. This allows for instance to use the heat of the sun for heating in winter while in summer, the heat from the sun is reduced by the closed blinds to reduce the cooling load.

Optionally, the sunblind and light control applications of a room or an area can be linked together. As both applications control the light available in the room this holistic approach assures maximum comfort and energy efficiency.

In addition to the constant light and sunblind control, any mathematical calculation and function or logical operation (Boolean algebra) can be created on the device and process all available data points.

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, OPC and Modbus

EnOcean sensors and buttons can be integrated via the optional L-ENO EnOcean interface. To use the L-DALI with an existing SCADA solution all run-time values and parameters can be accessed via BACnet, OPC (XML/DA and UA) and Modbus TCP.

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 DALI-2 multi-sensor LDALI-MS2 and LDALI-MS3, DALI-2 sensors of many well-known manufacturers can be used.

• 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. Their functionality can be configured individually. In addition to controlling lighting via DALI (dimming, scene recall, etc.) and sunblinds via SMI (up, down, etc.), button press events can be propagated in the building network, triggering other, non-lighting related building automation functions.

• DALI Relay Modules

Standard loads in the power grid can be controlled via DALI using DALI relay modules, like the LDALI-RM3 and LDALI-RM4.

• DALI Color Control

The L-DALI allows controlling DALI luminaires with color control functionality (DT8). Both, tunable white (Tc) and full RGB color control (RGBWAF and xy-coordinate) are supported. Light color can either be changed automatically, via manual operation (e.g. buttons) or via the network.

• 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.

Accessories	Interfaces	Routers, NIC	L-DALI	L-VIS, L-STAT	Gateways	L-IJOB	L-INX	L-ROC	L-WEB, L-STUDIO	Functions
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Accessories	Interfaces	Routers, NIC	L-DALI	L-VIS, L-STAT	Gateways	L-IJOB	L-INX	L-ROC	L-WEB, L-STUDIO	Functions
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Accessories	Interfaces	Routers, NIC	L-DALI	L-VIS, L-STAT	Gateways	L-IJOB	L-INX	L-ROC	L-WEB, L-STUDIO	Functions
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Accessories	Interfaces	Routers, NIC	L-DALI	L-VIS, L-STAT	Gateways	L-IJOB	L-INX	L-ROC	L-WEB, L-STUDIO	Functions
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Accessories	Interfaces	Routers, NIC	L-DALI	L-VIS, L-STAT	Gateways	L-IJOB	L-INX	L-ROC	L-WEB, L-STUDIO	Functions
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Accessories	Interfaces	Routers, NIC	L-DALI	L-VIS, L-STAT	Gateways	L-IJOB	L-INX	L-ROC	L-WEB, L-STUDIO	Functions
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Accessories	Interfaces	Routers, NIC	L-DALI	L-VIS, L-STAT	Gateways	L-IJOB	L-INX	L-ROC	L-WEB, L-STUDIO	Functions
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Accessories	Interfaces	Routers, NIC	L-DALI	L-VIS, L-STAT	Gateways	L-IJOB	L-INX	L-ROC	L-WEB, L-STUDIO	Functions
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Accessories	Interfaces	Routers, NIC	L-DALI	L-VIS, L-STAT	Gateways	L-IJOB	L-INX	L-ROC	L-WEB, L-STUDIO	Functions
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| Accessories | Interfaces | Routers, NIC | L-DALI | L-VIS, L-STAT | Gateways | L-IJOB | L-INX | L-ROC | L-WEB, L-STUDIO | Functions |
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Accessories	Interfaces	Routers, NIC	L-DALI	Gateways	L-VIS, L-STAT	L-IJOB	L-INX	L-ROC	L-WEB, L-STUDIO	Functions
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Accessories	Interfaces	Routers, NIC	L-DALI	Gateways	L-VIS, L-STAT	L-IJOB	L-INX	L-ROC	L-WEB, L-STUDIO	Functions
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| Accessories | Interfaces | Routers, NIC | L-DALI | Gateways | L-VIS, L-STAT | L-IJOB | L-INX | L-ROC | L-WEB, L-STUDIO | Functions |
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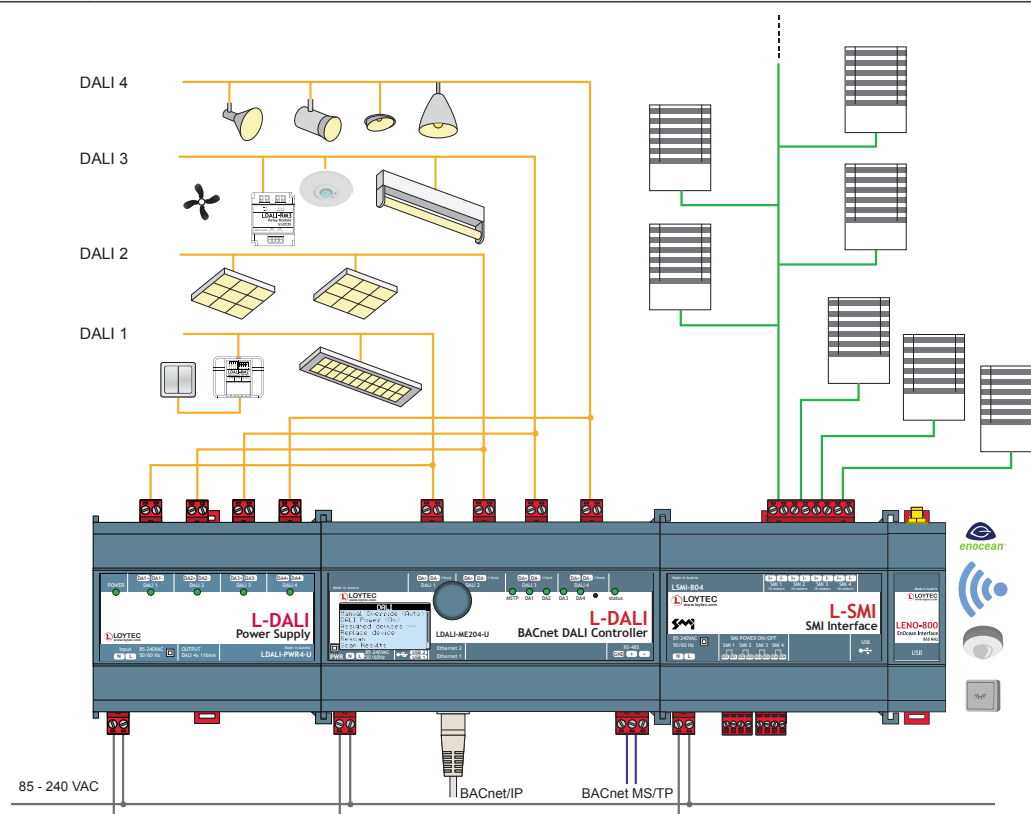
Accessories	Interfaces	Routers, NIC	L-DALI	Gateways	L-VIS, L-STAT	L-IJOB	L-INX	L-ROC	L-WEB, L-STUDIO	Functions
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LDALI-ME204-U, LDALI-ME201-U

- 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, Alexa & friends, multimedia equipment,...)
- Event-driven e-mail notification
- Supports Local and Global Connections
- 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
- Built-in OPC XML-DA and OPC UA server
- Modbus TCP (Master or Slave)
- 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

Specifications

Type	LDALI-ME204-U	LDALI-ME201-U
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 VAC, 50/60 Hz	85-240 VAC, 50/60 Hz, typ. 7.5 W
Operating conditions	0 °C to 40 °C, 10 – 90 % RH, noncondensing, degree of protection: IP40, IP20 (terminals)	
DALI channels	4	1
Integrated DALI bus power supply*	16 VDC 116 mA guaranteed supply current 125 mA max. supply current	16 VDC 230 mA guaranteed supply current 250 mA max. supply current
Interfaces	2 x Ethernet (100Base-T): OPC XML-DA, OPC UA, BACnet/IP*, Modbus TCP, HTTP, FTP, SSH, HTTPS, Firewall, VNC, SNMP 1 x RS-485 (ANSI TIA/EIA-485): BACnet MS/TP* 2 x USB-A: WLAN (needs LWLAN-800), EnOcean (needs LENO-80x) SMI (needs LSMI-804), LTE (needs LTE-800) * Either BACnet/IP or BACnet MS/TP	
Tools	L-INX Configurator and configuration via web interface	

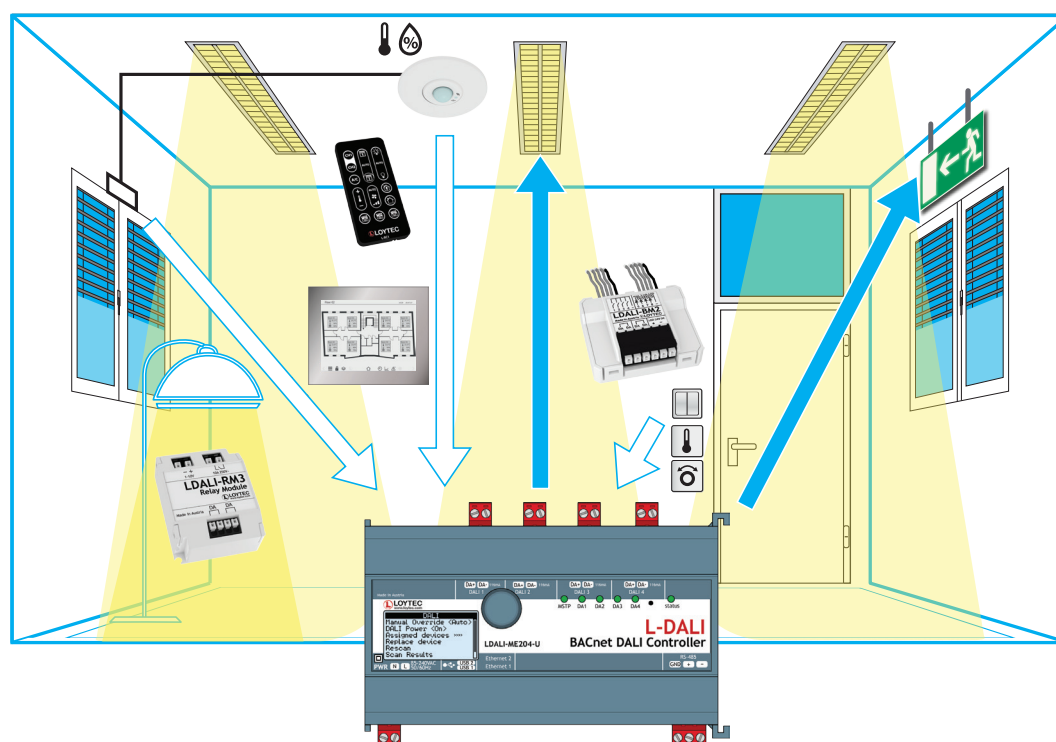


* LDALI-ME204-U with integrated DALI bus power supply will be available from Q3 2019.

BACnet/DALI Controller

LDALI-ME204-U, LDALI-ME201-U

Resource limits			
DALI ballasts per DALI channel	64	BACnet client mappings	1 000
DALI groups per DALI channel	16	BACnet scheduler objects	100
DALI sensors per DALI channel	16	BACnet calendar objects	25
DALI push buttons per DALI channel	64	BACnet notification classes	32
Scene control	16 scenes per DALI group	Trend logs	512 (4 000 000 entries, ≈ 60 MB)
Math objects	100	Data points in trend log	1 000
Alarm logs	10	E-mail templates	100
OPC data points	10 000	Modbus data points	2 000
Connections (Local/Global)	2 000 / 250	Number of EnOcean devices	100
Number of L-WEB clients	32 (simultaneously)	EnOcean data points	1 000
SMI devices (per channel)	16		
Order number	Product description		
LDALI-ME204-U	BACnet/DALI Controller, 4 DALI channels		
LDALI-ME201-U	BACnet/DALI Controller, 1 DALI channel, integrated DALI power supply		
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 multi-sensor (presence detection, lux sensor, IR receiver, temperature sensor, humidity sensor, 3 digital inputs)		
LDALI-MS3	DALI High-bay IP66 multi-sensor (presence detection, lux sensor)		
LDALI-BM2	Quadruple DALI pushbutton coupler		
LDALI-RM3	DALI Relay Module 10 A, Analog Interface 0 – 10 V and 1 – 10 V		
LDALI-RM4	DALI Relay Module 10 A, Analog Interface 0 – 10 V and 1 – 10 V, "spud-mount"		
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	USB LTE Interface		



LDALI-PWR2-U, LDALI-PWR4-U

Datasheet #89023220



The DALI-2 power supplies LDALI-PWR2-U and LDALI-PWR4-U are used to power two or four DALI channels. Per channel, the power supplies provide a guaranteed supply current of 116 mA to power devices connected to the DALI channel.

In case the DALI devices connected to the channel consume more than the 116 mA, two DALI outputs of the power supplies can be used in parallel, resulting in a guaranteed supply current of 232 mA (maximum supply current of 250 mA).

Installation

The DALI channel is treated to be non-SELV (Safety Extra Low Voltage). Therefore the relevant installation regulations for low voltage apply. The cable of a DALI channel is either limited to a maximum length of 300 m using a minimum wire cross-section of 1.5 mm² (AWG15) or must ensure a maximal voltage drop of 2 V.

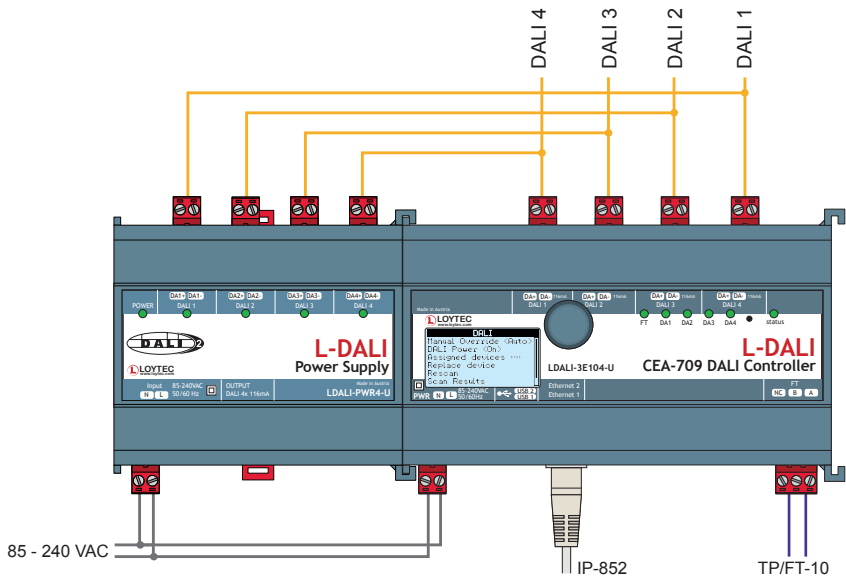
Wide Range Supply Voltage

The power supplies accept a wide range of supply voltage from 85-240 VAC, 50/60 Hz. They also feature a starting-current limitation.

DALI Power Outputs

The DALI power outputs provide 18 V (11 V – 20.5 V) and 116 mA guaranteed supply current. The power outputs are isolated from mains by basic isolation. The power outputs are short circuit proof and shut down if thermally overloaded. When a thermal overload occurs, the DALI control lamp switches off.

The LDALI-PWR2-U and LDALI-PWR4-U are DALI-2 certified.



Specifications	
Dimensions (mm)	107 x 100 x 60 (L x W x H), DIM023
Installation	DIN rail mounting following DIN 43880, top hat rail EN 50022
Power supply	85-240 V AC, 50/60 Hz, current limited start up, max. 12 W
Operating conditions	0 °C to 40 °C, 10 – 90 % RH, noncondensing, degree of protection: IP40, IP20 (terminals)
Interfaces	LDALI PWR2-U: 2 x 18 V DC (11 V – 20.5 V), each 116 mA guaranteed supply current, 125 mA max. supply current, 7 ms start-up time, short-circuit-proof, thermal overheat protection, basic isolation (not SELV) to the power line LDALI PWR4-U: 4 x 18 V DC (11 V – 20.5 V), each 116 mA guaranteed supply current, 125 mA max. supply current, 7 ms start-up time, short-circuit-proof, thermal overheat protection, basic isolation (not SELV) to the power line
Certificates	DALI-2
Order number	Product description
LDALI-PWR2-U	DALI power supply unit for 2 DALI channels
LDALI-PWR4-U	DALI power supply unit for 4 DALI channels

Datasheet #89060420



The L-RC1 is an infrared remote control, optimized for room automation applications. It allows the control of the room's lights, sunblinds and HVAC system.

It supports the individual control for up to two channels – groups of luminaires and blinds – and scene control for up to three scenes.

For HVAC applications the temperature setpoint and fan speed can be adjusted, A/C can be switched on and off and the room's occupancy status can be changed.

The L-RC1 is designed to work with L-DALI multi-sensors (LDALI-MS2) and L-STAT Room Operator Panels.

Features

- Infrared remote control optimized for room automation applications
- Control up to two light channels
- Control up to two sunblind channels
- Scene control for up to three scenes
- Adjust temperature setpoint
- Adjust fan speed
- Set occupancy status
- Switch A/C on/off

Specifications

Dimensions (mm)	40.5 x 86.4 x 7.20 (L x W x H), DIM039
Power supply	1 x CR2025 3.0 V button battery
Operating conditions	0 °C to 40 °C, 10 – 90 % RH, noncondensing
Interfaces	IR transmitter, 38±0.5 KHz, NEC standard IR format
Keys	18
For use with	LDALI-MS2, LSTAT-800-Gx-Lx, LSTAT-801-Gx-Lx, LSTAT-802-Gx-Lx, LSTAT-80x-CUSTOM

Order number	Product description
L-RC1	Infrared remote control for room automation applications

LDALI-MS2

Datasheet #89058320



The LOYTEC LDALI-MS2 multi-sensor performs occupancy detection and measures the lux level. It integrates perfectly into the L-DALI product line of lighting controllers and LROC-40x room automation controllers. The sensor uses a passive infrared presence detector, which is optimized for use in typical office environments, where even the small movements of somebody working at a desk have to be detected across the complete detection area. Its presence detection zone diameter of 10.8 m at 3 m mounting height is ideal to cover a typical office room or an area in an open office space.

With the built-in infrared receiver, the room's lights, sunblinds and HVAC system can be controlled via the optionally available IR remote control L-RC1. In addition to occupancy and lux sensors, the LDALI-MS2 comes with integrated temperature and humidity sensors. In room automation applications, those values can be used to calculate the current dew point. On the back of the sensor, there is a connector for three digital inputs, allowing to connect conventional switches and push-buttons, window contacts, dew point sensor, etc. This feature not only saves on additional hardware, but also significantly reduces wiring costs, as the inputs can be wired inside the room and wires no longer have to be pulled to the I/O modules in the switching cabinet.

The LDALI-MS2 comes with three mounting options: It can be mounted in-wall in standard flush-mounted boxes, spring snap in false ceilings and on-wall with the included surface mounting box.

Communication and power supply is handled via the DALI bus. The LDALI-MS2 supports the DALI-2 protocol as defined in the IEC 62386 2014 standard and can be integrated into DALI-2 systems of other vendors.

Features

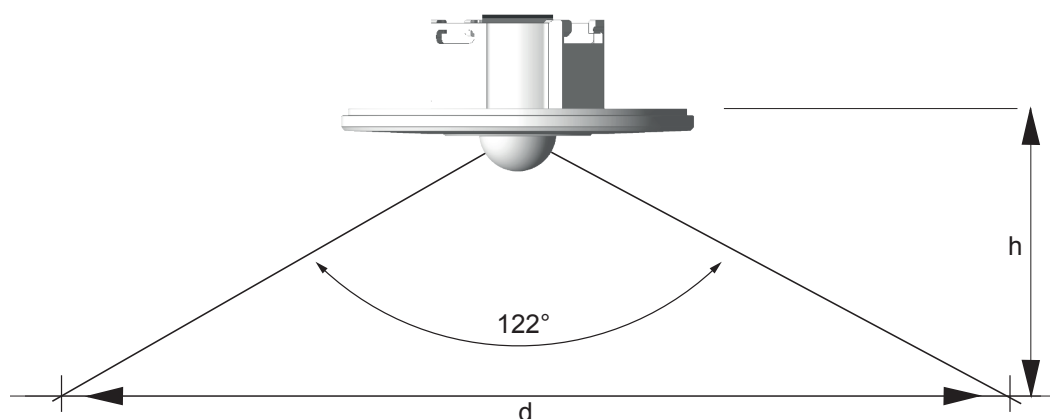
- Easy integration into LOYTEC L-DALI lighting systems and LROC-40x room automation controllers with a special focus on lighting control and reducing energy costs
- Supports DALI-2 as defined in IEC 62386 2014 standard (input device)
- High sensitivity Occupancy detection (PIR), optimized for office applications
- Lux level measurements
- Built-in infrared receiver for optional infrared remote control L-RC1
- Temperature sensor
- Humidity sensor
- 3 digital inputs (dry contact)
- LDALI-MS2 can be mounted in a flush-mounted box, directly in false ceilings (spring mount included) or on-wall (surface mounting box included)
- Multi-master compatible, up to 16 LDALI-MS2 sensors per DALI channel given a sufficiently dimensioned bus supply
- Supplied via the DALI channel, no external power supply is necessary
- Sensor head can be tilted up to $\pm 15^\circ$ vertically

Specifications

Dimensions (mm)	Total-Ø: 104; flush-mounted-Ø: 58; height flush-mounted: 30; DIM040
Installation	Ceiling mount: <ul style="list-style-type: none"> • Flush-mounted installation • Direct installation in false ceilings (spring mount included) • On-wall (surface mounting box included)
Power supply	DALI bus, typ. 3.5 mA at 16 VDC
Operating conditions	0 °C to 50 °C, 10 – 90 % RH, noncondensing, degree of protection: IP20
Interfaces	1 x DALI 1 x infrared remote control receiver 3 x digital input (dry contact, not protected against overvoltage)
DALI protocol conformance (IEC 62386 parts)	101 ed2, 103 ed1 (input device), 301 ed1 (digital inputs, IR remote), 303 ed1 (PIR), 304 ed1 (lux sensor)
Color	RAL 9010, pure white
For use with	LDALI-3E101-U, LDALI-3E102-U, LDALI-3E104-U, LDALI-ME201-U, LDALI-ME204-U, LDALI-PLC4, LROC-40x

Resource limits

Number of LDALI-MS2	16 per DALI channel, with sufficient dimensioned DALI bus power supply
Passive infrared motion detector	Detection diameter: 10,8 m @ 3 m mounting height (92 m ²), 136 zones, opening angle: 122°
Mounting height	max. 5 m
Lux level measurement	0 – 4000 lux, resolution: 0.125 lux
Temperature measurement	- 5 - 60 °C, resolution: 0.1 °C, accuracy: ±0.2 °C (0 – 70 °C)
Rel. Humidity measurement	0 % – 100 %, resolution 0.5 %, accuracy: typ. ±2.2 % R.H. @ 25 °C, 20 % – 80 % R.H. typ. ±4 % R.H. @ 25 °C, 0 % – 20 % R.H. and 80 % – 100 % R.H.
Connection wires profile	0.2 - 1.5 mm ² [AWG 28 - 14]
Wire stripping length	6 mm [0.24 in]
Wire length for digital inputs	< 10 m

**Mounting Height / Coverage**

h [m]	d [m]	A [m ²]
1.5	5.4	23
2.0	7.2	41
2.5	9.0	64
2.7	9.7	75
3.0	10.8	92
3.5	12.6	125
4.0	14.4	164
4.5	16.2	207
5.0	18.0	256

Order number	Product description
LDALI-MS2	DALI multi-sensor (presence detection, lux sensor, IR receiver, temperature sensor, humidity sensor, 3 digital inputs)
L-RC1	Infrared remote control for room automation applications

LDALI-MS3

Datasheet #89067620



Available from Q3 2019

The LOYTEC LDALI-MS3 multi-sensor performs occupancy detection and measures the lux level. With a mounting height of 5 to 10 m, an IP66 protection and an operating temperature between -20 to +50 °C it is the perfect sensor for all mid- and high-bay applications and harsh environments. Typical use cases include all kinds of halls, factory floors, storage buildings, warehouses, garages, and outdoor applications. The LDALI-MS3 integrates perfectly into the L-DALI product line of lighting controllers and LROC-40x room automation controllers.

The sensor uses a passive infrared presence detector, which is optimized for detection of moving people. Its presence detection zone diameter ranges from 7 m at 5 m mounting height to 14 m at 10 m height. Included with each LDALI-MS3 there is a detection area cover, which can be used to reduce the detection area by 120°.

Communication and power supply is handled via the DALI bus. The LDALI-MS3 supports the DALI-2 protocol as defined in the IEC 62386 2014 standard and can be integrated into DALI-2 systems of other vendors.

Features

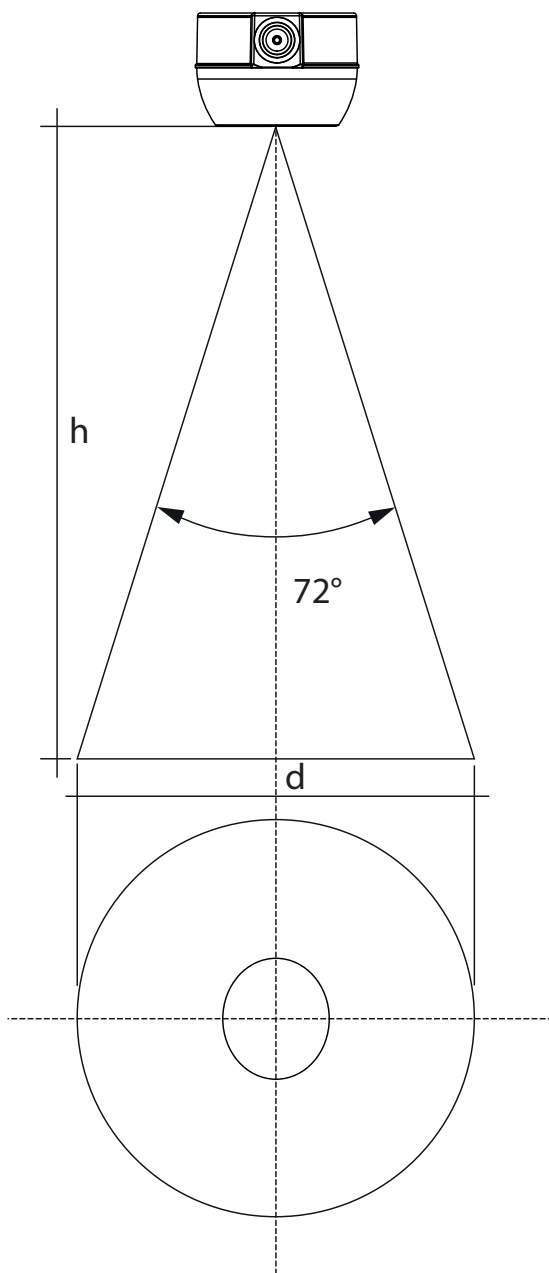
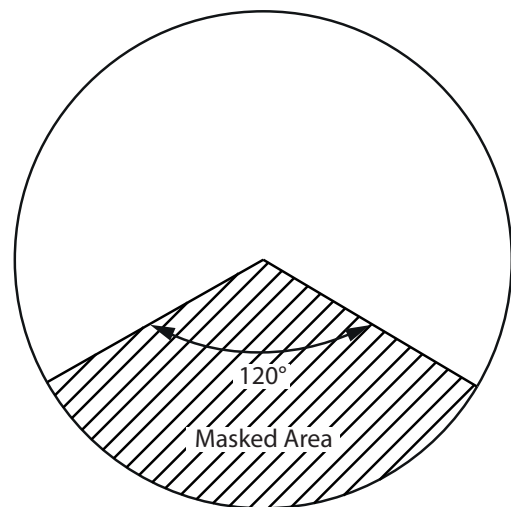
- Easy integration into LOYTEC L-DALI lighting systems and LROC-40x room automation controllers with a special focus on lighting control and reducing energy costs
- Supports DALI-2 as defined in IEC 62386 2014 standard (input device)
- Occupancy detection (PIR), optimized for moving people in mid- and high-bay applications
- Lux level measurements
- IP66 protection and ambient temperature -25°C to +50°C for use in harsh environments
- Direct mounting on ceiling
- Shutter for preventing movement detection in one direction included
- Multi-master compatible, up to 16 LDALI-MS3 sensors per DALI channel given a sufficiently dimensioned bus supply
- Supplied via the DALI channel, no external power supply is necessary

Specifications

Dimensions (mm)	Total-Ø: 111; DIM008
Installation	Ceiling surface mount
Power supply	DALI bus, typ. 8 mA at 16 VDC
Operating conditions	-20 °C to +50 °C, no condensing
Degree of protection	IP66
Interfaces	1 x DALI, protected against overvoltage (mains voltage)
DALI protocol conformance (IEC 62386 parts)	101 ed2, 103 ed1 (input device), 303 ed1 (PIR), 304 ed1 (lux sensor)
Color	RAL 9010, pure white
For use with	LDALI-3E101-U, LDALI-3E102-U, LDALI-3E104-U, LDALI-ME201-U, LDALI-ME204-U, LDALI-PLC4, LROC-40x

Resource limits

Number of LDALI-MS3	16 per DALI channel, with sufficient dimensioned DALI bus power supply
Passive infrared motion detector	Detection diameter: 7.0 m @ 5 m mounting height (38 m ²), opening angle: 72°
Mounting height	5 - 10 m
Lux level measurement	0.5 – 1024 lux, resolution: 0.25 lux
Connection wires profile	0.2 - 0.5 mm ² [AWG 24 - 20]
Wire stripping length	8 mm [0.31 in]

**Shutter for preventing movement detection****Mounting Height / Coverage**

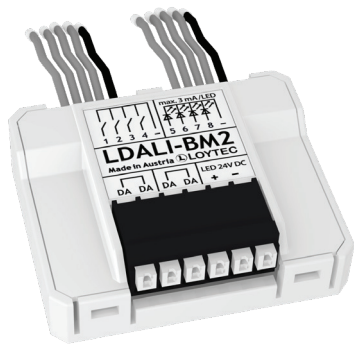
h [m]	d [m]	A [m ²]
5	7.0	38.6
6	8.4	55.4
7	9.8	75.4
8	11.2	98.5
9	12.6	124.7
10	14.0	153.9

Order number Product description

LDALI-MS3	DALI High-bay IP66 multi-sensor (presence detection, lux sensor)
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LDALI-BM2

Datasheet #89057620



The LDALI-BM2 pushbutton coupler integrates up to four customary light push buttons and switches into a DALI channel. Alternatively, two of the four inputs can be used as analog inputs to connect devices like sliders, dials or even resistance based sensors like NTC temperature sensors.

Connected pushbuttons or switches can be used to control luminaires and sun-blinds using L-DALI lighting controllers or L-ROC room automation controllers. The following functions are available:

- Dim up, dim down
 - Off
 - On with last dimming value
 - Scene recall: 1–15
 - Dim to a specified value in %
- Color temperature warmer/colder
 - Active auto mode
 - Move Sunblind up/down
 - Set area Occupied/Unoccupied

In the mode toggle, the function is carried out depending on the lighting status (toggle switch). Communication and power supply is handled via the DALI bus. The LDALI-BM2 supports the DALI-2 protocol as defined in the IEC 62386 2014 standard and can be integrated into DALI-2 systems of other vendors.

Features

- Easy integration into LOYTEC L-DALI lighting systems and LROC-40x room automation controllers
 - Supports DALI-2 as defined in IEC 62386 2014 standard (input device)
 - 2 digital inputs (dry contact) for conventional pushbuttons or switches
 - 2 universal inputs (potential free) for conventional push-buttons, switches, sliders, dials or NTC temperature sensors
- 4 outputs for direct control of feedback LEDs*
 - Multi-master compatible, up to 64 LDALI-BM2 pushbutton couplers per DALI channel with sufficient dimensioned bus supply
 - Supplied via the DALI channel, no external power supply is necessary
 - Pre-confectioned wires for connection of inputs
 - Optimized for mounting behind standard switches

Specifications

Dimensions (mm)	45.8 x 37.8 x 13.5 (L x W x H), DIM041
Installation	flush-mounted installation, can be directly installed behind the pushbutton/switch
Power supply	DALI bus, typ. 3.0 mA at 16 V DC (without LEDs) Optional 24 V DC (± 10%) required to supply feedback LEDs
Operating conditions	0 °C to 50 °C, 10–90 % RH, noncondensing, degree of protection: IP20
Interfaces	1 x DALI, protected against overvoltage (mains voltage) 2 x universal inputs (digital input or resistance measurement, not protected against overvoltage, pluggable), wire length < 10 m (digital), wire length < 50 cm (analog) 2 x digital input (dry contact, not protected against overvoltage, pluggable), wire length < 10 m 4 x outputs for feedback LEDs*
DALI protocol conformance (IEC 62386 parts)	101 ed2, 103 ed1 (input device), 301 ed1 (digital inputs), 302 ed1 (universal inputs)
For use with	LDALI-3E101-U, LDALI-3E102-U, LDALI-3E104-U, LDALI-ME201-U, LDALI-ME204-U, LDALI-PLC4, LROC-40x

Resource limits

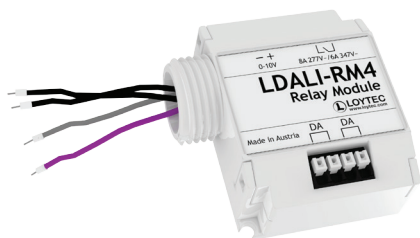
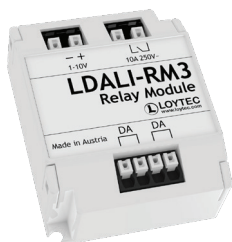
Number of LDALI-BM2	64 per DALI channel, with sufficient dimensioned DALI bus power supply
Connection wires profile	0.2 - 1.5 mm² [AWG 24 - 16]
Wire stripping length	8 mm [0.31 in]
Wire length for digital inputs	< 10 m
Wire length for universal inputs (digital)	< 10 m
Wire length for universal inputs (analog)	< 50 cm

Order number	Product description
LDALI-BM2	Quadruple DALI pushbutton coupler

* Available in future product version

LDALI-RM3, LDALI-RM4

Datasheet #89059020



The LDALI-RM Relay Modules enable the control of standard consumers via a DALI channel. Typical application scenarios are the integration of non-DALI luminaires or other loads like fans in toilets or washrooms and motors for partition walls or screens in DALI lighting applications.

The built-in relay contact can be used for currents of up to 10 A or loads of up to 2.500 VA, respectively. It supports a wide voltage range of 120 – 347 V AC and up to 30 V DC. Zero cross switching technology is used to be able to handle the large in-rush currents typically found in lighting applications. For legacy dimmable ballasts the LDALI-RM modules are also equipped with an 0-10 V and 1-10 V interface, which can be used together with the relay contact to control these types of loads via DALI.

Together with the LOYTEC DALI controllers or LROC-40x room automation controllers, the LDALI-RM modules act as programmable switching output modules. The integration of the module in the DALI network follows the same simple steps as the integration of a DALI lamp. The device supports the DALI specification IEC 62386-208 (Device Type 7, "switching function") for non-dimmable loads and the DALI specifications IEC 62386-206 (Device Type 5, "converter") for loads dimmable via the 0 - 10 V and 1 - 10 V interface, respectively. The LDALI-RM modules are directly connected to a DALI channel and also supplied with energy by that channel.

As a unique safety feature the relay state for fault conditions can be configured: In case of a loss of power on the DALI bus, the relay will switch to the position as defined with the DALI configuration register "System Failure Level".

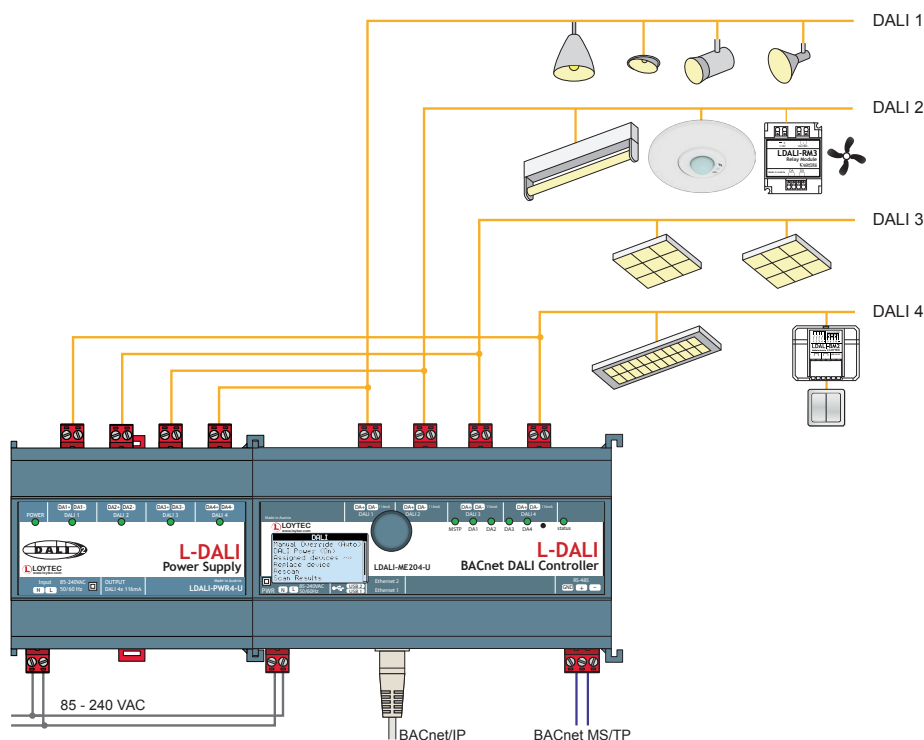
The LDALI-RM module comes with two housing options: While the LDALI-RM3 is designed for installation in distribution boxes or behind standard plugs in installation boxes, the LDALI-RM4 allows installation on US-style fixtures or junction box ½" knockouts ("spud-mount").

Features

- Easy integration into LOYTEC L-DALI lighting systems and LROC-40x room automation controllers
- Device configuration with the free L-DALI Configurator or via the built-in web server of the L-DALI controller
- Programmable switching output for standard consumers in the power grid
- Universal voltage support (120 – 347 V AC)
- Up to 64 LDALI-RM Relay Modules per DALI channel with sufficient dimensioned bus supply
- Supplied via the DALI channel
- Potential-free, bi-stable relay make contact
- Analog Interface 0 – 10 V and 1 – 10 V for legacy dimmable lamps
- DALI specification IEC 62386-208 (Device Type 7 – Switching Function) supported
- DALI specification IEC 62386-206 (Device Type 5 – Converter) supported
- Configurable relay position in case of power loss
- Zero cross switching function

L-DALI Relay Module

LDALI-RM3, LDALI-RM4



Specifications

Type	LDALI-RM3	LDALI-RM4
Dimensions (mm)	51 x 41 x 21 (L x W x H), DIM042	51 x 51 x 21 (L x W x H), DIM042
Power supply	DALI bus, typ. 3 mA at 16 VDC	
Operating conditions	0 °C to 50 °C, 10 – 90 % RH, non-condensing, degree of protection: IP20	
Interfaces	1 x DALI, protected against overvoltage (mains voltage) 1 x Analog interface 0 – 10 V or 1 – 10 V	
DALI protocol conformance (IEC 62386 parts)	101 ed2, 102 ed2, 208 ed1 (switching) or 206 ed1 (converter)	
For use with	LDALI-3E101-U, LDALI-3E102-U, LDALI-3E104-U, LDALI-ME201-U, LDALI-ME204-U, LDALI-PLC4, LROC-40x	

Resource limits

Number of LDALI-RM3/LDALI-RM4	64 per DALI channel, with sufficient dimensioned DALI bus power
Connection wires profile	0.5 – 1.5 mm ² [AWG 24 – 16]
Wire stripping length	8 mm [0.31 in]
Max. switching power	2 500 VA, 300 W
Nominal switching capacity AC	12 A, 120 V AC 10 A, 120 V AC 8 A, 277 V AC 6 A, 347 V AC
Nominal switching capacity DC	10 A, 30 V DC
Relay contact switching voltage	120 – 347 V AC / 30 V DC
Switching cycle	1.5 x 10 ⁵
Min. switching interval	500 ms
Max. average switching frequency	20 times/min
Interface (0 – 10 V / 1 – 10 V)	current sink 2 mA

Order number Product description

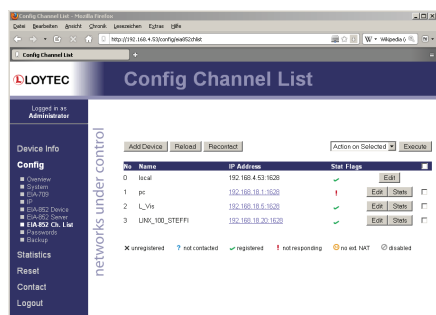
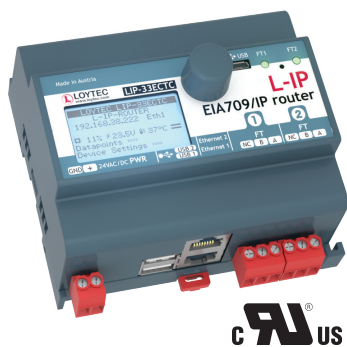
LDALI-RM3	DALI Relay Module 10 A, Analog Interface 0 – 10 V and 1 – 10 V
LDALI-RM4	DALI Relay Module 10 A, Analog Interface 0 – 10 V and 1 – 10 V, "spud-mount"

Routers, NIC



LIP-1ECTC, LIP-3ECTC, LIP-33ECTC, LIP-3333ECTC

Datasheet #89013120



The L-IP Routers LIP-1ECTC, LIP-3ECTC, LIP-33ECTC, and LIP-3333ECTC connect twisted pair channels (TP/FT-10 or TP/XF-1250) with the Ethernet/IP channel (IP-852) in LonMark Systems. L-IP routes CEA-709 packets through an IP based network such as a LAN (Ethernet), an Intranet, or even the Internet.

In order to provide optimal router configurations, the L-IP is available in four different versions providing either 4 x TP/FT-10, 2 x TP/FT-10, 1 x TP/FT10, or 1 x TP/XF-1250. Every L-IP supports the operating modes "Smart Switch Mode" and "Configured Router Mode".

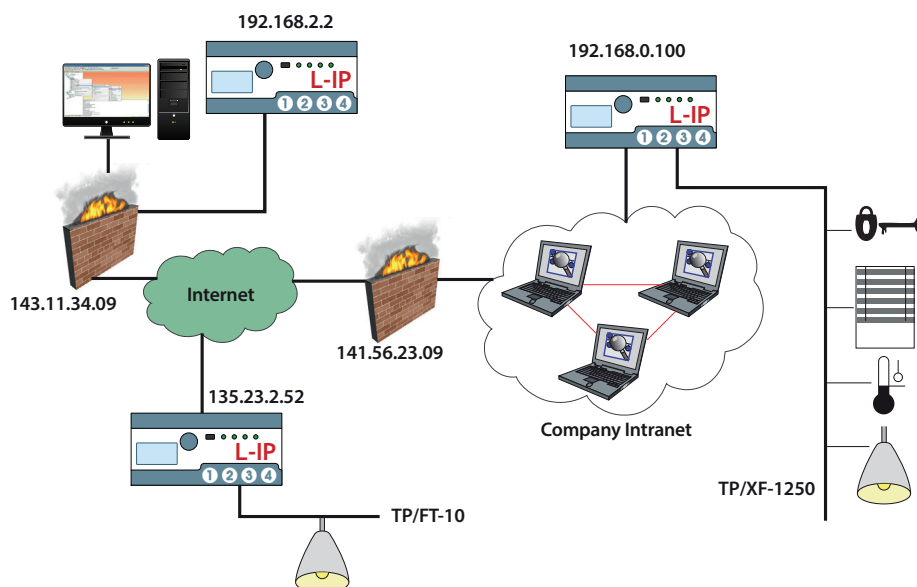
For an easy integration on the IP side, the L-IP provides a web interface. On L-IP Routers LIP-1ECTC, LIP-3ECTC, LIP-33ECTC, and LIP-3333ECTC the Web interface can also be used via an encrypted HTTPS connection. Through this web interface, the built-in CEA-852 Configuration Server can be switched on and configured. The Configuration Server is thus always available online in the network and no additional software tool is required.

Besides the router functionality, the L-IP Routers provide outstanding capabilities for network diagnostic and analysis. They allow the LPA (LOYTEC Protocol Analyzer) transparent access to the twisted pair channels (TP/FT-10 or TP/XF-1250) on the device via Ethernet/IP – via a local Intranet or the Internet. This allows a fast analysis of data communication and reduces time-consuming troubleshooting. All system registers are available as OPC XML-DA and OPC UA data points.

The L-IP Routers LIP-1ECTC, LIP-3ECTC, LIP-33ECTC, and LIP-3333ECTC are 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 to an insecure network (building LAN) where the standard building automation protocols are present (e.g. IP-852). These devices also feature firewall functionality of course to isolate particular protocols or services between the ports. The built-in VPN function provides for simple VPN setup and secure access to remote sites. The LTE-800 interface enables wireless access to remote sites through a mobile carrier.

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.



LIP-1ECTC, LIP-3ECTC, LIP-33ECTC, LIP-3333ECTC

Features

- Routes CEA-709 packets between TP/FT-10 (link power compatible) or TP/XF-1250 channels and Ethernet/IP (IP-852)
- Compliant with CEA-709, CEA-852, and ISO/IEC 14908-1 standard (LonMark System)
- Supports Configured Router mode, Smart Switch mode, and Repeater mode
- Built-in CEA-852 configuration server for up to 100 members
- Support for operation behind NAT routers and firewalls
- Easy installation, Auto-NAT, roaming, DHCP
- Remote LPA support with LPA-IP
- Integrated web server for device and IP-852 configuration
- Built-in enhanced communication test for IP-852
- Network diagnostic LEDs
- Dual Ethernet/IP interface
- Secure web interface via HTTPS
- Built-in OPC XML-DA and OPC UA server
- 128x64 graphic display with backlight
- Local display of device information
- Manual operation using the jog dial or VNC client
- Supports WLAN through LWLAN-800 Interface
- Supports LTE through LTE-800 Interface
- Stores user-defined project documentation
- Supports VPN for IP-852

Specifications

Operating conditions	0 °C to 50 °C, 10–90 % RH, noncondensing, degree of protection: IP40, IP20 (terminals)
Installation	DIN rail mounting following DIN 43880, top hat rail EN 50022
Power supply	12-35 VDC / 12-24 V AC $\pm 10\%$, typ. 3 W

Specifications

Type	LIP-1ECTC	LIP-3ECTC	LIP-33ECTC	LIP-3333ECTC
Dimensions (mm)	107 x 100 x 75 (L x W x H), DIM046			159 x 100 x 75 (L x W x H), DIM054
Interfaces	2 x Ethernet (100Base-T): LonMark IP-852, OPC XML-DA (server), OPC UA (server), HTTP, FTP, SSH, HTTPS, Firewall, NTP, VNC, SNMP 2 x USB-A: WLAN (needs LWLAN-800), LTE (needs LTE-800)			
	1 x TP/XF-1250	1 x TP/FT-10	2 x TP/FT-10	4 x TP/FT-10
Tools	Configuration via web browser or locally via graphic display and jog dial			

Resource limits

Configuration Server	CEA-852 configuration server for up to 100 members on the IP-852 channel
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Order number	Product description
LIP-1ECTC	CEA-709/IP-852 Router, 1 x TP/XF-1250, 1 x Ethernet-Port (IP-852)
LIP-3ECTC	CEA-709/IP-852 Router, 1 x TP/FT-10, 2 x Ethernet port (IP-852)
LIP-33ECTC	CEA-709/IP-852 Router, 2 x TP/FT-10, 2 x Ethernet port (IP-852)
LIP-3333ECTC	CEA-709/IP-852 Router, 4 x TP/FT-10, 1 x Ethernet port (IP-852)
LPOW-2415B	Power supply unit with power connector 24 VDC, 15 W
LWLAN-800	Wireless LAN Interface IEEE 802.11bgn
LT-03	Network terminator, 1 x TP/FT-10 or TP/LPT-10 (bus or free topology), 1 x Network Access Connector RJ45
LT-13	Network terminator, 1 x TP/FT-10 or TP/LPT-10 (bus or free topology), 1 x TP/XF-1250
LT-33	Network terminator, 2 x TP/FT-10 or TP/LPT-10 (bus or free topology)
LTE-800	USB LTE Interface

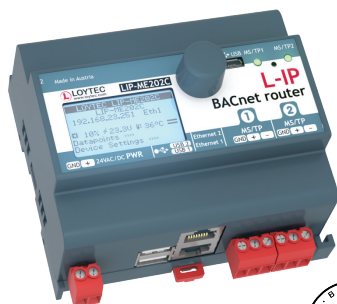
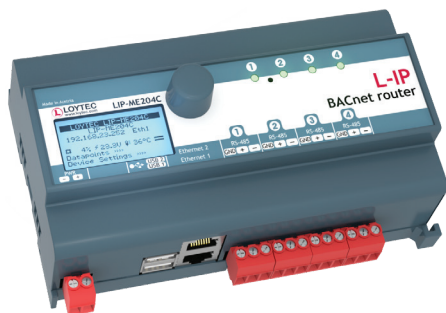
BACnet/IP Router

LIP-ME201C, LIP-ME202C, LIP-ME204C

Datasheet #89015520

✓ BACnet
CEA-709
KNX

Modbus
M-Bus
✓ OPC



The LIP-ME201C, LIP-ME202C, and LIP-ME204C BACnet/IP Routers connect BACnet MS/TP channels to a BACnet/IP network. The BACnet routers are compliant with the standards ASHRAE 135-2012 and ISO 16484-5:2012. The routers can be configured to act as a BACnet Broadcast Management Device (BBMD). The L-IP BACnet/IP Routers also provide Foreign Device support.

The BACnet router can act as a BACnet Time Master and as a BACnet MS/TP Slave Proxy. Extended features like the optional write protection of the BDT, a BACnet/IP Access Control List (ACL), and a simple communications test for BBMD help to locate issues on the network. The BACnet router also features remote MS/TP data packet capturing. BACnet MS/TP data packets are captured by the device and can be analyzed using Wireshark (free Protocol Analyzer, www.wireshark.org). Wireshark can either connect to the L-IP online or the capture file is loaded from the L-IPs web server and analyzed offline in Wireshark.

The complete device configuration of the BACnet router is done via the built-in web server, optionally also secured via HTTPS protocol. All system registers are available as OPC XML-DA and OPC UA data points.

The BACnet router is BTL certified as BACnet Building Controllers (B-BC).

Each L-IP BACnet/IP Router 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 to an insecure network (LAN) where the standard building automation protocols like BACnet/IP, LON/IP, or Modbus TCP are present. These devices also feature fire-wall functionality of course to isolate particular protocols or services between the ports. The built-in VPN function provides for simple VPN setup and secure access to remote sites. The LTE-800 interface enables wireless access to remote sites through a mobile carrier.

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.

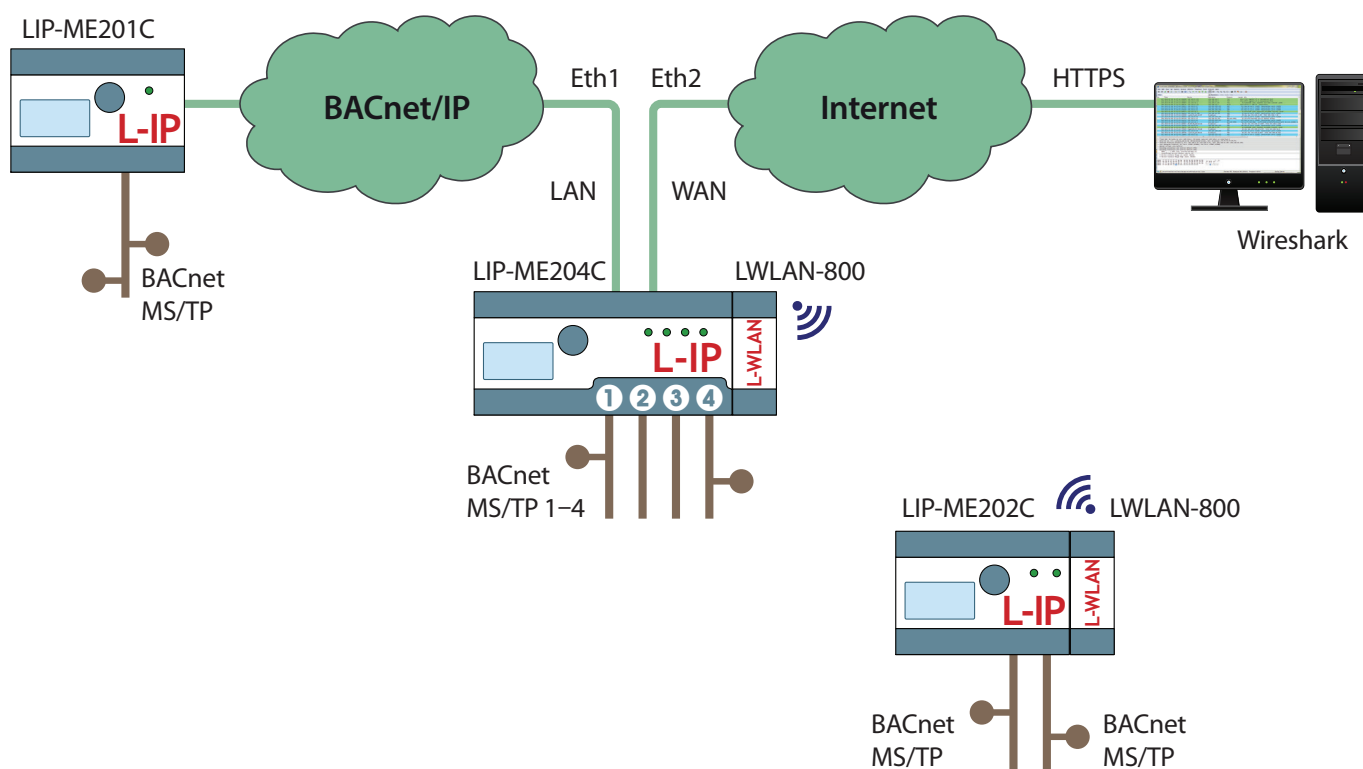
Features

- Routes packets between BACnet MS/TP and BACnet/IP
- Compliant with ANSI/ASHRAE 135-2012 and ISO 16484-5:2012 standard
- BBMD (BACnet Broadcast Management Device)
- Foreign device support
- Slave Proxy for up to 32 MS/TP slave devices
- Configuration via built-in web server
- Built-in OPC XML-DA and OPC UA server
- Dual Ethernet/IP interface
- Access to network statistics via web browser
- BACnet MS/TP diagnostic LED
- BACnet MS/TP diagnostic via web interface
- MS/TP remote data packet capture (Wireshark)
- Ethernet link and activity LED
- Secure web interface via HTTPS
- 128x64 graphic display with backlight
- Local display of device information
- Manual operation using the jog dial or VNC client
- Supports WLAN through LWLAN-800 Interface
- Supports LTE through LTE-800 Interface
- Stores user-defined project documentation
- Supports VPN for BACnet/IP

LIP-ME201C, LIP-ME202C, LIP-ME204C

Specifications

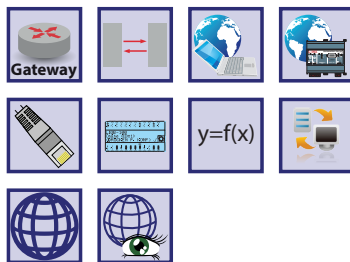
Type	LIP-ME201C	LIP-ME202C	LIP-ME204C
Dimensions (mm)	107 x 100 x 75 (L x W x H), DIM046		159 x 100 x 75 (L x W x H), DIM054
Installation	DIN rail mounting following DIN 43880, top hat rail EN 50022		
Power supply	12-35 VDC / 12-24 VAC $\pm 10\%$, typ. 2.5 W		24 VDC / 24 VAC $\pm 10\%$, typ. 2.5 W
Operating conditions	0 °C to 50 °C, 10 – 90 % RH, noncondensing, degree of protection: IP40, IP20 (terminals)		
Interfaces	2 x Ethernet (100Base-T): BACnet/IP, OPC XML-DA (server), OPC UA (server), HTTP, FTP, SSH, HTTPS, Firewall, NTP, VNC, SNMP		
	2 x USB-A: WLAN (needs LWLAN-800), LTE (needs LTE-800)		
	1 x BACnet MS/TP	2 x BACnet MS/TP	4 x BACnet MS/TP
Tools	Configuration via web browser		



BACnet/IP Router

LIP-ME201C, LIP-ME202C, LIP-ME204C

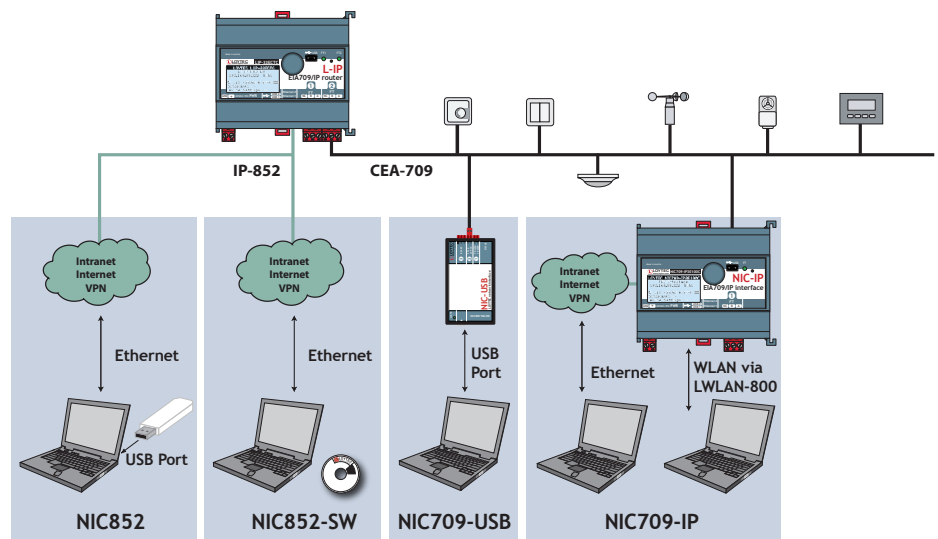
Order number	Product description
LIP-ME201C	BACnet/IP Router, 1 x BACnet MS/TP (RS-485), 2 x Ethernet port (BACnet/IP)
LIP-ME202C	BACnet/IP Router, 2 x BACnet MS/TP (RS-485), 2 x Ethernet port (BACnet/IP)
LIP-ME204C	BACnet/IP Router, 4 x BACnet MS/TP (RS-485), 2 x Ethernet port (BACnet/IP)
LPOW-2415B	Power supply unit with power connector 24 VDC, 15 W
LWLAN-800	Wireless LAN Interface IEEE 802.11bgn
LT-04	Network terminator, 1 x RS-485 (bus topology, ANSI TIA/EIA-485), 1 x Network Access Connector RJ45
LT-B4	Network terminator, 1 x RS-485 (bus topology, ANSI TIA/EIA-485) with biasing circuit (failsafe biasing)
LTE-800	USB LTE Interface



LOYTEC NICs are the most universal network interfaces for CEA-709 and IP-852 (Ethernet/IP) channels. Based on LOYTEC's Core Technologies, they offer high packet rates and short response times. All NICs are fully compatible with products like NL220, ALEX, LonMaker®, and other LNS® applications. The NICs are also compatible with NodeUtil32, NLUtil, OPC servers, and high performance ORION applications.

The multiplexed network interface (MNI) support allows starting multiple LNS® or MIP applications to run in parallel with an LPA on a single network interface.

The built-in VPN function provides for simple VPN setup and secure access to remote sites. The LTE-800 interface enables wireless access to remote sites through a mobile carrier.



Features

- Network interface for TP/FT-10, TP/XF-1250, RS485, and Ethernet/IP (IP-852) channels
- Available for USB and Ethernet port
- Create up to eight network nodes with a single network interface (MNI devices)
- Use the LPA, LSD Tool, your ORION applications, MIP applications, and LNS® (VNI) applications on a single network interface at the same time
- Compatible with BMS e.g. Honeywell EBI, TAC VISTA, etc.
- Compatible with LNS® applications in high performance VNI™ mode e.g. NL220, NLFacilities, NLOPC-VNI, ALEX, LonMaker®, etc.
- Compatible with MIP applications (LDV interface) e.g. NodeUtil32, NLUtil, NLOPC-MIP, Honeywell CARE 5/7, etc.
- Compatible with high performance ORION applications (ORION API)
- NIC852 is fully compatible with L-IP and i.LON® 600 Internet routers
- Use legacy MIP applications together with the IP-852 (Ethernet) channel
- With dual Ethernet, switched or separated (only NIC709-IP3E100C, NIC709-IP1E100C)
- Supports WLAN with LWLAN-800 Interface (only NIC709-IP3E100C, NIC709-IP1E100C)
- Supports LTE with LTE-800 Interface (only NIC709-IP3E100C, NIC709-IP1E100C)
- Runs on Windows 7, Windows 8, Windows 10, Windows Server 2003 (32-bit), Windows Server 2008, Windows Server 2012, Windows Server 2016

NIC Network Interface

NIC709-IP3E100C, NIC709-IP1E100C, NIC709-USB100, NIC852-SW, NIC852

Specifications NIC709-USB100

Type	NIC709-USB100
Dimensions (mm)	120 x 70 x 23 (L x W x H), DIM052
Power supply	Via USB, max. 130 mA
Operating conditions	0 °C to 50 °C, 10 – 90 % RH, noncondensing, degree of protection: IP40, IP20 (terminals)
Interfaces	1 x TP/FT-10 1 x TP/XF-1250 1 x RS-485 (ANSI TIA/EIA-485)
Tools	LOYTEC Network Interface NIC software
Operating system	Windows 7, Windows 8, Windows 10, Windows Server 2003 (32-bit), Windows Server 2008, Windows Server 2012, Windows Server 2016

Resource limits

MNI devices	8 (multiplexed network interfaces)
-------------	------------------------------------

Specifications NIC709-IP3E100C (successor of NIC709-IP3E100) and NIC709-IP1E100C (successor of NIC709-IP1E100)

Type	NIC709-IP3E100C	NIC709-IP1E100C
Dimensions (mm)	107 x 100 x 75 (L x W x H), DIM046	
Installation	DIN rail mounting following DIN 43880, top hat rail EN 50022	
Power supply	12-35 VDC / 12-24 VAC ±10 %, typ. 2.5 W	
Operating conditions	0 °C to 50 °C, 10 – 90 % RH, noncondensing, degree of protection: IP40, IP20 (terminals)	
Interfaces	2 x Ethernet (100Base-T): HTTP, FTP, SSH, HTTPS, Firewall, NTP, VNC, SNMP 2 x USB-A: WLAN (needs LWLAN-800) LTE (needs LTE-800)	
	1 x TP/FT-10	1 x TP/XF-1250
Tools	LOYTEC Network Interface NIC Software	
Operating system	Windows 7, Windows 8, Windows 10, Windows Server 2003 (32-bit), Windows Server 2008, Windows Server 2012, Windows Server 2016	

Resource limits

MNI devices	8 (multiplexed network interfaces)
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Specifications NIC852

Power supply	Via USB, max. 50 mA
Interfaces	1 x USB PC connector
Tools	LOYTEC Network Interface NIC software
Operating system	Windows 7, Windows 8, Windows 10, Windows Server 2003 (32-bit), Windows Server 2008, Windows Server 2012, Windows Server 2016

Resource limits

MNI devices	8 (multiplexed network interfaces)
-------------	------------------------------------

Order number	Product description
NIC709-USB100	USB interface, connects to the USB port of a PC, supports LonMark TP/FT-10, TP/XF-1250, TP/RS-485 channels
NIC709-IP3E100C	Remote network interface (RNI), PC connection via Ethernet or WLAN, for a LonMark TP/FT-10 channel
NIC709-IP1E100C	Remote network interface (RNI), PC connection via Ethernet or WLAN, for a LonMark TP/XF-1250 channel
NIC852	Floating license via USB hardlock key, uses Ethernet port of PC to connect to LonMark IP-852 channel
NIC852-SW	Software license for one PC, uses Ethernet port of PC to connect to LonMark IP-852 channel
LPOW-2415B	Power supply unit with power connector 24 VDC, 15 W
LWLAN-800	Wireless LAN Interface IEEE 802.11bgn
LT-03	Network terminator, 1 x TP/FT-10 or TP/LPT-10 (bus or free topology), 1 x Network Access Connector RJ45
LT-13	Network terminator, 1 x TP/FT-10 or TP/LPT-10 (bus or free topology), 1 x TP/XF-1250
LT-33	Network terminator, 2 x TP/FT-10 or TP/LPT-10 (bus or free topology)
LTE-800	USB LTE Interface

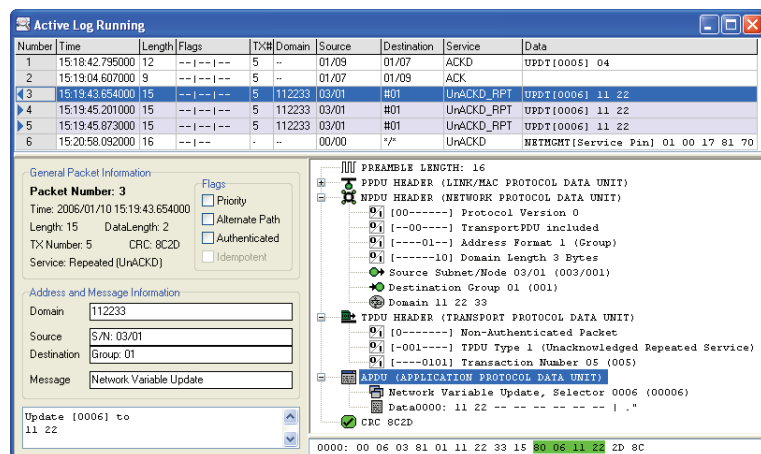
LPA-SET-USB, LPA-USB, LPA-IP, LPA-SW, LPA-IP-SW

Datasheet #89010520



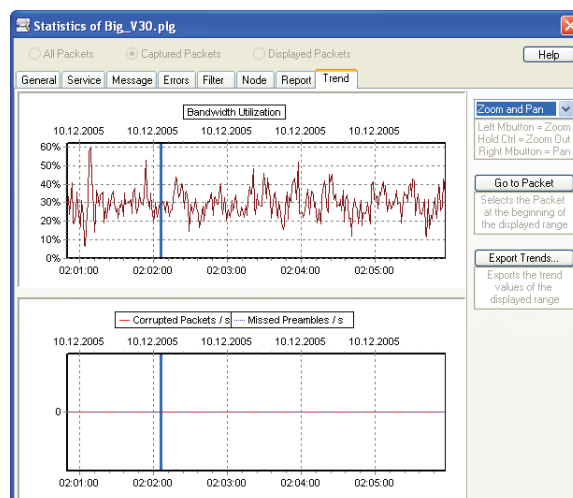
The LOYTEC Protocol Analyzer (LPA) for LonMark Systems captures all data packets on CEA-709 or IP-852 networks and displays all recorded packets on a PC screen. The LPA software provides a comprehensive set of functions and methods to view, filter, and analyze data packets down to bit level.

The long time recording capability helps to find even intermittent faults on the network. When the system is configured by an LNS based tool, the LPA software can browse the database in order to display the node and network variable names. Together with all LOYTEC devices featuring a Remote Network Interface (RNI), the LPA software can record packets even from remote twisted-pair channels.



With a single mouse-click, the built-in report function creates reports (text files) showing the health condition of the investigated channel and gives hints and tips on how to solve problems on this channel.

The intuitive and easy-to-use LPA software runs on all LOYTEC network interfaces. On the NIC852 network interfaces, it supports the remote LPA functionality. Each LPA-SW license must be registered for one LOYTEC NIC.



LPA-SET-USB, LPA-USB, LPA-IP, LPA-SW, LPA-IP-SW

Features

- Online CEA-709.1 packet monitoring in LonMark Systems
- Packet interpretation down to bit-level
- High resolution packet time-stamping
- Advanced, context specific packet filter and converter manipulation
- Conversion of network addresses and variables into symbolic names
- Advanced Transaction Identification
- Integrated Node Statistics for all detected domains, subnets, nodes, and groups
- Extensive packet statistics (short packets, CRC errors, packets/s, etc.)
- Statistic report function including hints and tips for solving network problems
- Statistic report plug-in interface for localization or customization of the statistic report
- Trend Logging for bandwidth utilization and packet errors
- LNS® database interpretation
- Interpretation of SNVTs, network management, and diagnostic messages
- Displays SNVTs in ISO and Imperial US system
- Long-term packet recording capability and error tracking in packets with protocol errors
- Remote LPA function (needs LPA-IP, LPA-SET-USB or LPA-IP-SW plus NIC852) with L-IP, NIC709-IP, LVIS-3E100, LVIS-3ME7-Gx, LVIS-3ME12-Ax, LVIS-3ME15-Ax, LVIS-3ME15-Gx, LINX-10x, LINX-11x, LINX-12x, LINX-15x, LROC-10x, LGATE-902, LGATE-95x

Specifications

LPA-SW for use with	NIC709-USB100, NIC709-IP3E100C, NIC709-IP1E100C
LPA-IP-SW for use with	NIC852, NIC852-SW
Operating system	Windows 7, Windows 8, Windows 10, Windows Server 2003 (32-bit), Windows Server 2008, Windows Server 2012, Windows Server 2016

Order number	Product description
LPA-SET-USB	Set contains: Network Interface NIC709-USB100 and NIC852 Protocol Analyzer Software LPA-IP-SW for IP-852 channels, supports remote LPA, registered to NIC852 Protocol Analyzer Software LPA-SW for CEA-709 channels, registered to NIC709-USB100
LPA-USB	Set contains: Network Interface NIC709-USB100 LPA-SW Protocol Analyzer Software for CEA-709 channels, registered to NIC709-USB100
LPA-IP	IP-852 Channel Protocol Analyzer bundle contains: Network Interface NIC852 Protocol Analyzer Software LPA-IP-SW for IP-852 channels, supports remote LPA, registered to NIC852
LPA-SW	Protocol Analyzer Software, supports all NIC709 network interfaces, NIC709 not included
LPA-IP-SW	Protocol Analyzer Software for IP-852 channels, supports Remote LPA functionality, NIC852 not included

Interfaces



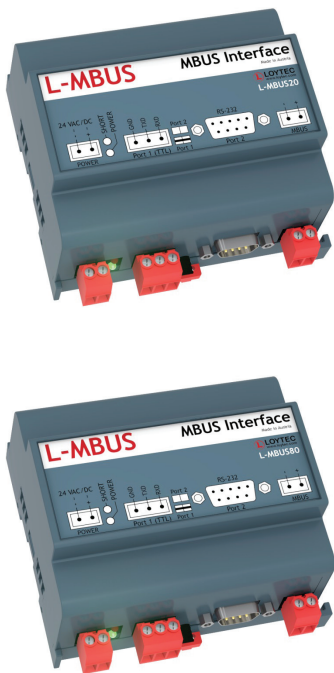
M-Bus Level Converter

L-MBUS20, L-MBUS80

Datasheet #89027520

BACnet
CEA-709
KNX

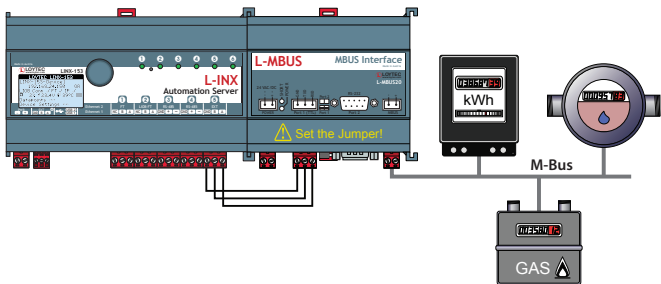
Modbus
✓ M-Bus
OPC



The L-MBUS level converters are used to connect an M-Bus network to a LOYTEC device. Up to 20 or 80 M-Bus devices can be connected via L-MBUS20 or L-MBUS80.

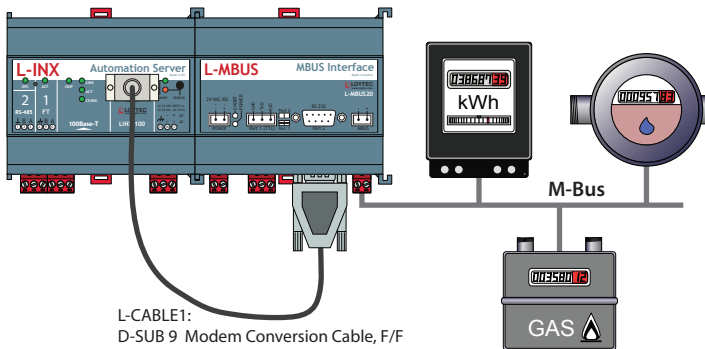
TTL Connection

The TTL port is used to connect the L-MBUS to the EXT port of L-INX Automation Servers, L-ROC Room Controllers, and also to the L-GATE Gateways. The interface is galvanically isolated.

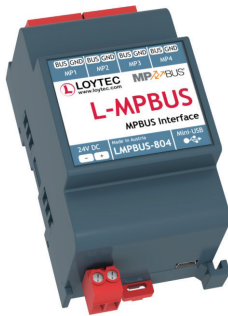


RS-232 Connection

The RS-232 port is used for connecting the M-Bus Level Converter to the CEA-709 Automation Servers LINX-100, LINX-101, LINX-110, and LINX-111 or BACnet Automation Servers LINX-200, LINX-201, LINX-210, and LINX-211. The wiring is done with an L-CABLE1. The interface is galvanically isolated.



General Specifications		
Dimensions (mm)	107 x 100 x 60 (L x W x H), DIM024	
Installation	DIN rail mounting following DIN 43880, top hat rail EN 50022	
Power supply	24 VDC / 24 VAC ±10 %	
Operating conditions	0 °C to 50 °C, 10 – 90 % RH, noncondensing, degree of protection: IP40, IP20 (terminals)	
Specifications		
Type	L-MBUS20	L-MBUS80
Power consumption	9.6 W	14.4 W
Baud rate	300 to 9600 baud	300 to 9600 baud
Interfaces	1 x TTL or 1 x RS-232 (EIA-232), galvanically isolated 1 x M-Bus	1 x TTL or 1 x RS-232 (EIA-232), galvanically isolated 1 x M-Bus
For use with	L-INX Automation Servers, L-ROC Room Controllers, L-GATE Gateways, LIOB-586/588/589 Controllers	
Resource limits		
M-Bus devices	Up to 20	Up to 80
Order number	Product description	
L-MBUS20	M-Bus level converter for 20 M-Bus devices	
L-MBUS80	M-Bus level converter for 80 M-Bus devices	
L-CABLE1	Connection cable between LINX-x00/x01/x10/x11 Automation Server and L-MBUSx0 M-Bus level converter	



The LMPBUS-804 connects up to four MP-Bus channels with up to 64 MP-Bus slaves to the USB port of the L-INX Automation Server, L-ROC Controller or L-GATE Gateway Controller.

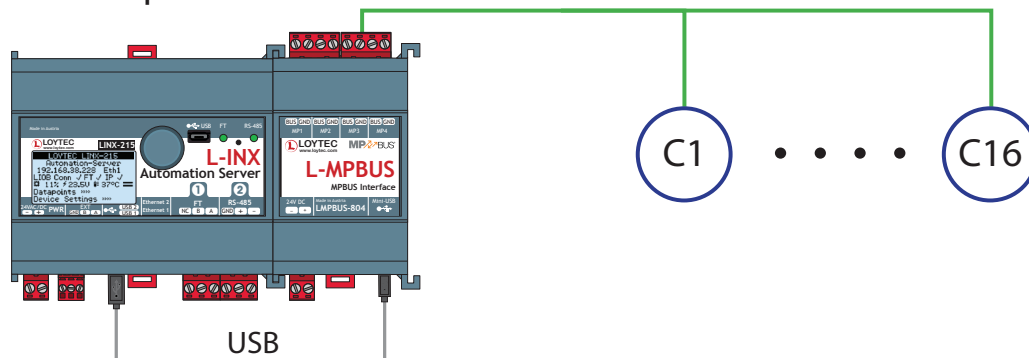
MP-Bus stands for Multi Point Bus. It is the Belimo Master/Slave bus system. The MP-Bus allows to connect up to 8 slaves to a master unit. By exclusively using latest design actuators (e.g. ...MPL) it is possible to connect up to 16 slaves. The advantages of this bus include reduced wiring expenses and substantially higher functionality. Furthermore one sensor can be connected per MP-Bus slave. These sensors include active sensors, passive resistances sensors and switches.

The sensor values can be read over the MP-Bus network.

Features

- MP-Bus Interface for L-INX, L-ROC, and L-GATE Controller
- Configuration through web interface
- 16 devices per channel, up to 4 channels
- Easy device replacement

Control up to 16 channels



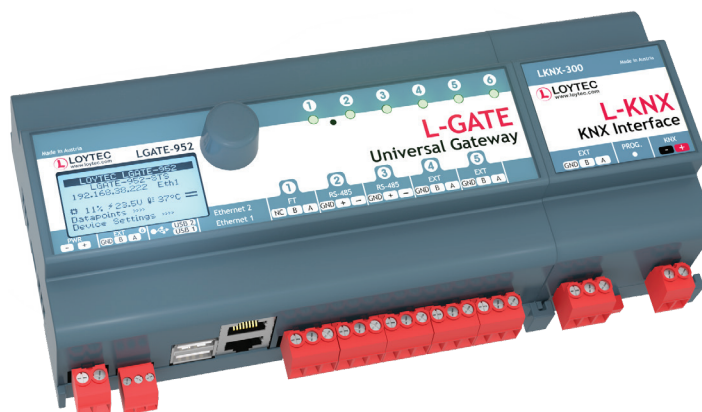
Specifications

Type	LMPBUS-804
Dimensions (mm)	55 x 100 x 60 (L x W x H), DIM051
Installation	DIN rail mounting following DIN 43880, top hat rail EN 50022
Power supply	24 VDC / 24 VAC $\pm 10\%$, typ. 2.5 W
Operating conditions	0 °C to 50 °C, 10 – 90 % RH, noncondensing, degree of protection: IP40, IP20 (terminals)
Installation	Connected with a standard USB 2.0 cable, max. 1 m
Interfaces	1 x Mini USB 2.0 Type B 4 x MP-Bus
Tools	Configuration via web interface
For use with	L-INX Automation Servers, L-ROC Room Controllers and L-GATE Gateways
Order number	Product description
LMPBUS-804	MP-Bus interface for 16 devices per channel, up to 4 channels



The KNX-Interface LKNX-300 allows the L-INX Automation Servers, the L-ROC Room Controllers, and the L-GATE Universal Gateways to interface to KNX devices connected to a KNX TP1 Bus. The LKNX-300 Interface needs to be connected to the EXT-Port on the L-INX/L-ROC/L-GATE devices.

For the KNX integration, LOYTEC's L-INX/L-ROC/L-GATE devices use an ETS4/ETS5 project. The project data is exported from the ETS4/ETS5 software and then imported in the LOYTEC L-INX Configurator. Thus, up to 250 or 1000 data points from the KNX network can be used by the L-INX/L-ROC/L-GATE devices on each port supporting KNXnet/IP or KNX TP1.



Features

- KNX TP1 Interface for L-INX, L-ROC, and L-GATE
- Access to a maximum of 250 or 1000 KNX data points via KNX TP1 (L-INX/L-ROC/L-GATE)
- Configurable through ETS4/ETS5 software via XML import
- Connected to the L-INX Automation Server, L-ROC Room Controller, or L-GATE Gateway via port EXT

Specifications

Dimensions (mm)	55 x 100 x 60 (L x W x H), DIM028
Installation	DIN rail mounting following DIN 43880, top hat rail EN 50022
Power supply	Via the KNX TP1 bus
Operating conditions	0 °C to 50 °C, 10 – 90 % RH, noncondensing, degree of protection: IP40, IP20 (terminals)
Installation	Attachable or connected with a 3-wire cable, max. 1 m
Interfaces	1 x EXT 1 x KNX TP1 LIOB-Connect is looped through the device
Baud rate	9600 baud
Tools	L-INX Configurator
Frequency	2400 ~ 2497 MHz
RF Output Power	18 (±2) dBm
For use with	L-INX Automation Servers, L-ROC Room Controllers, L-GATE Universal Gateways
Order number	Product description
LKNX-300	KNX interface to connect KNX TP1 devices

LENO-800, LENO-801, LENO-802

Datasheet #89032520



The L-ENO EnOcean Interface integrates wireless self-powered sensors and micro-energy devices seamlessly into building automation with the use of L-INX Automation Servers, the L-ROC Room Controller, the LIOB-AIR Controller, the L-GATE Universal Gateways and the L-DALI Controller. The L-ENO Interface only needs to be connected to the USB port. The L-ENO device is bus-powered over USB and detected automatically.

The L-ENO EnOcean Interfaces are available in three different versions for world-wide use:

- LENO-800 Europe 868 MHz band
- LENO-801 USA/Canada 902 MHz band
- LENO-802 Japan 928 MHz band

Features

- EnOcean Interface for L-INX, L-ROC, L-DALI, L-GATE and LIOB-AIR
- Supports all common EnOcean Profiles (EEPs) for sensors and actuators
- Configurable through device templates within the L-INX Configurator software
- Web interface for Teach-In, signal strength, and value test
- Easy device replacement
- External antenna included
- Connected to the L-INX Automation Server, L-ROC Room Controller, L-DALI Controller, L-GATE Gateway or LIOB-AIR Controllers via USB 2.0
- Support of multi-channel EnOcean devices
- Encrypted wireless connection if the EnOcean device supports this function
- Supports Mailbox function for sleepy actuators (e.g., battery-powered radiator valve)

Specifications

Type	LENO-800	LENO-801	LENO-802
Dimensions (mm)	27 x 89 x 60 (L x W x H) DIM037, EnOcean antenna DIM036		
Installation	DIN rail mounting following DIN 43880, top hat rail EN 50022 The external antenna has to be installed outside any metallized enclosure.		
Power supply	Via the USB 2.0 bus connection		
Operating conditions	0 °C to 50 °C, 10 – 90 % RH, noncondensing, degree of protection: IP40, IP20 (terminals)		
Installation	Connected with a standard USB 2.0 cable, max. 5 m		
Interfaces	1 x Mini USB 2.0 Type B 1 x EnOcean Wireless Interface conforming to ISO/IEC 14543-3-10 1 x SMA 50 Ohm, EnOcean antenna with 1.5 m connection cable and magnetic base		
Frequency	868.3 MHz	902.875 MHz	928.35 MHz
RF Output Power	3 dBm	1 dBm	0 dBm
Data rate	125 kbit/s		
Tools	L-INX Configurator		
For use with	L-INX Automation Servers, L-ROC Room Controllers, L-DALI Controllers, L-GATE Universal Gateways, LIOB-AIR Controllers		

Order number	Product description
LENO-800	EnOcean Interface 868 MHz Europe
LENO-801	EnOcean Interface 902 MHz USA/Canada
LENO-802	EnOcean Interface 928 MHz Japan

L-WLAN Wireless LAN Interface

LWLAN-800

Datasheet #89032820



The L-WLAN Interface expands a LOYTEC device with a wireless LAN connection. The wireless LAN Interface LWLAN-800 can be used with L-INX Automation Servers, L-ROC Room Controllers, L-DALI Controllers, the L-GATE Universal Gateways, L-IP Routers of the series ECTC, NIC709-IP3E100C Remote Network Interfaces, and with most L-VIS Touch Panels. The L-WLAN Interface only needs to be connected to the USB port. Due to the USB bus, the L-WLAN device is energy supplied and detected automatically.

The L-WLAN Interface uses the protocol IEEE 802.11n improvements which significantly increase connection speed, is backward compatible to IEEE 802.11b & IEEE 802.11g, offers a link speed up to 150 Mbps, and an operation frequency/channel:

- USA (FCC) 11 Channels: 2.412 GHz ~ 2.462 GHz
- Europe (ETSI) 13 Channels: 2.412 GHz ~ 2.472 GHz
- Japan 13 Channels: 2.412 GHz ~ 2.472 GHz

After attaching an LWLAN-800 Interface to the USB port of the corresponding LOYTEC device, it is possible to connect it to an existing WLAN Access Point, create a WLAN Access Point, or build up a Mesh network (IEEE 802.11s). The relatively new and emerging standard for Mesh networks offers numerous advantages. A major benefit of a Mesh network is its autonomy. Mesh point configured devices unite autonomously to one network in which Mesh points communicate via other Mesh points. To encrypt a WLAN network the encryption methods WEP, WPA, and WPA2 are available. The Mesh network is encrypted via simultaneous authentication of equals (SAE), comparable to WPA2.

The supplied antennas have a radial gain of up to +2 dBi and have to be mounted outside any metallized housing. To avoid any interferences, please keep a minimum distance of 0.5 m to any electronic devices which also operate with high-frequency signals such as of transformers, ballasts, computers, etc.

Features

- Configuration through web interface
- Increased range through MIMO (multiple-input and multiple-output) – exploiting multipath propagation
- Two external 2.4 GHz antennas included
- Possibility for connecting external antennas via 2 SMA sockets (50 Ω)
- Supports Mesh networking according to IEEE 802.11s
- Supports encryption WEP, WPA, and WPA2

Specifications	
Type	LWLAN-800
Dimensions (mm)	27 x 89 x 60 (L x W x H), DIM038, Antenna DIM043
Installation	DIN rail mounting following DIN 43880, top hat rail EN 50022 The WLAN antennas have to be installed outside any metallized housing.
Power supply	Via the USB 2.0 bus connection
Operating conditions	0 °C to 50 °C, 10 – 90 % RH, noncondensing, degree of protection: IP40, IP20 (terminals)
Installation	Connected with a standard USB 2.0 cable, max. 5 m
Interfaces	1 x SMA 50 Ohm, RX Antenna 2.4 GHz 1 x SMA 50 Ohm, TX/RX Antenna 2.4 GHz 2 x WLAN antenna magnetic base, cable length = 1 m 1 x USB 2.0 Type B
Frequency	2.4 GHz band
Standard	IEEE 802.11b, IEEE 802.11g, IEEE 802.11n, IEEE 802.11s
RF Output Power	18 dBm (63 mW) \pm 2 dBm
Tools	Configuration via web interface
For use with	L-INX Automation Servers, L-GATE Gateways, L-ROC Room Controllers, L-DALI Controllers, LVIS-3ME7-Gx, LVIS-3ME12-Ax, LVIS-3ME15-Ax, LVIS-3ME15-Gx, LIP-xECTC, NIC709-IP3E100C
Order number	Product description
LWLAN-800	Wireless LAN Interface IEEE 802.11bgn

LTE Interface

LTE-800

Datasheet #89066920



Available from Q3 2019

The LTE Interface expands a LOYTEC device with a wireless mobile connection in the LTE network of a mobile provider. The LTE-800 Interface can be used with L-INX Automation Servers, L-ROC Room Controllers, L-DALI Controllers, L-IOB I/O and LIOB-AIR Controllers, the L-GATE Universal Gateways, L-IP Routers of the series ECTC, NIC709-IP3E100C Remote Network Interfaces, and with L-VIS Touch Panels. The LTE Interface simply needs to be connected to the USB port. Power to the LTE Interface is supplied through the 24 VDC power connector.

The LTE Interface uses the communication standard for LTE, UMTS/HSPA+ and GSM/GPRS/EDGE. It is approved for the regions:

GCF* (Global), Verizon*/AT&T*/FCC*/PTCRB* (North America), CE* (Europe), RCM* (Australia), IC* (Canada), Anatel* (Brazil), IFETEL* (Mexico), CCC* (China), NCC* (Taiwan), KC* (South Korea), JATE*/TELEC* (Japan), NBTC* (Thailand), ICASA* (South Africa), FAC* (Russia)

After attaching an LTE-800 Interface to the USB port of the corresponding LOYTEC device, the LOYTEC device retrieves its IP configuration from the LTE provider. Together with the built-in VPN function, the LOYTEC device connects and can be accessed via the OpenVPN network technology. This ensures a secure communication path through the LTE network. All networking services of the LOYTEC device are available on the LTE interface and protected by the built-in firewall.

The LTE-800 Interface provides for an easy and simple solution to connect remote sites together via a VPN network and expose defined on-site services. Applications include remote management, energy monitoring, site visualization.

SMS transmission directly from the device is also enabled by the LTE-800 interface. Similar to E-Mails, SMS can contain configurable text and variable placeholders that resolve to data point content at the time of transmission. Together with an alarm data point the LTE-800 can be used as an SMS alarm notifier. The transmission of SMS can be limited to burst and long-term transmission rates.

Features

- Configuration through Web interface
- Easy mobile site integration using VPN technology
- OpenVPN compatible
- SMS transmission and alarm notifier
- Supports LTE standards

Specifications

Type	LTE-800
Dimensions (mm)	55 x 100 x 60 (L x W x H), DIM010, LTE Antenna, DIM060
Installation	DIN rail mounting following DIN 43880, top hat rail EN 50022 The external LTE antenna has to be installed outside any metallized enclosure.
Power supply	24 VDC
Operating conditions	0 °C to 50 °C, 10 – 90 % RH, noncondensing, degree of protection: IP40, IP20 (terminals)
Installation	Connected with a standard USB 2.0 cable, max. 5 m
Interfaces	1 x Mini USB 2.0 Type B 1 x Micro SIM 2 x SMA LTE Antenna
Standard	LTE, UMTS/HSPA+ and GSM/GPRS/EDGE
Tools	Configuration via web interface
For use with	L-INX Automation Servers, L-GATE Gateways, L-ROC Room Controllers, L-DALI Controllers, LVIS-3MExx-xx, LIOB-585/586/588/589, LIOB-AIRx, LIP-xECTC, NIC709-IP3E100C
Order number	Product description
LTE-800	USB LTE Interface

* Under development



SMI is the acronym for Standard Motor Interface. SMI is a bus protocol used to control SMI sunblind motors for shading. Up to 16 motors can be connected to the bus. The L-SMI interface connects an SMI bus to a L-INX, L-ROC, L-GATE or L-DALI controller. Two SMI interface models are available.

The LSMI-800 connects a single SMI channel with up to 16 SMI motors to the EXT port of the L-INX, L-ROC or L-GATE controller. The bus power for the SMI bus is provided by the LSMI-800 interface but it is not galvanically isolated. Only SMI high voltage motors may be connected to the LSMI-800 interface.

The LSMI-804 connects up to four SMI channels with up to 64 SMI motors to the USB port of the L-INX, L-ROC, L-GATE or L-DALI controller. A galvanically isolated bus power for the SMI bus is provided by the LSMI-804 interface. Hence SMI high voltage or SMI low voltage motors may be connected to the LSMI-804 interfaces but high voltage and low voltage motors must not be mixed on one LSMI-804 interface. In addition to the four SMI bus channels, the LSMI-804 offers four relays controlled by the L-INX, L-ROC, L-GATE or L-DALI controller. Each relay can be used to cut power for the SMI motors on one channel if the motors are standing still. Cutting power when the motors are not moving reduces power consumption for SMI sunblind installations by more than 140 kWh per year for every channel.

Features

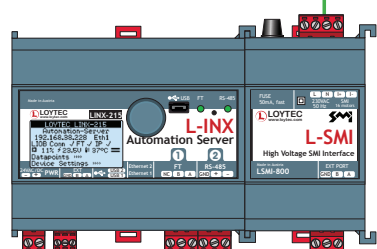
- SMI Interface for L-INX, L-ROC, L-GATE and L-DALI Controller
- Configuration through web interface
- Calibration of the blind drives via web interface
- Up to 16 blind drives per SMI port
- Supports Standard Motor Interface, SMI bus systems according to Standard Motor Interface e.V. www.standard-motor-interface.com
- Easy device replacement

Specifications

Type	LSMI-800	LSMI-804
Dimensions (mm)	55 x 100 x 60 (L x W x H), DIM033	107 x 100 x 60 (L x W x H), DIM034
Installation	DIN rail mounting following DIN 43880, top hat rail EN 50022	
Power supply	230 V AC, 50 Hz, max 2 W	85-240 V AC, 50/60 Hz, max 2 W
Operating conditions	0 °C to 50 °C, 10 – 90 % RH, noncondensing, degree of protection: IP40, IP20 (terminals)	
Installation	Connected with a 3-wire cable, max. 1 m	Connected with a standard USB 2.0 cable, max. 1 m
Interfaces	1 x EXT 1 x SMI (Standard Motor Interface)	1 x Mini USB 2.0 Type B 4 x SMI (Standard Motor Interface)
Digital Output (DO)	-	4 x Relay, 10 A
Tools	Configuration via web interface	
For use with	L-INX Automation Servers, L-ROC Room Controllers, L-GATE Gateways and L-DALI Controllers	
Order number	Product description	
LSMI-800	Standard Motor Interface for 16 motors via EXT port	
LSMI-804	Standard Motor Interface for 64 motors, 4 SMI channels via USB	

LSMI-800, LSMI-804

Control up to 16 motors



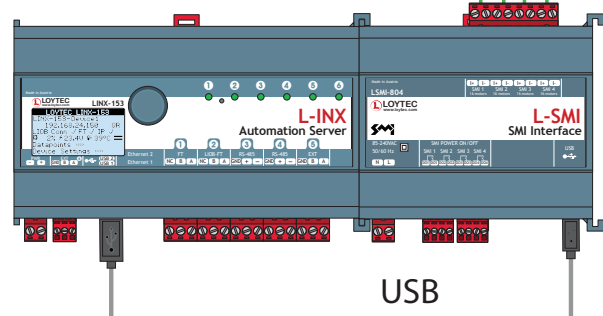
SMI



Sunblind Motors



Control up to 64 motors



(L-DALI, L-GATE)

SMI 1



SMI 2



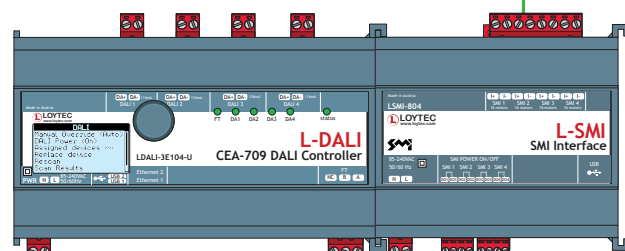
SMI 3



SMI 4

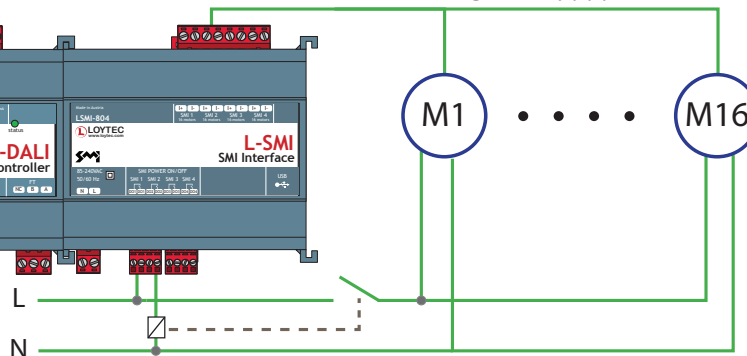


Cut-off power when motor is stopped



(L-INX, L-GATE, L-DALI)

SMI 1 4





Accessories

L-POW Power Supply

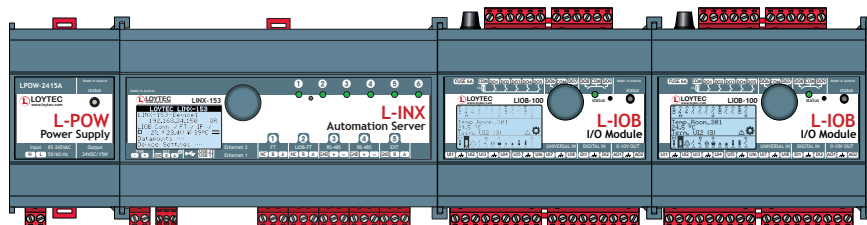
LPOW-2415A, LPOW-2415B, LPOW-2460B

Datasheet #89027720



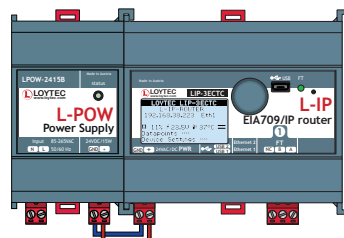
LPOW-2415A

LPOW-2415A is used to supply power to LOYTEC devices with the LOYTEC LIOB-Connect side outlet such as the L-INX Automation Servers, L-ROC Room Controllers, L-GATE Universal Gateways, and LIP-ME204. Additionally, all L-IOB I/O Modules and Controllers can be powered by the LPOW-2415A.



LPOW-2415B

The power supply LPOW-2415B provides 24 VDC via a plug-in screw terminal. It is used to supply power to LOYTEC devices with a separate power terminal of 24 VDC.



Energy Efficient

The LPOW-2415 are highly efficient switching power supplies. Their efficiency is approximately 80 %. The input voltage range of 85–240 VAC (50–60 Hz) allows worldwide use.

LPOW-2460B

The LPOW-2460B power supply provides 24 VDC and maximum 60 W with screw terminals. It is used to supply power to LOYTEC devices with a separate power terminal of 24 VDC.

Specifications

Type	LPOW-2415A	LPOW-2415B	LPOW-2460B
Dimensions (mm)	55 x 100 x 60 (L x W x H), DIM025, DIM026		71 x 91 x 55.6 (L x W x H), DIM050
Installation	DIN rail mounting following DIN 43880, top hat rail EN 50022		
Input voltage	85 – 240 VAC, 50 – 60 Hz		100 – 240 VAC, 50 – 60 Hz
Supply voltage	24 VDC 15 W via LIOB-Connect	24 VDC 15 W with plugable screw terminals	24 VDC 60 W with screw terminals
Operating conditions	0 °C to 50 °C, 10 – 90 % RH, noncondensing, degree of protection: IP40, IP20 (terminals)		0 °C to 50 °C, 10 – 90 % RH, noncondensing, degree of protection: IP20 (terminals)
For use with	LIOB-Connect devices for power supply with 24 VDC, max. 15 W (625 mA): L-INX Automation Servers, L-ROC Room Controllers, L-GATE Universal Gateways, LIP-ME204, L-IOB I/O Modules and Controllers	Devices for power supply with 24 VDC and max. 15 W (625 mA)	Devices for power supply with 24 VDC and max. 60 W (2.5 A) Maximum 6 devices
Order number	Product description		
LPOW-2415A	LIOB-Connect power supply unit, 24 VDC, 15 W		
LPOW-2415B	Power supply unit with power connector 24 VDC, 15 W		
LPOW-2460B	Power supply unit with power connector 24 VDC, 60 W		

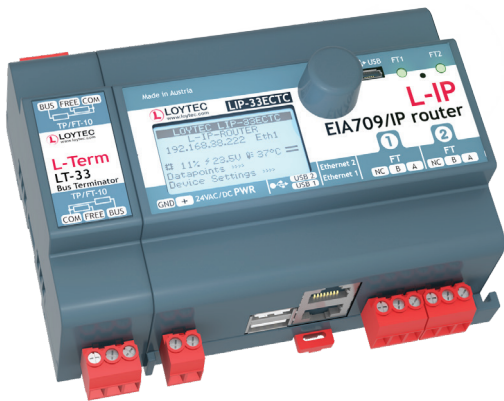


LOYTEC offers several network terminators in DIN rail housing for the LonMark TP/FT-10 and TP/XF-1250 channels.

L-Term LT-03 offers one standard network terminator for a TP/FT-10 or TP/LPT-10 channel supporting bus and free topology. In addition, LT-03 comes with a network access connector (RJ45) for a simple and reliable connection to the CEA-709 network e.g. for maintenance or analyzing the network locally.

L-Term LT-33 offers two standard network terminators for TP/FT-10 or TP/LPT-10 channels in bus and free topology. LT-33 is the perfect solution for LOYTEC network infrastructure products (e.g. L-IP, L-Switch^{XP}, L-Proxy etc.).

L-Term LT-13 combines a terminator for a TP/FT-10 or TP/LPT-10 channel in bus or free topology with a terminator for a TP/XF-1250 channel. LT-13 is the perfect solution to be used together with the LS-13CB, LS-13300CB, or the LS-13333CB L-Switch^{XP}.



Specifications	
Dimensions (mm)	27 x 89 x 60 (L x W x H), DIM027
Installation	DIN rail mounting following DIN 43880, top hat rail EN 50022
Operating conditions	0 °C to 50 °C, 10 – 90 % RH, noncondensing, degree of protection: IP40, IP20 (terminals)
Order number	Product description
LT-03	Network terminator, 1 x TP/FT-10 or TP/LPT-10 (bus or free topology), 1 x Network Access Connector RJ45
LT-13	Network terminator, 1 x TP/FT-10 or TP/LPT-10 (bus or free topology), 1 x TP/XF-1250
LT-33	Network terminator, 2 x TP/FT-10 or TP/LPT-10 (bus or free topology)

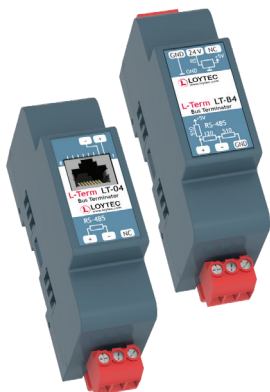
✓ BACnet
CEA-709
KNX

✓ Modbus
M-Bus
OPC

L-Term Network Terminator

LT-04, LT-B4

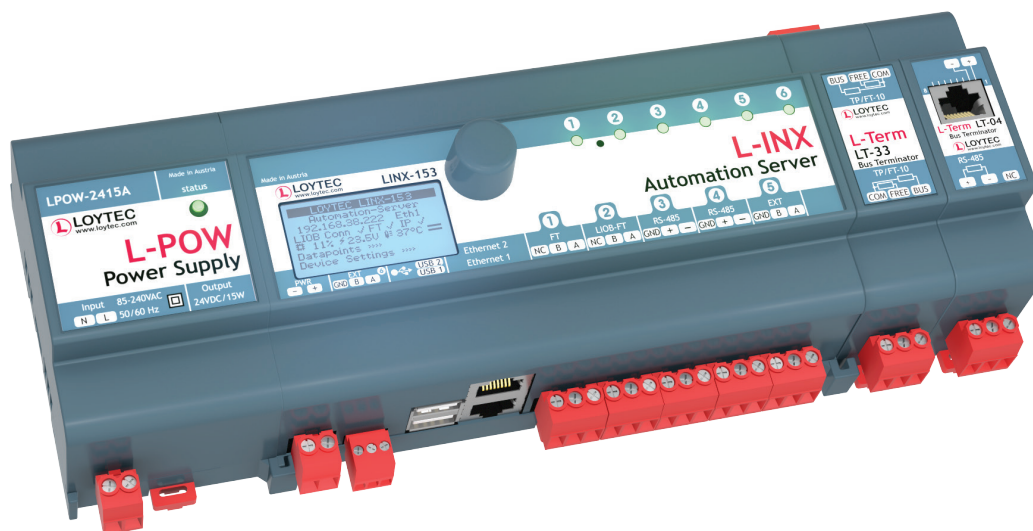
Datasheet #89016320



LOYTEC offers network terminators for RS-485 channels (ANSI TIA/EIA-485) such as BACnet MS/TP, Modbus RTU, or TP/RS485 (CEA-709) in DIN rail housings.

L-Term LT-04 is a terminator for RS-485 channels. In addition, LT-04 comes with a network access connector (RJ45) for a simple and reliable connection to the network e.g. for maintenance or analyzing the network locally.

The LT-B4 is a bus terminator for an RS-485 channel with biasing circuit (failsafe biasing). This biasing circuit draws the level of the bus during standby mode (idle) to a safe value (logic "1"). The LT-B4 needs a power supply of 24 V AC or 24 V DC.



Specifications

Type	LT-04	LT-B4
Power supply	–	24 VDC or 24 VAC ±10 %
Dimensions (mm)	27 x 89 x 60 (L x W x H), DIM027	
Installation	DIN rail mounting following DIN 43880, top hat rail EN 50022	
Operating conditions	0 °C to 50 °C, 10 – 90 % RH, noncondensing, degree of protection: IP40, IP20 (terminals)	
Termination impedance (Z)	120 Ω	
Order number	Product description	
LT-04	Network terminator, 1 x RS-485 (bus topology, ANSI TIA/EIA-485), 1 x Network Access Connector RJ45	
LT-B4	Network terminator, 1 x RS-485 (bus topology, ANSI TIA/EIA-485) with biasing circuit (failsafe biasing)	

Functions

L-WEB, L-STUDIO

L-ROC

L-INX

L-IOB

Gateways

L-VIS, L-STAT

L-DALI

Routers, NIC

Interfaces

Accessories

L-IOB Adapter

LIOB-A2, LIOB-A4, LIOB-A5

Datasheet #89028320



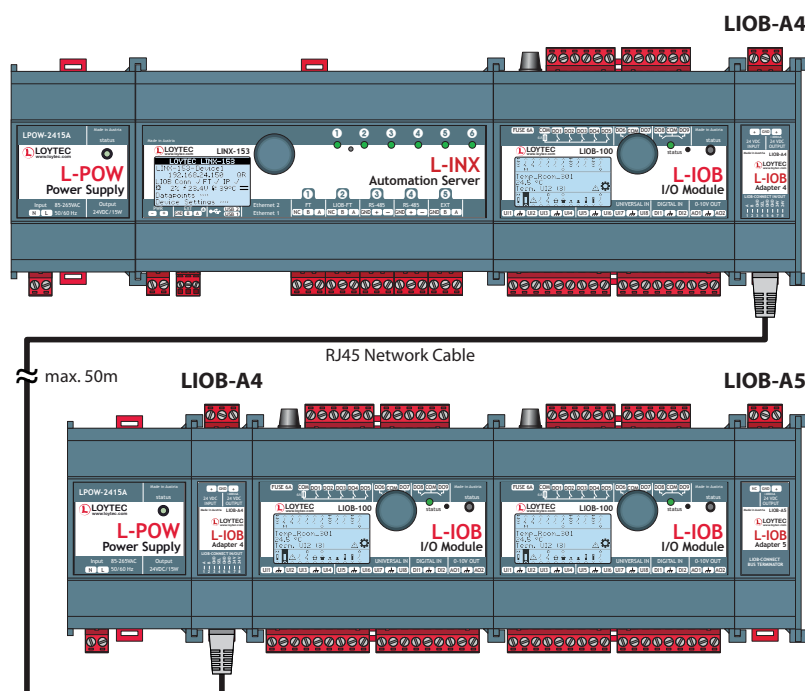
The LIOB-A2/A4 Adapters can be used to extend the LIOB-Connect bus and to connect an external power supply.

The LIOB-A5 Adapter is a terminator of the LIOB-Connect bus at the end of the last segment. A terminator is needed if the total length of the bus exceeds 1 m.

24 LIOB-Connect I/O Modules can be connected through the LIOB-Connect bus. Up to 4 LIOB-Connect I/O Modules can be plugged directly using the built-in LIOB-Connect plug. If more than 4 modules are to be used, the LIOB-Connect chain must be split into two (or more) segments of modules using LIOB-A2 and 4-wire cables (SEL, GND, A, B), or LIOB-A4 Adapters and standard RJ45 network cables. Each segment needs an external power supply, e.g. LPOW-2415A. This means that with a full configuration of 24 LIOB-Connect I/O Modules, five additional power supplies and 10 LIOB-A2/A4 adapters are required.

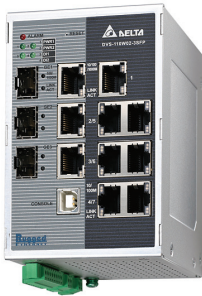
If the length exceeds 1 m, either a LIOB-A2 Adapter or a LIOB-A5 adapter must be used at the end of the last segment as a termination. When using the LIOB-A2 adapter as network terminator, the terminal TERM has to be connected with terminal B.

Additionally, the L-IOB Adapters have a power output usable for external devices limited to 100 mA (LIOB-A2) or 400 mA (LIOB-A4/A5).



Specifications

Type	LIOB-A2	LIOB-A4	LIOB-A5
Dimensions (mm)	55 x 100 x 60 (L x W x H), DIM029	27 x 100 x 60 (L x W x H), DIM030, DIM031	
Installation	DIN rail mounting following DIN 43880, top hat rail EN 50022		
Input voltage	24 VDC $\pm 10\%$, either with L-POW Power Supply through LIOB-Connect or with input terminals		-
Output voltage	24 VDC, < 100 mA with plugable screw terminal	24 VDC, < 400 mA with plugable screw terminal	
Operating conditions	0 °C to 50 °C, 10 – 90 % RH, noncondensing, degree of protection: IP40, IP20 (terminals)		
For use with	LIOB-Connect Modules (LIOB-10x)		
Order number	Product description		
LIOB-A2	L-IOB Adapter 2 to split the LIOB-Connect bus using 4-wire cables		
LIOB-A4	L-IOB Adapter 4 to split the LIOB-Connect bus using RJ45 network cables		
LIOB-A5	L-IOB Adapter 5 to terminate the LIOB-Connect bus		



The DVS-110W02-3SFP Managed 10-Port Ethernet Switch provides many essential features. Its enhanced hardware design, the user-friendly software interface, the packet protection and compatibility with multiple industrial communication standards makes it a highly reliable active network component.

The DVS-110W02-3SFP provides two built-in redundant power supplies and together with its RSTP support it is the perfect fit for building up highly available Ethernet ring topologies for L-INX, L-IOB, and L-ROC controllers.

It features a wide operating temperature range from -40°C to 75°C, and it is UL, CE, and FCC certified.

Features

- IPv6 Network address for larger network and neighbor discovery
- Automatic IP assignment by DHCP/BootP server for easy network construction
- DHCP relay option 82 for sending DHCP requests with clients' identities to a DHCP server
- SNMP v1/v2c/v3 facilitates the exchange of management between network devices
- Support MODBUS TCP protocol that facilitates the remote management by SCADA and other industrial devices
- STP/RSTP/MSTP for network redundancy further ensures reliability
- QoS (IEEE 802.1p) and TOS/DSCP for mission-critical applications
- SNTP (simple network time protocol) for network clock synchronization
- Broadcast/Multicast/Unknown Unicast storm control improves throughput problems
- MAC addresses locking function per port blocks unauthorized access
- USB console interface for easy connection with laptops
- IGMP Snooping and GMVP prunes multicast traffic
- CPU utilization displays the amount of works the CPU handles
- DDM diagnosis function by SFP fiber module
- Auto warning by email, DI, relay, Syslog & SNMP trap
- Compatible with various industrial protocols, EtherNet/IP, Profinet, CC-LINK IE and DNP 3.0

Specifications

Type	DVS-110W02-3SFP
Dimensions (mm)	75 x 108.7 x 145.3 (L x W x H), DIM055
Weight (g)	564
Standard Compliance	IEEE 802.3 10Base-T, IEEE 802.3u 100Base-T(X) and 100Base-FX, IEEE 802.3ab 1000Base-T, IEEE 802.3z 1000Base-X, IEEE 802.3x Flow Control, IEEE 802.1D Spanning Tree Protocol, IEEE 802.1w Rapid Spanning Tree Protocol, IEEE 802.1s Multiple Spanning Tree Protocol, IEEE 802.1p Class of Service, Priority Protocols, IEEE 802.1Q VLAN Tagging, IEEE 802.1X Port Authentication, IEEE 802.3ad LACP Aggregation, IEEE 802.1AB Link Layer Discovery Protocol
Processing Type	Store and Forward, IEEE 802.3x Flow control in full duplex
Interface Fast Ethernet	RJ45 Ports: 7 x 10/100Base-T(X), auto MDI/MDI-X, auto negotiation
Combo Ports	3 Ports, either: RJ45 Ports 10/100/1000Base-T, auto MDI/MDI-X, auto negotiation or SFP Ports 100/1000Base-SFP
Alarm Contacts	2 relay outputs Carry current 2 A at 24 VDC
Performance and Scalability	Switching Capacity: 7.4 Gbps
Power Requirements	Input Voltage: 2 sets, 12 to 48 VDC redundant terminal block power input Input Current: max. 0.95A Overload Current Protection, max. input current 3A Reverse Polarity Protection Buffer Time: min. 12ms at 24 VDC
Housing	IP40 aluminum metal case
Installation	Industrial DIN-Rail and wall mounting
Operating conditions	Operating Temperature: -40°C to 75°C (-40 °F to 167 °F) Storage Temperature: -40°C to 85°C (-40 °F to 185 °F) Ambient Relative Humidity: 5% to 95% (non-condensing)
Approvals	Safety: UL 508, EN 60950-1, IEC 61131-2 EMI: FCC 47 CFR Part 15 Subpart B Class A, IEC 61000-6-4, EN 55022 EMS: IEC 61000-6-2

Order number	Product description
DVS-110W02-3SFP	Managed 10-Port Industrial Ethernet Switch

Unmanaged Fast Ethernet Switch

DVS-008I00

Datasheet #89064120



The DVS-008I00 is an unmanaged 8-Port Fast Ethernet Switch with enhanced hardware design, packet protection and compatibility with multiple industrial communication standards. The DVS-008I00 features wide operating temperature range from -10°C to 60°C, and it is UL, CE, and FCC certified.

Features

- 12 to 48 VDC terminal block power input
- Compatible with various industrial protocols of EtherNet/IP, Profinet, CC-LINK IE and DNP 3.0

Specifications

Type	DVS-008I00
Dimensions (mm)	45 x 108.7 x 145.3 (L x W x H), DIM056
Weight (g)	300
Standard Compliance	IEEE 802.3 10Base-T , EEE 802.3u 100Base-T(X) and 100Base-FX , IEEE 802.3x Flow Control
Interface	Fast Ethernet Ports, RJ45 Ports: 8 x 10/100Base-T, auto MDI/MDI-X, auto negotiation
Performance and Scalability	Switching Capacity: 1.6Gbps Forwarding Rate: 2.4Mpps MAC Address Table: 8K Packet Buffer Memory: 1M bits
Power Requirements	Input Voltage: 1 set, 12 to 48 VDC terminal block input Input Current: Max. 0.18A Overload Current Protection, max. input current 3A Reverse Polarity Protection Buffer Time: min. 10ms at 24 VDC
Housing	IP40 aluminum metal case
Installation	Industrial DIN-Rail and wall mounting
Operating conditions	-10°C to 60°C, (14 °F to 140 °F) Storage Temperature: -40°C to 85°C, (-40 °F to 185 °F) Ambient Relative Humidity: 5% to 95% (non-condensing)
Approvals	Safety: UL 508, EN 60950-1, IEC 61131-2 EMI: FCC 47 CFR Part 15 Subpart B Class B, IEC 61000-6-4, EN 55022 EMS: IEC 61000-6-2
Order number	Product description
DVS-008I00	Unmanaged 8-Port Fast Ethernet Switch

Datasheet # 89066220



The DVP16SM11N is an input extension module to be used with the RTU-485.

The DVP16SM11N is UL, CE, and FCC certified.

Specifications

Type	DVP16SM11N
Dimensions (mm)	25.2 x 60 x96 (L x W x H), DIM058
Weight (g)	146 g
Power Consumption	2W
Noise immunity	ESD (IEC 61131-2, IEC 61000-4-2): 8KV Air Discharge ESD (IEC 61131-2, IEC 61000-4-2): 8KV Air DischargeEFT (IEC 61131-2, IEC 61000-4-4): Power Line: 2KV, Digital I/O: 1KV, Analog & Communication I/O: 1KV Damped-Oscillatory Wave: Power Line: 1KV, Digital I/O: 1KV RS (IEC 61131-2, IEC 61000-4-3): 26MHz ~ 1GHz, 10V/m
Operation / storage environment	Operation: 0°C ~ 55°C (temperature), 5% ~ 95% (humidity), pollution degree 2 Storage: -25°C ~ 70°C (temperature), 5% ~ 95%(humidity)

I/O Point Specifications

Input type	DC Type (Sink or Source)
Voltage/Input current	24 V DC 5 mA
Active level	Off - On: more than 16.5 V DC On - Off: less than 8 V DC
Response time	Approx. 10ms
Circuit isolation	By photocoupler
Input display	LED

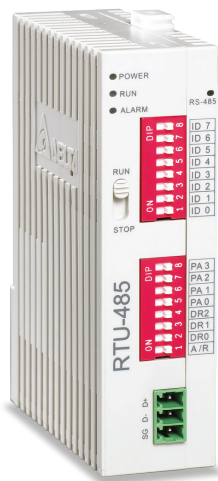
Order number Product description

DVP16SM11N	DVP16SM11N I/O Extension Module
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Modbus Remote I/O Communication Module

RTU-485

Datasheet # 89065520



The RTU-485 is a Modbus remote I/O communication module to remote-control Slim series DI/DO and AI/AO extension units. The RTU-485 is a standard Modbus slave compatible with LOYTEC devices featuring a Modbus Interface supporting Modbus master mode.

The RTU-485 is UL, CE, and FCC certified.

Features

- Supports Modbus protocol, slave mode
- Connects up to 8 DVP-S series I/O modules
- Max. baudrate: 115.2k bps

Specifications

Type	RTU-485
Dimensions (mm)	25.2 x 60 x96 (L x W x H), DIM059
Weight (g)	160 g
Interface	RS-485
Connector	3-pin, removable
Serial baudrate	1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 bps
Installation	Industrial DIN-Rail and wall mounting
Power Supply	24 V DC (-15 to 20%)

Order number	Product description
RTU-485	RS-485 Remote I/O Communication Module

OUR MISSION

LOYTEC researches, develops and manufactures products and solutions to open up new ways and opportunities for the modern building automation business.

Utilizing innovative technologies and open communication protocols in trendsetting products, LOYTEC creates the basis for efficient system integration, highest energy efficiency during operation and protection of investment.



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