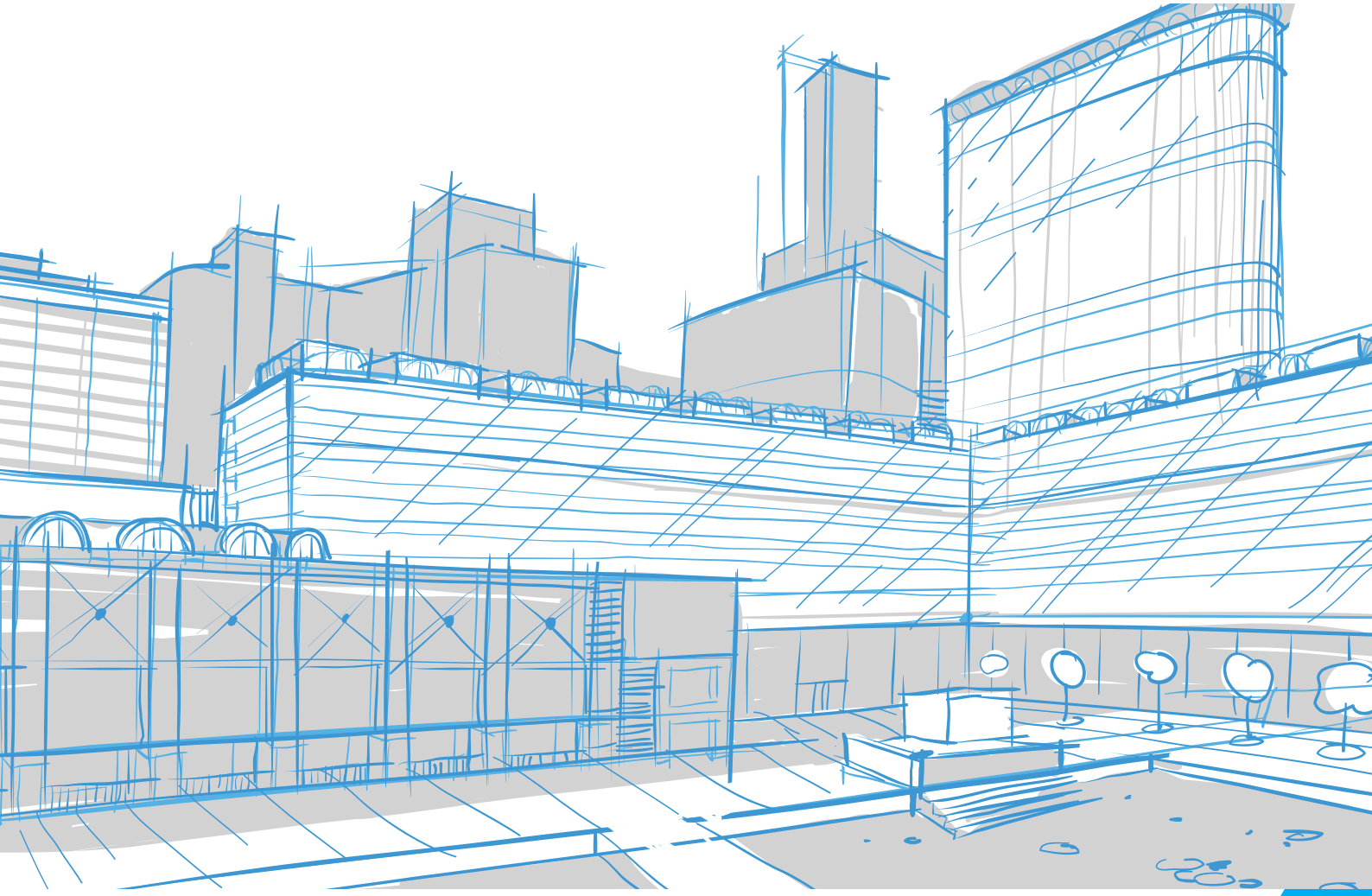


Delta Building Management and Control System

Product catalog

www.deltaww.com

Introduction of Building Management and Control System

Delta's Building Management and Control System (BMCS) combines innovative software technology and various international protocols to effectively integrate heating and cooling sources, air conditioning, ventilation, lighting, electricity, security and other building facilities. Building management software offers an all-in-one platform that integrates control and equipment operation management, and can connect to a wide range of office automation, hotel management, and property management systems. Delta's BMCS facilitates successful smart buildings and enhances operation efficiency.

In 2016, LOYTEC joined the Delta Group family to serve as a competence center for building automation solutions. Together, we offer not only a comprehensive building management and control system but also one-stop solutions with localized services.

For more product information, please refer to the LOYTEC electronics GmbH official website www.loytec.com

Why Delta Electronics

Our distinct local touch in serving our worldwide customers with over 150 sales offices, plant sites and R&D

Core competence in comprehensive smart energy-saving solutions

True One Solution experience with end-to-end services and supports

Fast facts of Delta group

- Established: 1971
- Ranking: named as the "Sector Leader" in the DJSI electronic equipment sector from 2012
- Recognition: since 2010, 47 international design awards including iF, Reddot, CES Innovation, Computex Best
- Business: power electronics, energy management, smart green life

Our mission

- To provide innovative, clean and energy-efficient solutions for a better tomorrow!

Innovation highlights

- Over 4,900 registered patents
- Our world's first titanium-grade server power supply has an efficiency rating reaching 96%
- High efficiency of 97.2% for telecom rectifier

Content

Overview . . . 4
LOYTEC Product Overview . . . 4
Functions . . . 5
AST™ Functions . . . 6
Communication . . . 8
Gateway . . . 13
L-IOB I/O . . . 14
Programming Functions . . . 15
Device Management . . . 15
Visualization / Operate and Monitor . . . 16
L-WEB Building Management & L-STUDIO . . . 19
Integrated Building Management System . . . 20
LWEB-900 . . . 20
LWEB-803 . . . 26
LWEB-802 . . . 29
Engineering Tool . . . 31
L-STUDIO 3.0 . . . 31
L-ROC Room Automation . . . 33
LROC-102 . . . 34
LROC-400, LROC-401, LROC-402 . . . 40
L-INX Automation Servers . . . 49
L-INX Overview . . . 50
LINX-153, LINX-154 . . . 51
LINX-215 . . . 56
L-IOB I/O Controllers & Modules . . . 59
L-IOB I/O Controllers . . . 60
LIOB-FT I/O Controller . . . 61
LIOB-180/181/182/183/184 V2 . . . 61
LIOB-IP852 I/O Controller . . . 63
LIOB-480/481/482/483/484 V2 . . . 63
LIOB-BIP I/O Controller . . . 65
LIOB-580/581/582/583/584 V2 . . . 65
L-IOB I/O Controller . . . 67
LIOB-586/588/589 . . . 67
L-IOB I/O Modules . . . 71
LIOB-Connect I/O Module . . . 72
LIOB-100/101/102/103 V2 . . . 72
LIOB-FT I/O Module . . . 74
LIOB-150/151/152/153/154 V2 . . . 74
LIOB-IP852 I/O Module . . . 76
LIOB-450/451/452/453/454 V2 . . . 76
LIOB-BIP I/O Module . . . 78
LIOB-550/551/552/553/554 V2 . . . 78
L-IOB I/O Controller with Application Program . . . 80
LIOB-AIR . . . 81
General Input and Output Specification of LOYTEC devices . . . 84

Content

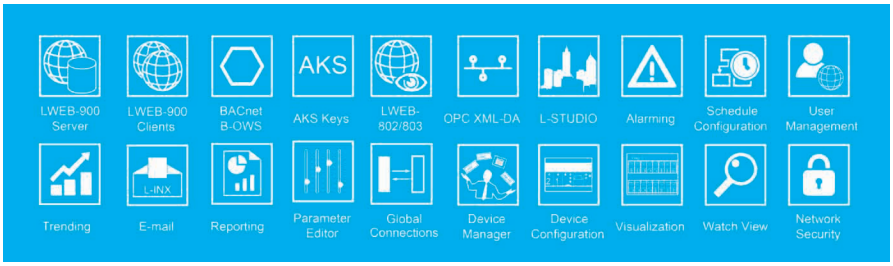
Gateways . . . 85
L-GATE, L-INX, L-DALI, L-Proxy . . . 86
L-GATE Gateway . . . 88
LGATE-952 . . . 88
LGATE-902 . . . 91
L-Proxy CEA-709 Multiport Gateway . . . 94
LP-33E100 . . . 94
L-VIS, L-STAT Touch Panels & Network Thermostats . . . 95
L-VIS Overview . . . 96
LVIS-3ME7-Gx/3ME12-A1/3ME15-A1/3ME15-Gx . . . 97
LVIS-3E100 . . . 101
LVIS-ME200 . . . 104
L-STAT Network Thermostat . . . 107
LSTAT-800, LSTAT-801, LSTAT-802 . . . 107
L-DALI Lighting Control . . . 111
L-DALI Overview . . . 112
CEA-709/DALI Controller . . . 113
LDALI-3E101-U, LDALI-3E102-U, LDALI-3E104-U . . . 113
BACnet/DALI Controller . . . 118
LDALI-ME204-U, LDALI-ME201-U . . . 118
Programmable DALI Controller . . . 123
LDALI-PLC4 . . . 123
L-DALI Power Supply . . . 128
LDALI-PWR2-U, LDALI-PWR4-U . . . 128
L-DALI Multi-Sensor . . . 129
LDALI-MS1 . . . 129
L-DALI Pushbutton Coupler . . . 131
LDALI-BM1 . . . 131
L-DALI Relay Module . . . 132
LDALI-RM1, LDALI-RM2 . . . 132
Routers, NIC . . . 133
CEA-709/IP-852 Router . . . 134
LIP-1ECTC, LIP-3ECTC, LIP-33ECTC, LIP-3333ECTC . . . 134
BACnet/IP Router . . . 136
LIP-ME201C, LIP-ME202C, LIP-ME204C . . . 136
CEA-709/IP-852 Router Redundant . . . 138
LIP-33ECRB . . . 138
L-Switch^{XP} CEA-709 Router . . . 140
LS-33/13/11/13300/33300/13333/11333CB . . . 140
NIC Network Interface . . . 141
NIC709-IP3E100C, NIC709-IP1E100C, NIC709-USB100, NIC852-SW, NIC852 . . . 141
LPA – CEA-709 Protocol Analyzer . . . 143
LPA-SET-USB, LPA-USB, LPA-IP, LPA-SW, LPA-IP-SW . . . 143
Interfaces . . . 145
M-Bus Level Converter . . . 146
L-MBUS20, L-MBUS80 . . . 146

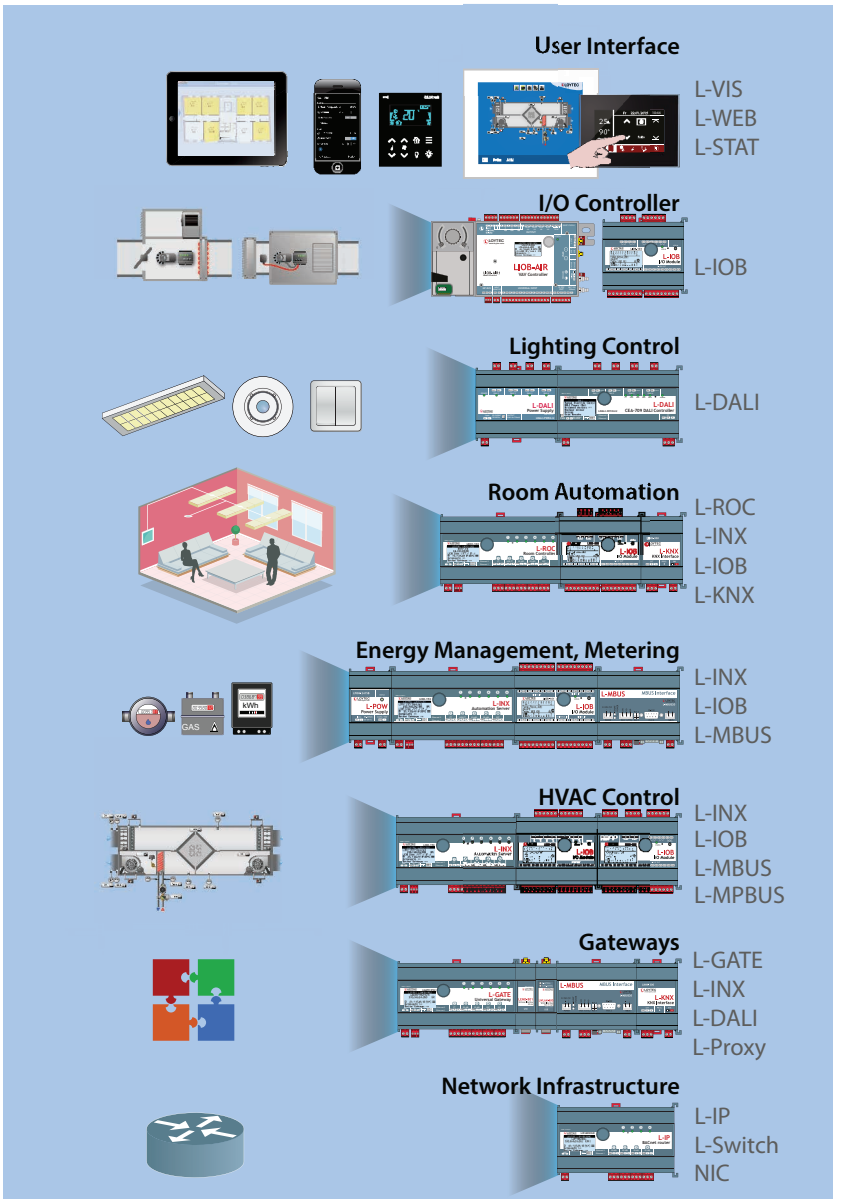
Content

MP-Bus Level Converter . . . 147
LMPBUS-804 . . . 147
KNX TP1 Interface . . . 148
LKNX-300 . . . 148
L-ENO EnOcean Interface . . . 149
LENO-800, LENO-801, LENO-802 . . . 149
L-WLAN Wireless LAN Interface . . . 150
LWLAN-800 . . . 150
L-SMI Standard Motor Interface . . . 151
LSMI-800, LSMI-804 . . . 151
Accessories . . . 153
L-POW Power Supply . . . 154
LPOW-2415A, LPOW-2415B, LPOW-2460B . . . 154
System Distribution Box . . . 155
LBOX-600, LBOX-ROC1, LBOX-ROC2 . . . 155
L-Term Network Terminator . . . 156
LT-03, LT-13, LT-33 . . . 156
LT-04, LT-B4 . . . 157
L-IOB Adapter . . . 158
LIOB-A2, LIOB-A4, LIOB-A5 . . . 158
Device Dimensions, Certificates . . . 159
Dimensions of the devices in mm and [inch] . . . 160
Certificates . . . 184

LOYTEC Product Overview

LWEB-900 Building Management System



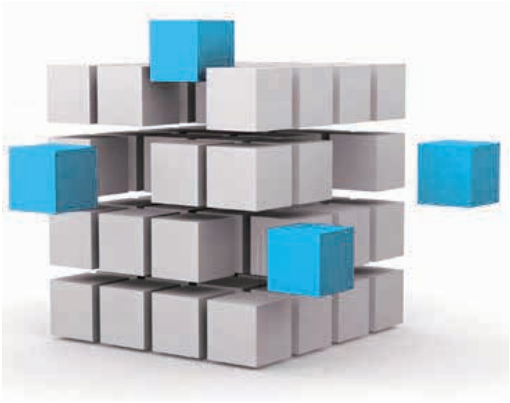


LON	BACnet	KNX	EnOcean	DALI	SMI	Modbus	M-Bus	MP-Bus	OPC	Programmable
✓	✓					✓			✓	
✓	✓							✓	✓	✓
✓	✓		✓	✓	✓	✓			✓	
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
✓	✓	✓	✓			✓	✓	✓	✓	✓
✓	✓	✓	✓			✓	✓	✓	✓	✓
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
✓	✓								✓	

Functions


OPC XML-DA
RNI
BACnet
Local I/O
DALI
OPC UA
Modbus
LIOB CONNECT
CEA-709
M-Bus
LIOB IP
LIOB FT
Gateway
CEA-709
LONMARK 3.4
y=f(x)
OPC
&
SMI
BACnet
VNC
KNX

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

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.

Ethernet (Ethernet Switch)

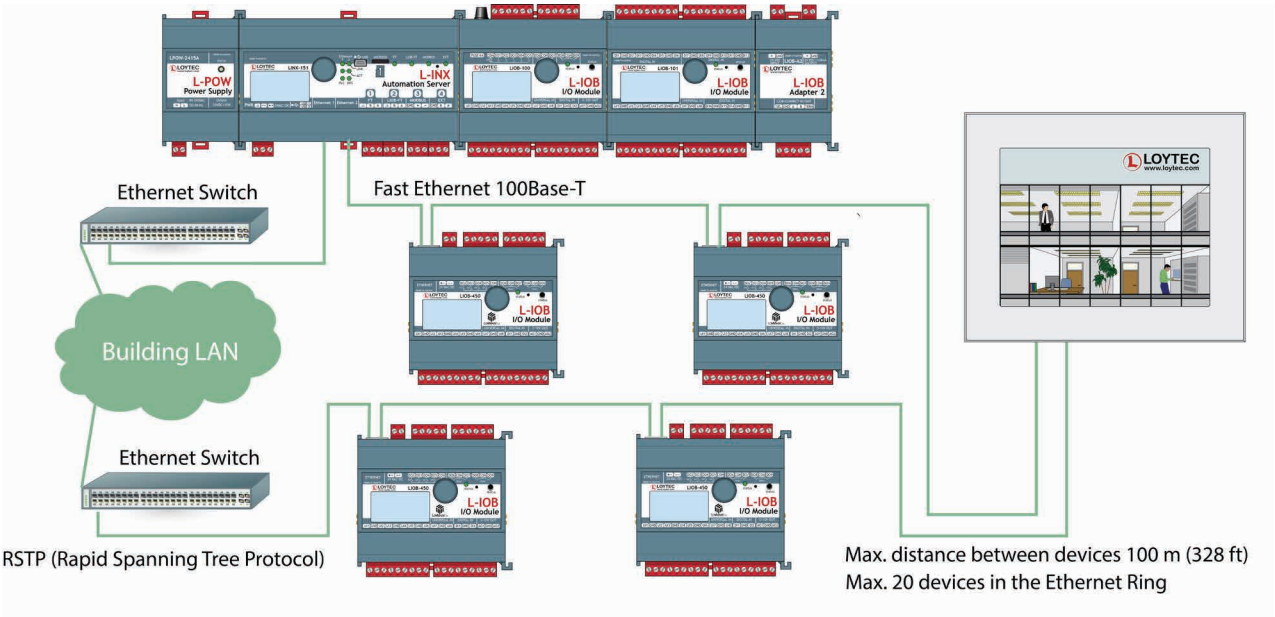
Ethernet summarizes a variety of networking technologies, software (protocols) and hardware (cable, hubs, interface cards, etc.) for wired, local area networks (LANs). Originally published in 1983 as the IEEE 802.3 standard, Ethernet has evolved to today's most used LAN technology. As a packet-switched 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

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.

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.

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.

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.

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.

Local Connection



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

Functions

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.

Functions

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

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 (v1, v2, …, vn) 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 don't 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 don't require a reboot of the device. The trended data can be exported into a CSV file over the web interface.

LWEB-900



The LWEB-900 Building Management System offers a BACnet Operator Workstation capability to integrate BACnet devices via BACnet/IP. In addition most LOYTEC devices can use the OPC XML-DA web service to get connected to LWEB-900. LWEB-900 is a highly flexible and scalable solution which accompanies you from installation and configuration of LOYTEC devices (L-INX Automation Servers, L-IOB I/O Modules and Controllers with IP connectivity, L-ROC Room Controllers, L-GATE Gateways, L-VIS Touch Panels, L-DALI Controllers), all the way to daily operation of the facilities.

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.

Functions

Reporting

LWEB-900 can create reports based on trend logs. Reports can be used, for example, to document the energy consumption in a building. The generation of a report can be triggered in one of the following ways:

Periodically: Reports can be generated daily, weekly, monthly, or yearly.
Event: The change of a data point value can trigger a report.
Manually: A report can be triggered manually by the user.

Reports can be generated in PDF, Excel, or Word format. They can be automatically distributed via e-mail.

User Management

LWEB-900 provides a separate work environment for each user. A user has to log on to the system and is presented with a perspective tailored to his individual requirements. A perspective defines which windows are open and how they are arranged. In this way, a user can define separate perspectives which are optimized for different tasks and quickly switch between them.

LWEB-900 uses access control lists to define which operations a user can perform on a certain object (e.g. folder, data point, graphical view, parameter view, trend chart). To speed up the access right configuration, access control lists can be inherited from parent to child objects.

Parameter View

The LWEB-900 parameter view allows configuring operational parameters, which are distributed over multiple devices, efficiently. For example, parameters for room temperature control, light control, or sunblind control can be organized in different parameter views. Each parameter view is a matrix where each cell represents a parameter. Parameters can be organized freely in the matrix depending on space layout and function. In this way, it is possible to e.g. adjust the running periods of sun blinds across many rooms with a few mouse clicks and write the new values reliably into the corresponding automation devices.

Watch View

The LWEB-900 watch view allows observing data point values in real time. Depending on the data point types, the values can also be changed and easily edited within the watch view. You are able to see what is actually going on in the network.

L-STAT

The L-STAT is a network thermostat with a modern, minimalistic look that fits any interior design. It is directly connected to a LOYTEC controller with a Modbus interface such as LIOB-AIR or L-ROC.

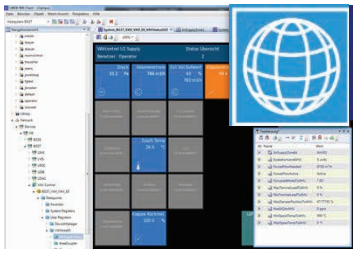
L-WEB Building Management & L-STUDIO



Integrated Building Management System

LWEB-900

Datasheet #89016119



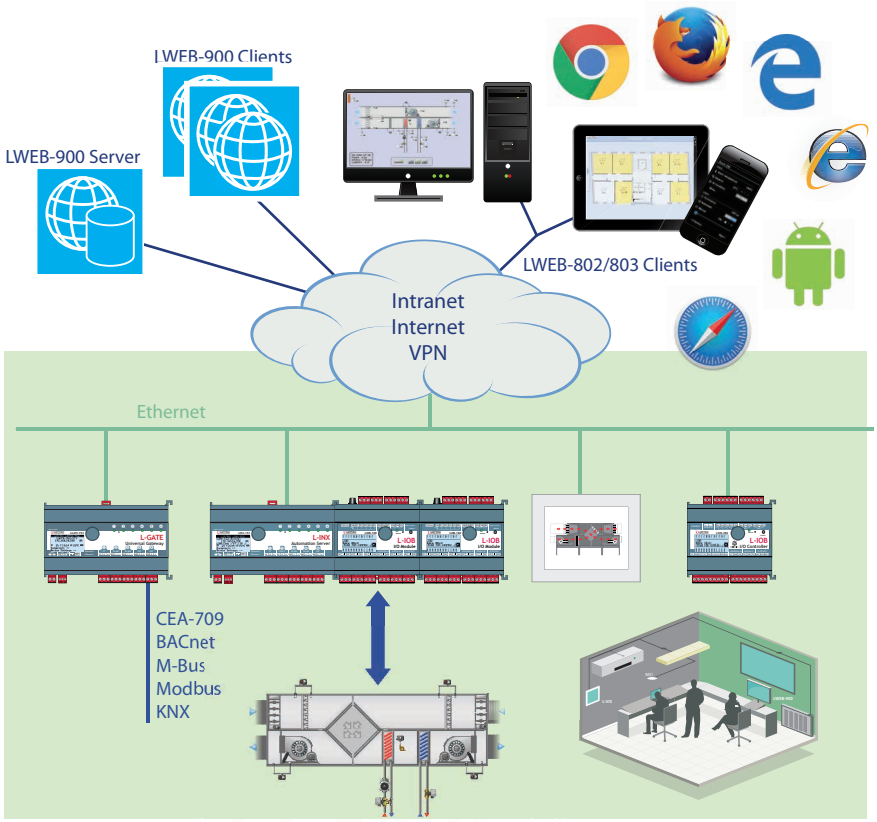


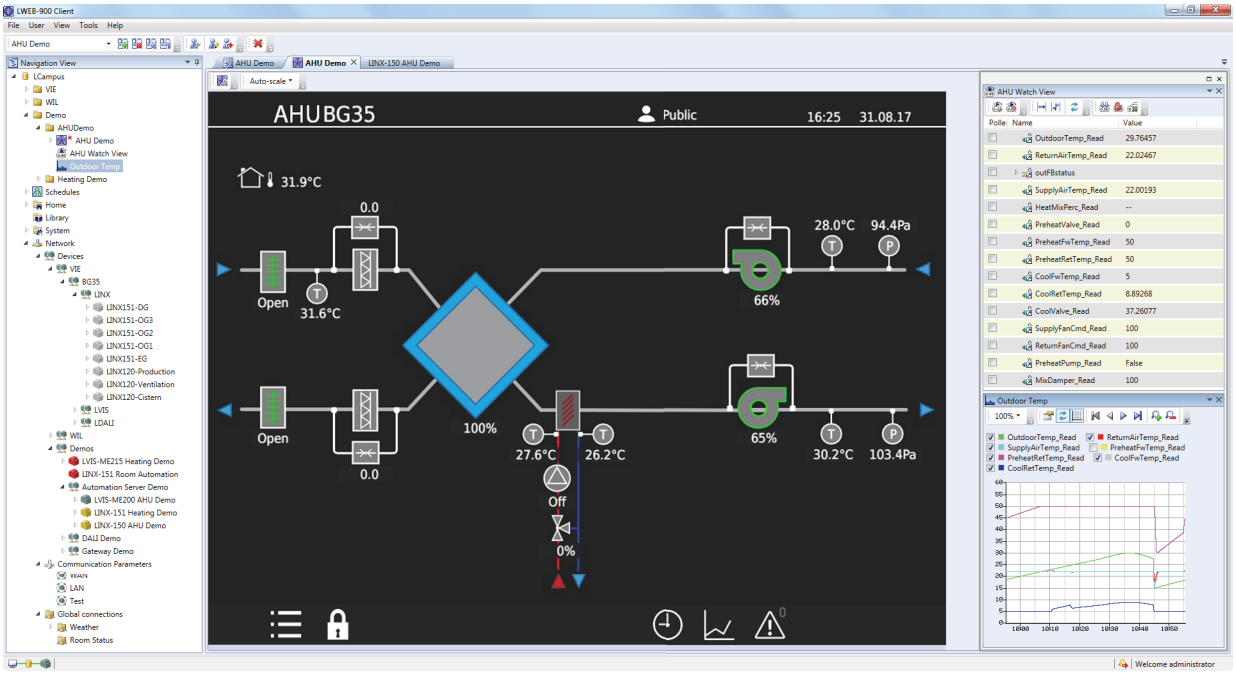
The integrated building management software LWEB-900 provides a user interface to manage and operate a LOYTEC building management system. LWEB-900 is a highly flexible and scalable solution which accompanies you from installation and configuration of LOYTEC devices (L-INX Automation Servers, L-IOB I/O Modules and Controllers with IP connectivity, L-ROC Room Controllers, L-GATE Gateways, L-VIS Touch Panels, L-DALI Controllers), all the way to daily operation of the facilities. Thus, a common user interface for the building automation system is available at all phases of the project.

LWEB-900 uses a client–server model consisting of the LWEB-900 Server and one or multiple LWEB-900 Clients. The LWEB-900 Server manages and stores system and operating parameters, historic data, access rights, and device configurations in an SQL data base. It exchanges real time data with distributed autonomous LOYTEC devices via web services independently of the underlying field bus technology (CEA-709, BACnet, DALI, M-Bus, Modbus, KNX, etc.).

The LWEB-900 Client is the user interface of the building management system. The client can be installed on the same PC as the server or on a remote PC. The use of web services to communicate between clients and server ensures that remote access is easily possible across firewalls and NAT routers. In this way, Intranet and Internet can be used to build distributed building automation systems. In addition, differences between the various field bus technologies are compensated and the user is presented with a consolidated view of the separate communication systems.

To check the status of the buildings technical equipment, there is no need to install the LWEB-900 Client. If you have an IP connection to the LWEB-900 Server, you can use a standard web browser to operate and monitor the building automation system. It makes no difference, whether a smart phone, tablet, or PC is used.







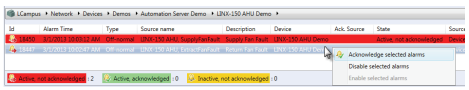
Visualize and Operate

In LWEB-900, all areas of a building can be visualized and operated using installation schematics. Each schematic can consist of a large number of dynamic display elements which reflect the current status of the facilities in real-time. These display elements also include complex elements like alarms, trend logs, and schedules. The configuration software to design the graphical representation of the installation is built directly into LWEB-900. Basic functions and attractive pages can be created in no time without any know-how in HTML, Java, etc. Dynamic information is shown in the form of numeric values, text, changing icons, bar graphs, trend logs, alarm and event lists, or schedule controls. Pixel graphics in all common file formats (GIF, JPG, BMP, TIFF, PNG, MNG, ICO), vector graphics (SVG) as well as alpha blending are supported.

The LWEB-900 Client adapts to the needs of the user. Dynamic schematics can be displayed in a separate window or they can be arranged in a perspective together with an alarm view, navigation view, and data point watch view.

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 and additionally offers distributed LWEB-900 clients the same functionality of visualization through web services.

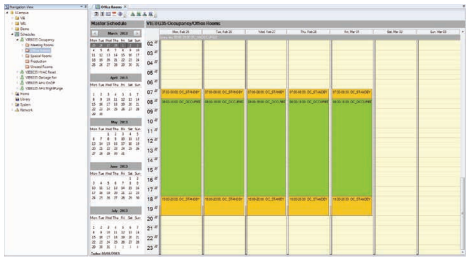


Alarming

With LWEB-900, alarms from different sources can be visualized and managed in a uniform manner. It makes no difference whether an alarm is generated by a L-INX Automation Server to report that a V-belt is torn, by a DALI light controller to report that the emergency light test fails, or by an L-GATE device to report an alarm from a 3rd party system. In LWEB-900, these alarms are presented in a common way which enables the user to maintain an overview. The user can acknowledge or disable alarms. When an alarm occurs, one or multiple receivers can be notified via e-mail. If the alarm is not acknowledged within a configurable amount of time, an alternative action can be triggered.

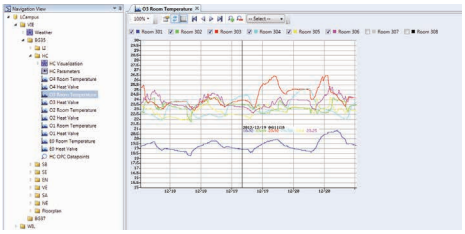
Integrated Building Management System

LWEB-900



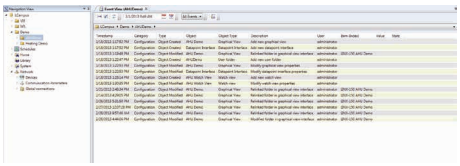
Scheduling

Schedules can either be executed in LOYTEC devices or directly in the LWEB-900 Server. To optimize the system, the scheduler should be at the same location as the corresponding control logic. For example, an occupancy scheduler should be executed by the L-INX automation controller which primarily uses this information, whereas a scheduler determining which people are notified about alarms should be executed in the LWEB-900 Server. LWEB-900 offers the unique possibility of organizing schedules executed on different devices in a hierarchical way and configuring them efficiently. The user interface is designed for non-technical users and is similar to calendar functions of common office applications. Schedulers are organized in a tree structure. Entries on the highest hierarchical level have an impact on all schedulers. Entries on a lower hierarchical level affect only the schedulers below that level. Local changes on the device are identified and can either be accepted or rejected. After the schedule hierarchy has been defined, LWEB-900 calculates the resulting configurations and if the scheduler is executed decentralized in a LOYTEC device, it downloads them to the corresponding device.



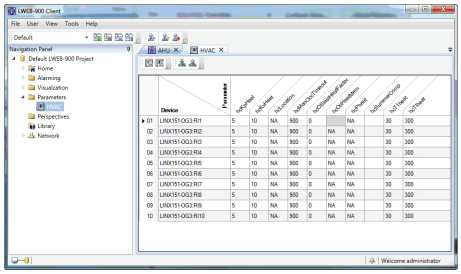
Trending

LOYTEC devices can record the values of data points over time. However, the memory available on a device is limited. LWEB-900 overcomes this restriction by reading out the trend data from the devices periodically and storing everything in the database. A user can also create ad-hoc trend logs directly in LWEB-900. This is the fastest way to create a trend log. One simply selects a data point and activates trending using the context menu. LWEB-900 periodically polls the data point value from the device and stores the value in the database. If the LWEB-900 Server cannot access the LOYTEC device directly via IP, an alternative communication method is available: the device can automatically e-mail trend data to the server. Trend logs can be viewed either as tables or as charts. Especially for trend charts, a large number of customization options are available. In addition, LWEB-900 allows exporting trend data as CSV files.



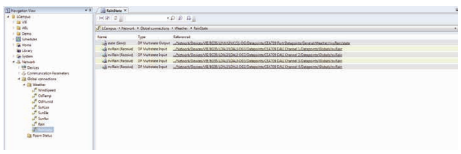
Event Log

All events are logged by LWEB-900 in the database. Events include alarms, alarm acknowledgements, log-in and log-out of users, change of operational parameter, change of device configuration, system messages, etc. The event log view offers a large variety of filters to efficiently analyze all activities in LWEB-900.



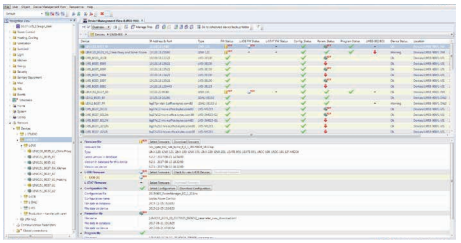
Parameter View

The parameter view allows configuring operational parameters, which are distributed over multiple devices, efficiently. For example, parameters for room temperature control, light control, or sunblind control can be organized in different parameter views. Each parameter view is a matrix where each cell represents a parameter. Parameters can be organized freely in the matrix depending on space layout and function. In this way, it is possible to e.g. adjust the running periods of sun blinds across many rooms with a few mouse clicks and write the new values reliably into the corresponding automation devices. The parameter view also allows to display real-time values.



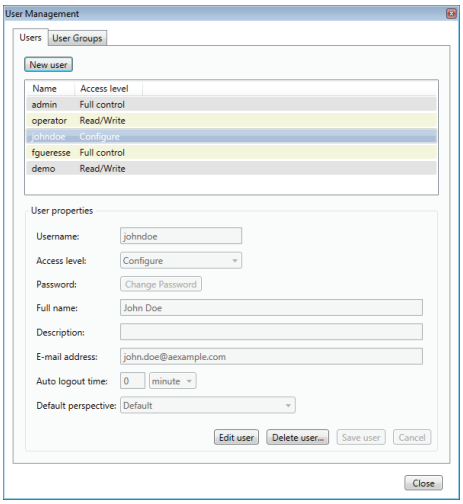
Global Connections

With LWEB-900 it is easy to connect data points of different LOYTEC devices via Ethernet/IP. For this purpose, a global connection can simply be created and drag and drop can be used to add input and output data points. It makes no difference whether the data points represent physical I/Os of L-IOB devices or data from field bus systems (CEA-709, BACnet, DALI, M-Bus, Modbus, KNX, etc.). LWEB-900 configures all devices which are part of the global connection accordingly. After the connection has been configured, the devices exchange data directly over the IP Network (without LWEB-900).



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, 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.



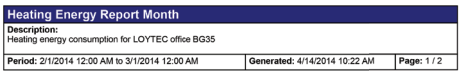
Device Configuration

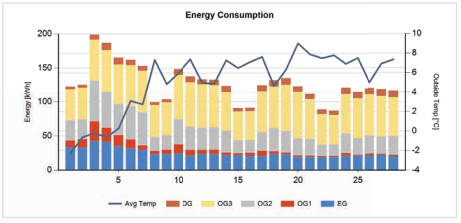
LWEB-900 manages and configures all LOYTEC devices based on a central database. The required device configuration software can be opened directly in LWEB-900 and the configuration files are stored in the data base.

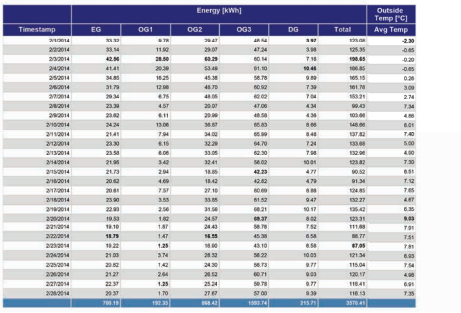
User Management

LWEB-900 provides a separate work environment for each user. A user has to log on to the system and is presented with a perspective tailored to his individual requirements. A perspective defines which windows are open and how they are arranged. In this way, a user can define separate perspectives which are optimized for different tasks and quickly switch between them.

LWEB-900 uses access control lists to define which operations a user can perform on a certain object (e.g. folder, data point, graphical view, parameter view, trend chart). To speed up the access right configuration, access control lists can be inherited from parent to child objects.







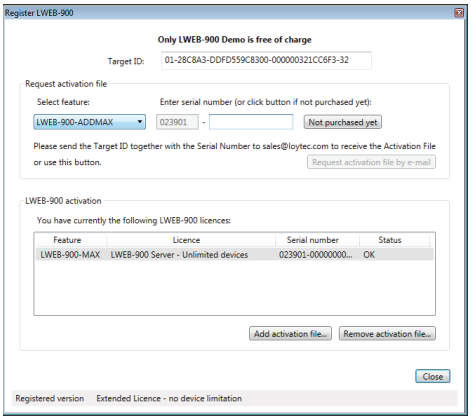
Reporting

LWEB-900 can create reports based on trend logs. Reports can be used, for example, to document the energy consumption in a building. The generation of a report can be triggered in one of the following ways:

- Periodically: Reports can be generated daily, weekly, monthly, or yearly.
- Event: The change of a data point value can trigger a report.
- Manually: A report can be triggered manually by the user.

Reports can be generated in PDF, Excel, or Word format. They can be automatically distributed via e-mail.

LWEB-900



Licensing

The licensing is based on the number of devices connected to an LWEB-900 Server. The base license includes 10 LOYTEC device licenses. To extend the number of devices, add-on licenses for 10 devices are available. An add-on license for an unlimited number of devices is available as well. For customers who know right from the beginning that they need a license for an unlimited number of devices, such license is offered as well. The maximum number of devices that can be integrated on an LWEB-900 Server depends on the PC and the database resources provided. LOYTEC L-IP Router and L-IOB Modules connected to L-INX Automation Servers, L-ROC Room Controllers or L-IOB I/O Controllers via L-IOB plug and play do not consume a device license. A fully featured LWEB-900 demo license with 30 days runtime is provided as well, including 10 device licenses.

BACnet Operator Workstation B-OWS (LWEB-900 Version 2.0)

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.

Watch View

The watch view allows observing data point values in real time. Depending on the data point types, the values can also be changed and easily edited within the watch view. You are able to see what is actually going on in the network.

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.

Conclusion

Together with LOYTEC devices, LWEB-900 is a seamless and comprehensive solution for building automation. Instead of separate tools and project files for different devices, LWEB-900 provides a common user interface for configuring and operating the complete system. The consistent use of web services for data communication allows controlling LWEB-900 from remote, no matter whether there are firewalls and NAT routers or not. In this way, end users and service technicians can monitor, operate, and configure the buildings' technical equipment from remote using standard IP technology.

LWEB-900

Features

- Displays customized graphical pages with dynamic content
- Multi-browser support (web access)
- Alarming from different sources, and time- and event-based forwarding via e-mail to several recipients
- Hierarchical organization of calendar and scheduler parameters across multiple devices and within the LWEB-900 Server
- Presentation of trend data in the form of charts or tables
- Structured representation and efficient adaptation of system and operating parameters (Parameter View)
- Fast and system-wide access to real time data
- Supports Global Connections
- SQL data base server
- Manages multiple users and access rights via ACL
- Reporting module to generate reports from trend logs using templates
- Configuration software for LOYTEC hardware can be directly started within the LWEB-900 user interface
- Automatic, periodic device backup and easy recovery of the device configuration for a device replacement
- Checks if firmware updates are available (Internet connection required) and displays devices with outdated firmware
- Download of the latest firmware for a defined group of devices
- Uses web services for communication (OPC XML-DA, SOAP/XML)
- Easy communication across firewalls and NAT routers on the Intranet and Internet
- Import/Export of trend logs and identification keys schema
- BACnet Operator Workstation (B-OWS)
- Watch View allows observing data points in real time

Specifications

Compatible with	L-INX Automation Server, L-ROC Room Controller, L-GATE Gateway, L-DALI Controller, L-VIS Touch Panel, L-IOB I/O Controller, L-IP Router
Operating system	Windows 7, Windows 8, Windows 10, Windows Server 2008, Windows Server 2012
Hardware requirements	LWEB-900 server: PC with at least 2 GHz, 32- or 64-bit processor, 4 GB RAM, 50 GB free hard disk space, Ethernet connection LWEB-900 client: PC with at least 2 GHz, 32- or 64-bit processor, 2 GB RAM, 1 GB free hard disk space, Ethernet connection, screen resolution 1280x720

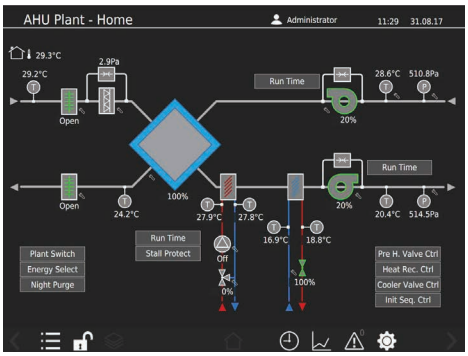
Order number	Product description
LWEB-900	Building Management Software for 10 devices (L-IP Router and L-IOB I/O Modules connected as extension to the L-INX Automation Servers, L-ROC Room Controllers and L-IOB I/O Controllers do not consume a device license), licenses for 5 LWEB-900 Clients and 20 LWEB-80x Clients are included
LWEB-900-ADD-10	Add-on license for 10 additional devices
LWEB-900-ADD-MAX	Add-on license for an unlimited number of devices
LWEB-900-MAX	Building Management Software for an unlimited number of devices, licenses for 5 LWEB-900 Clients and 20 LWEB-80x Clients are included
LWEB-900-CL-5	Add-on license for additional 5 LWEB-900 Clients
LWEB-900-80x-50	Add-on license for additional 50 LWEB-80x Clients
LWEB-900-80x-100	Add-on license for additional 100 LWEB-80x Clients
LWEB-900-80x-MAX	Add-on license for an unlimited number of LWEB-80x Clients

Graphical User Interface

LWEB-803

Datasheet #89025519





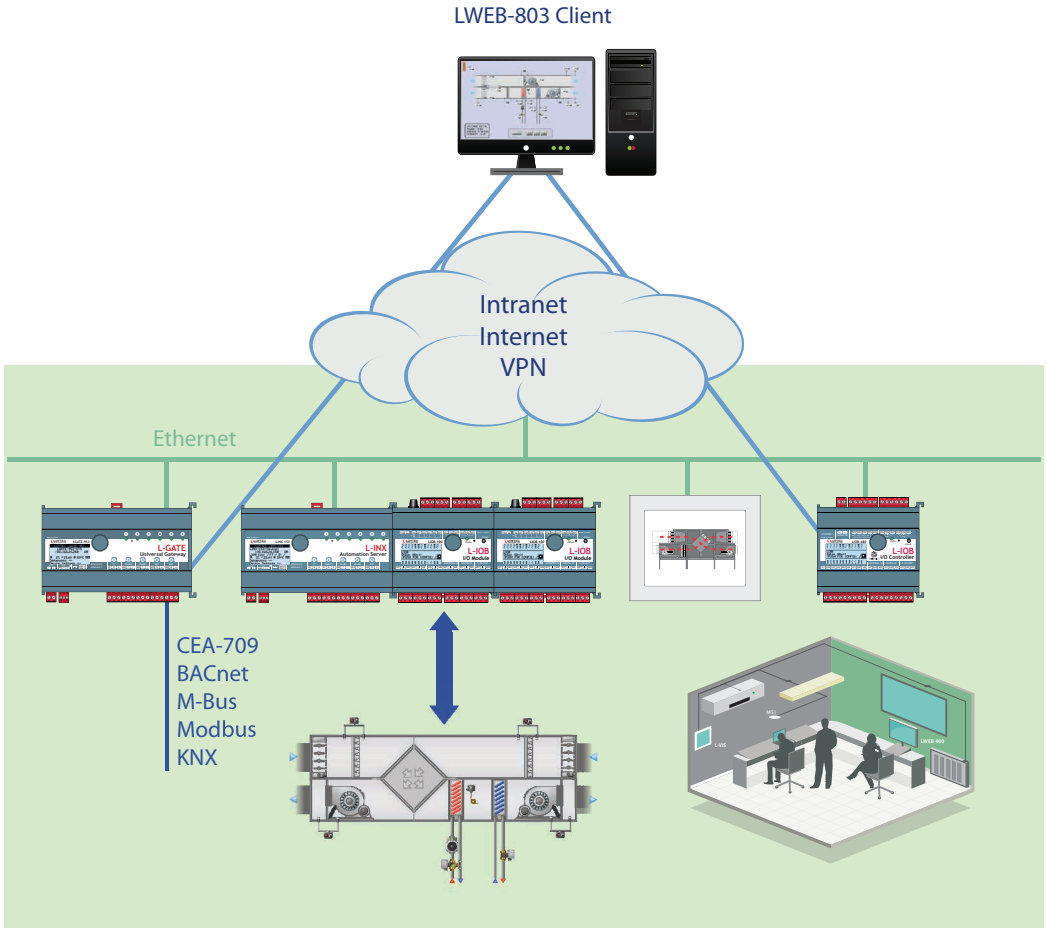
LWEB-803 is a graphical user interface to visualize dynamic pages showing plant details or a virtual room operator panel on a Microsoft Windows PC.

Dynamic Graphical Pages

The graphical pages 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, and 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, and schedule controls. The L-VIS/L-WEB configuration tool allows for using most of the pixel graphic formats (GIF, JPG, BMP, TIF, PNG) or vector graphics (SVG). The graphical projects may be stored on a LOYTEC device connected to the building network, on a file server, or on a 3rd party web server.

Data Point Communication through Web Services

LWEB-803 talks to LOYTEC devices using web services. Utilizing web services allows for smooth communication across firewalls and NAT routers. This way, the Intranet or Internet can be used to build up a distributed building automation system.



LWEB-803



Fast Navigation

When executing the graphical project, LWEB-803 loads the complete content and stores it on a PC. When changes in the graphical project are made, reloading the project simply updates the version on the PC. During normal operation, the data communication between LWEB-803 and the LOYTEC devices is limited to data point updates. The result is a fast navigation between the pages even when the connection is slow.

Virtual Room Operator Panel on PC

LWEB-803 can be used as a state of the art alternative to physically mounted room operator panels. LWEB-803 pages can be viewed in “Design Mode” which allows showing the graphical pages without frames and with a transparent background. LWEB-803 virtual room operator panels can be stored on the LOYTEC devices and operated within the MS Windows PC environment. There is practically no limit for the designer regarding the size, colors, and utilization of graphical elements. Even high availability of the system can be achieved by storing the virtual operator panels distributed on devices in the network.

Protected Kiosk Mode

In “Kiosk Mode”, users can exclusively operate the LWEB-803 application on the PC. When in Kiosk Mode, the user has no access to the PC’s desktop or any other software running on the PC.

Show Data Points from Multiple Devices in One Page

LWEB-803 can show data points located on multiple distributed devices in one page. This functionality is particularly important when utilized in energy monitoring applications where meter values are provided by distributed LOYTEC devices. When projects are distributed across multiple devices, LWEB-803 allows to create links between the projects for a continuous operation.

Display Diversity

LOYTEC devices can host multiple LWEB-803 projects. Each of these projects can have any resolution to display them perfectly on a PC monitor. Multiple Windows PCs can access LOYTEC devices at the same time. Widgets or dashboards can be created and placed on the PC desktop. Virtual room units can be designed appealingly in terms of style and usability to give access to room functions.

Features

- Displays customized graphic pages with dynamic content
- User-specific page layout, optionally frameless with transparent background
- Support of vector fonts
- Allows access to automation functions such as Alarming, Scheduling, and Trending (AST™)
- Presentation of trend data in the form of charts or tables
- Display of alarms in alarm lists
- Allows links between distributed LWEB-803 projects for a continuous operation
- Design of graphical projects with the L-VIS Configuration software
- Automatic updates (Internet connection required)
- Uses web services (OPC XML-DA, SOAP/XML) for communication
- Easy communication across firewalls and NAT routers

Specifications

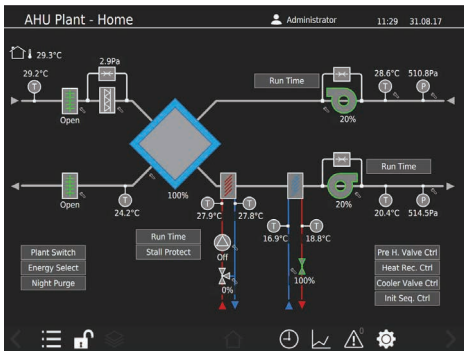
Compatible with	L-INX Automation Server, L-ROC Room Controller, L-GATE Universal Gateway, L-VIS Touch Panel, L-IOB I/O Controller, L-DALI Controller
Operating system	Windows 7, Windows 8, Windows 10, Windows Server 2003 (32-bit), Windows Server 2008, Windows Server 2012
Configuration tools	L-INX Configurator and L-VIS/L-WEB Configurator

Graphical User Interface

LWEB-802

Datasheet #89025719







LWEB-802 is a platform independent graphical user interface to visualize dynamic pages showing plant details or a virtual room operator panel in a standard web browser. By utilizing HTML5 and Java Script, the pages can be shown in a standard web browser without the need to install any additional software or browser plug-ins. LWEB-802 is tested to work with PCs (MS and MAC), smart phones, and tablets running Android OS or iOS. No apps are required or need to be maintained. The page creation process and also the feature set is the same as for LWEB-803.

Dynamic Graphical Pages

The graphical pages consist of multiple dynamic graphical controls that show the current plant status in real time. It is also possible to access decentral schedules, alarm servers, and 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, and schedule controls. The L-VIS/L-WEB configuration tool allows for using most of the pixel graphic formats (GIF, JPG, BMP, TIF, PNG) or vector graphics (SVG). The graphical projects may be stored on a LOYTEC device connected to the building network, on a file server, or on a 3rd party web server.

Data Point Communication through Web Services

LWEB-802 talks to LOYTEC devices using web services. Utilizing web services allows for smooth communication across firewalls and NAT routers. This way, the Intranet or Internet can be used to build up a distributed building automation system.

Fast Navigation

When opening the project, the complete content is loaded into the web browser. Navigating through the pages is done without loading any more content. The communication between LWEB-802 and LOYTEC devices is reduced to just data point updates. The result is extremely fast navigation between graphical pages even when the connection is slow.

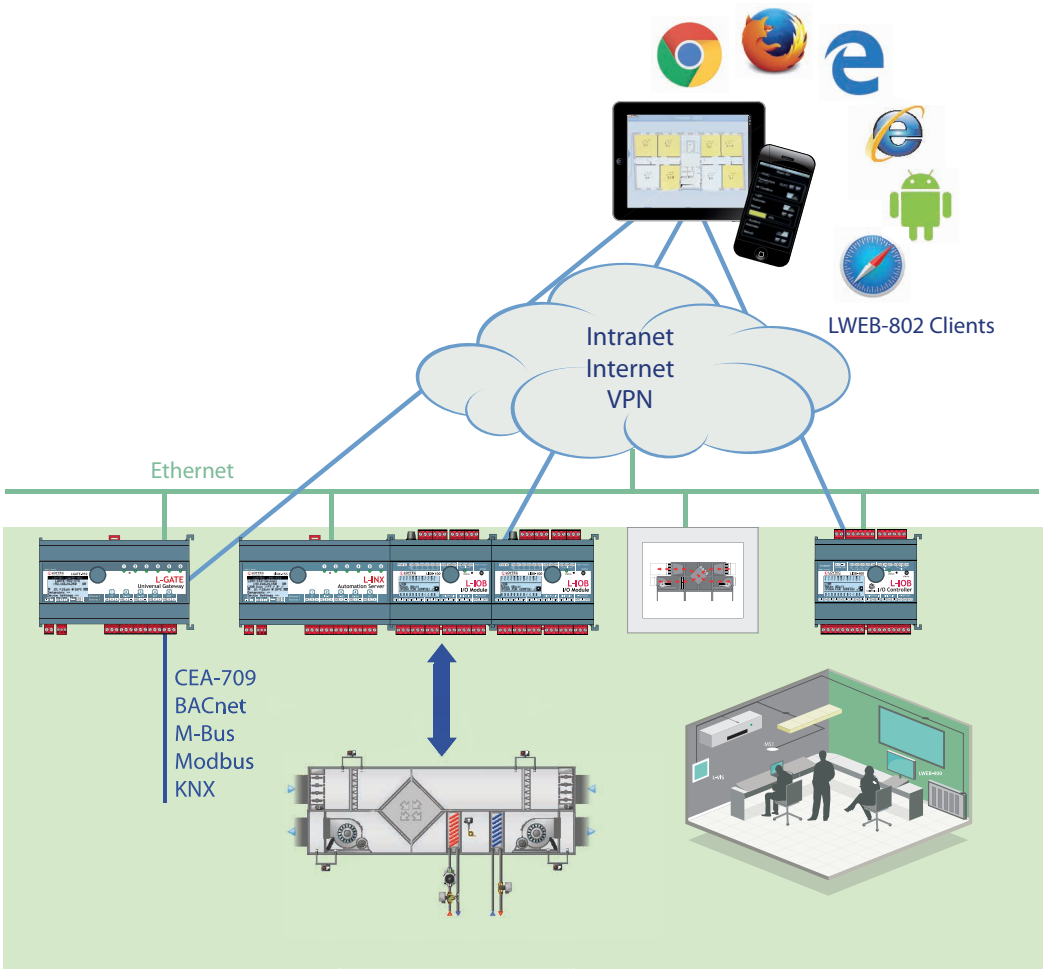
Room Operation through Web Browser

Specifically for room automation applications, LWEB-802 can be used as a state of the art alternative to room operator panels. Virtual room operator panels can be stored on the LOYTEC devices and operated within a standard web browser. There is practically no limit for the designer regarding the size, colors, and utilization of graphical elements. A high availability of the system can be achieved by storing the virtual operator panels distributed on devices in the network.

Show Data Points from Multiple Devices in One Page

LWEB-802 can show data points located on multiple distributed devices in one page. This functionality is particularly important when utilized in energy monitoring applications, where meter values are provided by distributed LOYTEC devices.

LWEB-802



Features

- Displays customized graphic pages in the web browser
- Multi-browser support
- Allows access to automation functions such as Alarming, Scheduling, and Trending (AST™)
- Presentation of trend data in the form of charts or tables
- Support of vector fonts
- Display of alarms in alarm lists
- Allows links between distributed LWEB-802 projects for a continuous operation
- Design of graphical projects with the L-VIS Configuration software
- Automatic updates (Internet connection required)
- Uses web services (OPC XML-DA, SOAP/XML) for communication
- Easy communication across firewalls and NAT routers

Specifications

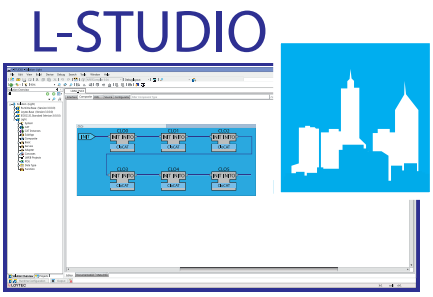
Compatible with	L-INX Automation Server, L-ROC Room Controller, L-GATE Universal Gateway, L-VIS Touch Panel, L-IOB I/O Controller, L-DALI Controller
Web browser	Google Chrome, Firefox, Android browser, iOS browser, Internet Explorer 10/11/Edge
Configuration tools	L-INX Configurator and L-VIS/L-WEB Configurator

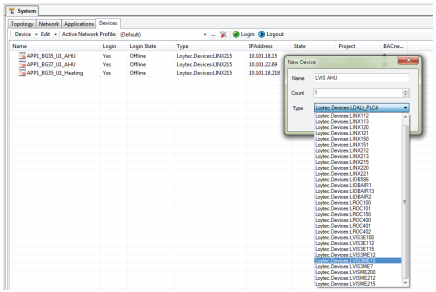
Order number	Product description
LWEB-802	Graphical user interface via web browser, compatible to Android and iOS, free download

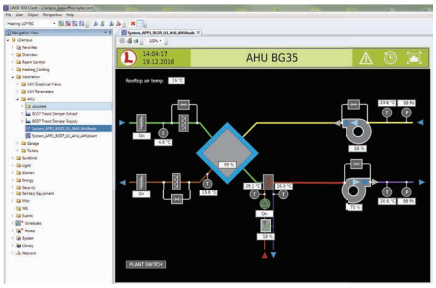
Engineering Tool

L-STUDIO 3.0

Datasheet #89056219







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.

L-STUDIO 3.0

Special challenges have arisen for the building automation market over the last few years. The search for energy-efficient operation requires complex control algorithms. At the same time, the comfort for the building's tenants needs to be increased. For regulating primary plants, e.g. ventilation systems, heating control systems or VAV systems, room automation is a relatively young discipline with a regulation of local functions such as lighting, shading and indoor climate. The highest degree of energy efficiency can only be achieved by a functional link-up of primary plants and room automation. Executing companies struggle with considerable cost pressure to offer these systems competitively. At the same time, the largest share of the total costs is attributable to the factor working hours. An essential part of a modern building automation solution is therefore a system that provides tools for the rapid and efficient planning of individual solutions.

There are several devices for the automated control of buildings available. Why do you need another system and what is special about L-STUDIO? The special feature is the comprehensive integration at all levels of the building control system, which enables extremely efficient and cost-effective workflows.

Integration of logic and data points

In L-STUDIO, data points for communication can be stored directly in logic blocks. Functions can be created either using one of the supplied libraries or by the user himself. As a configuration interface, the already familiar L-INX Configurator was integrated into the L-STUDIO software. The data points are generated automatically in the controller as soon as an instance of the function block for the program is created in the controller. The complete spectrum of LOYTEC's standard protocols (BACnet, CEA-709, Modbus, M-Bus, KNX, EnOcean, SMI, ...) is supported. But not only the data points are created automatically, all automation functions such as alarms, timer programs, trend logs or historical filters, which are specifically defined for these data points, are also generated without further configuration effort.

Integration of logic and visualization

The data points are the backbone for communication in a building automation system - the beautiful face, however, is the graphical visualization through which the end user operates the system. The visualization can be defined simultaneously with the logic functions. For each function block, one or more different "symbols" can be generated. The configuration tool "L-VIS Configurator", which is known from the LOYTEC Touch Panels and the software L-WEB, is integrated directly in L-STUDIO. All controls and functions, such as events or triggers, are available in the symbol editor.

Building management: L-STUDIO and LWEB-900 work as a team

In the case of larger projects, a central control system (building management system) is necessary, such as LOYTEC's LWEB-900 system. L-STUDIO projects can be directly imported into the LWEB-900 database. All devices including their configuration are created and saved automatically. Likewise, the graphical projects are loaded and converted from the devices so that they can be used as graphical views in LWEB-900. When changes

are made to the L-STUDIO project, the imported data in LWEB-900 can be updated in a single step. Special functions on the management level, such as customizing parameters or the management of timer programs and alarms, are adjusted with the LWEB-900 software.

Licensing via USB dongle

The L-STUDIO 3.0 programming environment is licensed via a USB dongle. This ensures that the license continues to function reliably even in case of computer changes or when system updates are necessary. On the controller side, a proprietary licensing algorithm was implemented to enable programming via Logicad or L-STUDIO. The new L-INX Automation Servers and L-IOB Controllers are programmable with L-STUDIO. If the device is to be programmed via L-LOGICAD instead, a runtime license has to be acquired. For this purpose, a registration code is generated for a controller which is entered via the controller's website or the LCD display. For existing L-INX controllers (LINX-12x, LINX-22x, LINX-15x, LINX-112, LINX-113, LINX-212, LINX-213) that are to be programmed only via Logicad, there is the option to purchase an update that enables programming via L-STUDIO.

Software licensing		
Controller	License	
	L-LOGICAD	L-STUDIO
LINX-112, LINX-113	included	upgradeable
LINX-212, LINX-213	included	upgradeable
LINX-120, LINX-121	included	upgradeable
LINX-220, LINX-221	included	upgradeable
LINX-150, LINX-151	included	upgradeable
LINX-215	upgradeable	included
LINX-153, LINX-154	upgradeable	included
LIOB-18x	included	n/a
LIOB-48x	included	n/a
LIOB-580, LIOB-581, LIOB-582, LIOB-583, LIOB-584	included	n/a
LIOB (V2) = with new hardware version		
LIOB-18X (V2)	included	n/a
LIOB-48x (V2)	included	upgradeable
LIOB-580 (V2), LIOB-581 (V2), LIOB-582 (V2), LIOB-583 (V2), LIOB-584 (V2)	included	upgradeable
LIOB-586	included	included
LIOB-588, LIOB-589	upgradeable	included
LIOB-AIRx	n/a	included
LDALI-PLC4	n/a	included

Order number	Product description
LWEB-803	Graphical user interface, visualization on Windows PC, free download

L-ROC Room Automation

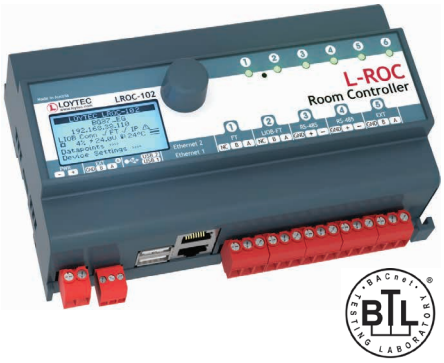


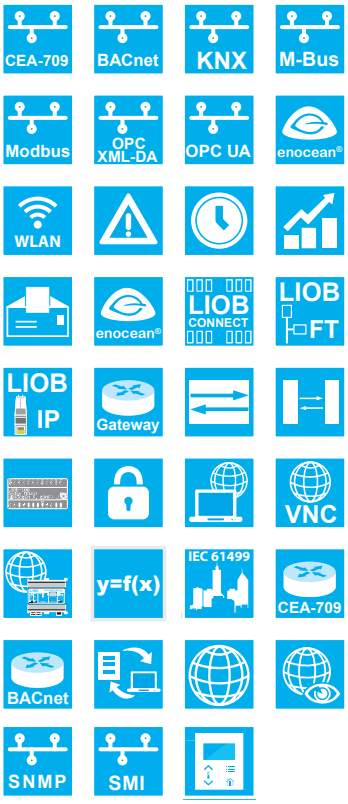
L-ROC Room Controller

LROC-102

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

Datasheet #89026119





The L-ROC Room Controller LROC-102 provides the basis for a revolutionary room automation system based on IP, which seamlessly integrates with native BACnet/IP networks and LonMark Systems at the controller level. Together with the L-STUDIO software, flexible room solutions can be created with little effort and changed on demand. Integral parts of the L-ROC System are a web-based room operation via an LWEB-802/803 dashboard and the automatic generation of graphics for the L-VIS Touch Panel for local operation. For CEA-709 room control units, CEA-709 multi-sensors and other CEA-709 devices can be connected via the LonMark TP/FT-10 channel on the L-ROC Controller. Local inputs and outputs are provided via L-IOB I/O Modules. KNX S-mode devices can be connected through KNX TP1 by using the optional LKNX-300 module.

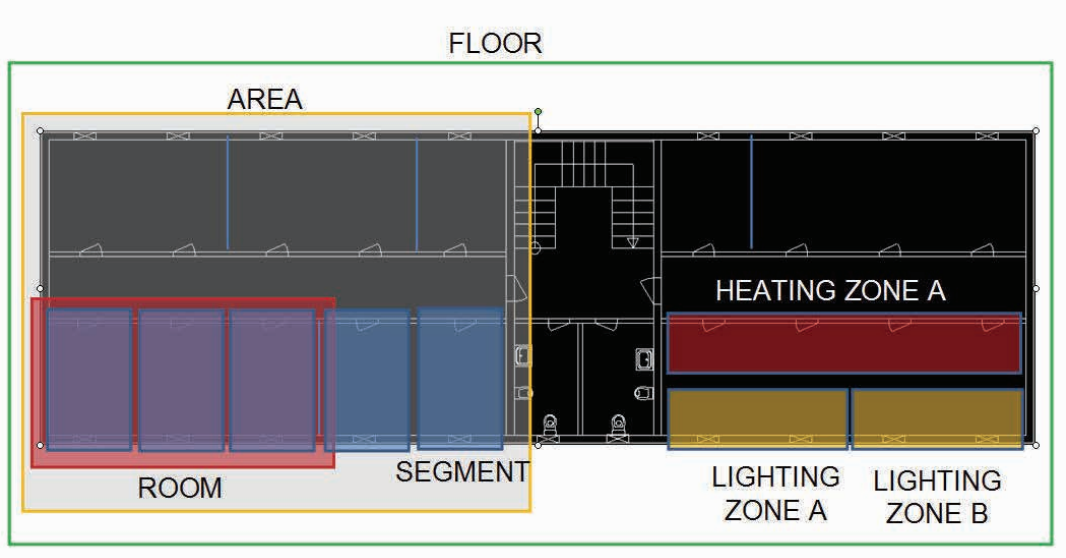
Flexible Room Concept for Room Automation

A room segment is the base unit of configuration in the L-ROC System. The L-ROC Room Controller provides a set of functions for every window axis including:

- lighting control with constant light controller
- sun blind control with angle adjustment
- temperature control for heating, cooling, and ventilation
- occupancy detection
- window monitoring

Each L-ROC Room Controller can handle up to 16 room segments. Based on the various room segment types, larger buildings can be modeled in a hierarchical manner. Areas are built with an area manager by combining multiple room controllers. A floor manager manages multiple areas in one floor. Depending on the architecture, the building can be split up into areas and floors as needed.

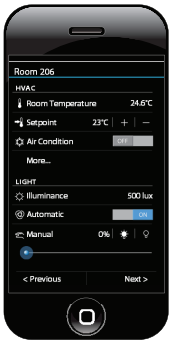
Area/Floor Managers are responsible for handling functions needed for corridor, staircase, and bathroom lighting, or even ventilation. Floor managers facilitate the data communication between the floors and handle floor relevant functions.



Rooms can now be created arbitrarily in any size by moving, installing, or removing partition walls. The resulting logical connections between the L-ROC Room Controllers will be built automatically. All graphical user interfaces and network connections are automatically generated and adapted respectively.

AST™ for every Room Segment

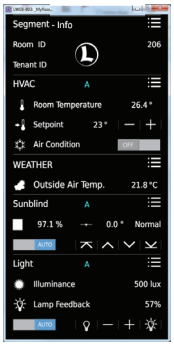
L-ROC provides a set of functions for Alarming, Scheduling, and Trending (AST™) for every room segment. Each room segment can be operated entirely independently. The AST™ functions are fully available to higher-level systems through BACnet/IP and web services (L-WEB System). Distributed schedulers can be efficiently managed and changed with LWEB-900.



Room Communication through redundant or separated IP Network

L-ROC Room Controllers are interconnected via a 100Base-T Ethernet network. Each L-ROC device 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.



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.

Integrated L-WEB Room Operation



L-ROC controllers provide graphical user interfaces for room operation directly via an IP connection to the user, without the need for an additional web server. Graphic projects are distributed among the L-ROC Room Controllers and can be accessed by LWEB-802/803 from any PC workstation, smart phone, or tablet PC running Android or iOS.

Integration of the L-STAT Network Thermostat

Per L-ROC Room Controller up to 16 L-STAT room control devices can be integrated into building automation via Modbus RTU (RS-485) interface. In addition to the attractive, modern design and intuitive operation, L-STAT provides a range of other features to individually increase the room comfort.

Internal sensors measure temperature, humidity, condensation, occupancy, and also the CO_2 value of the air. There is also the possibility to control room functions from remote via an IR remote control. Standard pushbuttons and external temperature sensors can be integrated through additional inputs. A built-in NFC chip (Near Field Communication) provides the ability to direct mobile devices to the address of the respective room website.

Connection to Higher-Level Systems

Higher-level systems can seamlessly integrate L-ROC Room Controllers via BACnet/IP, LonMark IP-852, or web services (OPC).

LROC-102

All these protocols are simultaneously available. It is possible to integrate the L-ROC Room Controller in a BACnet Operator Workstation and at the same time L-ROC will communicate with other CEA-709 devices on the IP-852 channel. Moreover, a higher-level SCADA or ERP System (Facility Management) gets information directly from the L-ROC Room Controller by using web services based on OPC.

Full LWEB-900 Support

The L-WEB System uses web services to communicate with the L-ROC System. All device and operating parameters of every single L-ROC Room Controller are automatically synchronized with the LWEB-900 SQL database by the LWEB-900 client or the LWEB-900 Master Device Manager. The parameters are available to all L-WEB client applications.

I/O Integration via Plug and Play

The L-ROC Room Controllers can automatically integrate physical I/Os by using L-IOB I/O Modules. Up to 24 L-IOB I/O Modules can be connected through LIOB-Connect, LIOB-FT, or LIOB-IP. All I/Os can be used by the L-ROC application and are also available via the web interface of L-ROC. All configurations of the L-IOB Modules are stored on the L-ROC and loaded on demand into the L-IOB I/O Modules. Exchanging I/O modules is done without any configuration effort requiring only a few quick configuration steps.



L-STUDIO

L-STUDIO is the world's first IEC 61499 based room automation system. Any room function can be realized with L-STUDIO in a distributed system of L-ROC devices. We call this new approach in automation "Cloud Control". In a cloud of L-ROC devices, all automation functions are mapped automatically to physical hardware. The object-oriented design method allows the efficient reuse of previously implemented functions. In the graphical development environment of L-STUDIO, areas are created from room segment with just a few mouse clicks. The areas are interconnected to floors and multiple floors form a building. The entire building application is automatically distributed to the L-ROC Controllers installed in the building.

New functions can be added to the room segment objects after initial configuration. These new functions can be applied individually or to all room segment objects very easily. Comprehensive debugging and watch functions allow for complete building troubleshooting. An extensive library of functions is provided for heating, ventilation, cooling, lighting, sun blind control, and security. With the integrated L-VIS/L-WEB Configurator, graphical pages for L-VIS Touch Panels and L-WEB applications can be customized.

LROC-102

Features

- Flexible built-in management for room segments
- Room controller for up to 16 room segments
- Networking via redundant or separated IP network
- Programmable with L-STUDIO (IEC 61499)
- Extension with physical inputs and outputs using L-IOB I/O Modules (LIOB-10x, LIOB-15x, and LIOB-45x/55x)
- 128x64 graphic display with backlight
- Local display of device and data point information
- Manual operation using the jog dial or VNC Client
- Integrated AST™ functions (Alarming, Scheduling, and Trending) for each room segment
- Event-driven e-mail notification
- Math objects to execute mathematical operations on data points
- Stores customized graphical pages
- Visualization of customized graphical pages through LWEB-900 (Building Management), LWEB-803 (Monitoring and Control), or LWEB-802 (Web Browser)
- Support of the L-STAT Network Thermostat
- Built-in OPC XML-DA and OPC UA server
- Dual switched or separated Ethernet ports
- 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)
- BACnet/IP compliant with B-BC (BACnet Building Controller) functionality
- Compliant with CEA-709, CEA-852, and ISO/IEC 14908 Standard (LonMark System)
- Connection of any CEA-709 device via TP/FT-10 channel
- CEA-709 integration via LonMark IP-852 (Ethernet/IP) channel
- Support of dynamically created or static NVs
- Support of user-defined NVs (UNVTs) and Configuration Properties (SCPTs, UCPTs)
- Integrated BACnet/IP to BACnet MS/TP Router including BBMD as well as Slave-Proxy functionality
- Integrated IP-852 to TP/FT-10 Router
- Connection to KNXnet/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)
- Gateway functions including Smart Auto-Connect™
- Modbus TCP and Modbus RTU (Master or Slave)
- 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
- Stores user-defined project documentation

L-ROC Room Controller

LROC-102

General Specifications	
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, non condensing, degree of protection: IP40, IP20 (terminals)

Specifications	
Type	**LROC-102**
Interfaces	2 x Ethernet (100Base-T): Web services (OPC XML-DA, OPC UA), LonMark IP-852*, BACnet/IP**, LIOB-IP, KNXnet/IP, Modbus TCP (Master or Slave), HTTP, FTP, SSH, HTTPS, Firewall, SNMP 1 x LIOB-Connect 2 x USB-A: WLAN (needs LWLAN-800), EnOcean (needs LENO-80x), SMI (needs LSMI-804) 1 x TP/FT-10* (LonMark System) 1 x LIOB-FT 2 x RS-485 (ANSI TIA/EIA-485): BACnet MS/TP** or Modbus RTU (Master or Slave) 2 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) * Router between LonMark IP-852 and TP/FT-10 ** Router between BACnet/IP and BACnet MS/TP
L-IOB I/O Modules	Up to 24 L-IOB I/O Modules in any combination of type LIOB-10x, LIOB-15x, and LIOB-45x/55x
BACnet/IP Router	1
LonMark CEA-709 Router	1
Program cycle time	Event-triggered
Programming, tools	L-STUDIO (IEC 61499 based)

Resource limits			
Total number of data points	30 000	LonMark Schedulers	100
OPC data points	10 000	LonMark Alarm Servers	1
BACnet objects	2 000 (analog, binary, multi-state)	E-mail templates	100
BACnet client mappings	5 000	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 (simultaneously)
CEA-709 External NVs (polling)	1 000	L-IOB I/O Modules	24
CEA-709 address table entries	1 000 (non-ECS mode: 15)	Number of EnOcean devices	100
LonMark Calendars	1 (25 calendar patterns)	EnOcean data points	1 000
SMI devices (per channel)	16		

LROC-102

Order number	Product description
LROC-102	Room Controller for room segment, aisle, floor, building, or campus management
LROC-START-M	Starter kit: 1 x LROC-102, 1 x L-IOB I/O Module, 1 x LPOW-2415A, and L-STUDIO software license
L-STUDIO	L-ROC programming and configuration software
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 6A, 4 x Triac 0.5A)
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 6A)
LIOB-103	LIOB-Connect I/O Module: 6 UI, 6 AO, 5 DO (5 x Relay 16A)
LIOB-150	LIOB-FT I/O Module: 8 UI, 2 DI, 2 AO, 8 DO (4 x Relay 6A, 4 x Triac 0.5A)
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 6A)
LIOB-153	LIOB-FT I/O Module: 6 UI, 6 AO, 5 DO (4 x Relay 16A, 1 x Relay 6A)
LIOB-154	LIOB-FT I/O Module: 7 UI, 4 AO, 7 DO (5 x Relay 6A, 2 x Triac 0.5A), 1 Pressure Sensor
LIOB-450	LIOB-IP852 I/O Module: 8 UI, 2 DI, 2 AO, 8 DO (4 x Relay 6A, 4 x Triac 0.5A)
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 6A)
LIOB-453	LIOB-IP852 I/O Module: 6 UI, 6 AO, 5 DO (4 x Relay 16A, 1 x Relay 6A)
LIOB-454	LIOB-IP852 I/O Module: 7 UI, 4 AO, 7 DO (5 x Relay 6A, 2 x Triac 0.5A), 1 Pressure Sensor
LIOB-550	LIOB-BIP I/O Module: 8 UI, 2 DI, 2 AO, 8 DO (4 x Relay 6A, 4 x Triac 0.5A)
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 6A)
LIOB-553	LIOB-BIP I/O Module: 6 UI, 6 AO, 5 DO (4 x Relay 16A, 1 x Relay 6A)
LIOB-554	LIOB-BIP I/O Module: 7 UI, 4 AO, 7 DO (5 x Relay 6A, 2 x Triac 0.5A), 1 Pressure Sensor
LPOW-2415A	LIOB-Connect power supply unit, 24 V DC, 15 W
LPOW-2415B	Power supply unit with power connector 24 V DC, 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
LSTAT-800-G3-Lx	Network Thermostat, front black, white enclosure, Modbus, NFC, temperature, rel. humidity, ext. switch/NTC, IR receiver, Buttons (Lx)
LSTAT-801-G3-Lx	Network Thermostat, front black, white enclosure, Modbus, NFC, temperature, rel. humidity, ext. switch/NTC, occupancy, IR receiver, Buttons (Lx)
LSTAT-802-G3-Lx	Network Thermostat, front black, white enclosure, Modbus, NFC, temperature, rel. humidity, ext. switch/NTC, occupancy, IR receiver, CO2, Buttons (Lx)
LSTAT-80x-CUSTOM	Customized Network Thermostat, minimum quantity 100 pieces, enclosure G1: silver, G2: black, G3: white; custom print Lx, including 2 working samples, lead time 10 weeks
LSMI-800	Standard Motor Interface for 16 motors via EXT port
LSMI-804	Standard Motor Interface for 64 motors, 4 SMI channels via USB

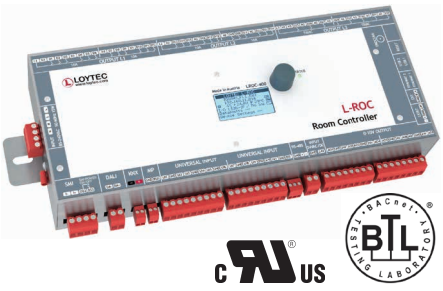
L-ROC Room Controller

LROC-400, LROC-401, LROC-402

☐ BACnet ☐ CEA-709 ☐ KNX ☐ Modbus ☐ M-Bus ☐ OPC ☐ DALI

LOYTEC COMPETENCE PARTNER

Datasheet #89036419





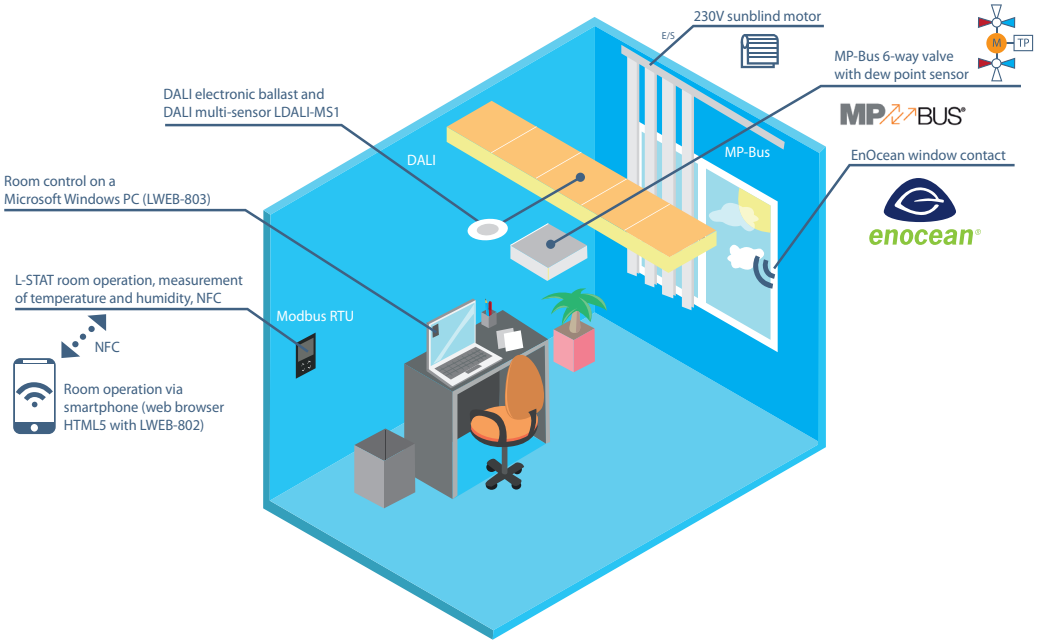
The L-ROC Room Controller provides the basis for a revolutionary room automation system based on IP, which seamlessly integrates with native BACnet/IP networks and LonMark Systems at the controller level. Together with the L-STUDIO software, flexible room solutions can be created and adapted to changing requirements during the project with little effort. Integral parts of the L-ROC system are a web-based room operation via an LWEB-802/803 dashboard and the automatic generation of graphics for the L-VIS Touch Panel for local operation.

Our room controllers provide all common interfaces and a large number of physical I/Os for room automation projects. KNX devices are integrated via the built-in KNX TP1 or the KNXnet/IP interface. DALI lamps and DALI sensors are connected to the DALI interface with an integrated DALI power supply. Up to 16 SMI sunblind motors connect to the SMI interface. Belimo valves connect to the MP-Bus interface. BACnet MS/TP devices connect to the RS-485 interface, which can also be configured as a Modbus RTU interface to connect MODBUS devices like energy meters or ekey finger scanner for access control. L-STAT thermostats connect to the dedicated L-STAT interface. The EXT interface can connect 16 more SMI sunblind motors through the LSMI-800 interface or M-Bus meters through the L-MBUS20 interface. EnOcean devices connect to the EnOcean interface through an external antenna. Dual Ethernet ports allow daisy chaining of L-ROC controllers in a ring topology and provide BACnet/IP, LON/IP, MODBUS/IP, KNXnet/IP and OPC communication. Optionally the L-ROC can communicate via wireless LAN through the LWLAN-800 wireless adapter connected to the USB port. 24 relay outputs, 8 TRIAC outputs, 8 analog outputs, 10 universal inputs and 2 digital inputs connect various physical inputs and outputs. Our room automation library provides pre built function modules for all lighting, heating, cooling, ventilation, sunblinds and access control via finger scanners. Built-in SSL encryption ensures secure operation of the room automation system.

Flexible Room Concept for Room Automation

A room segment is the smallest individually controllable entity in the L-ROC System. The L-ROC Room Controller provides a set of functions for every room segment including:

- lighting control with constant light controller
- sun blind control with angle adjustment

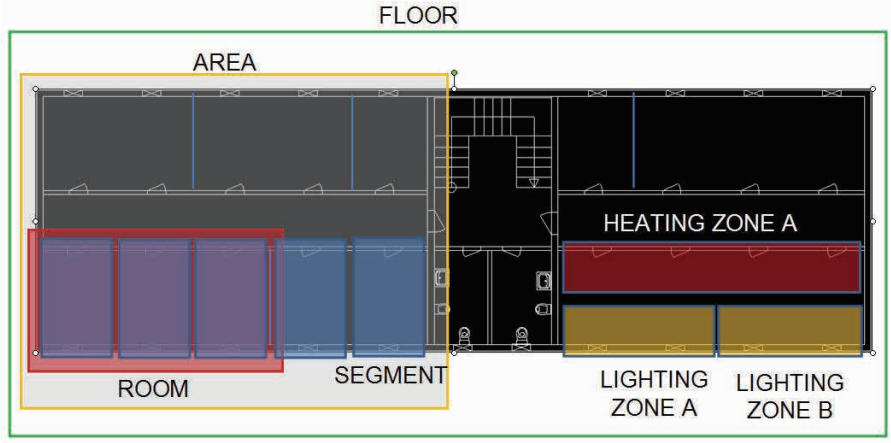


- temperature control for heating, cooling, and ventilation
- occupancy detection
- window monitoring and window contact

Depending on the model an L-ROC Room Controller can control between 8 and 16 room segments. Based on the various room segment types, larger buildings can be modeled in a hierarchical manner. Areas are built with an area manager by combining multiple room controllers. A floor manager manages multiple areas in one floor. Depending on the architecture, the building can be split up into areas and floors as needed.

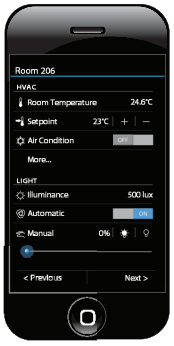
Area/Floor Managers are responsible for handling functions needed for corridor, staircase, and bathroom lighting, or even ventilation. Floor managers facilitate the data communication between the floors and handle floor relevant functions e.g. processing meter data.

Rooms can be created in any size by moving, installing, or removing partition walls. The resulting logical connections between the L-ROC Room Controllers will be built automatically. All graphical user interfaces and network connections are automatically generated and adapted respectively.



AST™ for every Room Segment

L-ROC provides a set of functions for Alarming, Scheduling, and Trending (AST™) for every room segment. Each room segment can be operated entirely independently. The AST™ functions are fully available to higher-level systems through BACnet/IP and web services (L-WEB System). Distributed schedulers can be efficiently managed and changed with LWEB-900.





Inter Room Communication through redundant IP Network

The L-ROC Room Controllers are equipped with two Ethernet ports. It can be configured to use the internal switch to interconnect the two ports in a bus or ring topology.

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.

Integrated L-WEB Room Operation

L-ROC controllers provide graphical user interfaces for room operation directly via an IP connection to the user, without the need for an additional web server. Graphic projects are distributed among the L-ROC Room Controllers and can be accessed by LWEB-802/803 from any PC workstation, smart phone, or tablet PC running Android or iOS.

L-ROC Room Controller

LROC-400, LROC-401, LROC-402



Integration of the L-STAT Network Thermostat

Depending on the model, 8 to 16 L-STAT thermostats can be integrated via the L-STAT interface per L-ROC Room Controller. In addition to the attractive, modern design and intuitive operation, L-STAT provides a range of features to individually increase the room comfort.

Internal sensors measure temperature, humidity, dew point, occupancy, and the CO_2 content of the air. There is also the possibility to control room functions via an IR remote control. Standard pushbuttons and external temperature sensors can be integrated through additional inputs. A built-in NFC chip (Near Field Communication) provides the ability to direct mobile devices to the URL of the respective room website.

Connection to Higher-Level Systems

Higher-level systems can seamlessly integrate L-ROC Room Controllers via BACnet/IP, LonMark IP-852, or web services (OPC).

All these protocols are simultaneously available. It is possible to integrate the L-ROC Room Controller in a BACnet Operator Workstation and at the same time L-ROC will communicate with other CEA-709 devices on the IP-852 channel. Moreover, a higher-level SCADA or ERP System (Facility Management) gets information directly from the L-ROC Room Controller by using web services based on OPC XML-DA or OPC UA.

Full LWEB-900 Support

The L-WEB System uses web services to communicate with the L-ROC System. All device and operating parameters of every single L-ROC Room Controller are automatically synchronized with the LWEB-900 SQL database. Controllers can be replaced from the database with a backup without user interaction.

I/O Integration via Plug and Play

The L-ROC Room Controllers can automatically integrate additional physical I/Os by using L-IOB I/O Modules. Up to 2 L-IOB I/O Modules can be connected through LIOB-IP. All I/Os can be used by the L-ROC application and are also available via the web interface of L-ROC. All configurations of the L-IOB Modules are stored on the L-ROC and loaded on demand into the L-IOB I/O Modules. Exchanging I/O modules is done without any configuration effort requiring only a few quick configuration steps

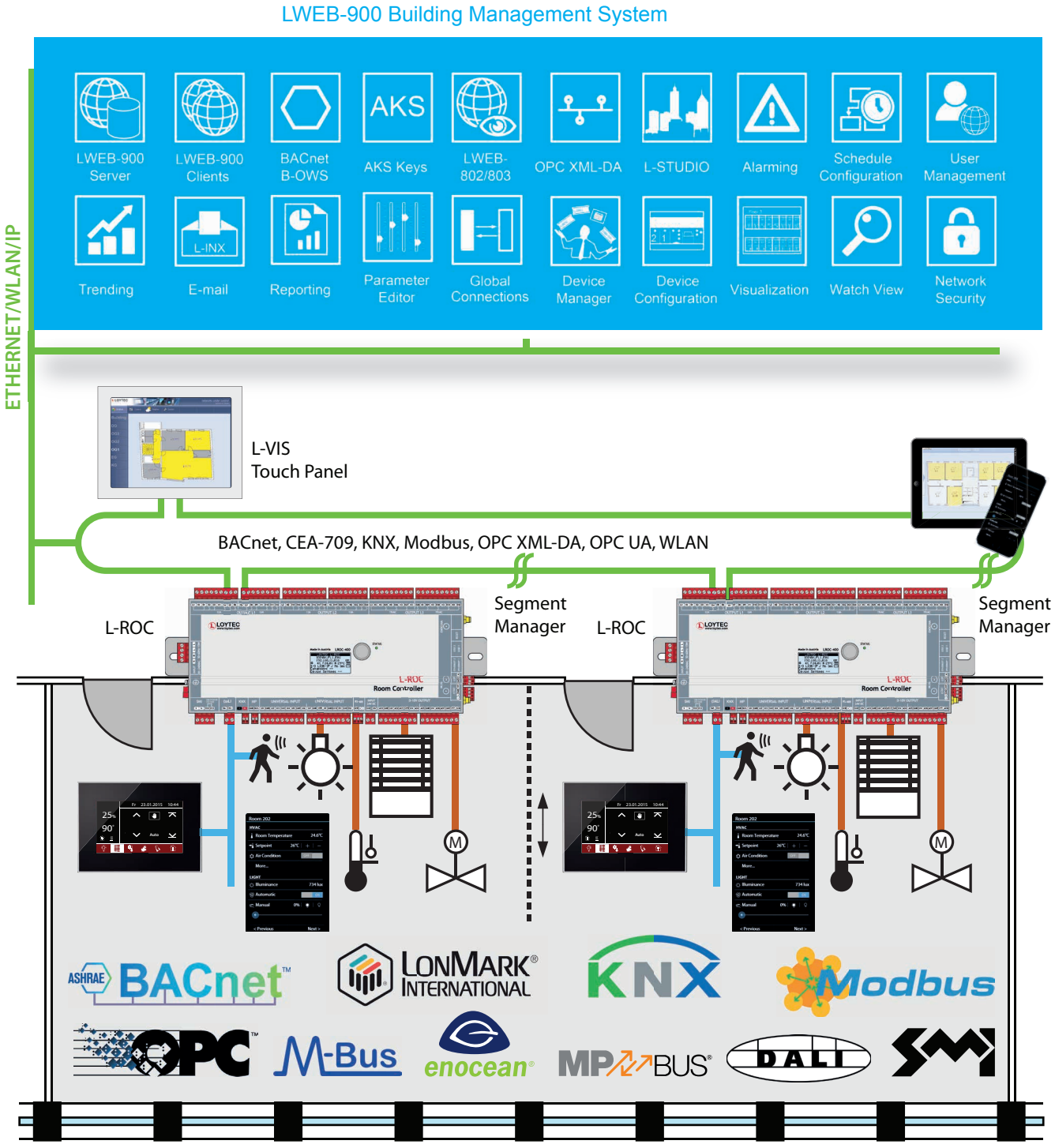
L-STUDIO



L-STUDIO is the world's first IEC 61499 based room automation system. Any room function can be realized with L-STUDIO in a distributed system of L-ROC devices. We call this new approach in automation "Cloud Control". In a cloud of L-ROC devices, all automation functions are mapped automatically to physical hardware. The object-oriented design method allows the efficient reuse of previously implemented functions. In the graphical development environment of L-STUDIO, areas are created from room segment with just a few mouse clicks. The areas are interconnected to floors and multiple floors form a building. The entire building application is automatically distributed to the L-ROC Controllers installed in the building.

New functions can be added to the room segment objects after initial configuration. These new functions can be applied individually or to all room segment objects very easily. Comprehensive debugging and watch functions allow for complete building troubleshooting. An extensive library of functions is provided for heating, ventilation, cooling, lighting, sun blind control, and security. With the integrated L-VIS/L-WEB Configurator, graphical pages for L-VIS Touch Panels and L-WEB applications can be customized..

LROC-400, LROC-401, LROC-402

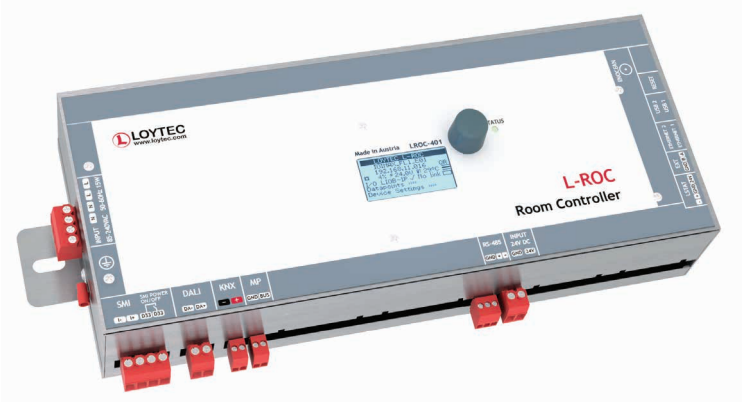


L-ROC Room Controller

LROC-400, LROC-401, LROC-402

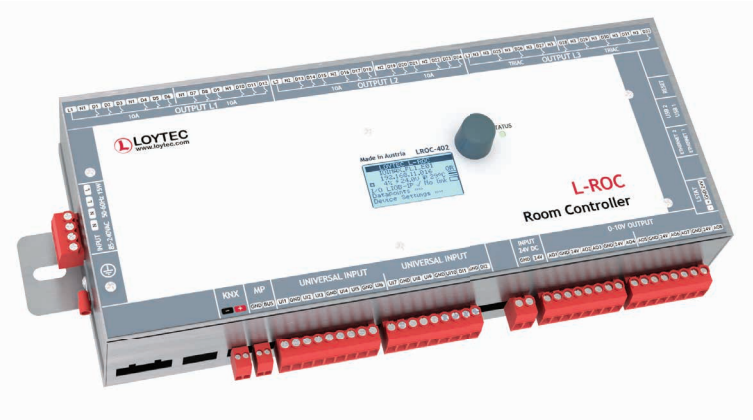
Features

- Flexible built-in management for room segments
- Room controller for up to 8 or16 room segments
- Networking via redundant IP network
- Programmable with L-STUDIO
- Extension with physical inputs and outputs using L-IOB I/O Modules (LIOB-45x or LIOB-55x)
- 128x64 graphic display with backlight for device configuration and maintenance
- Local display of device and data point information
- Manual operation using the jog dial or VNC Client
- Integrated AST™ functions (Alarming, Scheduling, and Trending) for each room segment
- Event-driven e-mail notification
- Math objects to execute mathematical operations on data points
- Stores customized graphical pages
- Visualization of customized graphical pages through LWEB-900 (Building Management), LWEB-803 (Monitoring and Control), or LWEB-802 (Web Browser)
- Support of the L-STAT Network Thermostat
- Built-in OPC XML-DA and OPC UA server
- Access to network statistics via SNMP
- 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)
- BACnet/IP compliant with B-BC (BACnet Building Controller) functionality
- Integrated BACnet/IP to BACnet MS/TP Router including BBMD as well as Slave-Proxy functionality
- Compliant with CEA-709, CEA-852, and ISO/IEC 14908 Standard (LonMark System)
- CEA-709 integration via LonMark IP-852 (Ethernet/IP) channel
- Support of dynamically created or static NVs
- Support of user-defined NVs (UNVTs) and Configuration Properties (SCPTs, UCPTs)
- Connection to KNXnet/IP and KNX TP1
- M-Bus Master according to EN 13757-3, connection via optional M-Bus Converter (L-MBUS20 or L-MBUS80)
- Gateway functions including Smart Auto-Connect™
- Modbus TCP and Modbus RTU (Master or Slave)
- Integrated web server for device configuration and monitoring data points
- Connection to EnOcean wireless devices (built-in EnOcean interface with external antenna for Europe, 868 MHz) or via LENO-80x
- Integration of actuators via MP-Bus
- DALI Integration of up to 64 DALI lamps (depending on the model)
- Integrated DALI power supply, 16 V DC, 230 mA guaranteed supply current, 250 mA max. supply current
- Test and assignment of DALI devices via the Web interface
- Replacement of DALI devices without additional software tools via the graphic display and jog dial
- Supports up to 16 DALI sensors
- Supports up to 64 DALI pushbuttons
- Supports the control of standard loads in the power grid via LDALI-RM1 Relay Modules
- Integrated Constant Light Controller
- Supports lamp burn-in mode
- Supports periodic testing of DALI emergency lights
- Integrated DALI Protocol Analyzer
- Supports WLAN through LWLAN-800 Interface
- Supports SMI (Standard Motor Interface) through LSMI-80x
- Stores user-defined project documentation



LROC-400, LROC-401, LROC-402

General Specifications			
Dimensions (mm)	340 x 144 x 70 (L x W x H), DIM047		
Installation	mountable directly via two oblong holes (ø 7 mm, distance 315 mm) or system distribution box LBOX-ROCx, DIM048		
Power supply	24 V DC ±10 % or 85 – 240 V AC, 50 – 60 Hz (do not connect 24 V DC if SMI or DALI are used)		
Operating conditions	0 °C to 50 °C, 10 – 90 % RH, non condensing, degree of protection: IP40, IP20 (terminals)		
Specifications			
Type	**LROC-400**	**LROC-401**	**LROC-402**
Power consumption	max 15 W	max 15 W	max 15 W
Interfaces	2 x Ethernet (100Base-T): Web services (OPC XML-DA, OPC UA), LonMark IP-852, BACnet/IP*, LIOB-IP, KNXnet/IP, Modbus TCP (Master or Slave), HTTP, FTP, SSH, HTTPS, Firewall, VNC, SNMP 1 x L-STAT (Network Thermostat) 1 x MP-Bus (actuator) 1 x KNX TP1 2 x USB-A: WLAN (needs LWLAN-800), EnOcean (needs LENO-80x), SMI (needs LSMI-804)		
	1 x RS-485 (ANSI TIA/EIA-485): BACnet MS/TP* or Modbus RTU (Master or Slave) 1 x DALI with integrated DALI bus power supply 16 V DC, 160 mA guaranteed supply current, 250 mA max. supply current 1 x SMI (Standard Motor Interface Master) 1 x EnOcean (Europe 868 MHz) with external antenna 1 x EXT: M-Bus, Master EN 13757-3 (needs LMBUS-20 or LMBUS-80) or SMI (needs LSMI-800)	1 x RS-485 (ANSI TIA/EIA-485): BACnet MS/TP* or Modbus RTU (Master or Slave) 1 x DALI with integrated DALI bus power supply 16 V DC, 160 mA guaranteed supply current, 250 mA max. supply current 1 x SMI (Standard Motor Interface Master) 1 x EnOcean (Europe 868 MHz) with external antenna 1 x EXT: M-Bus, Master EN 13757-3 (needs LMBUS-20 or LMBUS-80) or SMI (needs LSMI-800)	–
	* Router between BACnet/IP and BACnet MS/TP		



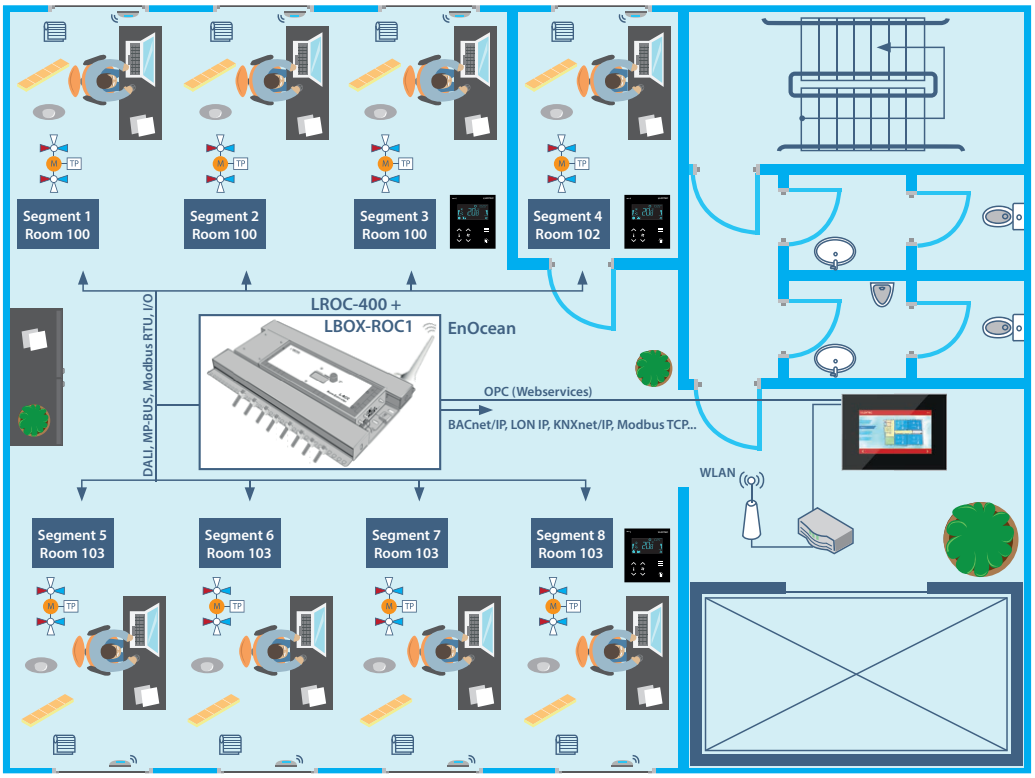
L-ROC Room Controller

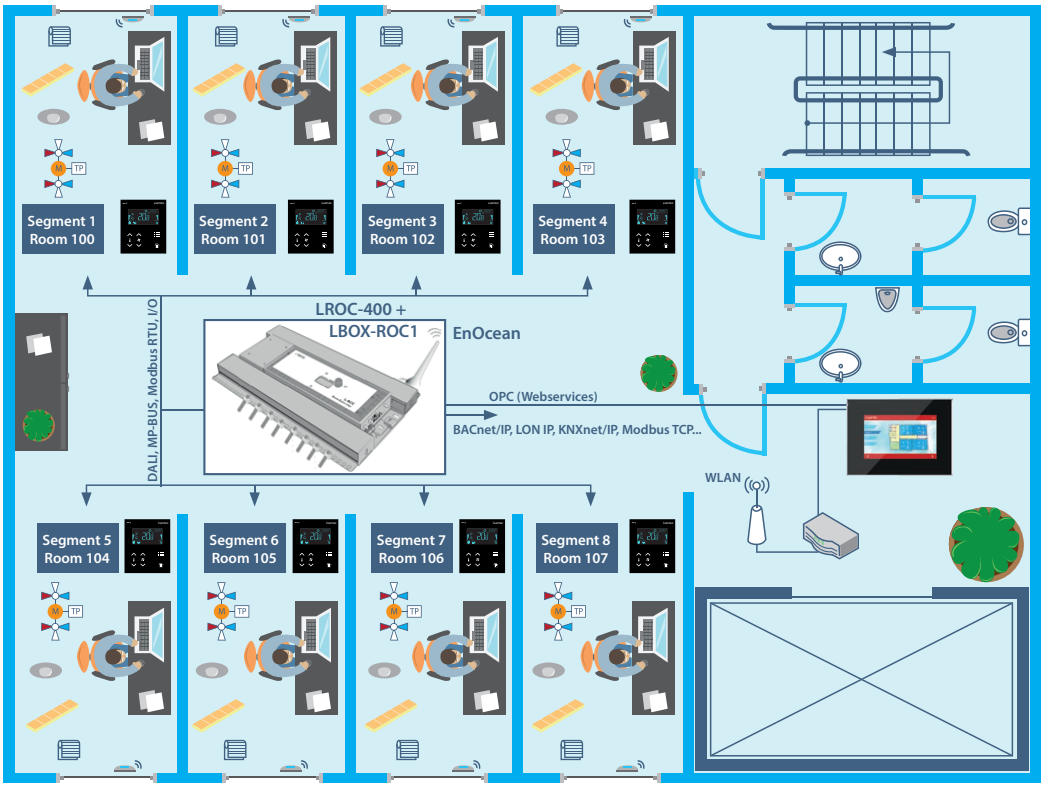
LROC-400, LROC-401, LROC-402

Specifications			
Type	**LROC-400**	**LROC-401**	**LROC-402**
Universal Input (UI)	10	0	10
Digital Input (DI)	2	0	2
Analog Output (AO)	8	0	8
Digital Output (DO)	32 (24 x Relay, 8 x Triac)	0	32 (24 x Relay, 8 x Triac)
Digital Output specification	Relay: 10 A Triac: 0,5 A @ 24–240 VAC	-	Relay: 10 A Triac: 0,5 A @ 24–240 VAC
Frequency	868.3 MHz	868.3 MHz	-
RF Output Power	3 dBm	3 dBm	-
L-IOB I/O extension	2 L-IOB I/O Modules of Type LIOB-45x or LIOB-55x		
BACnet/IP Router	1		
Program cycle time	Event-triggered		
Programming, Tools	L-STUDIO (IEC 61499 based)		
Max. number of Rooms/Segments	8	16	8
SMI Motors	16	16	0
SMI via LSMI-800	16	16	0
EnOcean devices (868 MHz)	32	64	0
EnOcean devices via LENO-80x	32	64	32
L-STAT Network Thermostats	8	16	8
DALI devices	64	64	0
DALI groups	16	16	-
DALI sensors	16	16	-
DALI pushbuttons (LDALI-BM1)	16 pushbutton coupler	16 pushbutton coupler	-
MP-Bus devices	8 (16 MPL)	8 (16 MPL)	8 (16 MPL)

Resource limits			
Total number of data points	30 000	LonMark Alarm Servers	1
OPC data points	10 000	E-mail templates	100
BACnet objects	2 000 (analog, binary, multi-state)	Math objects	100
BACnet client mappings	5 000	Alarm logs	10
BACnet calendar objects	25	M-Bus data points	1 000
BACnet scheduler objects	100 (64 data points per object)	Modbus data points	2 000
BACnet notification classes	32	KNX TP1 data points	1 000
Trend logs (BACnet or generic)	512 (4 000 000 entries, ≈ 60 MB)	KNXnet/IP data points	1 000
Total trended data points	1 000	Connections (Local / Global)	2 000 / 250
CEA-709 network variables (NVs)	2 000	Number of L-WEB clients	32 (simultaneously)
CEA-709 Alias NVs	2 000	L-IOB I/O Modules (via LIOB-IP)	2
CEA-709 External NVs (polling)	1 000	EnOcean data points	10 per EnOcean device
CEA-709 address table entries	1 000 (non-ECS mode: 15)	SMI devices (per channel)	16
LonMark Calendars	1 (25 calendar patterns)	MP-Bus devices	8 (16 MPL)
LonMark Scheduler	100		

LROC-400, LROC-401, LROC-402





L-ROC Room Controller

LROC-400, LROC-401, LROC-402

Order Number	Product Description
LROC-400	Room Controller for room segment, aisle, floor, building, or campus management
LROC-401	Room Controller for room segment, aisle, floor, building, or campus management
LROC-402	Room Controller for room segment, aisle, floor, building, or campus management
LROC-START-4xx	Starter Kit: 1 x LROC-4xx, 2 x LSTAT-800-xx-xx, 3 x L-STUDIO software license, 1 x LWEB-900-CP
LBOX-ROC1	System Distribution Box for LROC-40x Room Controller, 519 x 280 x 71 (L x W x H in mm)
LBOX-ROC2	System Distribution Box for LROC-40x Room Controller, 60 W 24 VDC power supply
L-STUDIO	L-ROC programming and configuration software
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
LSTAT-800-G3-Lx	Network Thermostat, front black, white enclosure, Modbus, NFC, temperature, rel. humidity, ext. switch/NTC, Buttons (Lx)
LSTAT-801-G3-Lx	Network Thermostat, front black, white enclosure, Modbus, NFC, temperature, rel. humidity, ext. switch/NTC, occupancy, IR receiver, Buttons (Lx)
LSTAT-802-G3-Lx	Network Thermostat, front black, white enclosure, Modbus, NFC, temperature, rel. humidity, ext. switch/NTC, occupancy, IR receiver, CO2, Buttons (Lx)
LSTAT-80x-CUSTOM	Customized Network Thermostat, minimum quantity 100 pieces, enclosure G1: silver, G2: black, G3: white; custom print Lx, including 2 working samples, lead time 10 weeks
LDALI-MS1	DALI multi-sensor (motion detection, brightness sensor, IR sensor)
LDALI-BM1	Quadruple DALI push button coupler
LDALI-RM1	DALI Relay Module 8A
LDALI-RM2	DALI Relay Module 8A, Analog Interface 1 – 10V
L-TEMP2	External temperature sensor (NTC10K) for use with L-IOB Universal Inputs
LSMI-800	Standard Motor Interface for 16 motors via EXT port
LSMI-804	Standard Motor Interface for 64 motors, 4 SMI channels via USB



L-INX Automation Servers

L-INX Overview

L-INX Automation Servers are automation stations with a high degree of integration and flexibility. They provide solutions for the following fields of activities:

- Multi-protocol applications with data points of different technologies: CEA-709 (LonMark systems), BACnet, KNX, Modbus, M-Bus, MP-Bus, EnOcean, SMI,
- Direct integration of physical in- and outputs as data points,
- Visualization of data points on PCs or mobile devices with LOYTEC L-WEB software or in OPC SCADA software bundles,
- Automation of single rooms up to primary plants using IEC 61131 programs,
- Used in environments with increased network security requirements,
- Basic automation functions: Alarming, Scheduling, historical Trending,
- Event- or time-driven e-mail notifications for alarms or historical data,
- Universal gateway for the connection of data points of supported network technologies.

Configuration

For basic configuration, the L-INX offers a web interface and local operations via an LCD display using the built-in jog dial. The advanced configuration is carried out with the L-INX Configurator Software. Data points are created manually, through importing of device templates, data point lists or reading data from connected devices. In LonMark systems, data points can be extracted from the LNS database and necessary bindings can be managed.

Automation Server

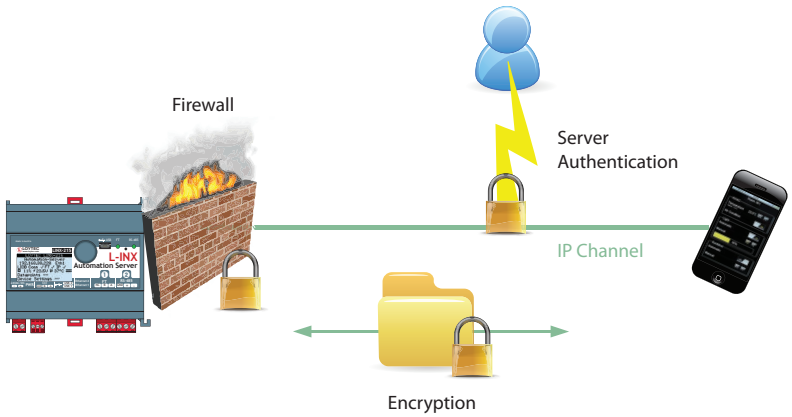
Data points are alarmed, scheduled, and recorded in the automation server. Alarms can be acknowledged and recorded in a local alarm log. Through schedulers and calendars, data points can be allocated with values at certain points in time. The internal clock can be synchronized via NTP or the LonMark Real-Time Keeper. Historical data point values can be recorded periodically, after a value change, or can be triggered. Mathematical objects allow easy calculations and the built-in e-mail client sends notifications e.g. triggered by alarms. Recorded data can be attached to the e-mail as CSV file.

Programmable logic

Beyond automation functions, there are L-INX models featuring a programmable logic controller (PLC) on a data point basis. It is developed with L-STUDIO or L-OGICAD according to IEC 61131-3 and is able to implement practically any logic via function block diagram or structured text. The data points of the L-INX serve as input, output or flag variables. As data points are generic, the program logic can be developed once and later be adapted to different systems. The PLC can also access terminals that are directly connected to the L-INX via L-IOB I/O modules. LOYTEC offers a library for building automation and HVAC that provides ready-made solutions for typical applications. For details please check the L-STUDIO section (page 31-32).

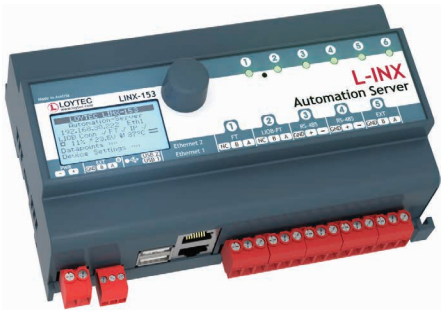
Network Security

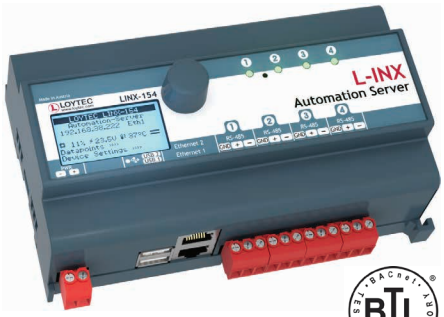
Nowadays, network security in building automation experiences increased attention. To facilitate system improvements for the integrator, the L-INX features a Secure Mode. Once activated, the L-INX activates an integrated firewall that blocks all unsecure accesses. To ensure authenticity of the data, individual certificates from a certification authority can be requested. The server certificate particularly provides an added value for mobile devices. Thereby, they can verify that they are connected with an authorized L-INX. For OPC based SCADA and visualization packets, the L-INX offers the implementation of Secure Channel with OPC UA that allows encryption and authentication for clients through certificates.



LINX-153, LINX-154

Datasheet #89047919







The L-INX Automation Servers LINX-153 and LINX-154 are powerful, programmable automation stations, which can be programmed by L-STUDIO. The L-INX Automation Servers can host user specific graphical pages and can integrate physical I/Os through L-IOB I/O Modules via LIOB-Connect, LIOB-FT, or LIOB-IP. The LINX-154 can only be extended by 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.

The powerful Automation Servers 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). LINX-153 Automation Servers feature an integrated Remote Network Interface (RNI) to access the TP/FT-10 channel on the device via Ethernet/IP. LINX-153 Automation Servers feature two built-in routers, one IP-852 router and one BACnet/IP to MS/TP router including BBMD as well as Slave-Proxy functionality providing the complete feature set of the corresponding L-IP devices.

The LINX-153 and LINX-154 implement the BACnet Building Controller (B-BC) profile and are BTL certified. In addition, the LINX-15x provide connectivity to KNXnet/IP (only LINX-153) and Modbus TCP via Ethernet/IP and to Modbus RTU via RS-485. M-Bus and KNX TP1 (only for LINX-153) 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. 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.

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.

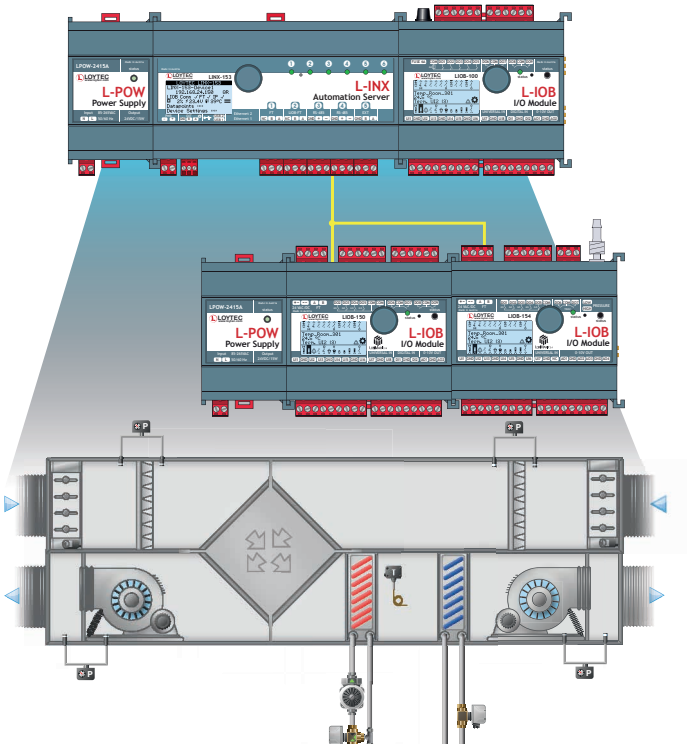
The L-INX devices provide fully featured AST™ functionality (Alarming, Scheduling, and Trending) and can be integrated perfectly into the L-WEB System.

L-INX Automation Server

LINX-153, LINX-154

Features

- Programmable with L-STUDIO IEC 61131-3 and IEC 61499
- Programmable with L-LOGICAD (a L-LOGICAD-LINX license is needed)
- Physical inputs and outputs with L-IOB I/O Modules (LIOB-10x, LIOB-15x, and LIOB-45x/55x for LINX-153) (LIOB-45x/55x for LINX-154)
- 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™)
- Event-driven e-mail notification
- Math objects to execute mathematical operations on data points
- Stores customized graphical pages
- Visualization of customized graphical pages through LWEB-900 (Building Management), LWEB-803 (Monitoring and Control), or LWEB-802 (Web Browser)
- Built-in OPC XML-DA and OPC UA server
- Dual switched or separated Ethernet ports
- 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
- Compliant with CEA-709, CEA-852, and ISO/IEC 14908 Standard (LonMark System)
- Supports TP/FT-10 (only LINX-153)
- 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 (only LINX-153)
- Integrated BACnet/IP to BACnet MS/TP Router including BBMD as well as Slave-Proxy functionality
- Integrated IP-852 to TP/FT-10 Router (only LINX-153)
- KNXnet/IP, connection to KNX TP1 through LKNX-300 Interface (only LINX-153)
- M-Bus Master according to EN 13757-3, connection via optional M-Bus Converter (only LINX-153) (L-MBUS20 or L-MBUS80)
- Gateway functions including Smart Auto-Connect™
- Modbus TCP and Modbus RTU (Master or Slave)
- Integrated web server for device configuration and monitoring data points
- Configurable via TP/FT-10 (only LINX-153) or Ethernet/IP
- Connection to EnOcean wireless devices via LENO-80x Interface (only LINX-153)
- Supports SMI (Standard Motor Interface) through LSMI-800 or LSMI-804 (only LINX-153)
- Supports MP-Bus through LMPBUS-804 Interface (only LINX-153)
- Supports WLAN through LWLAN-800 Interface
- Stores user-defined project documentation



LINX-153, LINX-154

Specifications LINX-153		
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, non condensing, degree of protection: IP40, IP20 (terminals)	
Interfaces (LINX-153)	2 x Ethernet (100Base-T): OPC XML-DA, OPC UA, LonMark IP-852, BACnet/IP, 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) 1 x LIOB-FT	2 x RS-485 (ANSI TIA/EIA-485): BACnet MS/TP or Modbus RTU (Master or Slave) 2 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), MP-Bus (needs LMPBUS-804)
L-IOB I/O Modules	Up to 24 L-IOB I/O Modules in any combination of type LIOB-10x, LIOB-15x, and LIOB-45x/55x	
Remote Network Interface	1 RNI with 2 MNI devices	
BACnet/IP Router	1	
CEA-709 Router	1	
Program cycle time	Down to 10 ms	
Specifications LINX-154		
Dimensions (mm)	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	24 VDC / 24 VAC ±10 %, typ. 2.5 W	
Operating conditions	0 °C to 50 °C, 10 – 90 % RH, non condensing, degree of protection: IP40, IP20 (terminals)	
Interfaces (LINX-154)	2 x Ethernet (100Base-T): OPC XML-DA, OPC UA, LonMark IP-852, BACnet/IP, LIOB-IP, Modbus TCP (Master or Slave), HTTP, FTP, SSH, HTTPS, Firewall, VNC, SNMP	4 x RS-485 (ANSI TIA/EIA-485): BACnet MS/TP or Modbus RTU (Master or Slave) 2 x USB-A: WLAN (needs LWLAN-800)
L-IOB I/O Modules	Up to 24 L-IOB I/O Modules in any combination of type LIOB-45x/55x	
BACnet/IP Router	1	
Program cycle time	Down to 10 ms	
L-STUDIO 3.0 licenses		
Type	**LINX-153**	**LINX-154**
Programming, Tools	L-STUDIO (IEC 61131-3 and IEC 61499 based), L-INX Configurator	
License	L-STUDIO: included L-LOGICAD: upgradeable	L-STUDIO: included L-LOGICAD: upgradeable

L-INX Automation Server

LINX-153, LINX-154

Resource limits LINX-153			
Total number of data points	30 000	LonMark Schedulers	100
OPC data points	10 000	LonMark Alarm Servers	1
BACnet objects	1 000 (analog, binary, multi-state)	E-mail templates	100
BACnet client mappings	5 000	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)	MP-Bus devices (per channel)	16
Total trended data points	1 000	KNX TP1 data points	1 000
CEA-709 network variables (NVs)	2 000	KNXnet/IP data points	1 000
CEA-709 Alias NVs	2 000	Connections (Local / Global)	2 000 / 250
CEA-709 External NVs (polling)	2 000	Number of L-WEB clients	32 (simultaneously)
CEA-709 address table entries	1 000 (non-ECS mode: 15)	L-IOB I/O Modules	24
LonMark Calendars	1 (25 calendar patterns)	Number of EnOcean devices	100
SMI devices (per channel)	16	EnOcean data points	1 000

Resource limits LINX-154			
Total number of data points	30 000	CEA-709 address table entries	1 000 (non-ECS mode: 15)
OPC data points	10 000	LonMark Calendars	1 (25 calendar patterns)
BACnet objects	1 000 (analog, binary, multi-state)	LonMark Schedulers	100
BACnet client mappings	5 000	LonMark Alarm Servers	1
BACnet calendar objects	25	E-mail templates	100
BACnet scheduler objects	100 (64 data points per object)	Math objects	100
BACnet notification classes	32	Alarm logs	10
Trend logs (BACnet or generic)	512 (4 000 000 entries, ≈ 60 MB)	Modbus data points	5 000
Total trended data points	1 000	Connections (Local / Global)	2 000 / 250
CEA-709 network variables (NVs)	2 000	Number of L-WEB clients	32 (simultaneously)
CEA-709 Alias NVs	2 000	L-IOB I/O Modules	24
CEA-709 External NVs (polling)	2 000		



LINX-153, LINX-154

Order number	Product description
LINX-153	BACnet & CEA-709 Automation Server with LIOB-Connect and 61131-3 programming in L-STUDIO
LINX-154	BACnet Automation Server with 4 RS-485 channels
LINX-START-L	Starter kit: 1 x LINX-153, 2 x L-IOB I/O Module, 1 x LPOW-2415A, and L-STUDIO software license
L-LOGICAD-LINX	Single license to activate L-LOGICAD runtime on LINX-153/LINX-154
L-STUDIO	L-ROC programming and configuration software
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 6A, 4 x Triac 0.5A)
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 6A)
LIOB-103	LIOB-Connect I/O Module: 6 UI, 6 AO, 5 DO (5 x Relay 16A)
LIOB-150	LIOB-FT I/O Module: 8 UI, 2 DI, 2 AO, 8 DO (4 x Relay 6A, 4 x Triac 0.5A)
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 6A)
LIOB-153	LIOB-FT I/O Module: 6 UI, 6 AO, 5 DO (4 x Relay 16A, 1 x Relay 6A)
LIOB-154	LIOB-FT I/O Module: 7 UI, 4 AO, 7 DO (5 x Relay 6A, 2 x Triac 0.5A), 1 Pressure Sensor
LIOB-450	LIOB-IP852 I/O Module: 8 UI, 2 DI, 2 AO, 8 DO (4 x Relay 6A, 4 x Triac 0.5A)
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 6A)
LIOB-453	LIOB-IP852 I/O Module: 6 UI, 6 AO, 5 DO (4 x Relay 16A, 1 x Relay 6A)
LIOB-454	LIOB-IP852 I/O Module: 7 UI, 4 AO, 7 DO (5 x Relay 6A, 2 x Triac 0.5A), 1 Pressure Sensor
LIOB-550	LIOB-BIP I/O Module: 8 UI, 2 DI, 2 AO, 8 DO (4 x Relay 6A, 4 x Triac 0.5A)
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 6A)
LIOB-553	LIOB-BIP I/O Module: 6 UI, 6 AO, 5 DO (4 x Relay 16A, 1 x Relay 6A)
LIOB-554	LIOB-BIP I/O Module: 7 UI, 4 AO, 7 DO (5 x Relay 6A, 2 x Triac 0.5A), 1 Pressure Sensor
LPOW-2415A	LIOB-Connect power supply unit, 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 level converter 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

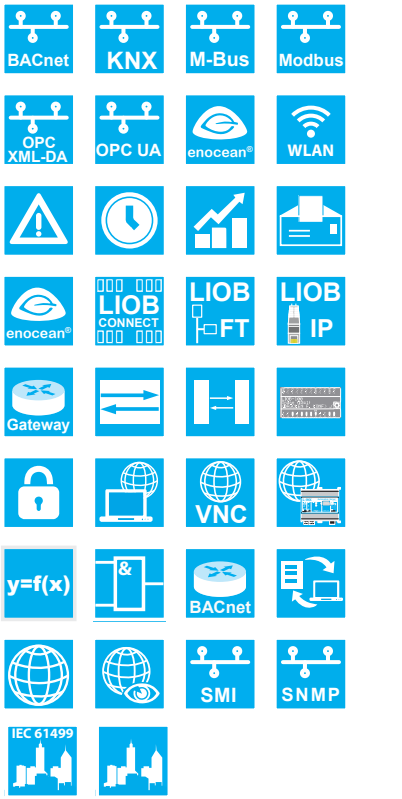
L-INX Automation Server

LINX-215

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

Datasheet #89047419





The L-INX Automation Servers LINX-215 are programmable automation stations with integrated graphical visualization for central automation tasks in BACnet networks, which can be programmed by L-STUDIO. 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.

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. The Automaton Servers feature an integrated IP-852 router providing the complete feature set of corresponding L-IP devices.

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. The Automaton Servers feature a BACnet/IP router including BBMD as well as Slave-Proxy functionality. LINX-215 is 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.

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.

Features

- Programmable with L-STUDIO IEC 61131-3 and IEC 61499
- Programmable with L-LOGICAD (a L-LOGICAD-LINX license is needed)
- Extension with physical inputs and outputs using L-IOB I/O Modules (LIOB-10x, LIOB-15x, LIOB-45x 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™)
- Event-driven e-mail notification
- Math objects to execute mathematical operations on data points

LINX-215

- Stores customized graphical pages
- Visualization of customized graphical pages through LWEB-900 (Building Management), LWEB-803 (Monitoring and Control), or LWEB-802 (Web Browser)
- Built-in OPC XML-DA and OPC UA server
- Dual switched or separated Ethernet ports
- 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
- Compliant with CEA-709, CEA-852, and ISO/IEC 14908 Standard (LonMark System)
- Support 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
- Integrated IP-852 to TP/FT-10 Router
- 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-800
- Supports WLAN through LWLAN-800 Interface
- Supports MP-Bus through LMPBUS-804 Interface
- Stores user-defined project documentation

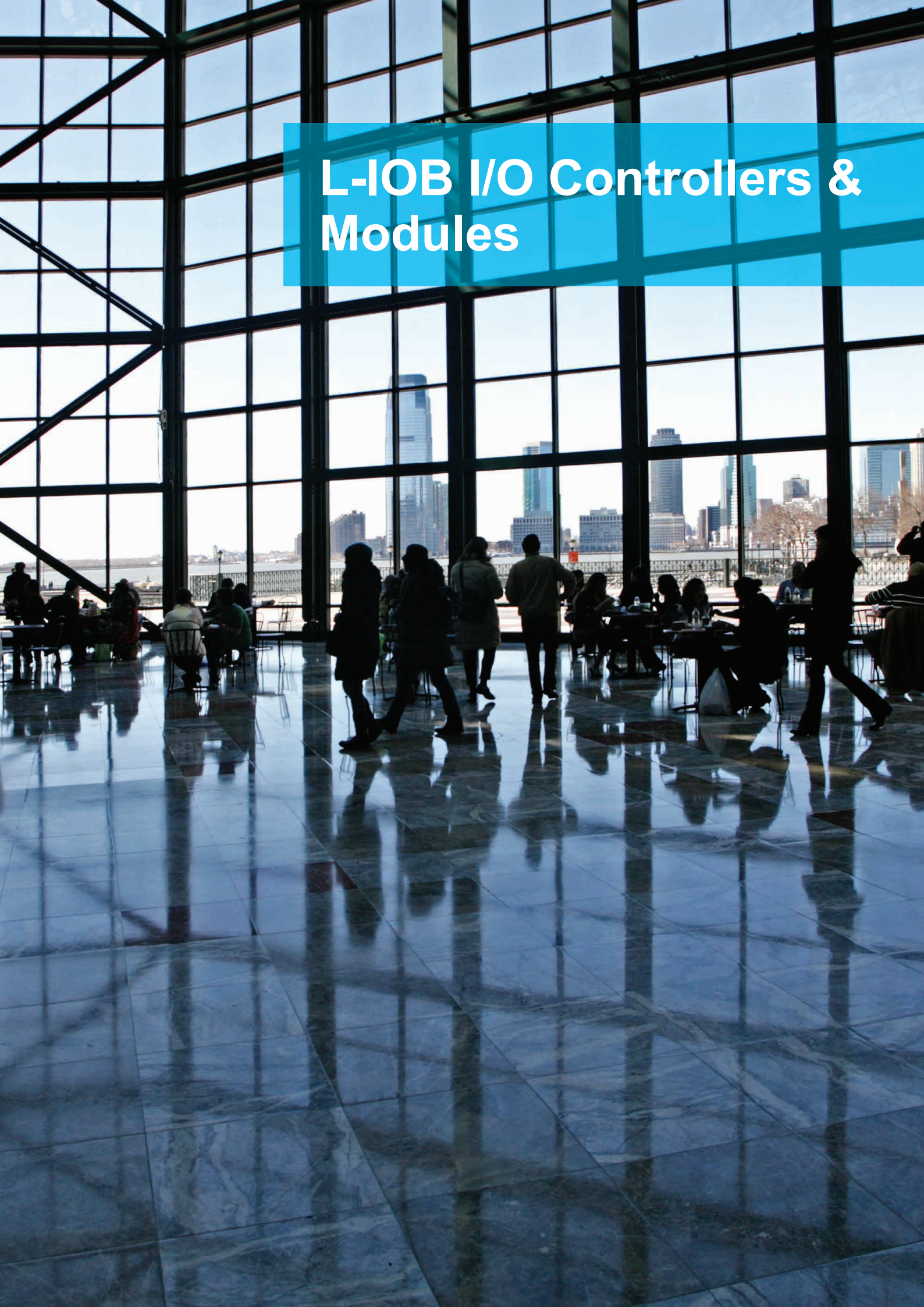
Specifications	
Dimensions (mm)	107 x 100 x 75 (L x W x H), DIM045
Installation	DIN rail mounting following DIN 43880, top hat rail EN 50022
Power supply	24 VDC / 24 VAC ±10 %, typ. 2.5 W
Operating conditions	0 °C to 50 °C, 10 – 90 % RH, non condensing, degree of protection: IP40, IP20 (terminals)
Interfaces	2 x Ethernet (100Base-T): OPC XML-DA, OPC UA, LonMark IP-852, BACnet/IP, LIOB-IP, KNXnet/IP, Modbus TCP (Master or Slave), HTTP, FTP, SSH, HTTPS, Firewall, VNC, SNMP 1 x LIOB-Connect 1 x RS-485 (ANSI TIA/EIA-485): BACnet MS/TP or Modbus RTU (Master or Slave) 1 x FT 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), MP-Bus (needs LMPBUS-804)
L-IOB I/O Modules	Up to 8 L-IOB I/O Modules in any combination of type LIOB-10x, LIOB-15x, LIOB-45x and LIOB-55x
BACnet/IP Router	1
CEA-709 Router	1
Remote Network Interface	1 RNI with 2 MNI devices
Program cycle time	Down to 10 ms
L-STUDIO 3.0 licenses	
Type	**LINX-215**
Programming, Tools	L-STUDIO (IEC 61131-3 and IEC 61499 based), L-INX Configurator
License	L-STUDIO: included L-LOGICAD: upgradeable

L-INX Automation Server

LINX-215

Resource limits			
Total number of data points	10 000	Address table entries	1 000 (non-ECS mode: 15)
OPC data points	2 000	LonMark Calendars	1 (25 calendar patterns)
BACnet objects	750 (analog, binary, multi-state)	LonMark Schedulers	100
BACnet client mappings	750	LonMark Alarm Servers	1
BACnet calendar objects	25	Total trended data points	256
BACnet scheduler objects	100 (64 data points per object)	E-mail templates	100
BACnet notification classes	32	Math objects	100
Trend logs (BACnet or generic)	256 (4 000 000 entries, ≈ 60 MB)	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	MP-Bus devices (per channel)	16
KNXnet/IP com-objects	250	KNX TP1 com-objects	250
Connections (Local / Global)	1 000 / 250	L-IOB I/O Modules	8
Number of L-WEB clients	32 (simultaneously)	Number of EnOcean devices	25
SMI devices (per channel)	16	EnOcean data points	250

Order number	Product description
LINX-215	BACnet Automation Server, B-BC, L-STUDIO programmable, built-in BACNet/IP to MS/TP Router CEA-709 Automation Server, built-in IP-852 Router
LINX-START-M	Starter kit: 1 x LINX-215, 2 x L-IOB I/O Module, 1 x LPOW-2415A, and L-STUDIO software license
L-LOGICAD-LINX	Single license to activate L-LOGICAD runtime on LINX-215
L-STUDIO	L-ROC programming and configuration software
LIOB-100	LIOB-Connect I/O Module: 8 UI, 2 DI, 2 AO, 9 DO (5 x Relay 6A, 4 x Triac 0.5A)
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 6A)
LIOB-103	LIOB-Connect I/O Module: 6 UI, 6 AO, 5 DO (5 x Relay 16A)
LIOB-150	LIOB-FT I/O Module: 8 UI, 2 DI, 2 AO, 8 DO (4 x Relay 6A, 4 x Triac 0.5A)
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 6A)
LIOB-153	LIOB-FT I/O Module: 6 UI, 6 AO, 5 DO (4 x Relay 16A, 1 x Relay 6A)
LIOB-154	LIOB-FT I/O Module: 7 UI, 4 AO, 7 DO (5 x Relay 6A, 2 x Triac 0.5A), 1 Pressure Sensor
LIOB-550	LIOB-BIP I/O Module: 8 UI, 2 DI, 2 AO, 8 DO (4 x Relay 6A, 4 x Triac 0.5A)
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 6A)
LIOB-553	LIOB-BIP I/O Module: 6 UI, 6 AO, 5 DO (4 x Relay 16A, 1 x Relay 6A)
LIOB-554	LIOB-BIP I/O Module: 7 UI, 4 AO, 7 DO (5 x Relay 6A, 2 x Triac 0.5A), 1 Pressure Sensor
LPOW-2415A	LIOB-Connect power supply unit, 24 V DC, 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 level converter 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



L-IOB I/O Controllers & Modules

L-IOB I/O Controllers

The L-IOB I/O Controller family of products consists of programmable controllers featuring various I/O configurations. Based on LOYTEC's 32-bit L-CORE platform, the L-IOB I/O Controllers provide first class performance for a wide area of applications.

Programmable

The built-in PLC functionality makes the L-IOB I/O Controllers a good fit for various control applications in building automation. Like the L-INX Automation Servers, the L-IOB I/O Controllers can be programmed with L-LOGICAD or L-STUDIO in IEC 61131-3. The same application libraries and application programs can be used on L-INX or L-IOB Controller devices. For details please check the L-STUDIO section (page 32).

LonMark Models

The LIOB-18x I/O Controllers, the LIOB-48x I/O Controllers and the LIOB-586/588/589 communicate in the LonMark system via network variables over TP/FT-10 or Ethernet/IP-852. They come with a freely configurable network variable interface and offer up to 256 address table entries.

BACnet/IP Models

The LIOB-58x I/O Controllers 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 Controllers.

L-IOB I/O Controllers – IEC 61131-3 programmable

LonMark TP/FT-10	LonMark IP-852	BACnet/IP	BACnet/IP and LonMark IP-852
LIOB-180 8 UI 2 DI 2 AO 8 DO	**LIOB-480** 8 UI 2 DI 2 AO 8 DO	**LIOB-580** 8 UI 2 DI 2 AO 8 DO	**LIOB-586** 6 UI 4 DI 6 DO
LIOB-181 8 UI 12 DI	**LIOB-481** 8 UI 12 DI	**LIOB-581** 8 UI 12 DI	**LIOB-588** 10 UI 6 AO 8 DO
LIOB-182 6 UI 6 AO 8 DO	**LIOB-482** 6 UI 6 AO 8 DO	**LIOB-582** 6 UI 6 AO 8 DO	**LIOB-589** 10 UI 6 DI 6 AO 4 DO
LIOB-183 6 UI 6 AO 5 DO	**LIOB-483** 6 UI 6 AO 5 DO	**LIOB-583** 6 UI 6 AO 5 DO	
LIOB-184 7 UI 4 AO 7 DO PRESS	**LIOB-484** 7 UI 4 AO 7 DO PRESS	**LIOB-584** 7 UI 4 AO 7 DO PRESS	

LIOB-FT I/O Controller

LIOB-180/181/182/183/184 V2

Datasheet #89024419



LIOB-18x I/O Controllers are compact, programmable automation stations for LonMark Systems with physical inputs and outputs.

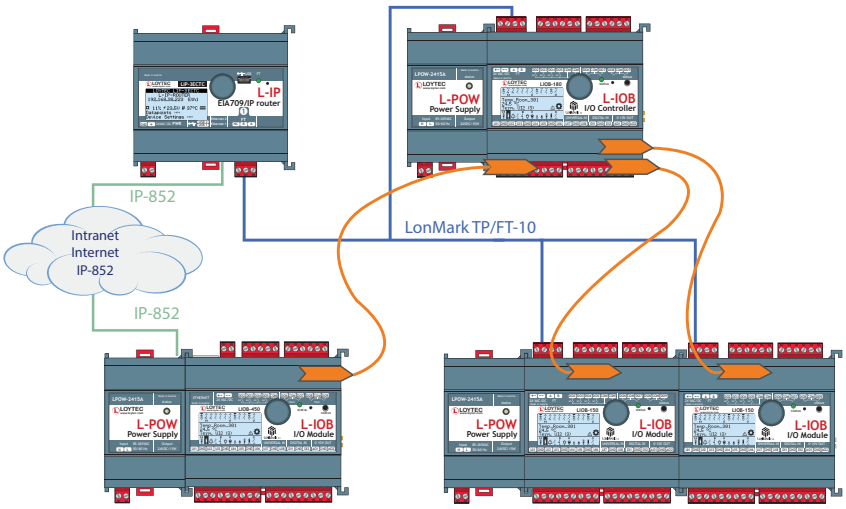
LonMark TP/FT-10 Channel

LIOB-18x I/O Controllers communicate via twisted pair over a TP/FT-10 channel in the LonMark System. LIOB-18x I/O Controllers offer extended features such as local alarming (SNVT_alarm and SNVT_alarm_2) and local scheduling.

Local Operation and Override

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





Features

- Automation station with physical inputs and outputs
- IEC 61131-3 programmable with L-LOGICAD
- 128x64 graphic display with backlight
- Local access to information about device status and data points in clear text and symbols
- Manual operation using the jog dial
- Compliant with CEA-709 and ISO/IEC 14908-2 standard (LonMark System)
- LonMark certified
- SNVT-based interface for integration in the LonMark TP/FT-10 channel
- NV interface can be freely defined
- Up to 256 address table entries (ECS mode)
- LNS plug-in for device configuration in the LonMark System
- Math objects to execute mathematical operations on data points
- LonMark Alarming with nvoAlarm (SNVT_alarm) and nvoAlarm_2 (SNVT_alarm_2)
- Local Scheduling

LIOB-FT I/O Controller

LIOB-180/181/182/183/184 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, non condensing, degree of protection: IP40, IP20 (terminals)				
Power supply	24 VDC / 24 VAC ±10 %				
Program cycle time	Down to 10 ms				
Interface	1 x LIOB-FT or LonMark TP/FT-10				
Resource limits					
Total number of data points	2000				
Network variables (NVs)	200				
Alias NVs	200				
Address table entries	256 (non-ECS mode: 15)				
LonMark Calendars	1 (25 calendar patterns)				
LonMark Schedulers	10				
LonMark Alarm Servers	1				
Connections (Local / Global)	200 / 0				
Specifications LIOB-FT I/O Controller (LIOB-18x)					
Type	**LIOB-180**	**LIOB-181**	**LIOB-182**	**LIOB-183**	**LIOB-184**
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
L-STUDIO 3.0 licenses					
Type	**LIOB-18x**				
Programming, Tools	L-LOGICAD software (IEC 61131-3)				
License	L-STUDIO: n/a L-LOGICAD: included				

Order number	Product description
LIOB-180	LIOB-FT I/O Controller: 8 UI, 2 DI, 2 AO, 8 DO (4 x Relay 6A, 4 x Triac 0.5A)
LIOB-181	LIOB-FT I/O Controller: 8 UI, 12 DI
LIOB-182	LIOB-FT I/O Controller: 6 UI, 6 AO, 8 DO (8 x Relay 6A)
LIOB-183	LIOB-FT I/O Controller: 6 UI, 6 AO, 5 DO (4 x Relay 16A, 1 x Relay 6A)
LIOB-184	LIOB-FT I/O Controller: 7 UI, 4 AO, 7 DO (5 x Relay 6A, 2 x Triac 0.5A), 1 Pressure Sensor
LINX-START-S	Starter kit: 1 x L-IOB I/O Controller, 1 x LPOW-2415A, and L-LOGICAD software license
L-LOGICAD-USB	IEC 61131-3 programming tool, single license, includes USB dongle
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

LIOB-IP852 I/O Controller

LIOB-480/481/482/483/484 V2

Datasheet #89026519





LIOB-48x I/O Controllers are IP-enabled, compact, programmable automation stations for LonMark Systems with physical inputs and outputs and integrated graphical visualization.

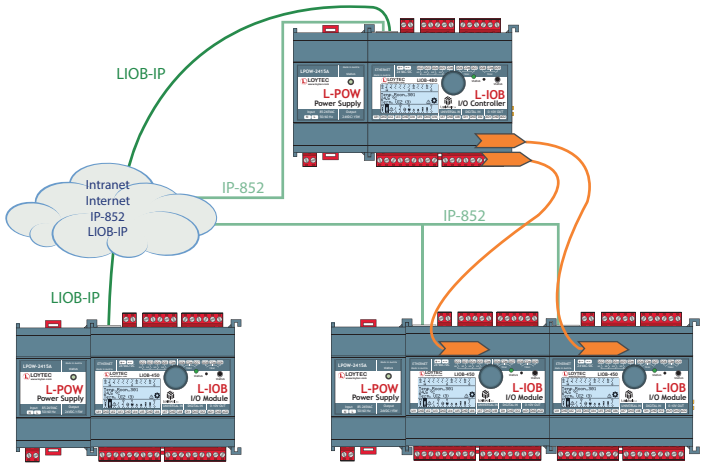
LonMark IP-852 Channel over Ethernet

The LIOB-48x I/O Controller is 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.

Technology data points are automatically exposed as OPC tags for higher level OPC client applications or L-WEB system via the integrated OPC server providing SSL encrypted web services (OPC XML-DA) or UA Secure Conversation (OPC UA). The L-IOB I/O Controllers further allow data exchange over global connections (network-wide data exchange), offer AST™ functions (Alarming, Scheduling, and Trending), store custom graphic pages for visualization in LWEB-802/803, and can be seamlessly integrated in the LWEB-900 Building Management System.

Local Operation and override

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



Features

- Automation station with physical inputs and outputs
- Programmable with L-LOGICAD (IEC 61131-3) or L-STUDIO (IEC 61131-3 or IEC 61499)
- Ethernet/IP interface
- 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
- Stores customized graphical pages
- Visualization of customized graphical pages through LWEB-900 (building management), or LWEB-802/803
- Integrated web server for device configuration and monitoring data points
- Extension with physical inputs and outputs using one LIOB I/O Module (LIOB-45x) via plug and play
- Compliant with CEA-852 and ISO/IEC 14908-4 standard (LonMark System)
- LonMark certified
- SNVT-based interface for integration in the LonMark IP-852 channel
- NV interface can be freely defined
- Up to 256 address table entries (ECS mode)
- LNS plug-in for device configuration in the LonMark System
- Alarming, Scheduling, and Trending (AST™)
- Event-driven e-mail notification
- Math objects to execute mathematical operations on data points
- Built-in OPC XML-DA and OPC UA server
- Stores user-defined project documentation

LIOB-IP852 I/O Controller

LIOB-480/481/482/483/484 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, non condensing, degree of protection: IP40, IP20 (terminals)
Power supply	24 V DC / 24 VAC ±10 %
Program cycle time	Down to 10 ms
L-IOB I/O Module	1 L-IOB I/O Module of type LIOB-IP852
Interface	2 x Ethernet (100Base-T): OPC XML-DA, OPC UA LonMark IP-852, LIOB-IP

Resource limits			
Total number of data points	2000	Trend logs	50 (390000 entries, ≈ 6 MB)
OPC data points	300	Total trended data points	100
Network variables (NVs)	200	E-mail templates	20
Alias NVs	200	Math objects	20
Address table entries	256 (non-ECS mode: 15)	Alarm logs	5
LonMark Calendars	1 (25 calendar patterns)	Connections (Local / Global)	200 / 100
LonMark Schedulers	10	Number of L-WEB clients	32
LonMark Alarm Servers	1	L-IOB I/O Module	1 (LIOB-IP852)

Specifications LIOB-IP852 I/O Controller (LIOB-48x)					
Type	**LIOB-480**	**LIOB-481**	**LIOB-482**	**LIOB-483**	**LIOB-484**
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

L-STUDIO 3.0 licenses		
Type	**LIOB-48x**	**LIOB-48x (V2)**
Programming, Tools	L-LOGICAD software (IEC 61131-3)	L-LOGICAD software (IEC 61131-3) L-STUDIO software (IEC 61131-3 or IEC 61499)
License	L-STUDIO: n/a L-LOGICAD: included	L-STUDIO: upgradable L-LOGICAD: included

Order number	Product description
LIOB-480	LIOB-IP852 I/O Controller: 8 UI, 2 DI, 2 AO, 8 DO (4 x Relay 6A, 4 x Triac 0.5A)
LIOB-481	LIOB-IP852 I/O Controller: 8 UI, 12 DI
LIOB-482	LIOB-IP852 I/O Controller: 6 UI, 6 AO, 8 DO (8 x Relay 6A)
LIOB-483	LIOB-IP852 I/O Controller: 6 UI, 6 AO, 5 DO (4 x Relay 16A, 1 x Relay 6A)
LIOB-484	LIOB-IP852 I/O Controller: 7 UI, 4 AO, 7 DO (5 x Relay 6A, 2 x Triac 0.5A), 1 Pressure Sensor
LINX-START-S	Starter kit: 1 x L-IOB I/O Controller, 1 x LPOW-2415A, and L-LOGICAD software license
L-STUDIO-LIOB	Upgrade license for L-IOB to activate the L-STUDIO runtime
L-LOGICAD-USB	IEC 61131-3 programming tool, single license, includes USB dongle
LPOW-2415A	LIOB-Connect power supply unit, 24 V DC, 15 W
LPOW-2415B	Power supply unit with power connector 24 V DC, 15 W
L-TEMP2	External temperature sensor (NTC10K) for use with L-IOB Universal Inputs

LIOB-580/581/582/583/584 V2

Datasheet #89026719





LIOB-58x I/O Controllers are IP-enabled, compact, programmable automation stations for BACnet/IP networks with physical inputs and outputs and integrated graphical visualization.

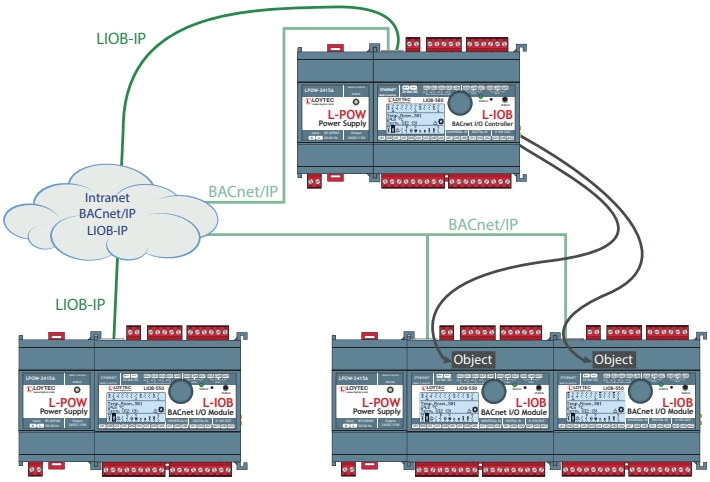
BACnet/IP over Ethernet

The LIOB-58x I/O Controller is 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.

Technology data points are automatically exposed as OPC tags for higher level OPC client applications or L-WEB system via the integrated OPC server providing SSL encrypted web services (OPC XML-DA) or UA Secure Conversation (OPC UA). The L-IOB I/O Controllers further allow data exchange over global connections (network-wide data exchange), offer AST™ functions (Alarming, Scheduling, and Trending), store custom graphic pages for visualization in LWEB-802/803, and can be seamlessly integrated in the LWEB-900 Building Management System. LIOB-58x I/O Controllers implement the BACnet Building Controller (B-BC) profile and are BTL certified.

Local Operation and override

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



Features

- Automation station with physical inputs and outputs
- Programmable with L-LOGICAD (IEC 61131-3) or L-STUDIO (IEC 61131-3 or IEC 61499)
- Ethernet/IP interface
- 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
- Stores customized graphical pages
- Visualization of customized graphical pages through LWEB-900 (building management), or LWEB-802/803
- Integrated web server for device configuration and monitoring data points
- Extension with physical inputs and outputs using one LIOB I/O Module (LIOB-55x)
- Compliant with ANSI/ASHRAE 135-2012 and ISO 16484-5:2012 standard
- B-BC (BACnet Building Controller) functionality, BTL certified
- BACnet objects for integration in BACnet/IP channels
- BACnet Client Mappings for integration in BACnet/IP channels
- Alarming, Scheduling, and Trending (AST™)
- Event-driven e-mail notification
- Math objects to execute mathematical operations on data points
- Built-in OPC XML-DA and OPC UA server
- Stores user-defined project documentation

LIOB-BIP I/O Controller

LIOB-580/581/582/583/584 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, non condensing, degree of protection: IP40, IP20 (terminals)
Power supply	24 VDC / 24 VAC ±10 %
Program cycle time	Down to 10 ms
L-IOB I/O Module	1 L-IOB I/O Module of type LIOB-BIP
Interface	2 x Ethernet (100Base-T): OPC XML-DA, OPC UA BACnet/IP, LIOB-IP

Resource limits			
Total number of data points	2000	Total trended data points	100
OPC data points	300	E-mail templates	20
BACnet objects	300 (analog, binary, multi-state)	Math objects	20
BACnet client mappings	300	Alarm logs	5
BACnet calendar objects	25	Connections (Local / Global)	200 / 100
BACnet scheduler objects	10	Number of L-WEB clients	32
BACnet notification classes	32	L-IOB I/O Module	1 (LIOB-BIP)
Trend logs (BACnet or generic)	50 (390 000 entries, ≈ 6 MB)		

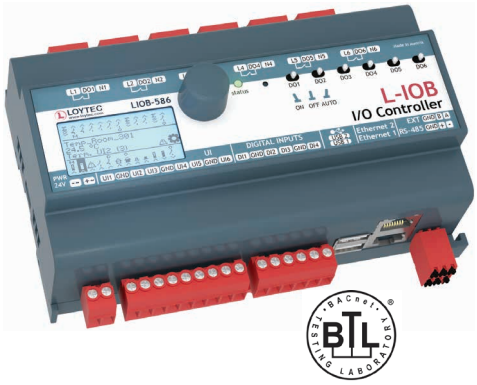
Specifications LIOB-BIP I/O Controller (LIOB-58x)					
Type	**LIOB-580**	**LIOB-581**	**LIOB-582**	**LIOB-583**	**LIOB-584**
Power consumption	4.5 W (Relays on)	4.5 W	4.5 W (Relays on)	4.5 W (Relays on)	4.5 W (Relays on)
Universal Input (UI)	8	8	6	6	7
Digital Input (DI)	2	12	-	-	-
Analog Output (AO)	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

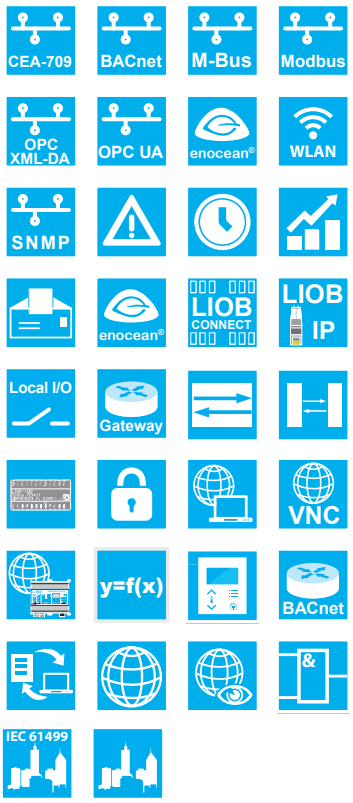
L-STUDIO 3.0 licenses		
Type	**LIOB-580/581/582/583/584**	**LIOB-580/581/582/583/584 (V2)**
Programming, Tools	L-LOGICAD software (IEC 61131-3)	L-LOGICAD software (IEC 61131-3) L-STUDIO software (IEC 61131-3 or IEC 61499)
License	L-STUDIO: n/a L-LOGICAD: included	L-STUDIO: upgradable L-LOGICAD: included

Order number	Product description
LIOB-580	LIOB-BIP I/O Controller: 8 UI, 2 DI, 2 AO, 8 DO (4 x Relay 6A, 4 x Triac 0.5A)
LIOB-581	LIOB-BIP I/O Controller: 8 UI, 12 DI
LIOB-582	LIOB-BIP I/O Controller: 6 UI, 6 AO, 8 DO (8 x Relay 6A)
LIOB-583	LIOB-BIP I/O Controller: 6 UI, 6 AO, 5 DO (4 x Relay 16A, 1 x Relay 6A)
LIOB-584	LIOB-BIP I/O Controller: 7 UI, 4 AO, 7 DO (5 x Relay 6A, 2 x Triac 0.5A), 1 Pressure Sensor
LINX-START-S	Starter kit: 1 x L-IOB I/O Controller, 1 x LPOW-2415A, and L-LOGICAD software license
L-STUDIO-LIOB	Upgrade license for L-IOB to activate the L-STUDIO runtime
L-LOGICAD-USB	IEC 61131-3 programming tool, single license, includes USB dongle
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

LIOB-586/588/589

Datasheet #89046119





The LIOB-586/588/589 I/O Controllers are IP-enabled, compact, programmable automation stations for LonMark Systems and BACnet/IP networks with physical inputs and outputs and integrated graphical visualization.

Communication

The LIOB-586/588/589 I/O Controllers 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.

Technology data points are automatically exposed as OPC tags for higher level OPC client applications or L-WEB system via the integrated OPC server providing SSL encrypted web services (OPC XML-DA) or UA Secure Conversation (OPC UA). The L-IOB I/O Controllers further allow data exchange over global connections (network-wide data exchange), offer AST™ functions (Alarming, Scheduling, and Trending), store custom graphic pages for visualization in LWEB-802/803, and can be seamlessly integrated in the LWEB-900 Building Management System. LIOB-586 I/O Controllers implement the BACnet Building Controller (B-BC) profile and are BTL certified.

Local Operation and override

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

The six relay outputs can be overridden via 3-way switches on the LIOB-586 front panel.

Power measurement

External meters can be integrated via M-Bus or Modbus. The LIOB-586/588/589 I/O Controllers perfectly meet energy management and energy reporting applications.

Features

- Automation station with physical inputs and outputs
- IEC 61131-3 and IEC 61499 programmable with L-STUDIO
- Programmable with L-LOGICAD (a L-LOGICAD-LINX license is needed for LIOB-588 and LIOB-589 only)
- Extension with physical inputs and outputs using one L-IOB I/O Module (LIOB-10x or LIOB-45x/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
- Manual override of each output through switches (LIOB-586 only)
- Alarming, Scheduling, and Trending (AST™)
- Event-driven e-mail notification
- Math objects to execute mathematical operations on data points
- Stores customized graphical pages
- Visualization of customized graphical pages through LWEB-900 (Building Management), LWEB-803 (Monitoring and Control), or LWEB-802 (Web Browser)
- Support of the L-STAT Network Thermostat
- Built-in OPC XML-DA and OPC UA server
- Dual switched or separated Ethernet ports
- Access to network statistics
- 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) functionality, BTL certified

L-IOB I/O Controller

LIOB-586/588/589

- Compliant with CEA-709, CEA-852, and ISO/IEC 14908 Standard (LonMark System)
- Supports IP-852 (Ethernet/IP)
- Support of dynamically created or static NVs
- Support of user-defined NVs (UNVTs) and Configuration Properties (SCPTs, UCPTs)
- Integrated BACnet/IP to BACnet MS/TP Router including BBMD as well as Slave-Proxy functionality
- M-Bus Master according to EN 13757-3, connection via optional M-Bus Converter (L-MBUS20 or L-MBUS80)
- Gateway functions including Smart Auto-Connect™
- Modbus TCP and Modbus RTU (Master or Slave)
- Integrated web server for device configuration and monitoring data points
- Connection to EnOcean wireless devices via LENO-80x Interface
- Supports WLAN through LWLAN-800 Interface
- Stores user-defined project documentation

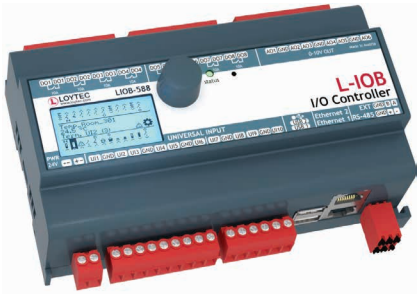
General Specifications			
Type	**LIOB-586**	**LIOB-588**	**LIOB-589**
Dimensions (mm)	159 x 100 x 75 (L x W x H), DIM005	159 x 100 x 75 (L x W x H), DIM006	159 x 100 x 75 (L x W x H), DIM007
Installation	DIN rail mounting following DIN 43880, top hat rail EN 50022		
Operating conditions	0 °C to 50 °C, 10 – 90 % RH, non condensing, degree of protection: IP40, IP20 (terminals)		
Power supply	24 VDC / 24 VAC ±10 % via L-POW, or with an external power supply		
Program cycle time	Down to 10 ms, and event-triggered		
L-IOB I/O Module	1 L-IOB I/O Module of type LIOB-10x or LIOB-45x/55x		
Interface	2 x Ethernet (100Base-T): Web services (OPC XML-DA, OPC UA), LonMark IP-852, BACnet/IP*, LIOB-IP, Modbus TCP (Master or Slave), HTTP, FTP, SSH, HTTPS, Firewall, VNC, SNMP 1 x LIOB-Connect 2 x USB-A: WLAN (needs LWLAN-800), EnOcean (needs LENO-80x) 1 x EXT: M-Bus, Master EN 13757-3 (needs L-MBUS20 or L-MBUS80) 1 x RS-485 (ANSI TIA/ EIA-485): BACnet MS/ TP*, or Modbus RTU (Master or Slave), or L-STAT Network Thermostats * Router between BACnet/IP and BACnet MS/TP		

Specifications LIOB I/O Controller (LIOB-58x)			
Type	**LIOB-586**	**LIOB-588**	**LIOB-589**
Power consumption	5.4 W (Relays on)	5.9 W (Relays on)	4.5 W (Relays on)
Universal Input (UI)	6	10	10
Digital Input (DI)	4	-	6
Analog Output (AO)	-	6	6
Digital Output (DO)	6 (6 x Relay 16 A)	8 (8 x Relay 10 A)	4 (4 x Relay 10 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.		

L-STUDIO 3.0 licenses			
Type	**LIOB-586**	**LIOB-588**	**LIOB-589**
Programming, Tools	L-STUDIO (IEC 61131-3 and IEC 61499 based)		
License	L-STUDIO: included L-LOGICAD: included	L-STUDIO: included L-LOGICAD: upgradeable	L-STUDIO: included L-LOGICAD: upgradeable

Resource limits			
Total number of data points	10 000	LonMark Schedulers	10
OPC data points	1 000	LonMark Alarm Servers	1
BACnet objects	500 (analog, binary, multi-state)	E-mail templates	50
BACnet client mappings	500	Math objects	50
BACnet calendar objects	25	Alarm logs	10
BACnet scheduler objects	10 (64 data points per object)	M-Bus data points	300
BACnet notification classes	32	Modbus data points	300
Trend logs (BACnet or generic)	256 (4 000 000 entries, ≈ 60 MB)	Connections (Local / Global)	500 / 100
Total trended data points	256	Number of L-WEB clients	32 (simultaneously)
CEA-709 network variables (NVs)	500	L-IOB I/O Modules	1
CEA-709 Alias NVs	500	L-STAT Network Thermostats	8
CEA-709 External NVs (polling)	500	EnOcean devices	10
CEA-709 address table entries	1 000 (non-ECS mode: 15)	EnOcean data points	100
LonMark Calendars	1 (25 calendar patterns)		

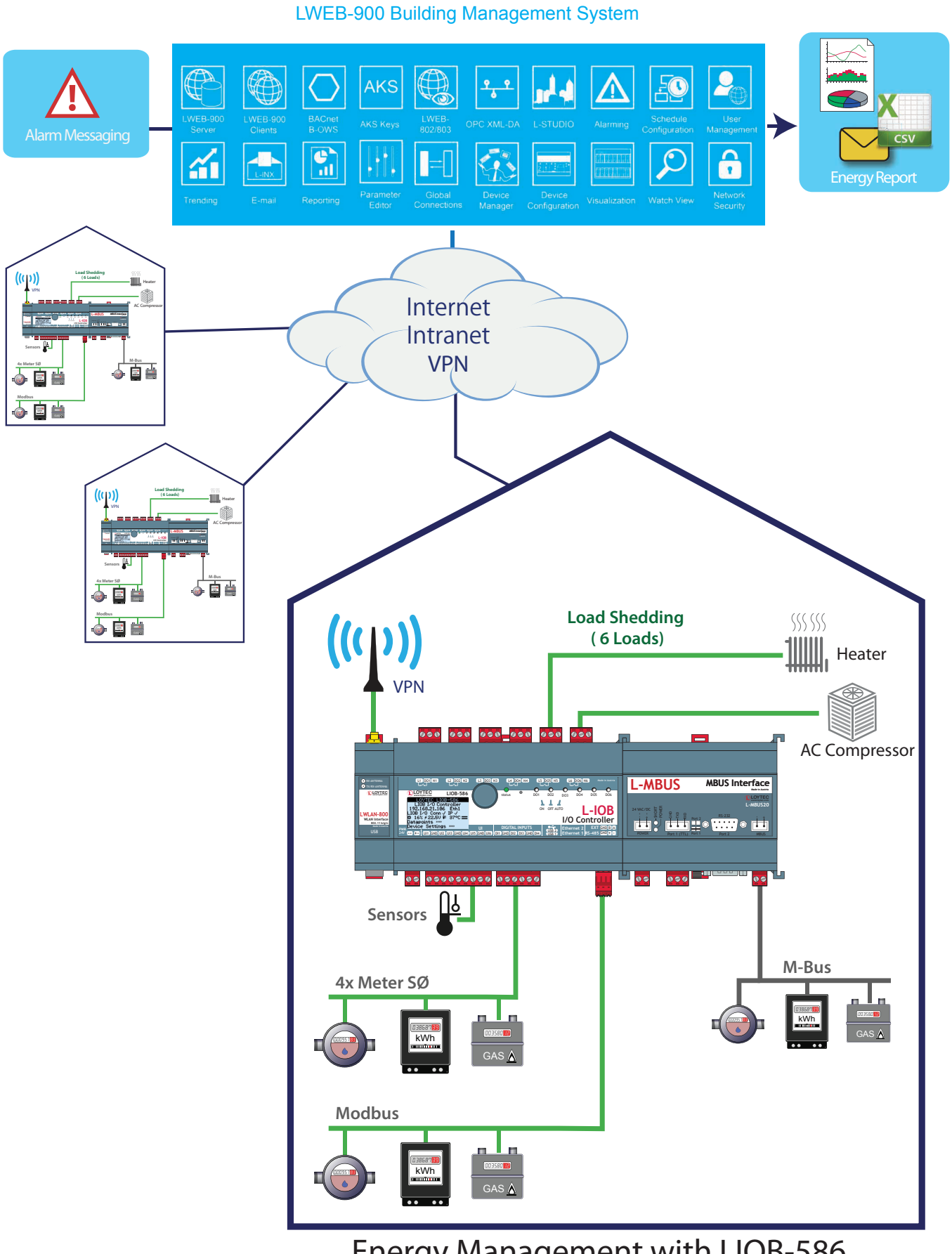
Order number	Product description
LIOB-586	LIOB I/O Controller: 6 UI, 4 DI, 6 DO (6 x Relay 16A)
LIOB-588	LIOB I/O Controller: 10 UI, 6 AO, 8 DO (6 x Relay 10A)
LIOB-589	LIOB I/O Controller: 10 UI, 6 AO, 6 DI, 4 DO (4x Relay 10A)
L-LOGICAD-LIOB	Upgrade license for L-IOB to activate the L-LOGICAD runtime
LPOW-2415A	LIOB-Connect power supply unit, 24 V DC, 15 W
LPOW-2415B	Power supply unit with power connector 24 V DC, 15 W
L-TEMP2	External temperature sensor (NTC10K) for use with L-IOB Universal Inputs
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
L-MBUS20	M-Bus level converter for 20 M-Bus devices
L-MBUS80	M-Bus level converter for 80 M-Bus devices
LSTAT-800-G3-Lx	Network Thermostat, front black, white enclosure, Modbus, NFC, temperature, rel. humidity, ext. switch/NTC, Buttons (Lx)
LSTAT-801-G3-Lx	Network Thermostat, front black, white enclosure, Modbus, NFC, temperature, rel. humidity, ext. switch/NTC, occupancy, IR receiver, Buttons (Lx)
LSTAT-802-G3-Lx	Network Thermostat, front black, white enclosure, Modbus, NFC, temperature, rel. humidity, ext. switch/NTC, occupancy, IR receiver, CO2, Buttons (Lx)
LSTAT-80x-CUSTOM	Customized Network Thermostat, minimum quantity 100 pieces, enclosure G1: silver, G2: black, G3: white; custom print Lx, including 2 working samples, lead time 10 weeks





L-IOB I/O Controller

LIOB-586/588/589



Energy Management with LIOB-586

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, and LIOB-48x/58x I/O 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.

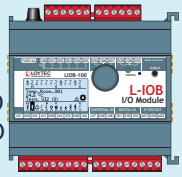
BACnet/IP Models

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.

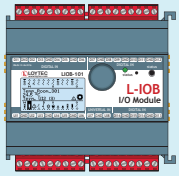
L-IOB I/O Modules

LIOB-Connect

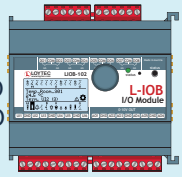
LIOB-100
8 UI
2 DI
2 AO
9 DO



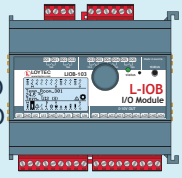
LIOB-101
8 UI
16 DI



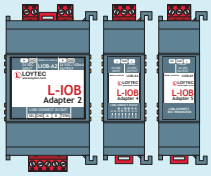
LIOB-102
6 UI
6 AO
8 DO



LIOB-103
6 UI
6 AO
5 DO

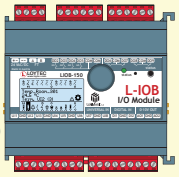


LIOB-A2/A4/A5

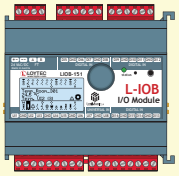


LonMark TP/FT-10

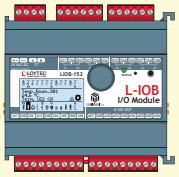
LIOB-150
8 UI
2 DI
2 AO
8 DO



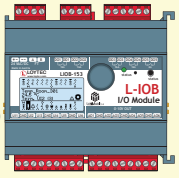
LIOB-151
8 UI
12 DI



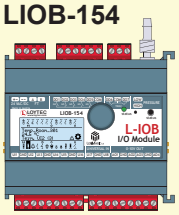
LIOB-152
6 UI
6 AO
8 DO



LIOB-153
6 UI
6 AO
5 DO

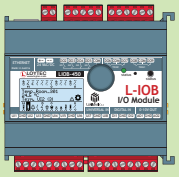


LIOB-154
7 UI
4 AO
7 DO
PRESS

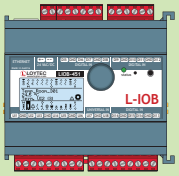


LonMark IP-852

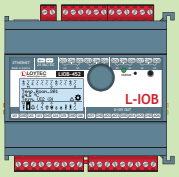
LIOB-450
8 UI
2 DI
2 AO
8 DO



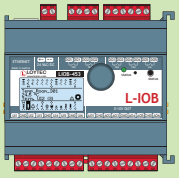
LIOB-451
8 UI
12 DI



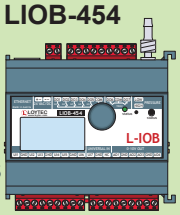
LIOB-452
6 UI
6 AO
8 DO



LIOB-453
6 UI
6 AO
5 DO

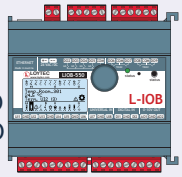


LIOB-454
7 UI
4 AO
7 DO
PRESS

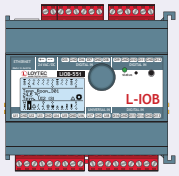


BACnet/IP

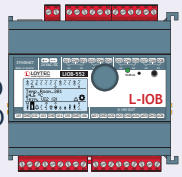
LIOB-550
8 UI
2 DI
2 AO
8 DO



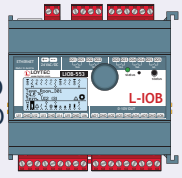
LIOB-551
8 UI
12 DI



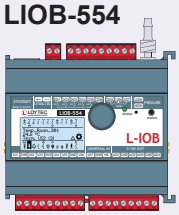
LIOB-552
6 UI
6 AO
8 DO



LIOB-553
6 UI
6 AO
5 DO



LIOB-554
7 UI
4 AO
7 DO
PRESS



LIOB-Connect I/O Module

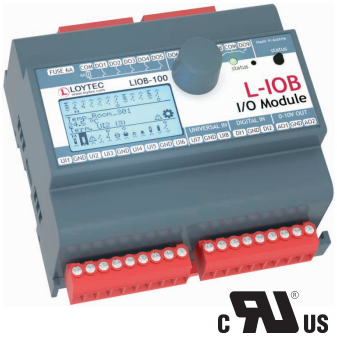
LIOB-100/101/102/103 V2

LOYTEC COMPETENCE PARTNER

BACnet
CEA-709
KNX

Modbus
M-Bus
OPC

Datasheet #89018319





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.

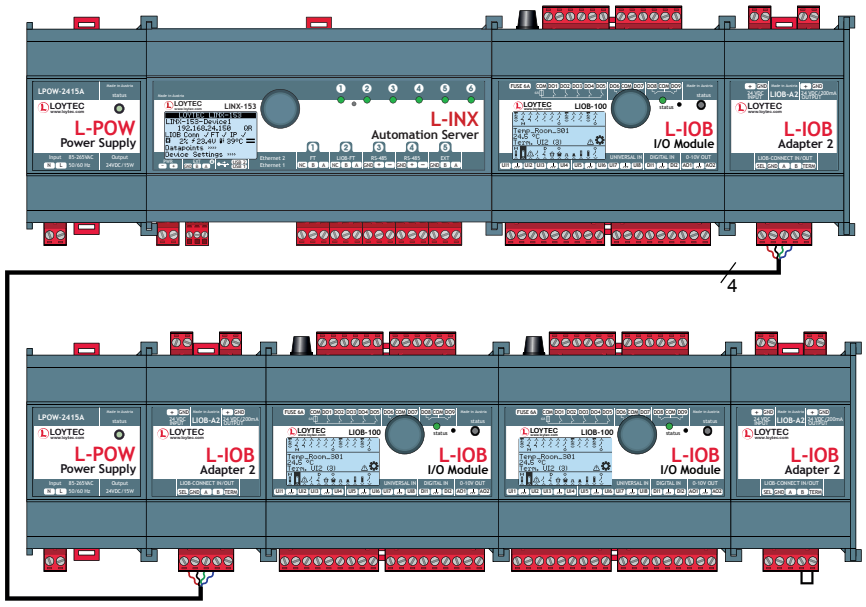
LIOB-Connect

The LIOB-10x Modules have gold-plated connectors (LIOB-Connect) to string multiple devices together and connect them to the L-INX or L-ROC. The L-INX or L-ROC 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.

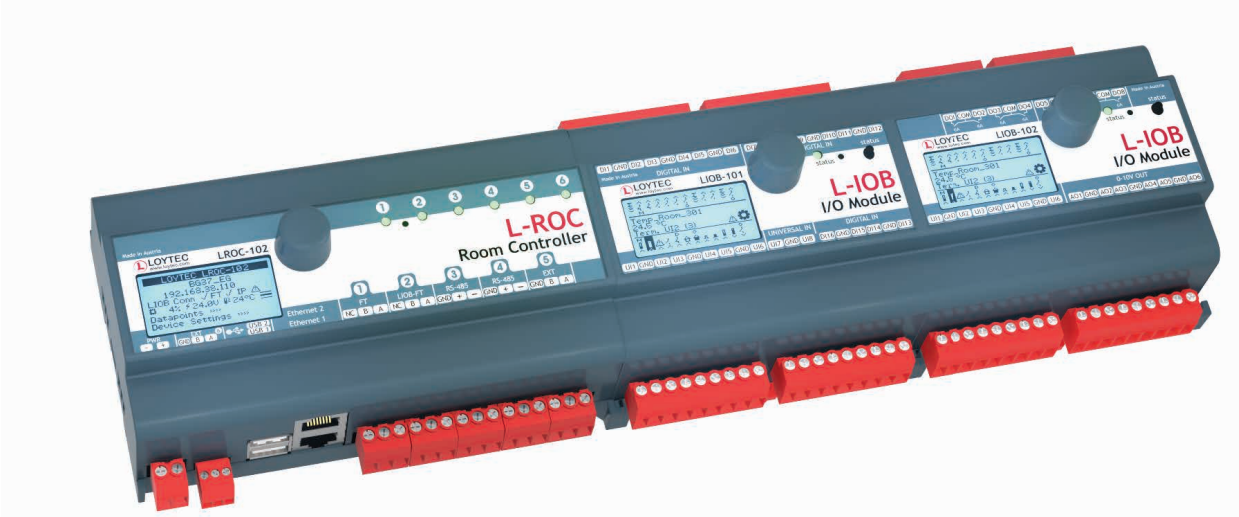




Features

- 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

LIOB-100/101/102/103 V2



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, non condensing, degree of protection: IP40, IP20 (terminals)			
Power supply	24 VDC / 24 VAC ±10 % via L-INX, L-ROC, or L-POW, or with LIOB-Connect, or via connecting of an external power supply to the upper left terminal			
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 6A, 4 x Triac 0.5A)
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 6A)
LIOB-103	LIOB-Connect I/O Module: 6 UI, 6 AO, 5 DO (5 x Relay 16A)
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

BACnet ☐ CEA-709 KNX
Modbus M-Bus OPC

Datasheet #89019919



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.

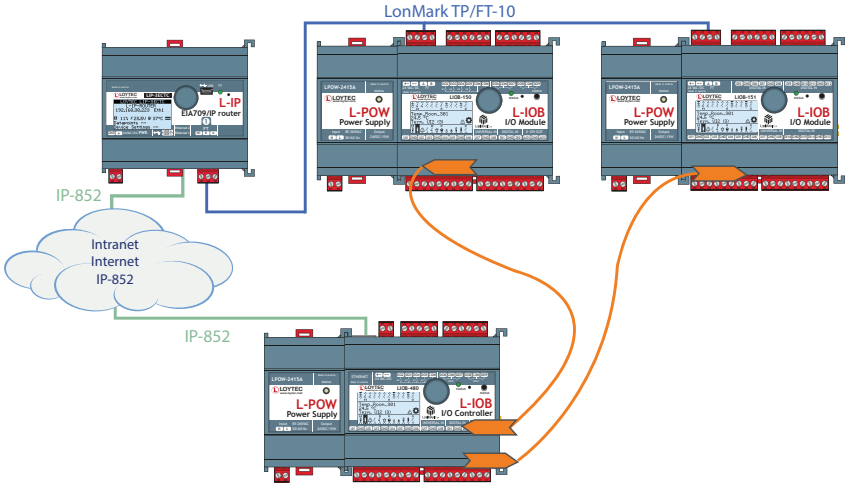
LIOB-FT mode

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 at the L-INX and L-ROC
- 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, non condensing, degree of protection: IP40, IP20 (terminals)				
Power supply	24 VDC / 24 VAC ±10 % via L-INX, L-ROC, or L-POW, or with LIOB-Connect, or via connecting an external power supply to the upper left terminal				
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 6A, 4 x Triac 0.5A)
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 6A)
LIOB-153	LIOB-FT I/O Module: 6 UI, 6 AO, 5 DO (4 x Relay 16A, 1 x Relay 6A)
LIOB-154	LIOB-FT I/O Module: 7 UI, 4 AO, 7 DO (5 x Relay 6A, 2 x Triac 0.5A), 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

LIOB-IP852 I/O Module

LIOB-450/451/452/453/454 V2

BACnet ☐ CEA-709 KNX
Modbus M-Bus OPC

Datasheet #89026919





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.

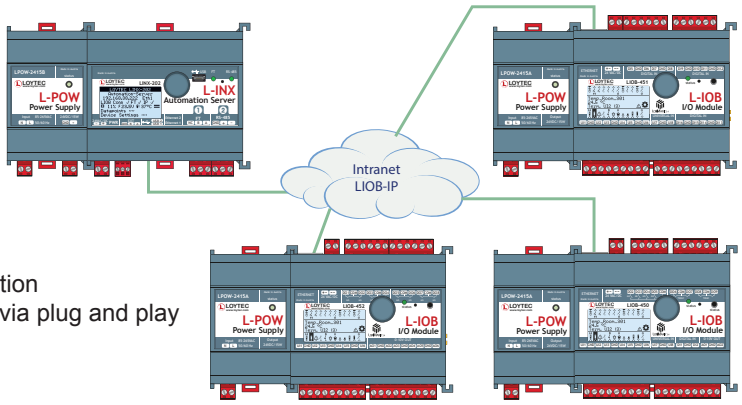
The LIOB-45x Modules are equipped with a web interface to query the device status. The local display can be accessed via VNC.

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, LIOB-48x I/O Controllers, 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.

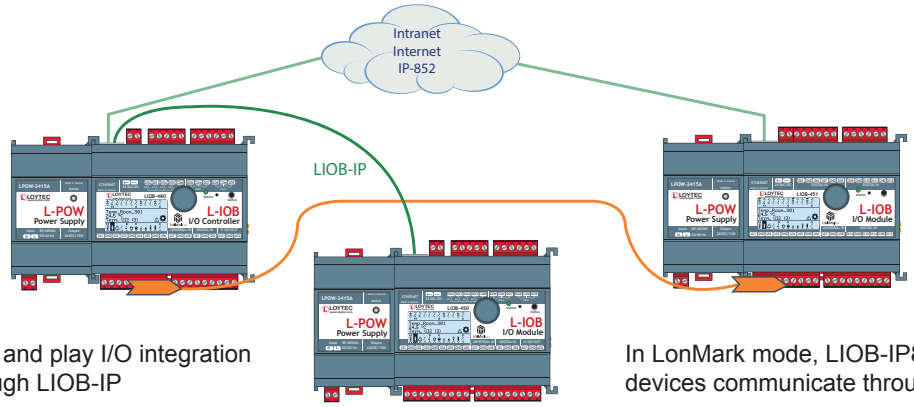


L-INX I/O integration through LIOB-IP via plug and play

Features

- I/O module with physical inputs and outputs
- Ethernet/IP network 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, and LIOB-48x I/O Controller via LIOB-IP
- Automatic integration into device configurations with L-INX, L-ROC, and LIOB-48x I/O Controller
- Easy device replacement without any additional software at the L-INX, L-ROC, and LIOB-48x I/O Controller
- Integrated web server for device configuration
- LNS plug-in for device configuration in the LonMark System

LIOB-450/451/452/453/454 V2



Plug and play I/O integration through LIOB-IP

In LonMark mode, LIOB-IP852 devices communicate through NVs

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, non condensing, degree of protection: IP40, IP20 (terminals)
Power supply	24 VDC / 24 VAC ±10 % via L-INX, L-ROC, or L-POW, or with LIOB-Connect, or via connecting of an external power supply to the upper left terminal
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)

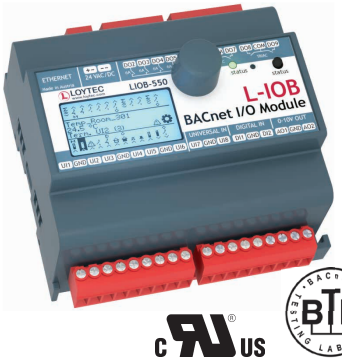
Order number	Product description
LIOB-450	LIOB-IP852 I/O Module: 8 UI, 2 DI, 2 AO, 8 DO (4 x Relay 6A, 4 x Triac 0.5A)
LIOB-451	LIOB-IP852 I/O Module: 8 UI, 12 DI
LIOB-452	LIOB-IP852 I/O Module: 6 UI, 6 AO, 8 DO (8 x Relay 6A)
LIOB-453	LIOB-IP852 I/O Module: 6 UI, 6 AO, 5 DO (4 x Relay 16A, 1 x Relay 6A)
LIOB-454	LIOB-IP852 I/O Module: 7 UI, 4 AO, 7 DO (5 x Relay 6A, 2 x Triac 0.5A), 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

LIOB-BIP I/O Module

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

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

Datasheet #89027119





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.

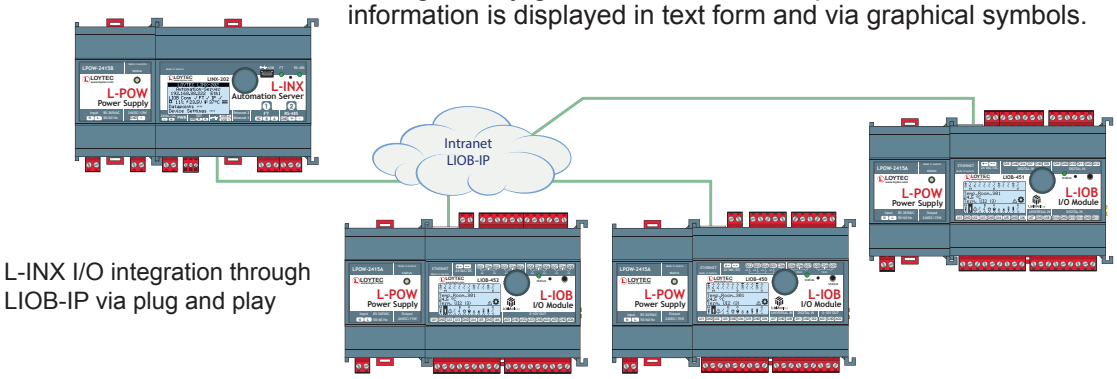
The LIOB-55x Modules are equipped with a web interface to query the device status and display or change each data point of the module. In addition to the BACnet object interface, the I/O data points are exposed by the integrated OPC server providing SSL encrypted web services (OPC XML-DA) or UA Secure 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, LIOB-58x I/O Controllers, 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.

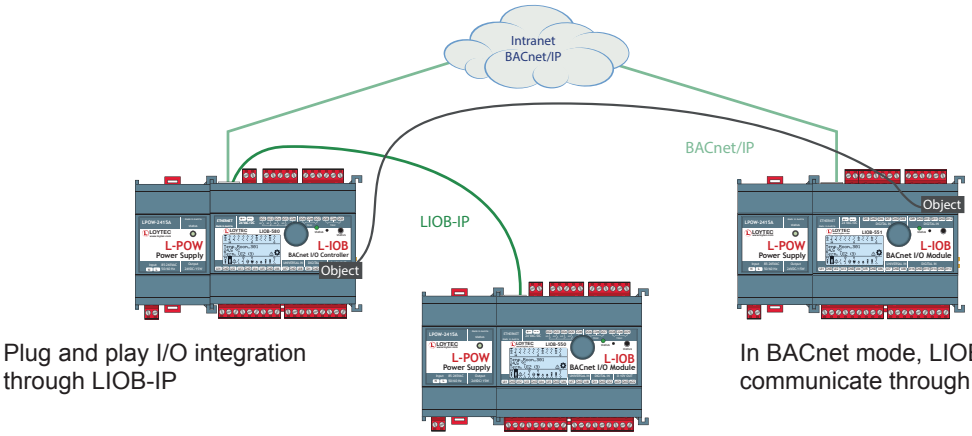


L-INX I/O integration through LIOB-IP via plug and play

Features

- I/O module with physical inputs and outputs
- Ethernet/IP network 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 and LIOB-58x I/O Controller via LIOB-IP
- Automatic integration into device configurations with L-INX, L-ROC, and LIOB-58x I/O Controller
- Easy device replacement without any additional software at the L-INX, L-ROC, and LIOB-58x I/O Controller
- 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



Plug and play I/O integration through LIOB-IP

In BACnet mode, LIOB-BIP devices communicate through BACnet/IP

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, non condensing, degree of protection: IP40, IP20 (terminals)
Power supply	24 VDC / 24 VAC ±10 % via L-INX, L-ROC, or L-POW, or with LIOB-Connect, or via connecting of an external power supply to the upper left terminal
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, ≈ 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		

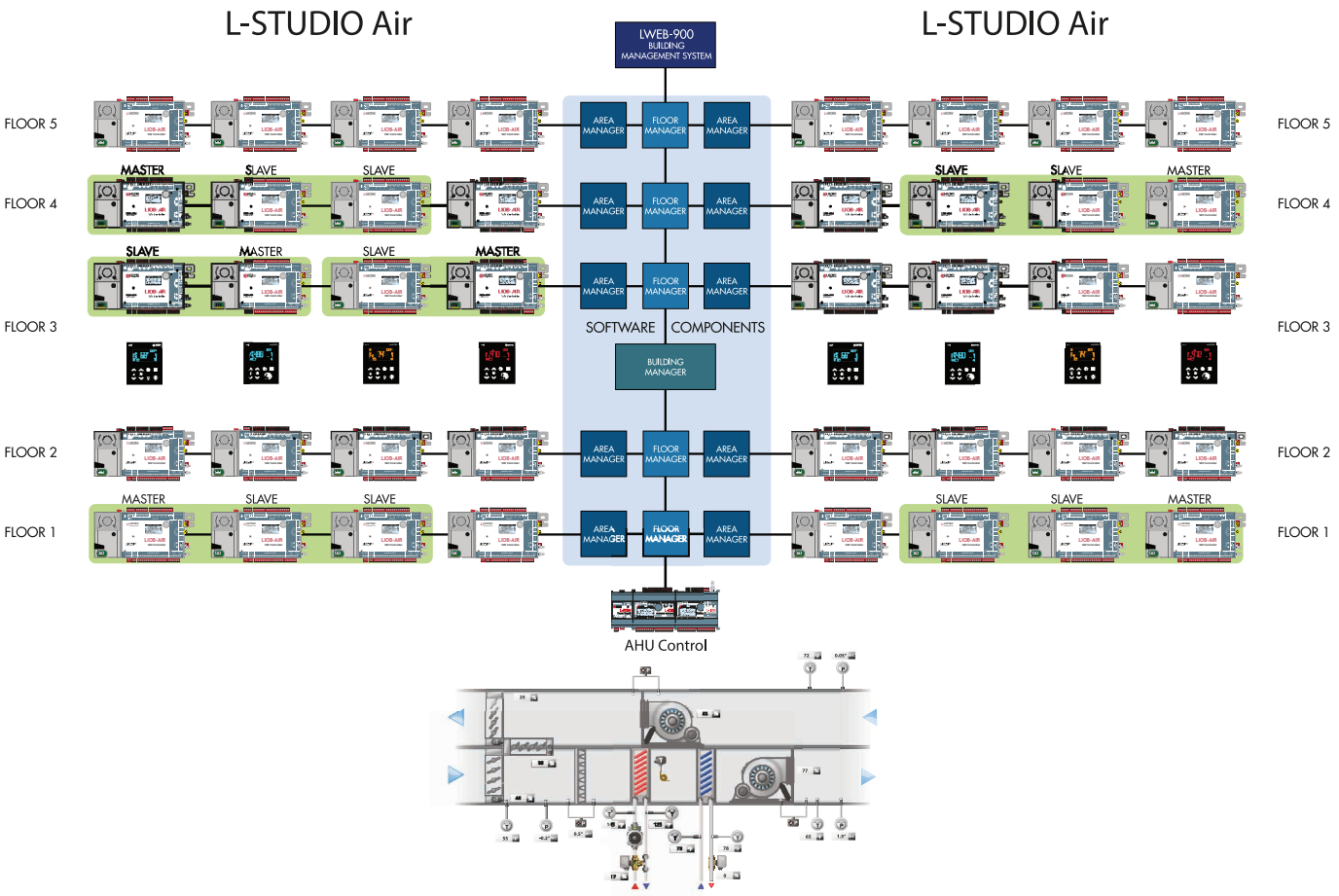
Order number	Product description
LIOB-550	LIOB-BIP I/O Module: 8 UI, 2 DI, 2 AO, 8 DO (4 x Relay 6A, 4 x Triac 0.5A)
LIOB-551	LIOB-BIP I/O Module: 8 UI, 12 DI
LIOB-552	LIOB-BIP I/O Module: 6 UI, 6 AO, 8 DO (8 x Relay 6A)
LIOB-553	LIOB-BIP I/O Module: 6 UI, 6 AO, 5 DO (4 x Relay 16A, 1 x Relay 6A)
LIOB-554	LIOB-BIP I/O Module: 7 UI, 4 AO, 7 DO (5 x Relay 6A, 2 x Triac 0.5A), 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

L-IOB I/O Controller with Application Program

The product family of L-IOB I/O Controllers with application program consists of I/O Controllers with specifically programmed application programs for building automation. Ready-made software modules and integrated hardware components facilitate engineering through a simple configuration and parameterization instead of programming.

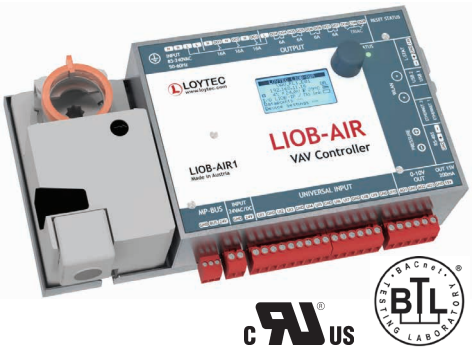
The entire project is configured within the IEC 61499 based automation software L-STUDIO and can be seamlessly integrated in an L-ROC room automation system.

LIOB-AIR – Variable Air Volume Controller (VAV-Controller)



LIOB-AIR

Datasheet #89033119





LIOB-AIR is a fully IP based variable air volume controller (VAV controller) with a predefined, flexible, reprogrammable application program and sophisticated management functions for a building ventilation system.

The L-STUDIO AIR designer supports fast and flexible project design meeting any VAV system requirements. Each VAV controller has a BACnet and an OPC network interface and integrates seamlessly into every BMS. The graphic pages for operation, supervision, and device configuration are hosted on the LIOB-AIR eliminating the need for a Tridium or whatsoever middleware component. Without any additional effort L-STUDIO AIR seamlessly integrates into the LWEB-900 building management system. Local trending and alarming provide in depth operating conditions to the BMS. Local scheduling allows reliable zone operation even if the network is down. Sophisticated DCV algorithms safe energy and 24/7 online test algorithms ensure proper system operation and detect malfunctioning devices like a blocked damper actuator, a stuck reheat valve, a dead series fan, etc.

Communication can be established via Ethernet or via the optional meshed WLAN. The dual Ethernet interface allows daisy chaining VAV controllers for simple network wiring. The optional built-in WLAN supports diversity antennas for reliable wireless communication in a self-healing meshed network topology. A dedicated port connects the L-STAT thermostat for user interaction tasks. The built-in damper actuator communicates via MP-Bus and provides detailed status information. The built-in differential pressure sensor is used to measure the air flow. A number of universal inputs and analog and digital outputs can be configured to connect additional sensors and actuators.

Supported VAV types

- Standard VAV (only Air Flow Control without Reheat and without Fan)
- VAV with electric reheat up to 3 stages
- VAV with hot water reheat
- VAV with series fan
- VAV with series fan and electric reheat up to 3 stages
- VAV with series fan and hot water reheat
- VAV with parallel fan and electric reheat up to 3 stages
- VAV with parallel fan and hot water reheat
- all reheats can also have optional peripheral heat

Supported inputs (sensors)

- pressure (internal)
- space temperature
- space temperature setpoint, absolute setpoint and/or offset
- occupancy sensor
- occupancy override (setback override)
- discharge temperature
- CO_2 or VOC sensor
- relative humidity
- window contact
- damper feedback
- flow setpoint external (European version)

Supported outputs (actuators)

- damper MP-Bus
- damper modulating
- damper floating
- parallel fan (also EC motors are supported)
- series fan (also EC motors are supported)
- reheat hot water modulating
- reheat hot water floating
- reheat electric modulating
- reheat electric up to 3 stages
- peripheral heat modulating
- peripheral heat floating
- peripheral heat on / off

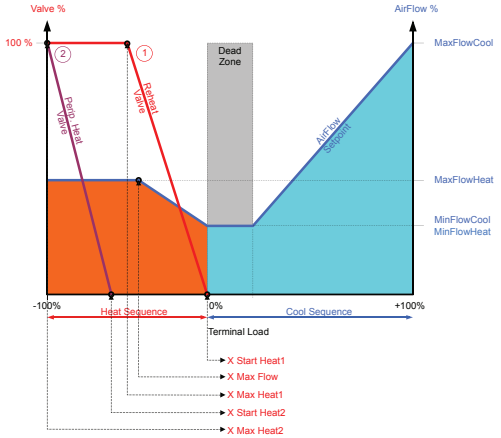
LIOB I/O Controller with Application Program

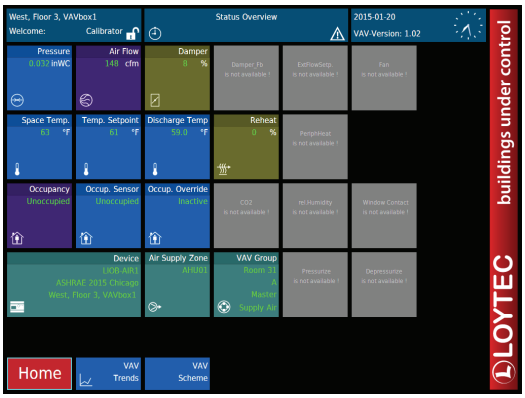
LIOB-AIR

The LIOB-AIR VAV controller integrates the following applications:

- Flow Control
- Flow Configuration
- Flow Alarms
- Air Flow Calibration
- Space Temperature Control
- Sequence Control
- Space Temperature Alarms
- Space Temperature Setpoint Control
- External Space Temperature Setpoint
- Occupancy Control
- Discharge Temperature Control
- CO_2 or VOC Control
- Humidity control
- External Flow Setpoint Operation
- Data aggregation to the Air Handling Unit
- Group Functions

Sequence Control





Features

- I/O controller with physical inputs and outputs
- Specific application program for variable air volume control
- Networking via redundant IP network
- Alarming, Scheduling, and Trending (AST™)
- Trending of all important data points in the controller
- Configuration and parameterization with L-STUDIO, IEC 61499
- Integration of the L-STAT Network Thermostat
- Integrated LWEB-802/803 room operation
- Integrates seamlessly into the LWEB-900 system
- Dual switched or separated Ethernet ports
- BACnet/IP interface is compliant to the B-BC (BACnet Building Controller) profile
- Integrated OPC XML-DA and OPC UA server
- Manual control using the jog dial
- Remote manual control via VCN client
- 128x64 graphical display with backlight
- Local display of device and data point information as clear text and via symbols
- Simple device replacement without software tool
- Built-in web server for device configuration
- Connection to EnOcean wireless devices via LENO-80x Interface
- Supports WLAN, LIOB-AIR1 and LIOB-AIR13: built-in WLAN, LIOB-AIR2: needs LWLAN-800
- Integration of an actuator via MP-Bus
- Differential pressure sensor
- Damper actuator included

L-STUDIO 3.0 licenses

Type	LIOB-AIR1	LIOB-AIR2	LIOB-AIR13
Programming, Tools	L-STUDIO (based on IEC 61499), VAV application library or IEC 61131 standard library		
License	L-STUDIO: included L-LOGICAD: n/a	L-STUDIO: included L-LOGICAD: n/a	L-STUDIO: included L-LOGICAD: n/a

Specifications

Type	LIOB-AIR1	LIOB-AIR2	LIOB-AIR13
Dimensions (mm)	260 x 120 x 68 (L x W x H), DIM043		208 x 120 x 68 (L x W x H), DIM044
Installation	mountable on the corresponding volume flow actuator		mountable via oblong holes
Operating conditions	0 °C to 50 °C, 10–90 % RH, non condensing, degree of protection: IP20		
Power supply	85-240 VAC 50/60Hz or 24 VDC / 24 VAC ±10 %	24 VDC / 24 VAC ±10 %	
Interfaces	2 x Ethernet (100Base-T): OPC XML-DA, OPC UA, LonMark IP-852, BACnet/IP, Modbus TCP, LIOB-IP, HTTP, FTP, SSH, HTTPS, Firewall, SNMP, VNC 1 x L-STAT (Network Thermostat) 1 x MP-Bus (actuator) 2 x USB-A		
	1 x RS-485 (ANSI TIA/EIA-485): BACnet MS/TP or Modbus RTU (Master or Slave) 1 x Internal WLAN (2 x SMA) 1 x SMA 50 Ohm, RX Antenna 2.4 GHz 1 x SMA 50 Ohm, TX/RX Antenna 2.4 GHz	–	1 x Internal WLAN (2 x SMA) 1 x SMA 50 Ohm, RX Antenna 2.4 GHz 1 x SMA 50 Ohm, TX/RX Antenna 2.4 GHz
Universal Input (UI)	10	10	10
Analog Output (AO)	3	3	3
Digital Output (DO)	9 (3 x Relay 16A, 4 x Relay 6A, 2 x Triac 0.5A)	6 (4 x Relay 6A, 2 x Triac 0.5A)	6 (4 x Relay 6A, 2 x Triac 0.5A)
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	0–250 Pa		
Power supply output	15 VDC, max. 200 mA		
Frequency	2400 ~ 2497 MHz	-	2400 ~ 2497 MHz
RF Output Power	18 (±2) dBm	-	18 (±2) dBm
Actuator	Torque rating: 5 Nm		

Resource limits

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

Order number	Product description
LIOB-AIR1	LIOB I/O controller with application program variable air volume control, actuator included
LIOB-AIR2	LIOB I/O controller with application program variable air volume control, actuator included
LIOB-AIR13	LIOB I/O controller with application program variable air volume control, actuator included
LIOB-AIR-START-M	Starter kit: 2 x LIOB-AIRx, 3 x L-STUDIO software license
L-TEMP2	External temperature sensor (NTC10K) for use with L-IOB Universal Inputs

More product variants are available online under www.loytec.com/liobair.

General Input and Output Specification of LOYTEC devices

Datasheet #89049119

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 ±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 kΩ, sampling period 10 ms.

  - In voltage mode, the threshold values are < 0.8 V for low level and > 2 V for high level.
  - In resistance mode, the threshold values are < 1.9 kΩ for low level and > 6.7 kΩ for high level.

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

- **Voltage Metering 0-10 V**

  Input Impedance > 20 kΩ, sampling period < 1 s.

- **Current loop 4-20 mA**

  Input Impedance > 20 kΩ, sampling period < 1 s. An internal shunt of 249 Ω is available for some universal inputs. Otherwise, an external resistor of 249 Ω must be used as a shunt.

- **Resistance Measurement**

  Input Impedance 10 kΩ, sampling period < 1 s. Resistors in the range of 1 kΩ to 100 kΩ 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:

$$p = n \cdot 125\ ms$$

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 Ω 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 ±100 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.



Gateways

Gateways

L-GATE, L-INX, L-DALI, L-Proxy



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, and OPC XML-DA. The LINX-202/203 supports connectivity to BACnet, Modbus, M-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. LOYTECs 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.

The L-Proxy CEA-709 multi-port gateway (LP-33E100) is designed to connect separate LonMark systems. Up to five networks can be integrated via two TP/FT-10 and three IP-852 interfaces.



L-GATE, L-INX, L-DALI, L-Proxy

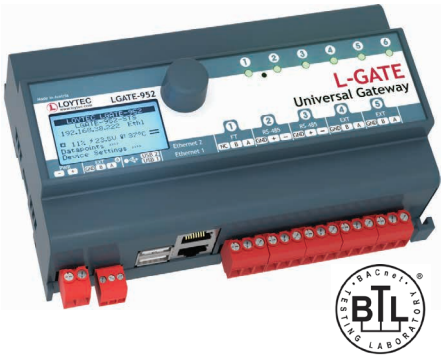
Features	LGATE-952	LGATE-902	LP-33E100	LINX-102	LINX-103	LINX-202	LINX-203
LON IP-852 – TP/FT-10	X	X	X	X	X		
BACnet/IP – MS/TP	X	X				X	X
KNXnet/IP – KNX TP1	X	X		X	X	X	X
EnOcean	X	X		X	X	X	X
SMI	X	X		X	X	X	X
Modbus TCP – Modbus RTU	X	X		X	X	X	X
M-Bus	X	X		X	X	X	X
OPC XML-DA, OPC UA Server	X	X		X	X	X	X
Dual Ethernet (switched or separated)	X	X		X	X	X	X
WLAN	X	X		X	X	X	X
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

L-GATE Gateway

LGATE-952

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

Datasheet #89023319





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.

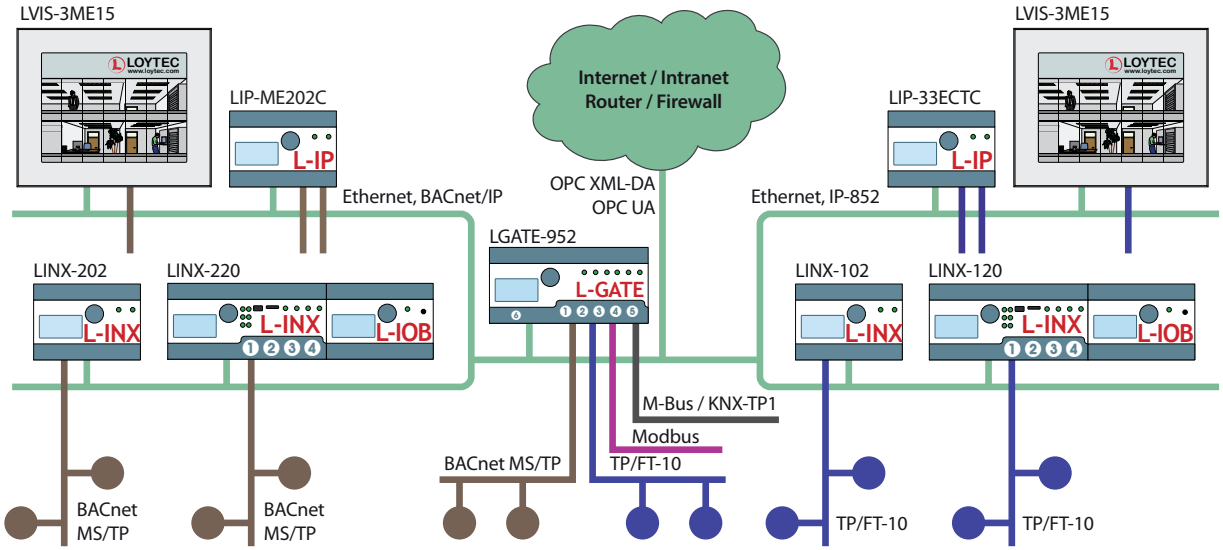
Each LGATE-952 is equipped with two Ethernet ports. It can either be configured to use the internal switch to interconnect the two ports or every port is configured to work in a separate IP network.

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.

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.

LGATE-952



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™)
- 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 switched or separated Ethernet ports
- 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 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, non condensing, degree of protection: IP40, IP20 (terminals)

L-GATE Gateway

LGATE-952

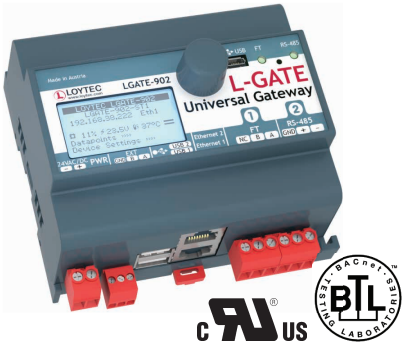
Specifications	
Type	**LGATE-952**
Interfaces	2 x Ethernet (100Base-T): OPC XML-DA, OPC UA, LonMark IP-852*, BACnet/IP**, KNXnet/IP, Modbus TCP (Master or Slave), HTTP, FTP, SSH, HTTPS, Firewall, VNC, SNMP 1 x TP/FT-10* (LonMark System) 2 x USB-A: WLAN (needs LWLAN-800), EnOcean (needs LENO-80x), SMI (needs LSMI-804), MP-Bus (needs LMPBUS-804) 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 V DC, 15 W
LPOW-2415B	Power supply unit with power connector 24 V DC, 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 level converter 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

LGATE-902

Datasheet #89035819





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.

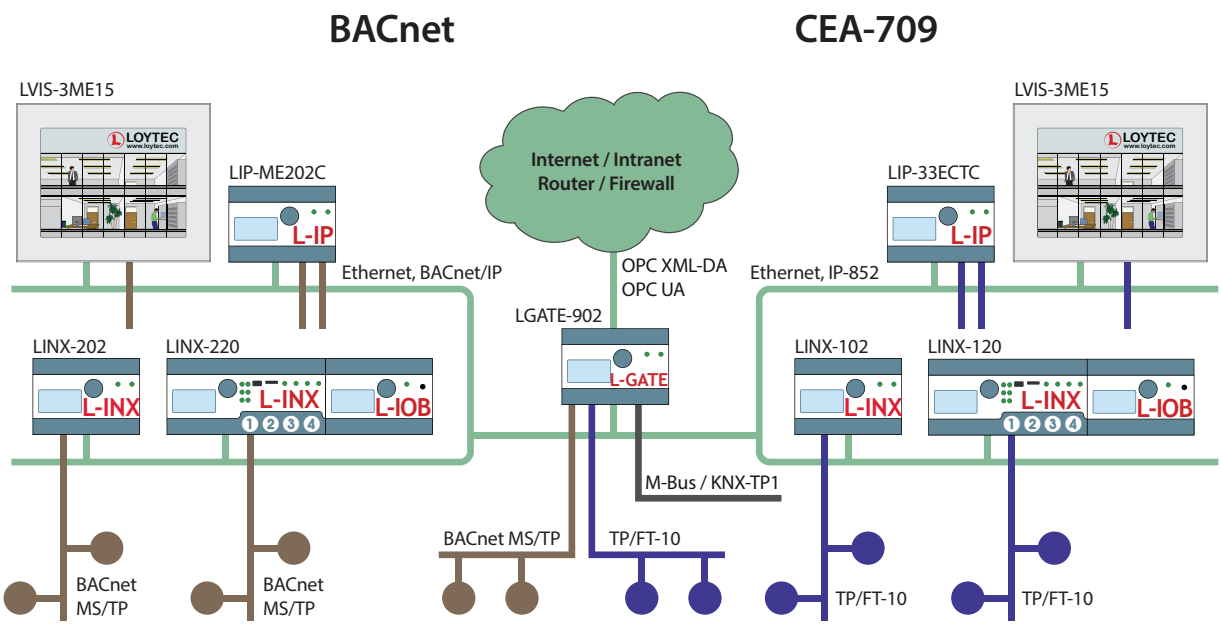
When the Ethernet ports are configured for two separate IP networks, one port can be connected for instance to a WAN (Wide Area Network) with enabled network security (HTTPS) while the second port can be configured to be connected to an insecure network (LAN) where the standard building automation protocols like BACnet/IP, LON/IP, or Modbus TCP are present. These devices also feature 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.

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

L-GATE Gateway

LGATE-902



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™)
- 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 switched or separated Ethernet ports
- 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 MP-Bus through LMPBUS-804 Interface
- Stores user-defined project documentation

LGATE-902

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	12–35 VDC / 12–24 VAC ±10 %, typ. 2.5 W
Operating conditions	0 °C to 50 °C, 10–90 % RH, non condensing, degree of protection: IP40, IP20 (terminals)
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 2 x USB-A: WLAN (needs LWLAN-800), EnOcean (needs LENO-80x) SMI (needs LSMI-804) MP-Bus (needs LMPBUS-804) 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) * Either BACnet/IP or BACnet MS/TP ** Either LonMark IP-852 or TP/FT-10
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 level converter 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

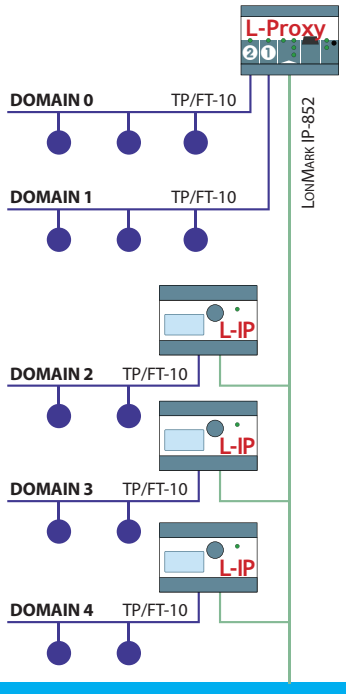
L-Proxy CEA-709 Multiport Gateway

LP-33E100

BACnet
☐ CEA-709
KNX
Modbus
M-Bus
OPC

Datasheet #89012819





The L-Proxy Multiport Gateway exchanges data packets across domain boundaries in LonMark Systems. Network variables or configuration properties are used to transfer data. L-Proxy represents up to five independent network nodes (one on each TP/FT-10 channel and up to three on the IP-852 channel). Every L-Proxy node can be configured in different domains and therefore in different LNS® databases. Individually created input and output network variables or configuration properties on every L-Proxy node are connected internally between the L-Proxy nodes with a configuration tool supplied with the unit.

L-Proxy is the perfect solution for data exchange between independent LonMark Systems. Whether different phases of construction, different systems, or expanded networks with multiple LNS® databases – L-Proxy connects. L-Proxy allows to share common data (e.g. from a weather station) across network boundaries.

Network Communication

L-Proxy can be connected to an Ethernet/IP channel (LonMark IP-852) and to TP/FT-10 channels. Static and dynamic NVs form the interface. In addition to SNVTs, User Defined NVs (UNVTs) and Configuration Properties (SCPTs, UCPTs) are supported.

Features

- Compliant with CEA-709, CEA-852, and ISO/IEC 14908-1 standard (LonMark System)
- Supports TP/FT-10 or IP-852 (CEA-852 Ethernet)
- Data exchange via network variables accross multiple domains
- Extends the address tables of Neuron® Chip based nodes
- Support of dynamically created network variables or static network variables
- Support of user defined NVs (UNVTs) and configuration properties (SCPTs, UCPTs)
- Represents up to five independent network nodes
- Configuration tool usable with and without LNS®

Specifications

Dimensions (mm)	107 x 100 x 60 (L x W x H), DIM009
Installation	DIN rail mounting following DIN 43880, top hat rail EN 50022
Power supply	12-35 VDC / 12-24 VAC ±10 %, typ. 3 W
Operating conditions	0 °C to 50 °C, 10–90 % RH, non condensing, degree of protection: IP40, IP20 (terminals)
Interfaces	1 x Ethernet (100Base-T): LonMark IP-852, HTTP, FTP 2 x TP/FT-10 (LonMark System)
Tools	L-Proxy Configurator

Resource limits

Network variables NVs	512 per L-Proxy node	External NVs (polling)	512 per L-Proxy node
Alias NVs	512 per L-Proxy node	Address table entries	512 (non-ECS mode: 15)

Order number	Product description
LP-33E100	L-Proxy CEA-709 Multiport Gateway

L-VIS, L-STAT Touch Panels & Network Thermostats



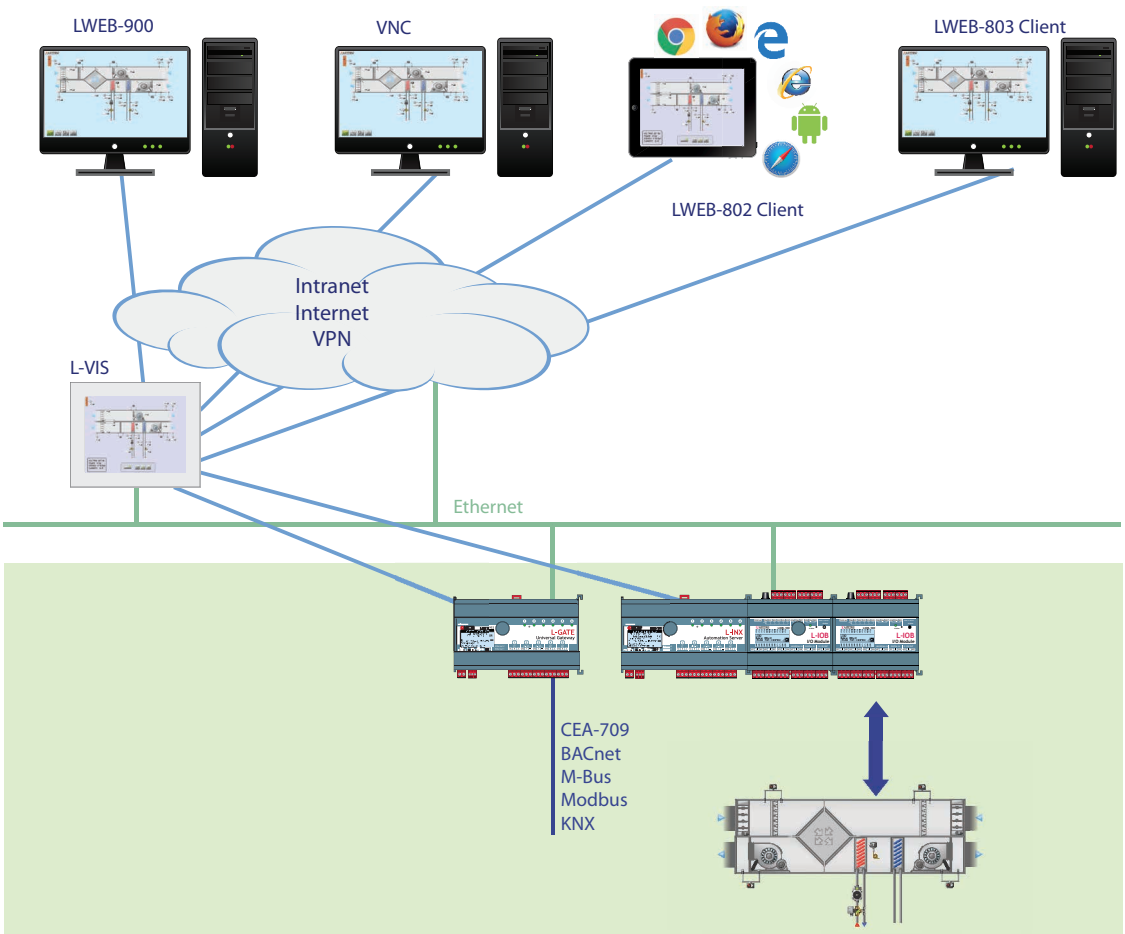
L-VIS Overview

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.



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

Datasheet #89033419









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

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.

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 Panel

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

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.

In addition, the L-VIS Touch Panels provide connectivity to Modbus TCP via Ethernet/IP.

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. The resulting data point value can then be either shown on the page or provided via an output Network Variable. Network Variables are automatically mapped to OPC data points that can be accessed via web services.

The L-VIS devices 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 (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.

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.

Features

- High resolution TFT touch display with dimmable backlight
- Anodized aluminum front frame 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
- Built-in OPC UA and OPC XML-DA server
- Built-in OPC XML-DA client
- Dual switched or separated Ethernet ports
- Alarming, Scheduling, and Trending (AST™)
- 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

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 1 x Digital interface for up to 4 L-TEMP1 sensors 2 x USB-A: (LVIS-3ME15-Gx only 1 x USB-A) WLAN (needs LWLAN-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 VAC, 7 W, backlight on: 13 W	24 VDC ±10 %, 4 W, backlight on: 10 W or 85-240 VAC, 7 W, backlight on: 13 W
Operating conditions	+10 °C to 40 °C, 10-90 % RH, non condensing		
Degree of protection	Front: IP54 / back: IP10		
Tools	L-VIS/L-WEB Configurator		

Resource limits	
OPC data points	10 000
Modbus data points	2 000
VNC clients	16
Network variables (NVs)	1 000
Alias NVs	1 000
Address table entries	524 (non-ECS mode: 15)
LonMark Calendars	1 (25 calendar patterns)
LonMark Schedulers	100
LonMark Alarm Servers	1
BACnet server objects	512
BACnet calendar objects	25
BACnet scheduler objects	100 (64 data points per object)
BACnet notification classes	32
E-mail templates	100
Math objects	2 000
Alarm logs	100
Trend logs	512 (4 000 000 entries, ≈ 60 MB)
Total trended data points	512
Connections (Local/Global)	2 000/250
Number of L-WEB clients	32 (simultaneously)

L-VIS Touch Panel

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

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
L-TEMP1	External temperature sensor
LWLAN-800	Wireless LAN Interface IEEE 802.11bgn

Not recommended for new projects!
Please use LVIS-3ME7-Gx

L-VIS Touch Panel

LVIS-3E100

Datasheet #89017119





L-VIS Touch Panels for LonMark Systems 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.

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.

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.

Connectivity and Data Points

The L-VIS Touch Panels support connectivity to LonMark IP-852 (Ethernet/IP) or TP/FT-10 channels. The integrated remote network interface (Ethernet/IP) provides remote access to the device TP/FT-10 channel for configuration, service and maintenance purposes. In addition, the L-VIS Touch Panels provide connectivity to Modbus TCP via Ethernet/IP.

Math objects can calculate any kind of formula using data points available on the device. The resulting data point value can then be either shown on the page or provided via an output Network Variable. Network Variables are automatically mapped to OPC XML-DA data points that can be accessed via web services.

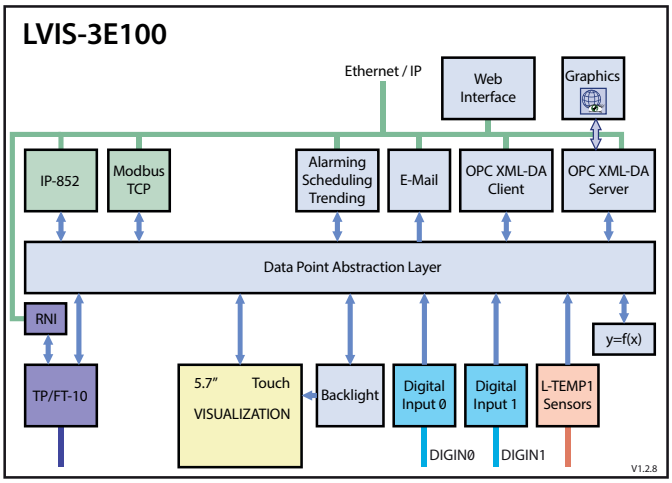
The L-VIS Touch Panels provide fully featured AST™ functionality (Alarming, Scheduling, and Trending) and can be integrated perfectly into the L-WEB Building Management System.

L-VIS Touch Panel

LVIS-3E100

Features

- TFT touch display with dimmable backlight
- Anodized aluminium front frame
- 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 popular font types such as TrueType, Type-1, BDF, PCF, and OTF
- Supports Unicode text
- Built-in OPC XML-DA server
- Built-in OPC XML-DA client
- Alarming, Scheduling, and Trending (AST™)
- 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 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
- Modbus TCP (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



LVIS-3E100

Specifications	
Type	**LVIS-3E100**
Screen size	5.7” (145 mm)
Dimensions (mm)	210 x 164 x 63 (L x W x H), DIM001
Dimensions cut-out (mm)	180 x 150 x 57 (L x W x H)
Display resolution	320 x 240, 256 colors
Interfaces	1 x Ethernet (100Base-T): OPC XML-DA (server, client), LonMark IP-852, HTTP, FTP, SMTP, NTP, VNC, Modbus TCP (Master or Slave) 1 x TP/FT-10 2 x Digital Input 1 x Digital interface for up to 4 L-TEMP1 sensors
Remote Network Interface	1 RNI with 2 MNI devices
Power supply	24 V DC or 24 V AC ± 10% typ. 3 W, backlight on: 8 W
Operating conditions	+10 °C to 40 °C, 10-90 % RH, non condensing
Degree of protection	Front: IP54 / back: IP10
Tools	L-VIS/L-WEB Configurator
Resource limits	
OPC data points	2 000
Modbus data points	2 000
VNC clients	16
Network variables (NVs)	1 000
Alias NVs	1 000
Address table entries	524 (non-ECS mode: 15)
LonMark Calendars	1 (25 calendar patterns)
LonMark Schedulers	100
LonMark Alarm Servers	1
E-mail templates	100
Math objects	500
Alarm logs	20
Trend logs	100 (390 000 entries, ≈ 6 MB)
Total trended data points	256
Connections (Local/Global)	1 000/250
Number of L-WEB clients	15 (simultaneously)

Order number	Product description
LVIS-3E100	CEA-709 Touch Panel with 5.7” display (Aluminium frame with anodized finish)
LVIS-FRAME1	Mounting frame for 5.7” Touch Panels
L-TEMP1	External temperature sensor

L-VIS Touch Panel

LVIS-ME200

Not recommended for new projects!
Please use LVIS-3ME7-Gx

☐ BACnet
CEA-709
KNX

☐ Modbus
M-Bus

☐ OPC

Datasheet #89017319





L-VIS Touch Panels for BACnet 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 utilizing an embedded 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.

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.

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.

Connectivity and Data Points

The L-VIS Touch Panels support connectivity to BACnet/IP and BACnet MS/TP and implement the BACnet Building Controller (B-BC) profile. They include a fully featured built-in BACnet/IP to MS/TP router with BBMD and slave proxy functionality. In addition, the L-VIS Touch Panels provide connectivity to Modbus TCP via Ethernet/IP and to Modbus RTU via RS-485.

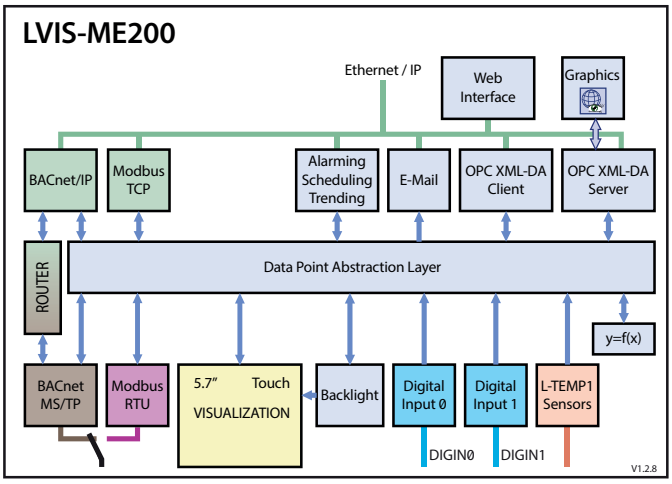
Math objects can calculate any kind of formula using data points available on the device. The resulting data point value can then be either shown on the page or provided via a BACnet object. All BACnet server objects are automatically mapped to OPC XML-DA data points that can be accessed via web services.

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-ME200

Features

- TFT touch display with dimmable backlight
- Anodized aluminum front frame
- 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 popular font types such as TrueType, Type-1, BDF, PCF, and OTF
- Supports Unicode text
- Built-in OPC XML-DA server
- Built-in OPC XML-DA client
- Alarming, Scheduling, and Trending (AST™)
- Event-driven e-mail notification
- Math objects to execute mathematical operations on data points
- 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



L-VIS Touch Panel

LVIS-ME200

Specifications	
Type	**LVIS-ME200**
Screen size	5.7” (145 mm)
Dimensions (mm)	210 x 164 x 63 (L x W x H), DIM001
Dimensions cut-out (mm)	180 x 150 x 57 (L x W x H)
Display resolution	320 x 240, 256 colors
Interfaces	1 x Ethernet (100Base-T): OPC XML-DA (server, client), BACnet/IP, HTTP, FTP, SMTP, NTP, VNC, Modbus TCP (Master or Slave) 1 x RS-485 (ANSI TIA/EIA-485): BACnet MS/TP or Modbus RTU (Master or Slave) 2 x Digital Input 1 x Digital interface for up to 4 L-TEMP1 sensors
Power supply	24 V DC or 24 V AC ± 10% typ. 3 W, backlight on: 8 W
Operating conditions	+10 °C to 40 °C, 10-90 % RH, non condensing
Degree of protection	Front: IP54 / back: IP10
Tools	L-VIS/L-WEB Configurator1
Resource limits	
OPC data points	2 000
Modbus data points	2 000
VNC clients	16
BACnet server objects	512
BACnet calendar objects	25
BACnet scheduler objects	100 (64 data points per object)
BACnet notification classes	32
E-mail templates	100
Math objects	500
Alarm logs	10
Trend logs	100 (390 000 entries, ≈ 6 MB)
Total trended data points	256
Connections (Local/Global)	1 000/250
Number of L-WEB clients	15 (simultaneously)
Order number	**Product description**
LVIS-ME200	BACnet Touch Panel with 5.7” display (Aluminium frame with anodized finish), B-BC
LVIS-FRAME1	Mounting frame for 5.7” Touch Panels
L-TEMP1	External temperature sensor

L-STAT Network Thermostat

LSTAT-800, LSTAT-801, LSTAT-802

Datasheet #89034319



Modbus | Local I/O

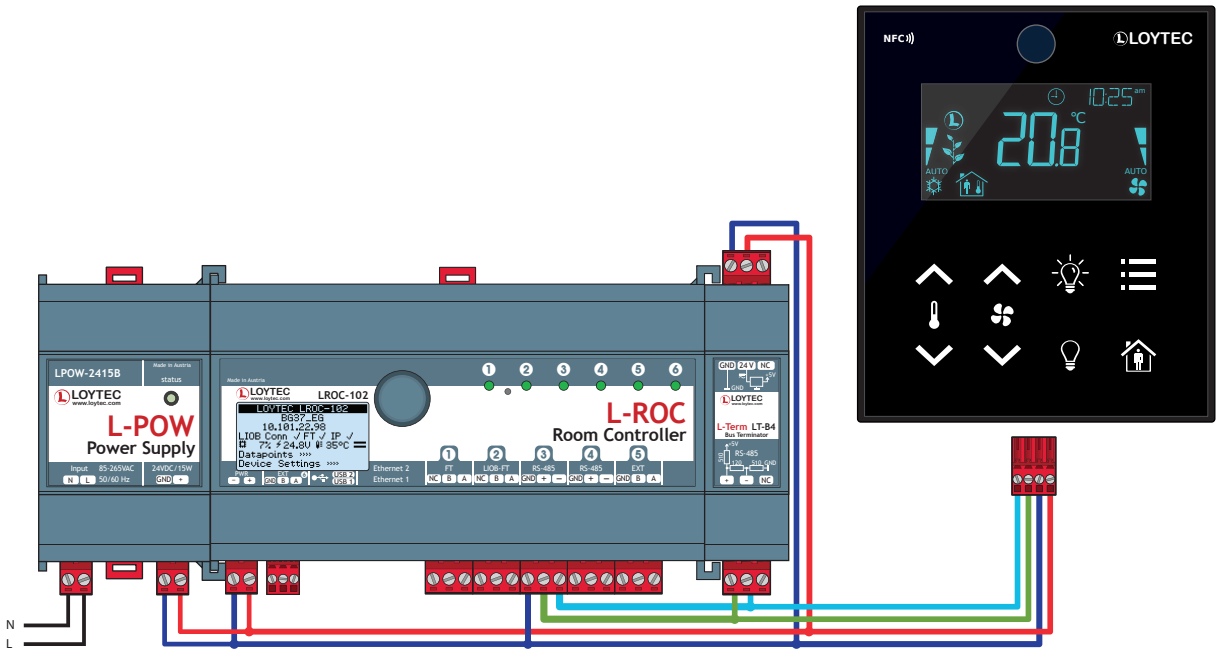
The L-STAT is a network thermostat device with a modern, minimalistic look that fits any interior design. It is directly connected to a LOYTEC controller with a Modbus interface such as LIOB-AIR or L-ROC.

Up to 16 L-STAT devices can be connected to one controller to offer control at different locations in- or outside even for the largest rooms. The L-STAT is equipped with a segmented LCD display featuring an RGB backlight with adjustable color, offering a neat way to make the L-STAT match the interior color concept of an office building. Eight capacitive touch buttons are used to cycle through sensor values, display parameters, and adjust setpoints. Up to four external buttons can be accessed and processed by the controller.

The L-STAT's internal sensors measure temperature, humidity, dew point, occupancy, and CO_2 level. Sensor values can be displayed in SI or US units. Additionally, the date and time as well as the current level of eco-friendliness in the form of green leafs are also displayed on the LCD display. Parameters controlled by the controller's logic can be overridden on the L-STAT, such as for occupancy, air conditioning, and ventilation. A direct access mode is available to quickly adjust the most important setpoints e.g. for temperature and ventilation control.

A buzzer provides acoustic feedback for the touch buttons and can also be used to indicate alarms and error states. To prevent unauthorized modifications, two access levels (end user, system integrator) are used, which are secured via 4-digit pin codes. Device replacement, firmware upgrade, and L-STAT configuration are performed with very little effort through the controller. The L-STAT device is represented in the controller by a simple data point interface, which can be directly connected to the IEC 61131 or IEC 61499 logic application and offers all common functions for data points such as alarming, scheduling, trending, historic filters, math functions, etc.

Using an NFC tag, the L-STAT transmits the URL of the controller's web interface to mobile devices for more extensive control and administrative tasks. Last but not least, the L-STAT comes with a built-in infrared receiver for comfortable remote control.



L-STAT Network Thermostat

LSTAT-800, LSTAT-801, LSTAT-802

Specifications			
Type	**LSTAT-800-Gx-Lx**	**LSTAT-801-Gx-Lx**	**LSTAT-802-Gx-Lx**
Dimensions (mm)	94.5 x 110 x 19.5 (W x H x D), DIM032		
Installation	Onto a flush-mounted box		
Power supply	24 V DC ±10 %, max. 0.8 W		24 V DC ±10 %, max. 1.8 W
Operating conditions	0 °C to 50 °C, 10 – 90 % RH, non condensing, degree of protection: IP30		
Display	LCD display featuring an RGB backlight with adjustable color		
Interfaces, sensors	1 x RS-485 (ANSI TIA/EIA-485): Modbus RTU (Slave), adjustable bus speed 1 200 – 115 200 bit/s (typical 57 600 bit/s), configurable transmission mode (typical “8E1”, 1 start bit, 8 data bits, even parity, 1 stop bit) 1 x NFC (Near Field Communication) 1 x Buzzer 1 x Internal temperature sensor 1 x Internal relative humidity sensor 3 x Digital Input for connection of standard switches and pushbuttons 1 x Universal Input, configurable either for L-TEMP2 (NTC temperature sensor) or for connection of standard switches and pushbuttons 1 x Infrared receiver		
	–	1 x Occupancy sensor	
	–		1 x CO_2 sensor
Buttons (capacitive touch)	LSTAT-80x-Gx-L1: 4 x Button with temperature up/down, occupancy, and menu LSTAT-80x-Gx-L2: 6 x Button with temperature up/down, fan up/down, occupancy, and menu LSTAT-80x-Gx-L3: 8 x Button with temperature up/down, fan up/down, light on/off, occupancy, and menu LSTAT-80x-Gx-L4: 8 x Button with temperature up/down, sunblinds up/down, light on/off, occupancy, and menu LSTAT-80x-Gx-L5: 8 x Button with temperature up/down, fan up/down, sunblinds up/down, occupancy, and menu LSTAT-80x-Gx-L6: 8 x Button with temperature up/down, fan up/down, sunblinds up/down, light, and menu		
For use with	L-INX, LIOB-AIR, L-ROC Controller, Third party controller with Modbus Master via Modbus RTU		

Specifications of the sensors	
Temperature measurement	Sensor type: CMOS, range: -40 – 125 °C, resolution: 0.1 °C, accuracy: ±0.5 °C (5 – 60 °C)
Relative Humidity (R.H.)	Sensor type: capacitive humidity sensor, range: 0 % – 100 % R.H., resolution: 0.1 % R.H., accuracy: ±2 % R.H. @ 25 °C, 20 % – 80 % R.H. ±3 % R.H. @ 25 °C, 0 % – 20 % R.H. and 80 % – 100 % R.H., respectively
Infrared occupancy detector, maximum detection range	5 m, 64 zones, opening angle horizontal: 94°, vertical: 82°, difference in temperature: target to environment: > 4 °C
CO_2	0 – 2 000 ppm, ±30 ppm or ±3 %
Infrared receiver	NEC protocol (Apple Remote compatible)

LSTAT-800, LSTAT-801, LSTAT-802

Order number	Product description
LSTAT-800-G3-L1	Network Thermostat, front black, white enclosure, Modbus, NFC, temperature, rel. humidity, ext. switch/NTC, IR receiver, Buttons (L1): temperature up_down/occupancy/menu
LSTAT-800-G3-L2	Network Thermostat, front black, white enclosure, Modbus, NFC, temperature, rel. humidity, ext. switch/NTC, IR receiver, Buttons (L2): temperature up_down/fan up_down/occupancy/menu
LSTAT-800-G3-L3	Network Thermostat, front black, white enclosure, Modbus, NFC, temperature, rel. humidity, ext. switch/NTC, IR receiver, Buttons (L3): temperature up_down/fan up_down/light on_off/occupancy/menu
LSTAT-800-G3-L4	Network Thermostat, front black, white enclosure, Modbus, NFC, temperature, rel. humidity, ext. switch/NTC, IR receiver, Buttons (L4): temperature up_down/sunblinds up_down/light on_off/occupancy/menu
LSTAT-800-G3-L5	Network Thermostat, front black, white enclosure, Modbus, NFC, temperature, rel. humidity, ext. switch/NTC, IR receiver, Buttons (L5): temperature up_down/fan up_down/sunblinds up_down/occupancy/menu
LSTAT-800-G3-L6	Network Thermostat, front black, white enclosure, Modbus, NFC, temperature, rel. humidity, ext. switch/NTC, IR receiver, Buttons (L6): temperature up_down/fan up_down/sunblinds up_down/light/menu
LSTAT-801-G3-L1	Network Thermostat, front black, white enclosure, Modbus, NFC, temperature, rel. humidity, ext. switch/NTC, occupancy, IR receiver, Buttons (L1): temperature up_down/occupancy/menu
LSTAT-801-G3-L2	Network Thermostat, front black, white enclosure, Modbus, NFC, temperature, rel. humidity, ext. switch/NTC, occupancy, IR receiver, Buttons (L2): temperature up_down/fan up_down/occupancy/menu
LSTAT-801-G3-L3	Network Thermostat, front black, white enclosure, Modbus, NFC, temperature, rel. humidity, ext. switch/NTC, occupancy, IR receiver, Buttons (L3): temperature up_down/fan up_down/light on_off/occupancy/menu
LSTAT-801-G3-L4	Network Thermostat, front black, white enclosure, Modbus, NFC, temperature, rel. humidity, ext. switch/NTC, occupancy, IR receiver, Buttons (L4): temperature up_down/sunblinds up_down/light on_off/occupancy/menu
LSTAT-801-G3-L5	Network Thermostat, front black, white enclosure, Modbus, NFC, temperature, rel. humidity, ext. switch/NTC, occupancy, IR receiver, Buttons (L5): temperature up_down/fan up_down/sunblinds up_down/occupancy/menu
LSTAT-801-G3-L6	Network Thermostat, front black, white enclosure, Modbus, NFC, temperature, rel. humidity, ext. switch/NTC, occupancy, IR receiver, Buttons (L6): temperature up_down/fan up_down/sunblinds up_down/light/menu
LSTAT-802-G3-L1	Network Thermostat, front black, white enclosure, Modbus, NFC, temperature, rel. humidity, ext. switch/NTC, occupancy, IR receiver, CO2, Buttons (L1): temperature up_down/occupancy/menu
LSTAT-802-G3-L2	Network Thermostat, front black, white enclosure, Modbus, NFC, temperature, rel. humidity, ext. switch/NTC, occupancy, IR receiver, CO2, Buttons (L2): temperature up_down/fan up_down/occupancy/menu
LSTAT-802-G3-L3	Network Thermostat, front black, white enclosure, Modbus, NFC, temperature, rel. humidity, ext. switch/NTC, occupancy, IR receiver, CO2, Buttons (L3): temperature up_down/fan up_down/light on_off/occupancy/menu
LSTAT-802-G3-L4	Network Thermostat, front black, white enclosure, Modbus, NFC, temperature, rel. humidity, ext. switch/NTC, occupancy, IR receiver, CO2, Buttons (L4): temperature up_down/sunblinds up_down/light on_off/occupancy/menu
LSTAT-802-G3-L5	Network Thermostat, front black, white enclosure, Modbus, NFC, temperature, rel. humidity, ext. switch/NTC, occupancy, IR receiver, CO2, Buttons (L5): temperature up_down/fan up_down/sunblinds up_down/occupancy/menu
LSTAT-802-G3-L6	Network Thermostat, front black, white enclosure, Modbus, NFC, temperature, rel. humidity, ext. switch/NTC, occupancy, IR receiver, CO2, Buttons (L6): temperature up_down/fan up_down/sunblinds up_down/light/menu
LSTAT-80x-CUSTOM	Customized Network Thermostat, minimum quantity 100 pieces, enclosure G1: silver, G2: black, G3: white; custom print Lx, including 2 working samples, lead time 10 weeks
A complete list of L-STAT models is available on our website www.loytec.com/lstat.	

L-STAT Network Thermostat

LSTAT-800, LSTAT-801, LSTAT-802

L-STAT Button Configuration Overview

L-STAT-80x-G3-L1



L-STAT-80x-G3-L2



L-STAT-80x-G3-L3



L-STAT-80x-G3-L4



L-STAT-80x-G3-L5



L-STAT-80x-G3-L6



LSTAT-80x-CUSTOM





L-DALI Lighting Control

L-DALI Lighting Control

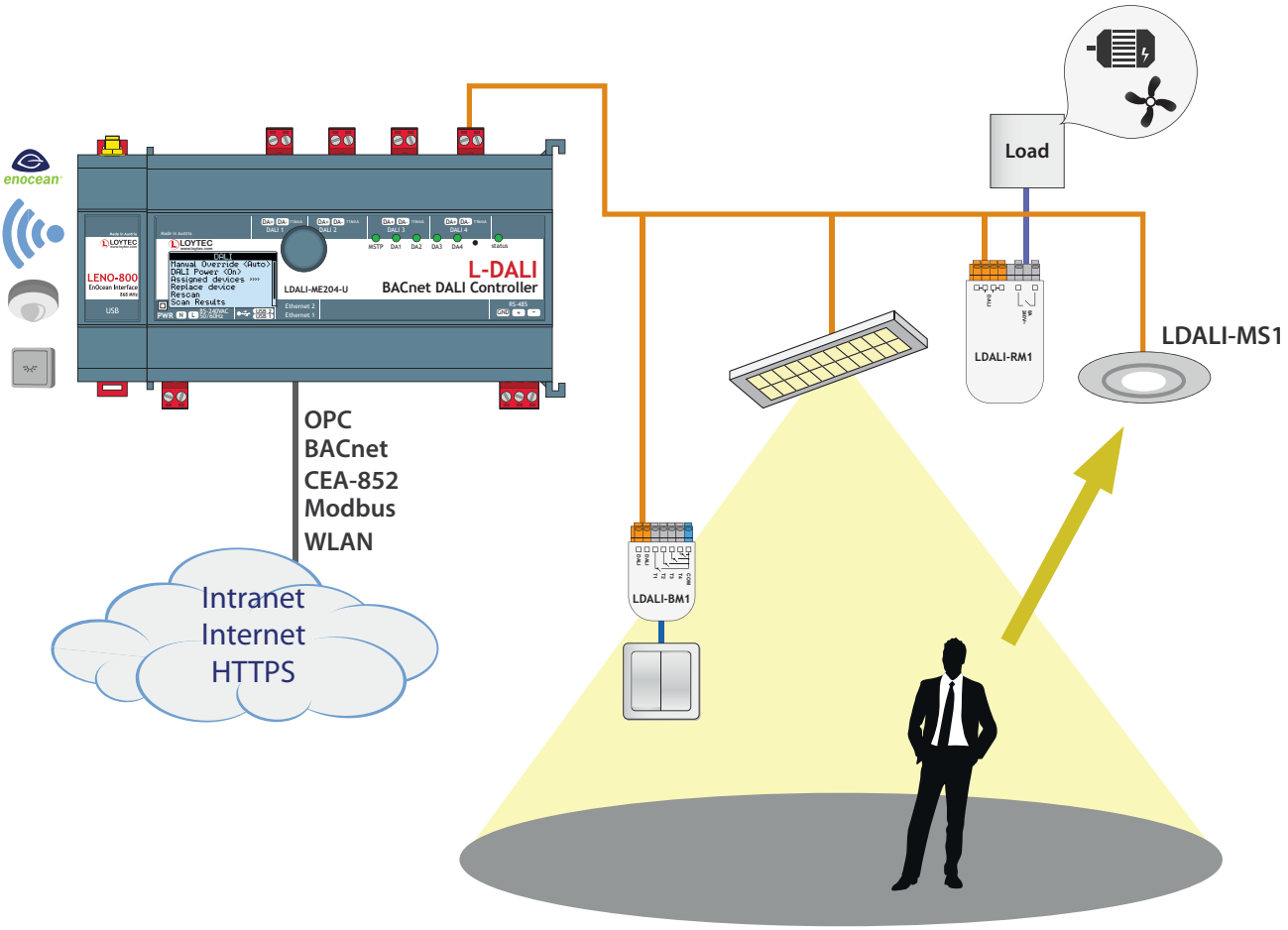
L-DALI Overview

The L-DALI product line offers DALI lighting controls functionality that leaves nothing to be desired in combination with powerful lighting applications. This allows an incorporation of the DALI system in the superior building automation system and an integration of the lighting system in the remaining automation system for realizing a full-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 pushbutton couplers e.g. LDALI-BM1 and also a variety of multi sensors like the LDALI-MS1. With the LDALI-RM1 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 buspower supply (selected models only) which can also power a DALI channel, and a 128x64 graphical display for manual operation using a jog dial.



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

Datasheet #89016919





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.

Built-In or External DALI Power Supply

The LDALI-3E101-U comes with a built-in DALI power supply. It can supply one DALI channel with a guaranteed supply current of 230 mA. 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 VAC, 50/60 Hz. The LDALI-3E102-U and LDALI-3E104-U need an external DALI power supply to power up the DALI network. External power supplies are available for up to four DALI channels.

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.

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

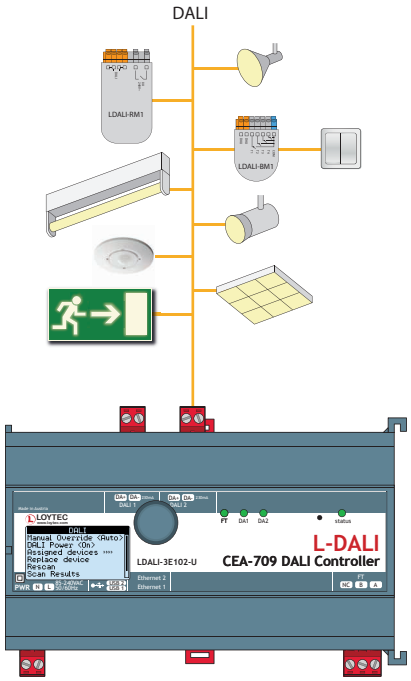
The integrated Sunblind Controller (LonMark Functional Profile #6111) allows intelligent controlling of blinds connected via SMI (requires LSMI-804) or the CEA-709 network. It offers effective sun and anti-glare protection through active slat control and slat adjustment according to the sun position. 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.

CEA-709/DALI Controller

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



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 run-time 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 multi-sensors for presence detection and light level recognition. In addition to the LOYTEC DALI multi-sensor LDALI-MS1, DALI sensors of well-known manufacturers can be selected from a list of tested devices.

- **DALI Push Button**

  For manual operation, DALI push button coupler 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.) also commands can be sent into the building network with a single keystroke.

- **DALI Relay Modules**

  Standard loads in the power grid can be controlled via DALI using DALI Relay Modules.

- **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, 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.

Smooth DALI integration in LonMark Systems

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.

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

DALI Network Interface

L-DALI represents a DALI-Master in the DALI network which can interact with selected DALI multi-sensors in Multi-Master mode. The L-DALI lineup for LonMark Systems features 1, 2, or 4 independent DALI channels. Up to 64 DALI-based luminaries per DALI channel can be controlled individually or via 16 groups. All luminaries are monitored for lamp or ballast defect.

LonMark Interface

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

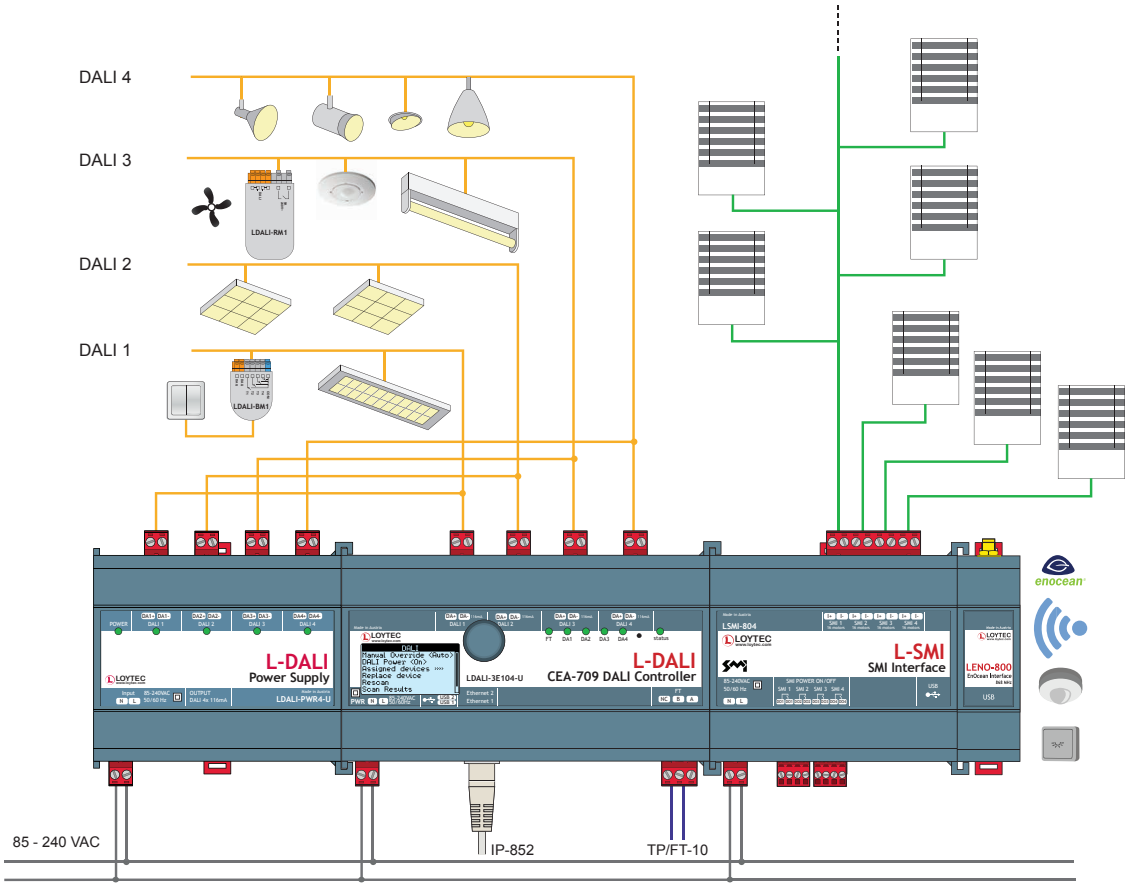
- Light Sensor #1010
- Occupancy Sensor #1060
- Constant Light Controller #3050
- Sunblind Controller #6111
- Open Loop Sensor (button) #1
- All data points are available in a tree structure on the integrated web server to be displayed or set using a web browser.

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 push buttons per DALI channel
- Integrated DALI bus power supply, can be switched off, 16 VDC, 230 mA guaranteed supply current, 250 mA max. supply current (LDALI-3E101-U only)
- 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-RM1 Relay Modules
- Integrated Constant Light Controller
- Integrated Sunblind Controller
- 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)
- Event-driven e-mail notification
- Supports Local and Global Connections
- Built-in OPC XML-DA and OPC UA server
- Stores customized graphical pages
- Visualization of customized graphical pages through LWEB-900 (building Management), LWEB-803 (Monitoring and Control), or LWEB-802 (Web Browser)
- Stores user-defined project documentation
- Dual switched or separated Ethernet ports
- 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

CEA-709/DALI Controller

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 VAC, 50/60 Hz, typ. 7.5 W	85-240 VAC, 50/60 Hz	
Operating conditions	0 °C to 50 °C, 10–90 % RH, non condensing, degree of protection: IP40, IP20 (terminals)		
DALI channels	1 with integrated DALI bus power supply 16 V DC, 230 mA guaranteed supply current, 250 mA max. supply current	2	4
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) * 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-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		

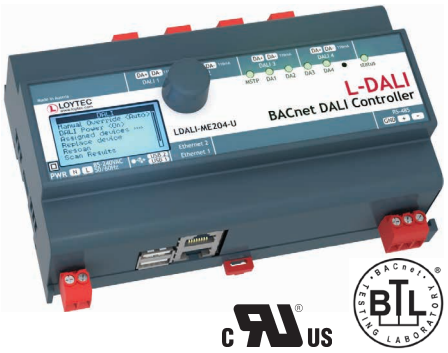
Order number	Product description
LDALI-3E101-U	CEA-709/DALI Controller, AST, Sunblind Controller, 1 DALI channel, integrated DALI power supply
LDALI-3E102-U	CEA-709/DALI Controller, AST, Sunblind Controller, 2 DALI channels
LDALI-3E104-U	CEA-709/DALI Controller, AST, Sunblind Controller, 4 DALI channels
LDALI-PWR2-U	DALI power supply unit for 2 DALI channels
LDALI-PWR4-U	DALI power supply unit for 4 DALI channels
LDALI-MS1	DALI multi-sensor (motion detection, brightness sensor, IR sensor)
LDALI-BM1	Quadruple DALI push button coupler
LDALI-RM1	DALI Relay Module 8A
LDALI-RM2	DALI Relay Module 8A, Analog Interface 1 – 10 V
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

BACnet/DALI Controller

LDALI-ME204-U, LDALI-ME201-U

☐ BACnet CEA-709 ☐ DALI
☐ Modbus ☐ OPC

Datasheet #89021219





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.

Built-In or External DALI Power Supply

The LDALI-ME201-U comes with a built-in DALI power supply. It can supply one DALI channel with a guaranteed supply current of 230 mA. The DALI bus power can be switched on and off via web interface or LCD UI.

Thanks to the switching power supply, the device can handle input voltages from 85 – 240 VAC, 50/60 Hz. The LDALI-ME204-U needs an external DALI power supply to power up the DALI network. Power supplies are available for up to four channel DALI networks.

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.

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 LSMI-804). 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.

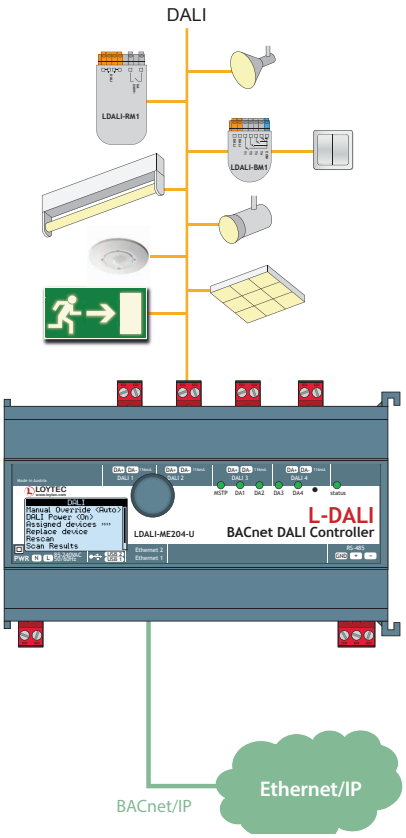
In addition to the constant light and sunblind control, any mathematical calculation and function or logical operation (Boolean algebra) can be created on the device and process all available data points.

Device Configuration via Tool or Web Interface

The device configuration, commissioning, and parameterization is done either with the configuration tool software 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 multi-sensors for presence detection and light level recognition. In addition to the LOYTEC DALI multi-sensor LDALI-MS1, DALI sensors of well-known manufacturers can be selected from a list of tested devices.

- **DALI Push Button**

  For manual operation, DALI push button coupler 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.) also commands can be sent into the building network with a single keystroke.

- **DALI Relay Modules**

  Standard loads in the power grid can be controlled via DALI using DALI Relay Modules.

- **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, 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.

Smooth DALI Integration into BACnet and Modbus Networks

The L-DALI Controller maps information from the DALI network to BACnet objects or Modbus registers that are used to control DALI ballasts or to display operating states.

DALI Network Interface

L-DALI represents a DALI-Master in the DALI network which can interact with selected DALI multi-sensors 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-based luminaries per DALI channel can be controlled individually or via 16 groups. All luminaries are monitored for lamp or ballast defect.

BACnet Interface

The following BACnet server objects are supported:

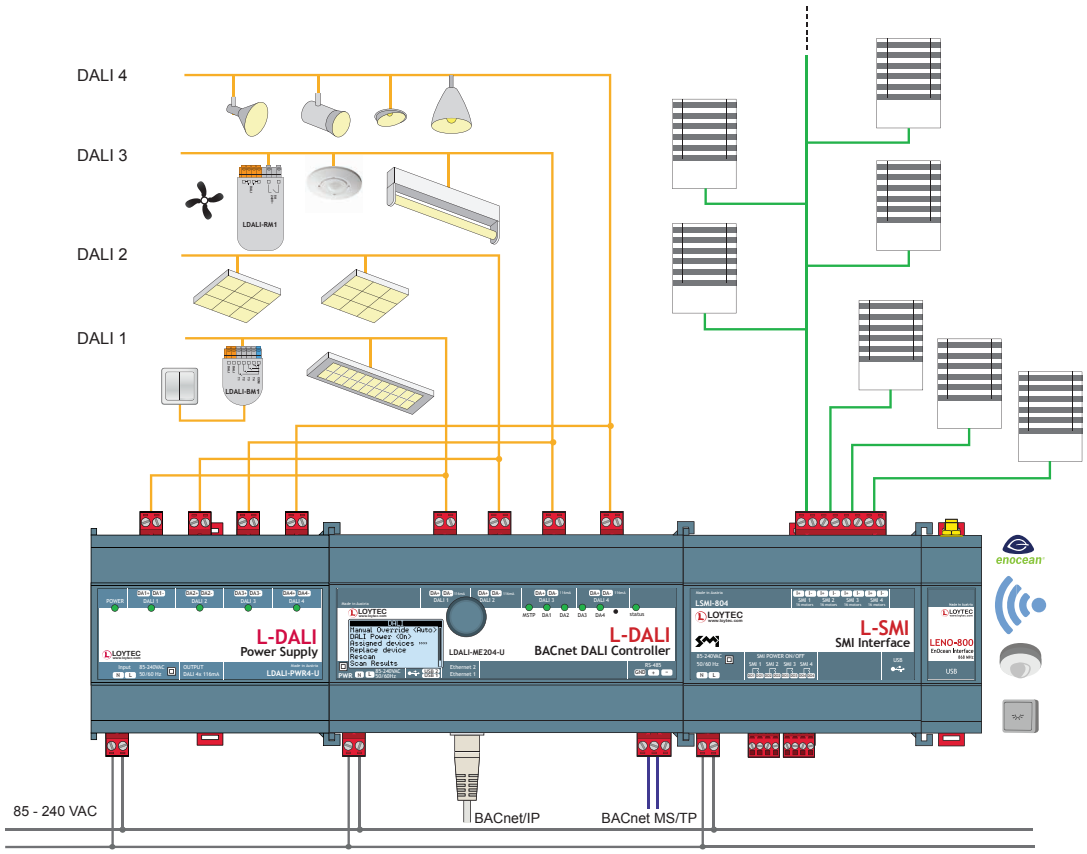
- Analog Output objects to control DALI ballasts, groups, and channels
- Multi-State Output objects for scene control of DALI groups and channels

BACnet/DALI Controller

LDALI-ME204-U, LDALI-ME201-U

- Analog Input objects providing feedback from DALI ballast, groups, and channels
- Analog Input objects providing status information from DALI groups and channels
- Accumulator objects providing estimated energy usage of DALI groups and channels
- Multi-State Output objects to issue commands (start/stop emergency test or burn-in, change color temperature, etc.) to DALI ballasts, groups and channels
- Analog Input objects providing battery status of emergency ballasts, groups
- Analog Input objects providing lux level information from supported DALI sensors
- Binary Input objects providing occupancy information from supported DALI sensors
- Loop objects providing constant light controller functionality
- Binary Input objects providing button information from supported DALI buttons
- Various objects to control sunblinds

All data points are available on the web server in a tree structure and can be displayed and set via a web browser.



LDALI-ME204-U, LDALI-ME201-U

Features

- DALI integration into BACnet networks
- 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 push buttons per DALI channel
- Integrated DALI bus power supply, 16 VDC, 230 mA guaranteed supply current,
  250 mA max. supply current (LDALI-ME201-U only)
- Manual operation using the jog dial and local access to information about device status and data points in clear text and symbols
- 128x64 graphic display with backlight
- Built-in web server for device configuration
- Test and assignment of DALI devices on the web interface
- Replacement of DALI devices without additional software tools via LCD and jog dial
- Supports the control of standard loads in the power grid via LDALI-RM1 Relay Modules
- Integrated Constant Light Controller
- Integrated Sunblind Controller
- Supports lamp burn-in mode
- Supports periodic testing of DALI emergency lights
- Integrated DALI Protocol Analyzer
- Compliant with ANSI/ASHRAE 135-2012 and ISO 16484-5:2012 standard
- Supports BACnet/IP or BACnet MS/TP
- BACnet Client Function (Write Property, Read Property, COV Subscription)
- B-BC (BACnet Building Controller) functionality, BTL certified
- Alarming, Scheduling, and Trending (AST™) locally or embedded in L-WEB (building management)
- Event-driven e-mail notification
- Supports Local and Global Connections
- Built-in OPC XML-DA and OPC UA server
- Stores customized graphical pages
- Visualization of customized graphical pages through LWEB-900 (building Management), LWEB-803 (Monitoring and Control), or LWEB-802 (Web Browser)
- Stores user-defined project documentation
- Dual switched or separated Ethernet ports
- 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

Specifications

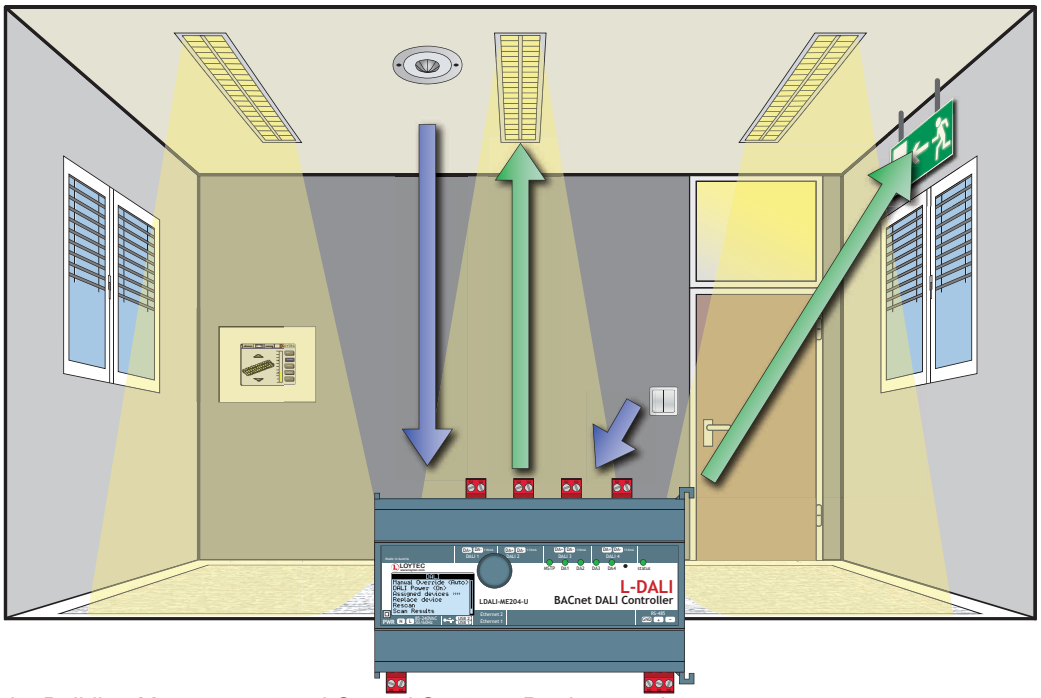
Type	**LDALI-ME204-U**	**LDALI-ME201-U**
Dimensions (mm)	159 x 100 x 75 (L x W x H), DIM035	
Installation	DIN rail mounting following DIN 43880, top hat rail EN 50022	
Power supply	85-240 VAC, 50/60 Hz	85-240 VAC, 50/60 Hz, typ. 7.5 W
Operating conditions	0 °C to 50 °C, 10 – 90 % RH, non condensing, degree of protection: IP40, IP20 (terminals)	
DALI channels	4	1 with integrated DALI bus power supply 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) * Either BACnet/IP or BACnet MS/TP	
Tools	L-INX Configurator and configuration via web interface	

BACnet/DALI Controller

LDALI-ME204-U, LDALI-ME201-U

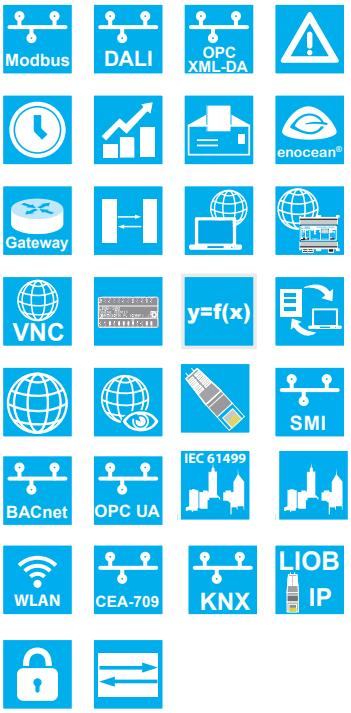
Resource limits			
DALI ballasts per DALI channel	64	BACnet client mappings	1 000
DALI groups per DALI channel	16	BACnet scheduler objects	100
DALI sensors per DALI channel	16	BACnet calendar objects	25
DALI push buttons per DALI channel	64	BACnet notification classes	32
Scene control	16 scenes per DALI 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-MS1	DALI multi-sensor (motion detection, brightness sensor, IR sensor)
LDALI-BM1	Quadruple DALI push button coupler
LDALI-RM1	DALI Relay Module 8A
LDALI-RM2	DALI Relay Module 8A, Analog Interface 1 – 10 V
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



Datasheet #89055219





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

Built-In or External DALI Power Supply

The LDALI-PLC4 Controller needs an external DALI power supply to power up the DALI network. Power supplies are available for single channel or up to four channel DALI networks.

DALI Network Interface

The LDALI-PLC4 device is equipped with 4 independent DALI channels. Up to 64 DALI-based luminaries per DALI channel can be controlled individually or via 16 groups. All luminaries are monitored for lamp or ballast defect. L-DALI represents a DALI-Master in the DALI network which can interact with selected DALI multi-sensors in Multi-Master mode.

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.

Freely Programmable

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

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

Connectivity

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

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

Each LDALI-PLC4 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.

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 LDALI-PLC4 provides fully featured AST™ functionality (Alarming, Scheduling, and Trending) and can be integrated perfectly into the L-WEB System.

Device Configuration via Tool or Web Interface

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

EnOcean, SMI and LIOB/IP

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

Advanced DALI Functions

- **DALI Sensors**

  The LDALI-PLC4 Controllers support the integration of DALI multi-sensors for presence detection and light level recognition. In addition to the LOYTEC DALI multi-sensor LDALI-MS1, DALI sensors of well-known manufacturers can be selected from a list of tested devices.

- **DALI Push Button**

  For manual operation, DALI push button coupler and IR remote controls can be integrated into the system. The function executed when a button is pressed is freely programmable in the program logic.

- **DALI Relay Modules**

  Standard loads in the power grid can be controlled via DALI using DALI Relay Modules.

- **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, 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.

LDALI-PLC4

Features

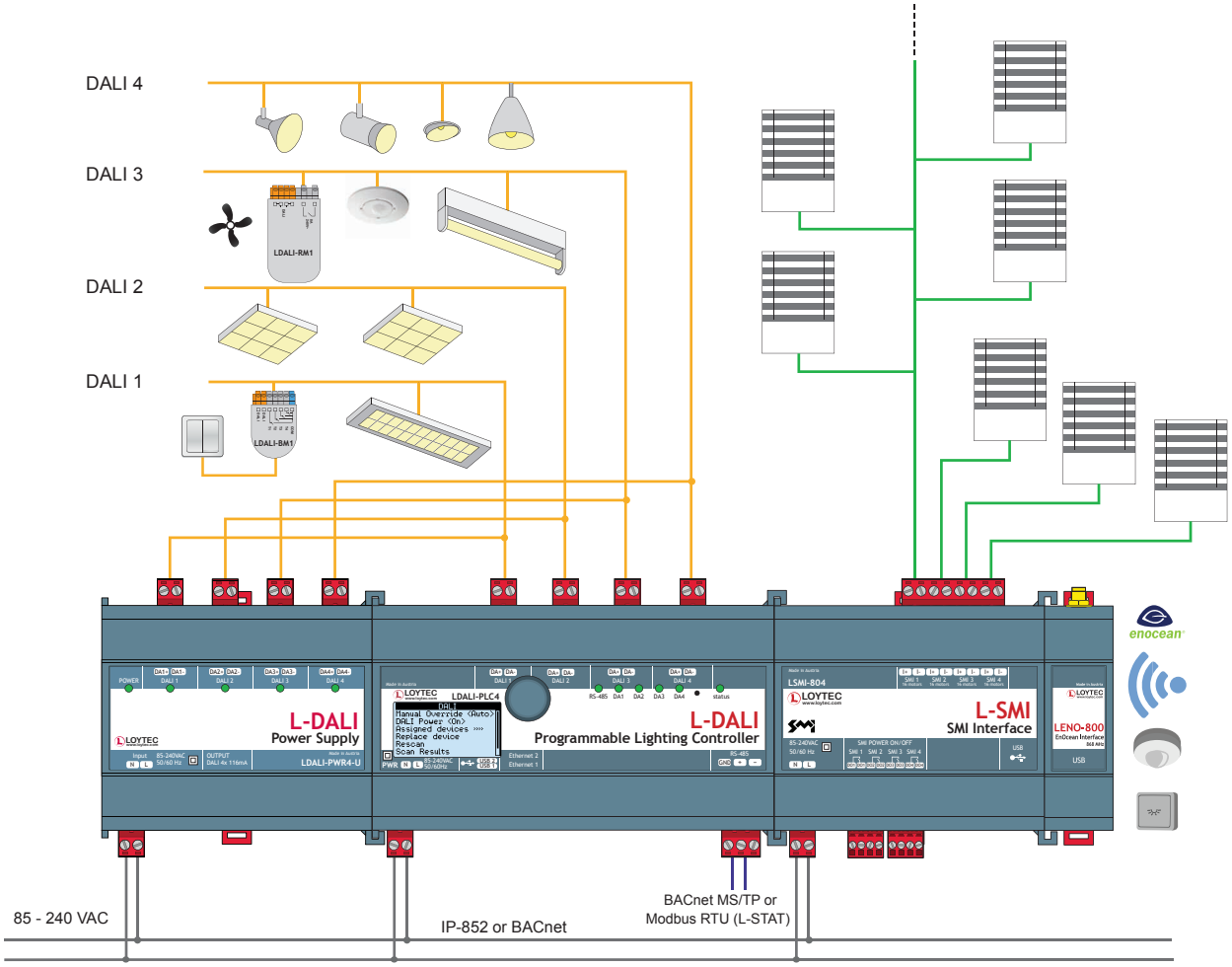
- IEC 61131-3 and IEC 61499 programmable with L-STUDIO
- Supports up to 64 DALI ballasts and 16 DALI groups per DALI channel
- Supports up to 16 DALI sensors per DALI channel
- Supports up to 64 DALI push buttons per DALI channel
- Manual operation using the jog dial and local access to information about device status and data points in clear text and symbols
- 128x64 graphic display with backlight
- Built-in web server for device configuration
- Test and assignment of DALI devices on the web interface
- Replacement of DALI devices without additional software tools via LCD and jog dial
- Supports the control of standard loads in the power grid via LDALI-RM1 Relay Modules
- Supports lamp burn-in mode
- Supports periodic testing of DALI emergency lights
- Integrated DALI Protocol Analyzer
- Physical inputs and outputs with L-IOB I/O Modules
- Compliant with CEA-709, CEA-852, and ISO/IEC 14908 Standard (LonMark System)
- Support of dynamically created or static NVs
- Support of user-defined NVs (UNVTs) and Configuration Properties (SCPTs, UCPTs)
- KNXnet/IP
- Gateway functions including Smart Auto-Connect™
- Modbus TCP and Modbus RTU (L-STAT only)
- Compliant with ANSI/ASHRAE 135-2012 and ISO 16484-5:2012 standard
- Supports BACnet/IP or BACnet MS/TP
- BACnet Client Function (Write Property, Read Property, COV Subscription)
- B-BC (BACnet Building Controller) functionality, BTL certified
- Alarming, Scheduling, and Trending (AST™) locally or embedded in L-WEB (building management)
- Event-driven e-mail notification
- Supports Local and Global Connections
- Built-in OPC XML-DA and OPC UA server
- Stores customized graphical pages
- Visualization of customized graphical pages through LWEB-900 (building Management), LWEB-803 (Monitoring and Control), or LWEB-802 (Web Browser)
- Stores user-defined project documentation
- Dual switched or separated Ethernet ports
- Supports SMI (Standard Motor Interface) through LSMI-804
- Connection to EnOcean wireless devices via LENO-80x Interface
- Supports WLAN through LWLAN-800 Interface

L-STUDIO 3.0 Licenses

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

Programmable DALI Controller

LDALI-PLC4



Specifications	
Type	**LDALI-PLC4**
Dimensions (mm)	159 x 100 x 75 (L x W x H), DIM035
Installation	DIN rail mounting following DIN 43880, top hat rail EN 50022
Power supply	85-240 VAC, 50/60 Hz
Operating conditions	0 °C to 50 °C, 10–90 % RH, non condensing, degree of protection: IP40, IP20 (terminals)
DALI channels	4
Interfaces	2 x Ethernet (100Base-T): OPC XML-DA, OPC UA, LonMark IP-852, BACnet/IP*, LIOB-IP, KNXnet/IP, Modbus TCP (Master or Slave), HTTP, FTP, SSH, HTTPS, Firewall, VNC, SNMP * Either BACnet/IP or BACnet MS/TP 1 x RS-485 (ANSI TIA/EIA-485): BACnet MS/TP*, or Modbus RTU (L-STAT only) 2 x USB-A: WLAN (needs LWLAN-800), EnOcean (needs LENO-80x) SMI (needs LSMI-804)

Resource limits			
Total number of data points	30 000	LonMark Alarm Servers	1
OPC data points	10 000	E-mail templates	100
BACnet objects	2 000 (analog, binary, multi-state)	Math objects	100
BACnet client mappings	5 000	Alarm logs	10
BACnet calendar objects	25	KNXnet/IP data points	1 000
BACnet scheduler objects	100 (64 data points per object)	Connections (Local / Global)	2 000 / 250
BACnet notification classes	32	Number of L-WEB clients	32 (simultaneously)
Trend logs (BACnet or generic)	512 (4 000 000 entries, ≈ 60 MB)	L-IOB I/O Modules	24
Total trended data points	1 000	Number of EnOcean devices	100
CEA-709 network variables (NVs)	1 000	EnOcean data points	1 000
CEA-709 Alias NVs	2 000	DALI Channels	4
CEA-709 External NVs (polling)	2 000	DALI Ballasts per channel	64
CEA-709 address table entries	1 000 (non-ECS mode: 15)	DALI Groups per channel	16
LonMark Calendars	1 (25 calendar patterns)	DALI Sensors per channel	16
LonMark Schedulers	100	DALI Buttons per channel	64

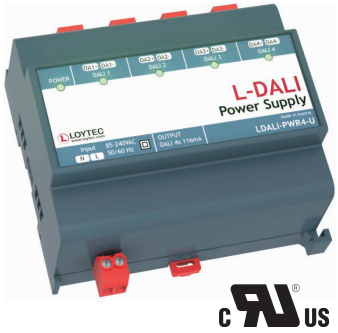
Order number	Product description
LDALI-PLC4	Freely programmable DALI Controller, 4 DALI channels
LDALI-PWR2-U	DALI power supply unit for 2 DALI channels
LDALI-PWR4-U	DALI power supply unit for 4 DALI channels
LDALI-MS1	DALI multi-sensor (motion detection, brightness sensor, IR sensor)
LDALI-BM1	Quadruple DALI push button coupler
LDALI-RM1	DALI Relay Module 8A
LDALI-RM2	DALI Relay Module 8A, Analog Interface 1 – 10 V
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
LSTAT-800-G3-Lx	Network Thermostat, front black, white enclosure, Modbus, NFC, temperature, rel. humidity, ext. switch/NTC, IR receiver, Tasten (Lx)
LSTAT-801-G3-Lx	Network Thermostat, front black, white enclosure, Modbus, NFC, temperature, rel. humidity, ext. switch/NTC, occupancy, IR receiver, Tasten (Lx)
LSTAT-802-G3-Lx	Network Thermostat, front black, white enclosure, Modbus, NFC, temperature, rel. humidity, ext. switch/NTC, occupancy, IR receiver, CO2, Tasten (Lx)
LSTAT-80x-CUSTOM	Customized Network Thermostat, minimum quantity 100 pieces, enclosure G1: silver, G2: black, G3: white; custom print Lx, including 2 working samples, lead time 10 weeks
LSMI-804	Standard Motor Interface for 64 motors, 4 SMI channels via USB

L-DALI Power Supply

BACnet ☐ DALI
CEA-709 OPC

LDALI-PWR2-U, LDALI-PWR4-U

Datasheet #89023219



The DALI 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

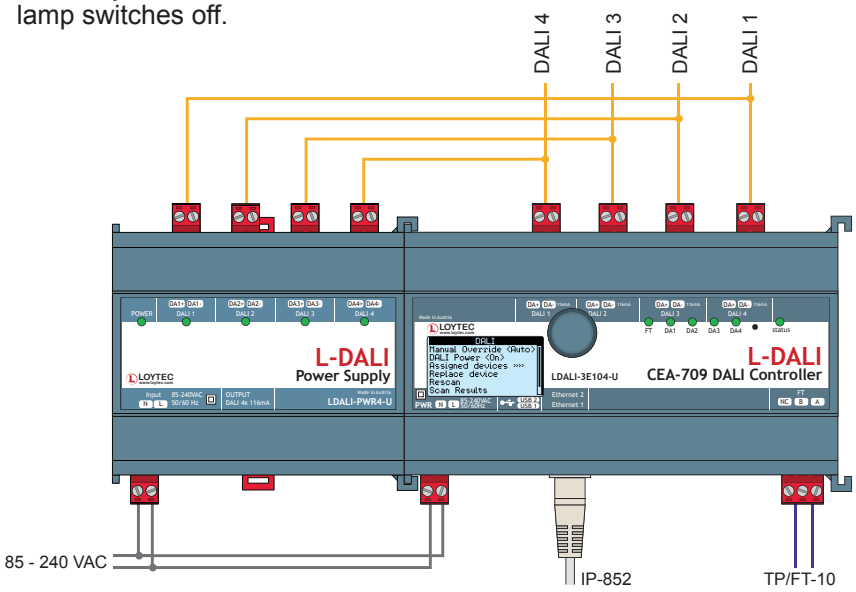
The DALI channel is treated to be non-SELV (Safety Extra Low Voltage). Therefore the relevant installation regulations for low voltage apply. The cable of a DALI channel is either limited to a maximum length of 300 m using a minimum wire cross-section of 1.5 mm² (AWG15) or must ensure a maximal voltage 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 16 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.



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 VAC, 50/60 Hz, current limited start up, max. 12 W
Operating conditions	0 °C to 50 °C, 10 – 90 % RH, non condensing, degree of protection: IP40, IP20 (terminals)
Interfaces	LDALI-PWR2-U: 2 x 16 VDC (11 V – 20.5 V), each 116 mA guaranteed supply current, 125 mA max. supply current, short-circuit-proof, basic isolation (not SELV) to the power line LDALI-PWR4-U: 4 x 16 VDC (11 V – 20.5 V), each 116 mA guaranteed supply current, 125 mA max. supply current, , short-circuit-proof, basic isolation (not SELV) to the power line

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

L-DALI Multi-Sensor

LDALI-MS1

Datasheet #89034019





The LOYTEC L-DALI multi-sensor performs motion detection and measures the lux level. It integrates perfectly into the L-DALI product line of lighting controllers and LROC-40x room automation controllers. With the already built-in infrared receiver, lighting scenarios can be recalled via a remote control or lighting groups can be dimmed. In combination with the L-DALI controller, the desired automation status is achieved with a single push of a button. Building-wide, the connection to DALI and the gateway connection to the respective building network, e. g. BACnet, LonMark, etc. ensure a secure and fast communication with LOYTEC devices.

Motion detection is performed with the PIR sensor of the LDALI-MS1. The motion detection is divided into 92 zones and thus very sensitive. The sensor can be tilted to max. 40° allowing a perfect targeting of the detection area. The opening angel of 98.5° at a mounting height of 3 m covers more than 38 m². Objects can be detected at a distance of up to 12 m.

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
- Motion detection
- Lux level measurements
- Built-in infrared receiver for infrared remote control
- LDALI-MS1 can be mounted in a flush-mounted box or directly in cavity walls
- Multi-master compatible, up to 16 LDALI-MS1 sensors per DALI channel given a sufficiently dimensioned bus supply
- The sensor is supplied via the DALI channel, no external power supply is necessary
- 92 zones for motion detection
- The sensor head can be tilted up to 40° vertically and rotated 360° axially

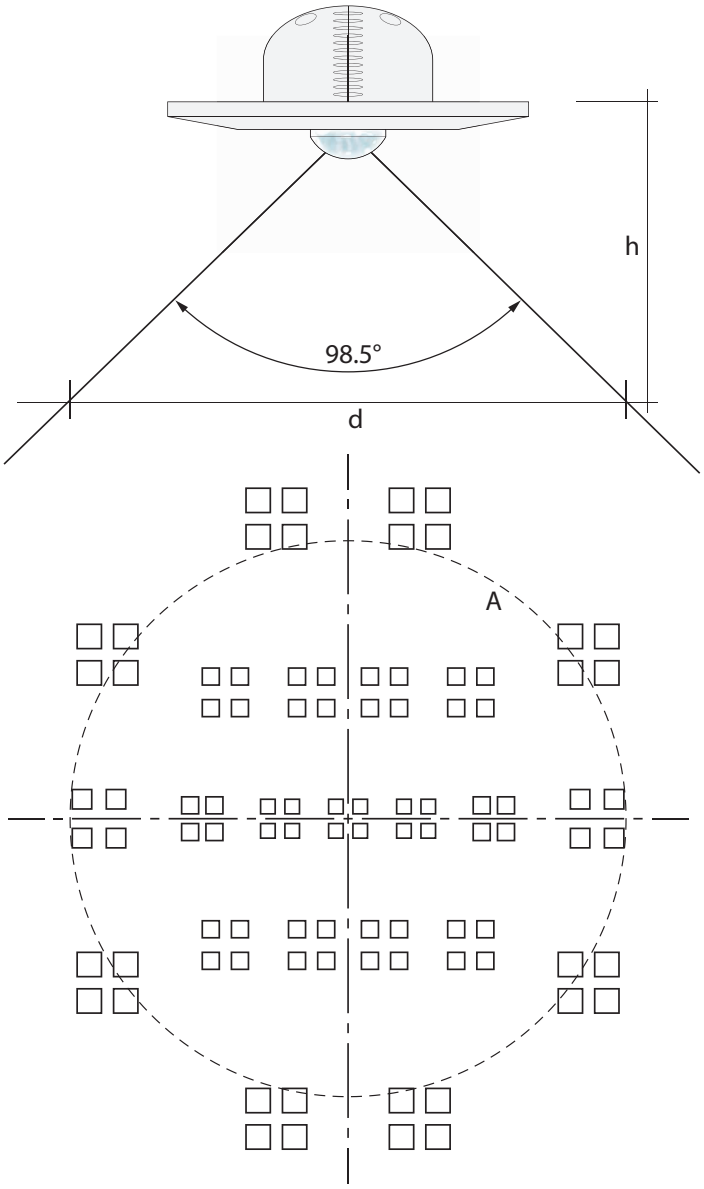
Specifications

Dimensions (mm)	Total-Ø: 98; flush-mounted-Ø: 46; height flush-mounted: 30; DIM040
Installation	flush-mounted installation or direct installation in cavity walls
Power supply	DALI bus, typ. 4.1 mA at 16 V DC
Operating conditions	0 °C to 50 °C, 10 – 90 % RH, non condensing, degree of protection: IP20
Interfaces	1 x DALI, protected against overvoltages (power supply) 1 x infrared remote control receiver
Color	RAL 9010, pure white
For use with	LDALI-3E102-U, LDALI-3E104-U, LDALI-3E101-U, LDALI-ME204-U, LDALI-ME201-U, LROC-40x

Recource limits

Number of LDALI-MS1	16 per DALI channel
Infrared motion receiver max. coverage	12 m, 92 zones, opening angle: 98.5°, difference in temperature: target to environment: > 4 °C
Lux level measurement	0 – 2500 lux, resolution: 1 lux

LDALI-MS1



h	d	A
2.5 m	5.80 m	26.4 m²
2.7 m	6.7 m	30.8 m²
3.0 m	6.96 m	38.1 m²
3.5 m	8.12 m	51.8 m²
4.0 m	9.28 m	67.7 m²
4.5 m	10.4 m	85.7 m²
5.0 m	11.6 m	105.8 m²

Order number	Product description
LDALI-MS1	DALI multi-sensor (motion detection, brightness sensor, IR sensor)

L-DALI Pushbutton Coupler

LDALI-BM1

Datasheet #89033719



The LDALI-BM1 push button coupler integrates up to four customary light push buttons and switches into a DALI channel. When the push button is pressed, DALI commands are sent to a DALI group within the DALI channel or even across DALI bus limits to the corresponding building network (via L-DALI controller).

Each input can be configured to execute a function depending on how it is pressed (short or long push of a button, toggle, button, or switch mode). 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.

In the mode toggle, the function is carried out depending on the lighting status (toggle switch).

The module LDALI-BM1 is directly connected to a DALI channel and also supplied with energy by that channel. A L-DALI controller or LROC-40x is required for configuration.

Features

- Easy integration into LOYTEC L-DALI lighting systems and LROC-40x room automation controllers
- Device configuration with configuration tool or via the built-in web server of the used L-DALI controller
- Programmable inputs for 4 conventional push buttons or switches
- Multi-master compatible, up to 64 LDALI-BM1 push button coupler per DALI channel with sufficient dimensioned bus supply
- The push button is supplied via the DALI channel
- Push buttons are directly connected to LDALI-BM1 (potential-free make contact)
- L-DALI or L-ROC controller required

Specifications

Dimensions (mm)	28 x 14.2 x 41.2 (L x W x H), DIM041
Installation	flush-mounted installation, can be directly installed behind the push button/switch
Power supply	DALI bus, typ. 3.1 mA at 16 V DC
Operating conditions	0 °C to 50 °C, 10 – 90 % RH, non condensing, degree of protection: IP20
Interfaces	1 x DALI, protected against overvoltages (power supply) and polarized (bipolar) 4 x push button inputs with a joint connection, not protected against overvoltages, push buttons have to be installed potential free, in case of several modules the joint port (COM) should not be connected.
For use with	LDALI-3E102-U, LDALI-3E104-U, LDALI-3E101-U, LDALI-ME204-U, LDALI-ME201-U, LROC-40x

Recource limits

Number of LDALI-BM1	64 per DALI channel, with sufficient dimensioned DALI bus power supply
Connection wires profile	0.5 – 1.5 mm² [AWG 20 – 16]
Wire stripping length	8.5 – 9.5 mm [0.32 – 0.36 in]
Line lenght to a pushbutton	< 50 cm

Order number	Product description
LDALI-BM1	Quadruple DALI push button coupler

L-DALI Relay Module

BACnet CEA-709 ☐ DALI OPC

LDALI-RM1, LDALI-RM2

Datasheet #89036119



The LDALI-RM Relay Modules enable the control of standard consumers via a DALI channel. The built-in relay contact can be used for currents of up to 8 A respectively loads of up to 2 000 VA. The module is designed for a maximum inrush current of 80 A. The LDALI-RM modules are directly connected to a DALI channel and also supplied with energy by that channel.

Together with the LOYTEC DALI controllers or LROC-40x room automation controllers, the LDALI-RM1 acts as a programmable switching output module. The integration of the module in the DALI network follows the same simple steps as the integration of a DALI lamp. The LDALI-RM1 is a control device for non-dimmable loads based on the DALI specification IEC 62386-208 (Device Type 7).

The LDALI-RM2 has the same features as the LDALI-RM1 but in addition a 1 – 10 V interface to dim lamps based on the DALI specifications IEC 62386-206 (Device Type 5).

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
- Up to 64 LDALI-RM1 Relay Modules per DALI channel with sufficient dimensioned bus supply
- The relay module is supplied via the DALI channel
- Potential-free, bistable relay make contact
- DALI specification IEC 62386-208, Device Type 7 – Switching Function (LDALI-RM1)
- DALI specification IEC 62386-206, Device Type 5 – Converter (LDALI-RM2)
- Analog Interface 1 – 10 V for dimmable lamps (LDALI-RM2 only)

Specifications

Type	LDALI-RM1	LDALI-RM2
Dimensions (mm)	32.5 x 15.2 x 60 (L x W x H), DIM042	
Power supply	DALI bus, typ. 2.6 mA at 16 V DC	DALI bus, typ. 4.2 mA at 16 V DC
Operating conditions	0 °C to 45 °C, 10 – 90 % RH, non-condensing, degree of protection: IP20	
Interfaces	1 x DALI, protected against overvoltages (power supply) 1 x Relay output, make contact, single pole, potential-free, bistable *	1 x DALI, protected against overvoltages (power supply) 1 x Relay output, ma ke contact, single pole, potential-free, bistable * 1 x Analog Interface 1 – 10 V, current sink 1 mA
For use with	LDALI-3E102-U, LDALI-3E104-U, LDALI-3E101-U, LDALI-ME204-U, LDALI-ME201-U, LROC-40x	

Recource limits

Number of LDALI-RM1/LDALI-RM2	64 per DALI channel, with sufficient dimensioned DALI bus power
Connection wires profile	0.5 – 1.5 mm² [AWG 20 – 16]
Wire stripping length	8.5 – 9.5 mm [0.32 – 0.36 in]
Nominal load and current AC	2 000 VA / 8 A
Nominal load and current DC	150 W / 5 A
Relay contact switching voltage	250 V AC / 30 V DC
Max. inrush current peak AC	80 A, zero cross switching
Switching cycle	5 x 10^5
Max. permissible switching frequency	1 Hz
Interface (1 – 10V)	1 – 10 V current sink 1 mA (LDALI-RM2 only)

Order number	Product description
LDALI-RM1	DALI Relay Module 8A
LDALI-RM2	DALI Relay Module 8A, Analog Interface 1 – 10 V

* If the DALI supply fails, the relay contact remains in the latest state.



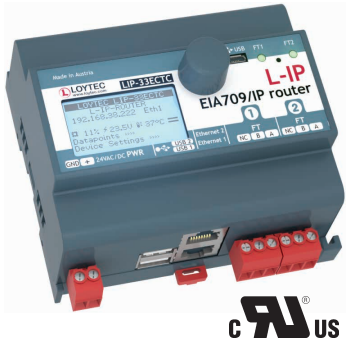
Routers, NIC

CEA-709/IP-852 Router

BACnet
☐ CEA-709
Modbus
M-Bus
☐ OPC

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

Datasheet #89013119

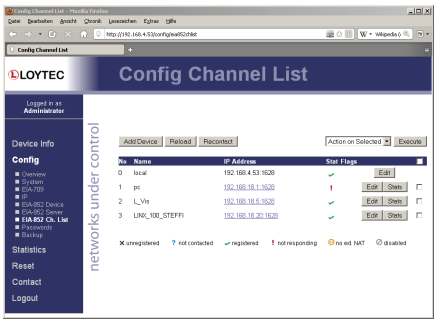




The L-IP Routers LIP-1ECTC, LIP-3ECTC, LIP-33ECTC, and LIP-3333ECTC connect twisted pair channels (TP/FT-10 or TP/XF-1250) with the Ethernet/IP channel (IP-852) in LonMark Systems. L-IP routes CEA-709 packets through an IP based network such as a LAN (Ethernet), an Intranet, or even the Internet.

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. 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 Configuraton server is thus always available online in the network and no additional software tool is required.

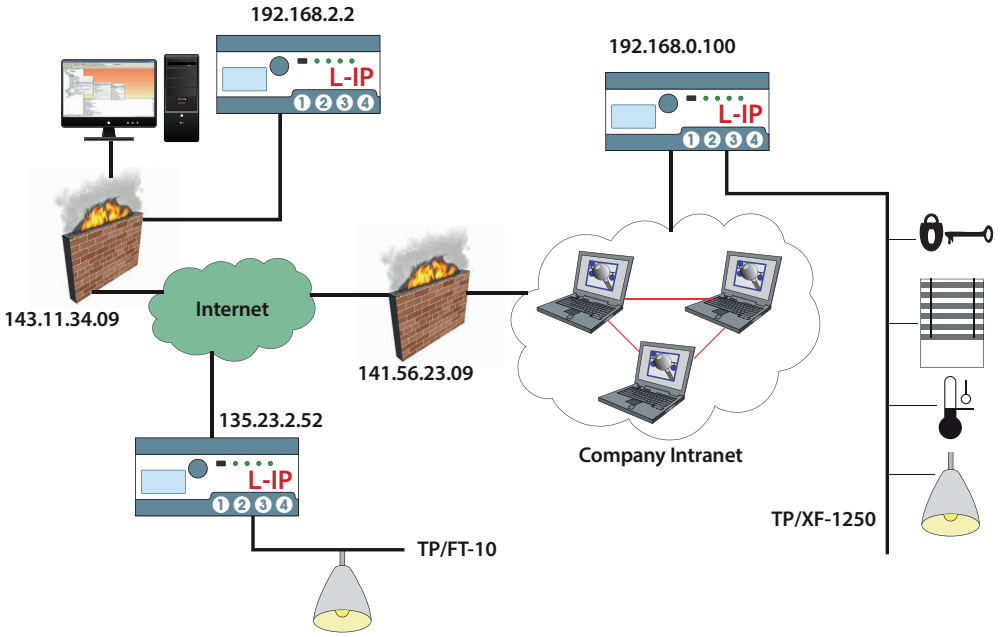


Besides the router functionality, the L-IP Routers provide outstanding capabilities for network diagnostic and analysis. They allow the LPA (LOYTEC Protocol Analyzer) transparent access to the twisted pair channels (TP/FT-10 or TP/XF-1250) on the device via Ethernet/IP – via a local Intranet or the Internet. 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.

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 switched or separated Ethernet ports
- 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
- Stores user-defined project documentation

Specifications

Operating conditions	0 °C to 50 °C, 10 – 90 % RH, non condensing, degree of protection: IP40, IP20 (terminals)
Installation	DIN rail mounting following DIN 43880, top hat rail EN 50022
Power supply	12-35 V DC / 12-24 V AC ±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)			
	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

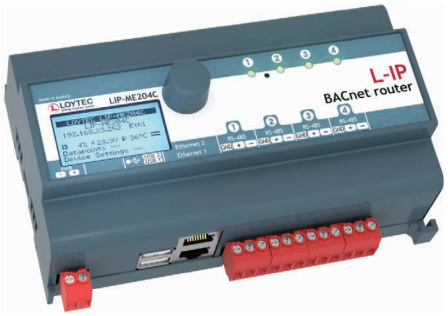
Order number	Product description
LIP-1ECTC	CEA-709/IP-852 Router, 1 x TP/XF-1250, 1 x Ethernet-Port (IP-852)
LIP-3ECTC	CEA-709/IP-852 Router, 1 x TP/FT-10, 2 x Ethernet port (IP-852)
LIP-33ECTC	CEA-709/IP-852 Router, 2 x TP/FT-10, 2 x Ethernet port (IP-852)
LIP-3333ECTC	CEA-709/IP-852 Router, 4 x TP/FT-10, 1 x Ethernet port (IP-852)
LPOW-2415B	Power supply unit with power connector 24 V DC, 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)

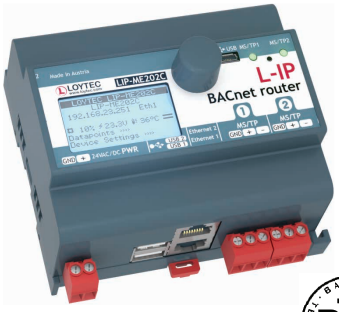
BACnet/IP Router

LIP-ME201C, LIP-ME202C, LIP-ME204C

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

Datasheet #89015519







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 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.

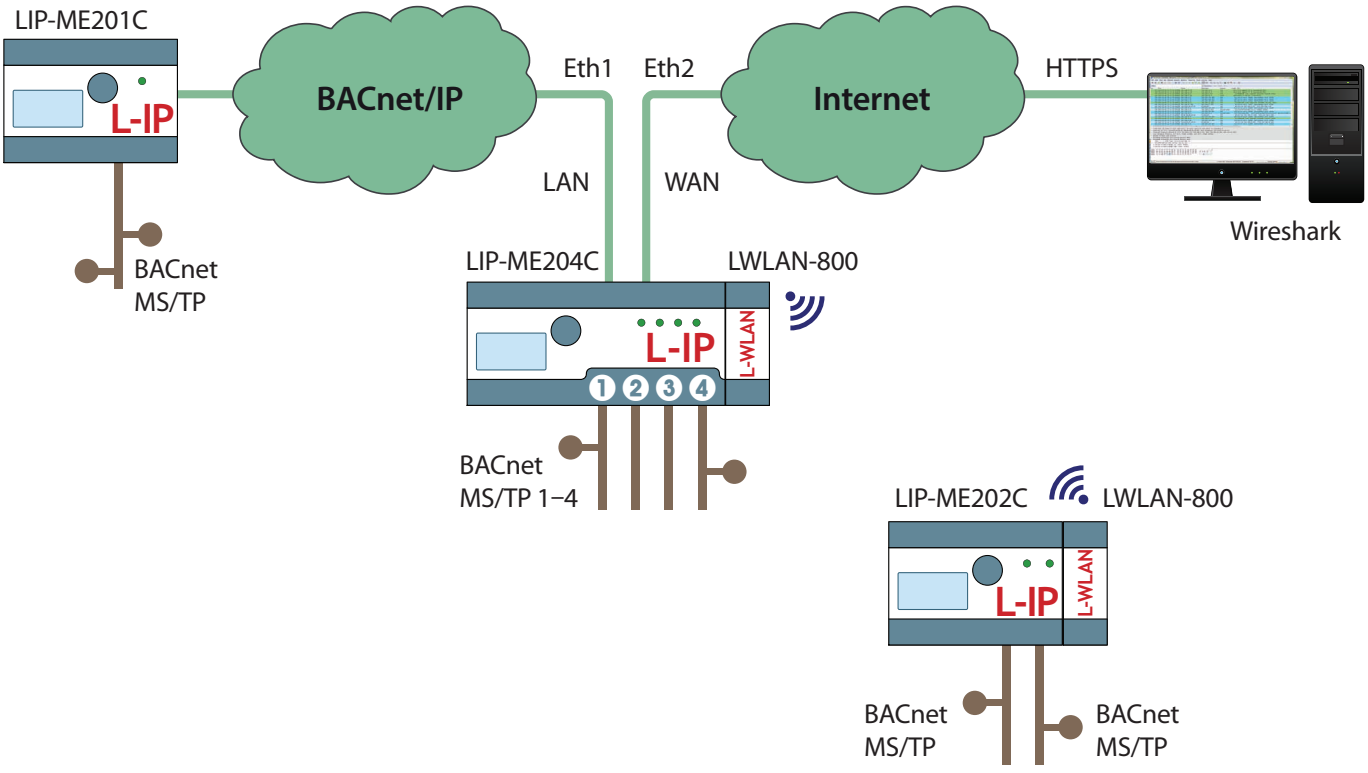
Features

- 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 switched or separated Ethernet ports
- 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
- Stores user-defined project documentation

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 ±10 %, typ. 2.5 W		24 VDC / 24 VAC ±10 %, typ. 2.5 W
Operating conditions	0 °C to 50 °C, 10 – 90 % RH, non condensing, 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)		
	1 x BACnet MS/TP	2 x BACnet MS/TP	4 x BACnet MS/TP
Tools	Configuration via web browser		

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
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)



CEA-709/IP-852 Router Redundant

LIP-33ECRB

Datasheet #89028519



The L-IP Redundant connects twisted pair channels (TP/FT-10 or TP/XF-1250) with the Ethernet/IP-852 channel in LonMark Systems and allows building a redundant network infrastructure. An integrated algorithm detects and “heals” a broken cable on the TP/FT-10 channel and helps to find the point of failure immediately. In addition, the L-IP Redundant monitors the nodes on the TP/FT-10 channel and creates an alarm in case of a failure. For this reason, L-IP Redundant can only be used as a Configured Router.

Full redundancy on both the IP channel and the CEA-709 channel including device redundancy can be achieved using two devices in parallel (Twin Mode).

The integrated CEA-852 Configuration Server can manage up to 100 IP-852 devices. The configuration is done through the built-in web interface.

Alarms report a broken network cable, node failures, or high communication loads. The L-IP Redundant supports alarming according to the LonMark profile definition. Similarly, alarm conditions are provided via network variables. Alarm messages are displayed immediately via the built-in web interface and the LNS® plug-in. Alarm conditions can be forwarded via e-mail in combination with a L-INX Automation Server, an L-VIS Touch Panel, or an L-GATE Gateway, to inform about a node failure or a broken network cable.

Features

- Routes packets between a TP/FT-10 channel (link power compatible) and Ethernet/IP (IP-852)
- Compliant with CEA-709, CEA-852, and ISO/IEC 14908-1 standard (LonMark System)
- Detection of broken cable (TP/FT-10 channel)
- Full redundancy with two L-IP Redundant devices in Twin Mode (IP channel and TP/FT-10 channel)
- Device redundancy by mutual monitoring of L-IP Redundant devices in Twin mode
- Communication on the TP/FT-10 channel is guaranteed in case of a single cable break
- Nodes on the TP/FT-10 channel can be monitored
- Notification via SNVTs and LonMark alarming via Node Object
- Monitors network health (bandwidth utilization, error rate, etc.)
- Supports Configured Router Mode only
- 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

Specifications

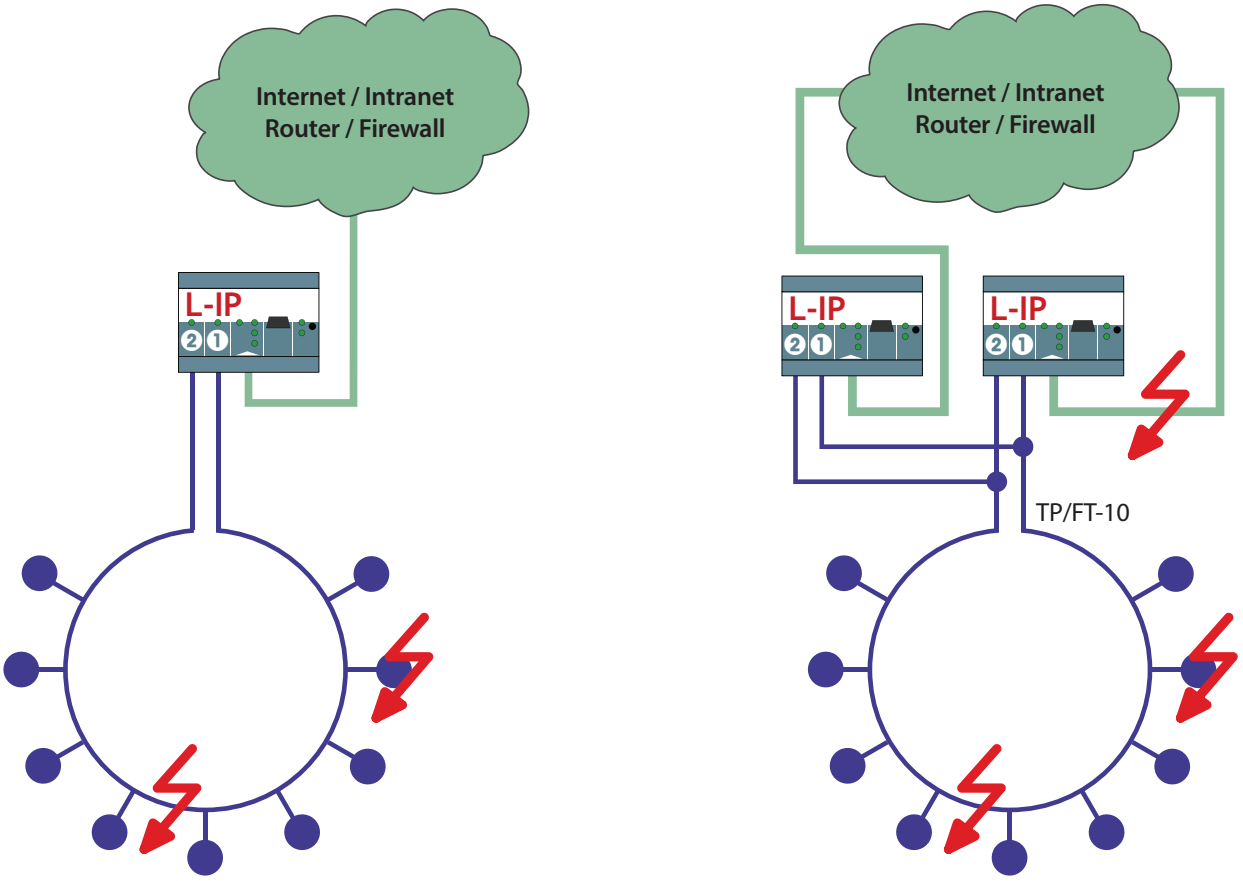
Dimensions (mm)	107 x 100 x 60 (L x W x H), DIM009
Installation	DIN rail mounting following DIN 43880, top hat rail EN 50022
Power supply	12-35 VDC / 12-24 VAC ±10 %, typ. 3 W
Operating conditions	0 °C to 50 °C, 10 – 90 % RH, non condensing, degree of protection: IP40, IP20 (terminals)
Interfaces	1 x Ethernet (100Base-T): LonMark IP-852, HTTP, FTP 2 x TP/FT-10
Tools	L-IP Redundant Configurator

Resource limits

Configuration Server	CEA-852 configuration server for up to 100 members on the IP channel

LIP-33ECRB

Order number	Product description
LIP-33ECRB	CEA-709/IP-852 Router for redundant mode, 2 x TP/FT-10, 1 x Ethernet port (IP-852)
LPOW-2415B	Power supply unit with power connector 24 V DC, 15 W
LT-03	Network terminator, 1 x TP/FT-10 or TP/LPT-10 (bus or free topology), 1 x Network Access Connector RJ45
LT-33	Network terminator, 2 x TP/FT-10 or TP/LPT-10 (bus or free topology)



L-Switch^{XP} CEA-709 Router

LS-33/13/11/13300/33300/13333/11333CB

BACnet ☐ CEA-709 KNX Modbus M-Bus OPC

Datasheet #89011919



The L-Switch^{XP} is the solution for interconnecting multiple twisted pair channels (TP/FT-10 or TP/XF-1250 channels) in LonMark Systems. It provides up to five ports and routes packets between these ports. The L-Switch^{XP} router delivers first class performance and flexibility in use. In order to provide the optimal router configuration, the L-Switch^{XP} comes with two, three, or five ports and two operating modes “Smart Switch Mode” and “Configured Router Mode”.

Features

- Physical separation and logical connection of up to five CEA-709 network segments
- TP/FT-10 channels are compatible with link power
- Compliant with CEA-709 and ISO/IEC 14908-1 (LonMark System)
- Can be used as configured router, learning switch, or as repeater (Smart Switch mode)
- Plug and play installation (Smart Switch mode)
- Forwards packets of up to 256 bytes length
- Supports up to four domains (Smart Switch mode)
- Learning of the topology with forwarding decision based on subnet/node and group addresses (Smart Switch mode)
- Short propagation delay between ports
- Network diagnostic LEDs
- CEA-709 status and activity LED
- Shapes for LonMaker® Network Management Tool available

Specifications

Type	LS-33CB	LS-13CB	LS-11CB	LS-33300CB	LS-13300CB	LS-13333CB	LS-11333CB
Dimensions (mm)	107 x 100 x 60 (L x W x H), DIM010			159 x 100 x 60 (L x W x H), DIM008			
Installation	DIN rail mounting following DIN 43880, top hat rail EN 50022						
Power supply	12-35 VDC / 12-24 VAC ±10 %, typ. 3 W						
Operating conditions	0 °C to 50 °C, 10 – 90 % RH, non condensing, degree of protection: IP40, IP20 (terminals)						
Interfaces	2 x TP/FT-10	1 x TP/XF-1250 1 x TP/FT-10	2 x TP/XF-1250	3 x TP/FT-10	1 x TP/XF-1250 2 x TP/FT-10	1 x TP/XF-1250 4 x TP/FT-10	2 x TP/XF-1250 3 x TP/FT-10
Tools	Configuration via console RS-232 (EIA-232)						

Order number	Product description
LS-33CB	L-Switch^{XP} CEA-709 Router, 2 x TP/FT-10
LS-13CB	L-Switch^{XP} CEA-709 Router, 1 x TP/XF-1250, 1 x TP/FT-10
LS-11CB	L-Switch^{XP} CEA-709 Router, 2 x TP/XF-1250
LS-33300CB	L-Switch^{XP} CEA-709 Router, 3 x TP/FT-10
LS-13300CB	L-Switch^{XP} CEA-709 Router, 1 x TP/XF-1250, 2 x TP/FT-10
LS-13333CB	L-Switch^{XP} CEA-709 Router, 1 x TP/XF-1250, 4 x TP/FT-10
LS-11333CB	L-Switch^{XP} CEA-709 Router, 2 x TP/XF-1250, 3 x TP/FT-10
LPOW-2415B	Power supply unit with power connector 24 VDC, 15 W
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)

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

Datasheet #89013519

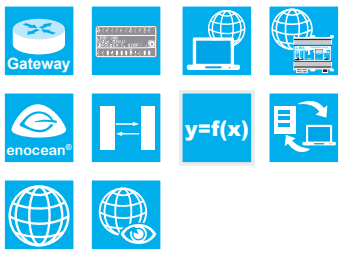


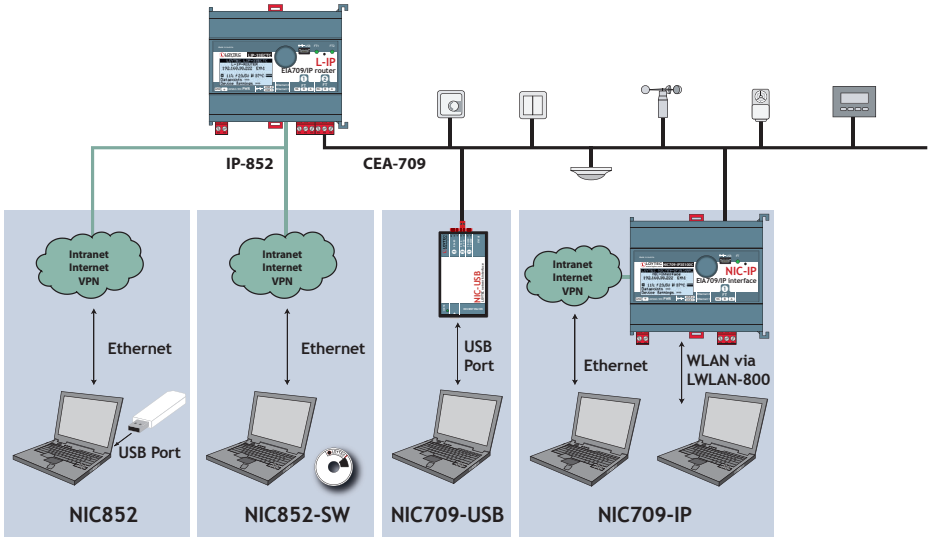
LOYTEC NICs are the most universal network interfaces for CEA-709 and IP-852 (Ethernet/IP) channels. Based on LOYTEC's Core Technologies, they offer high packet rates and short response times. All NICs are fully compatible with products like NL220, ALEX, LonMaker®, and other LNS® applications. The NICs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









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)
- Runs on Windows 7, Windows 8, Windows 10, Windows Server 2003 (32-bit), Windows Server 2008, Windows Server 2012

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, non condensing, 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	
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 V DC / 12-24 V AC ±10 %, typ. 2.5 W	
Operating conditions	0 °C to 50 °C, 10 – 90 % RH, non condensing, 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)	
	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	
Resource limits		
MNI devices	8 (multiplexed network interfaces)	
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	
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 V DC, 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)

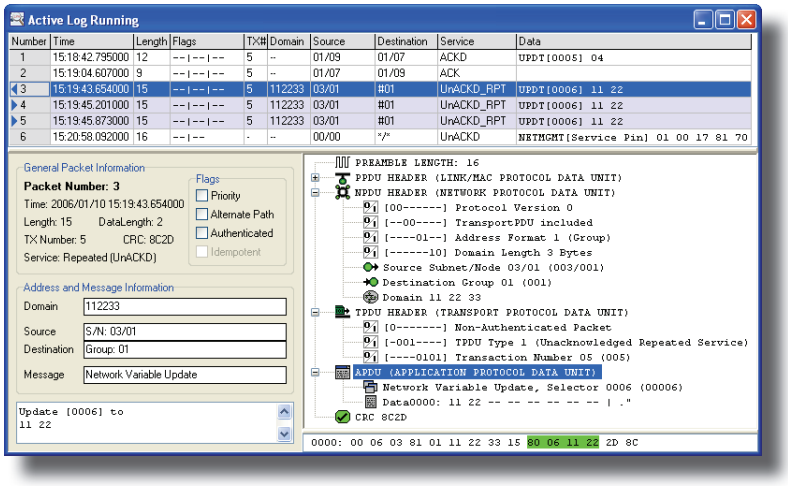
LPA-SET-USB, LPA-USB, LPA-IP, LPA-SW, LPA-IP-SW

Datasheet #89010519



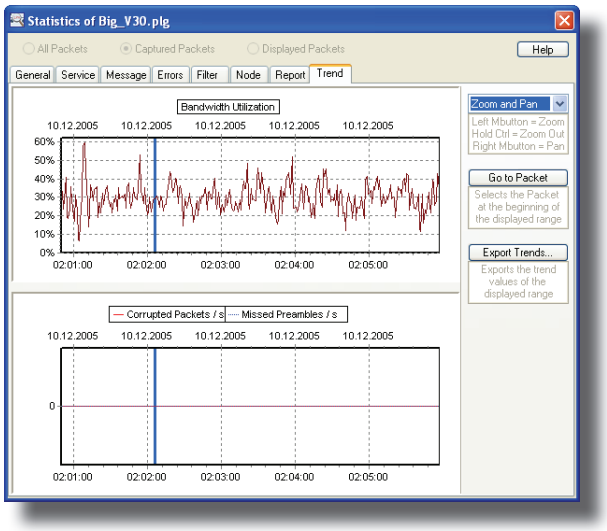
The LOYTEC Protocol Analyzer (LPA) for LonMark Systems captures all data packets on CEA-709 or IP-852 networks and displays all recorded packets on a PC screen. The LPA software provides a comprehensive set of functions and methods to view, filter, and analyze data packets down to bit level.

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 – CEA-709 Protocol Analyzer

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

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

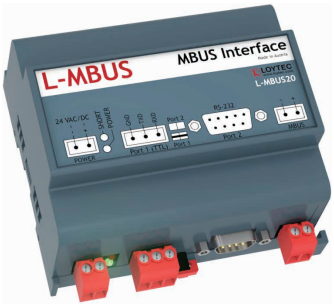


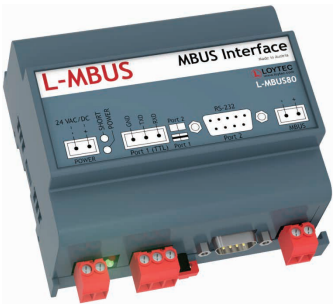
Interfaces

M-Bus Level Converter

L-MBUS20, L-MBUS80

Datasheet #89027519

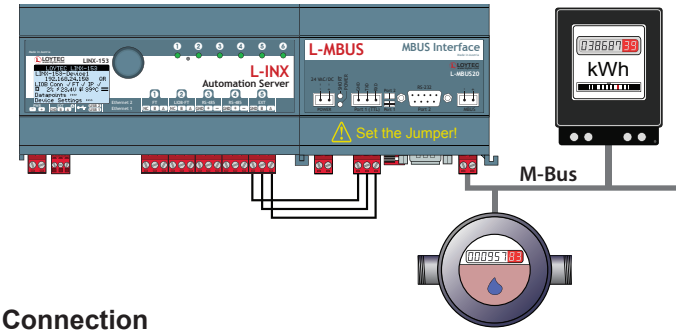




The L-MBUS level converters are used to connect an M-Bus network to a LOYTEC device. Up to 20 or 80 M-Bus devices can be connected via L-MBUS20 or L-MBUS80.

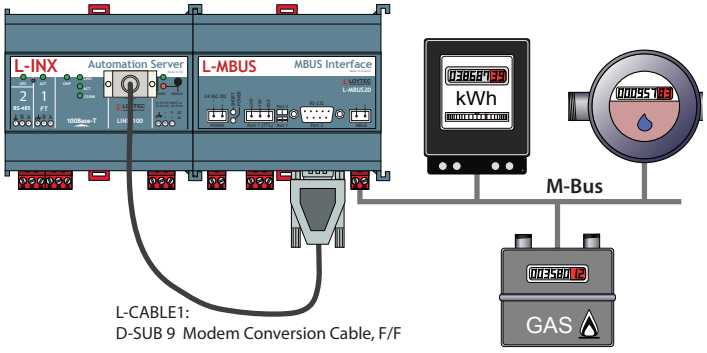
TTL Connection

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, non condensing, 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

MP-Bus Level Converter

LMPBUS-804

Datasheet #89055719



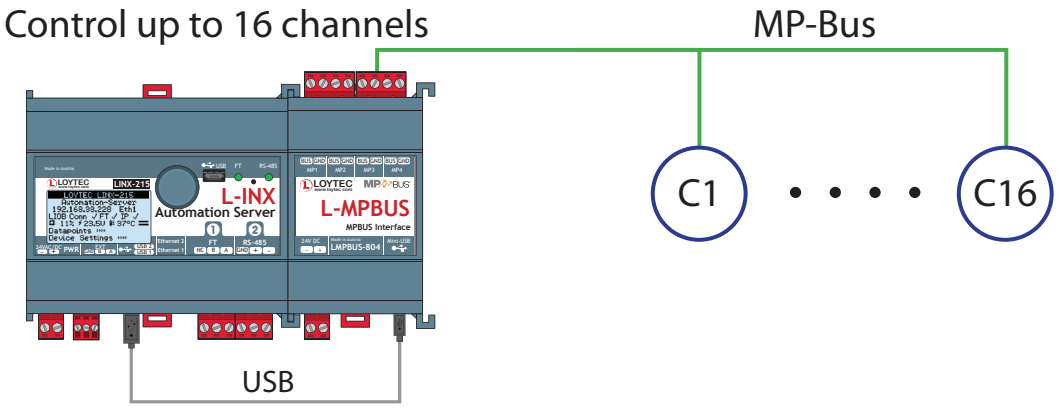
The LMPBUS-804 connects up to four MP-Bus channels with up to 64 MP-Bus slaves to the USB port of the L-INX Automation Server, L-ROC Controller or L-GATE Gateway Controller.

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



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 ±10 %, typ. 2.5 W
Operating conditions	0 °C to 50 °C, 10 – 90 % RH, non condensing, 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 level converter for 16 devices per channel, up to 4 channels

KNX TP1 Interface

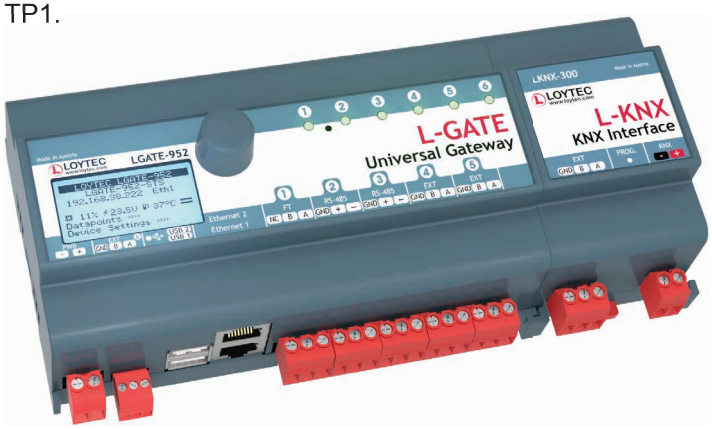
LKNX-300

Datasheet #89027319



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 1 000 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 1 000 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, non condensing, 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 #89032519



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 worldwide 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, LIOB-AIR, L-DALI and L-GATE
- 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 DIM039		
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, non condensing, 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 confirming 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 #89032819



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, non condensing, 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) ±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

LSMI-800, LSMI-804

Datasheet #89046819





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

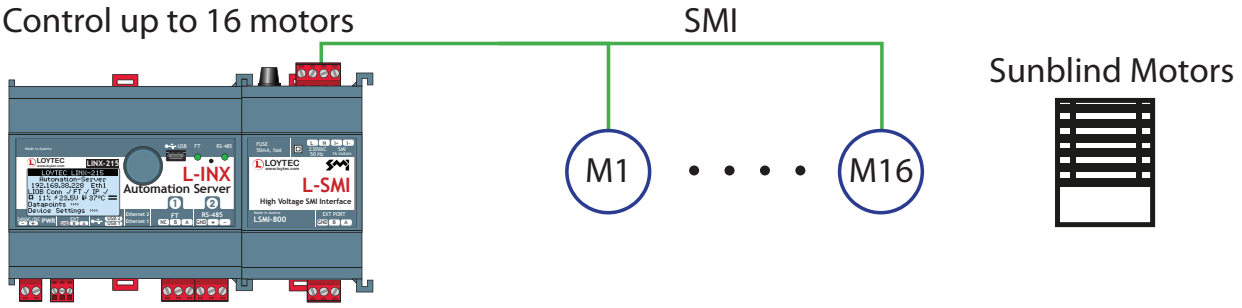
Specifications

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 VAC, 50 Hz, max 2 W	85-240 VAC, 50/60 Hz, max 2 W
Operating conditions	0 °C to 50 °C, 10–90 % RH, non condensing, 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	

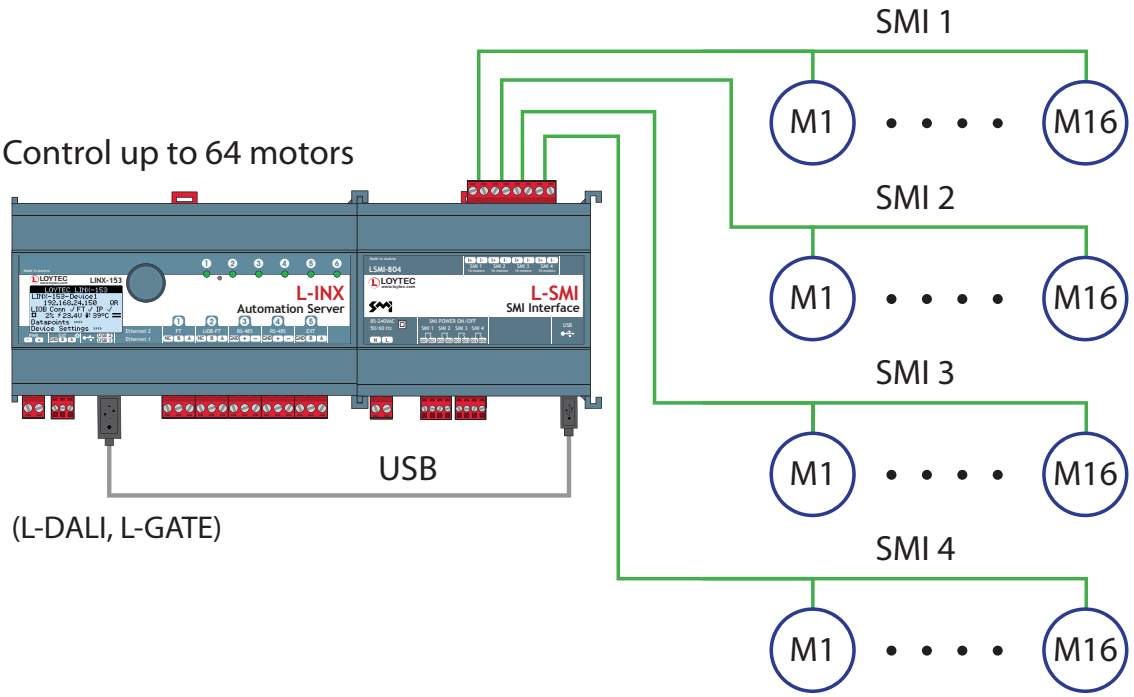
Order number	Product description
LSMI-800	Standard Motor Interface for 16 motors via EXT port
LSMI-804	Standard Motor Interface for 64 motors, 4 SMI channels via USB

LSMI-800, LSMI-804

Control up to 16 motors

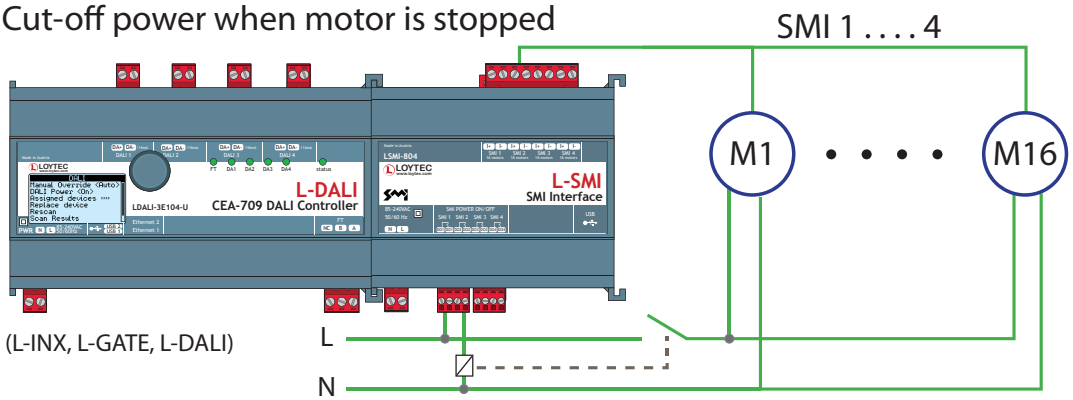


Control up to 64 motors



(L-DALI, L-GATE)

Cut-off power when motor is stopped



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



Accessories

L-POW Power Supply

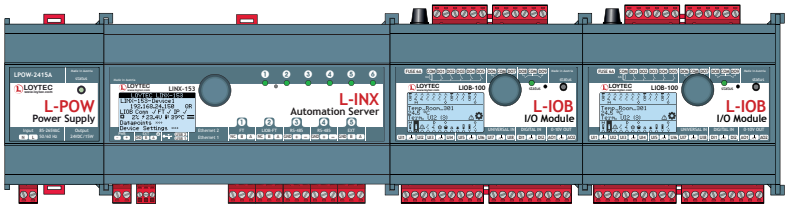
LPOW-2415A, LPOW-2415B, LPOW-2460B

Datasheet #89027719



LPOW-2415A

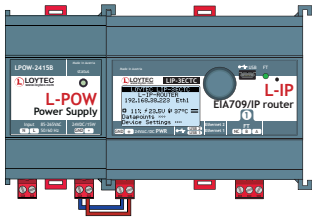
LPOW-2415A is used to supply power to LOYTEC devices with the LOYTEC LIOB-Connect side outlet such as the L-INX Automation Servers, L-ROC Room Controllers, L-GATE Universal Gateways, and LIP-ME204. Additionally, all L-IOB I/O Modules and Controllers can be powered by the LPOW-2415A.





LPOW-2415B

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





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

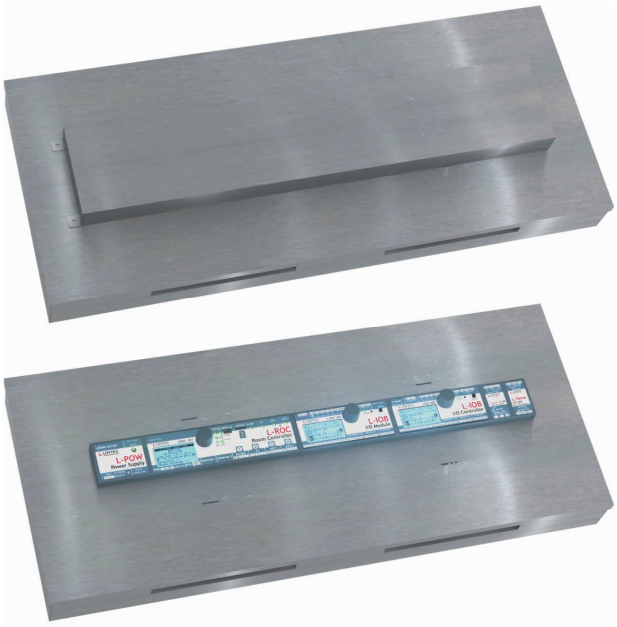
The LPOW-2460B power supply provides 24 V DC and maximum 60 W with screw terminals. It is used to supply power to LOYTEC devices with a separate power terminal of 24 V DC.

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 V DC 15 W via LIOB-Connect	24 V DC 15 W with plugable screw terminals	24 V DC 60 W with screw terminals
Operating conditions	0 °C to 50 °C, 10 – 90 % RH, non condensing, degree of protection: IP40, IP20 (terminals)		0 °C to 50 °C, 10 – 90 % RH, non condensing, degree of protection: IP20 (terminals)
For use with	LIOB-Connect devices for power supply with 24 V DC, 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 V DC and max. 15 W (625 mA)	Devices for power supply with 24 V DC and max. 60 W (2.5 A) Maximum 6 devices

Order number	Product description
LPOW-2415A	LIOB-Connect power supply unit, 24 V DC, 15 W
LPOW-2415B	Power supply unit with power connector 24 V DC, 15 W
LPOW-2460B	Power supply unit with power connector 24 V DC, 60 W

LBOX-600, LBOX-ROC1, LBOX-ROC2

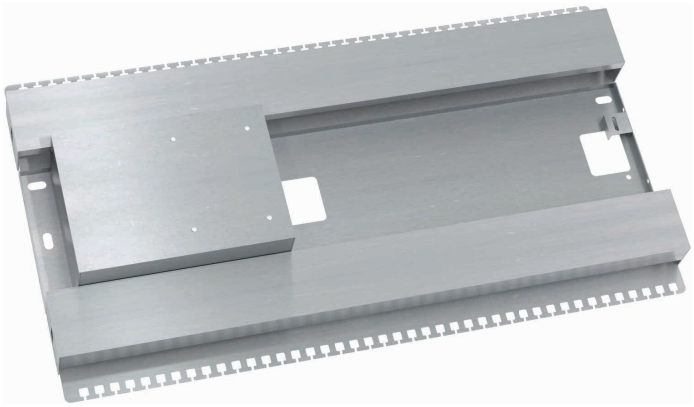
Datasheet #89028119



With L-BOX System Distribution Boxes, LOYTEC offers the possibility of a decentralized installation of hardware components, e.g. for the flexible room automation system L-ROC.

For the typical requirements of room automation projects with reoccurring segments, the hardware designed for a certain amount of segments (e.g. 8 or 16 segments, usually I/O modules) can be installed in L-BOX. L-BOX is normally mounted in an intermediate ceiling or double floor. The cabling of the field components in the segment (sunblind motor, actuators for valves, window contacts etc.) can be connected to the L-BOX in a star topology. In the L-BOX, the cables are strain-relieved and directly wired to the I/O modules.

Specifications LBOX-600	
Dimensions (mm)	600 x 250 x 82 (L x W x H), DIM049
Device Installation	485 mm long, top hat rail (35 mm wide) for snap-on mounting of equipment (EN 50022)
Material	Metal, DC01 Sendzimir galvanized
Order number	**Product description**
LBOX-600	L-BOX System Distribution Box for room automation components, 600 x 250 x 82 (L x W x H in mm)



LBOX-ROC1, LBOX-ROC2

The LBOX-ROC1 and the LBOX-ROC2 are designed to ease hardware installation and cabling of LROC-40x room automation projects.

It consists of built-in terminals and strain reliefs, and it is normally mounted in an intermediate ceiling or double floor.

The LBOX-ROC2 has the same features as the LBOX-ROC1, but instead of the 75mm DIN rail it has a built-in 60W 24 VDC power supply.

Specifications LBOX-ROC1, LBOX-ROC2	
Dimensions (mm)	519 x 280 x 71 (L x W x H), DIM048
Device Installation	suitable for the installation of an LROC-400, LROC-401, or LROC-402 Room Controller
Material	Metal, DC01 Sendzimir galvanized
Input voltage	100 – 240 VAC, 50 – 60 Hz (LBOX-ROC2 only)
Supply voltage	24 VDC 60 W (LBOX-ROC2 only)
Order number	**Product description**
LBOX-600	L-BOX System Distribution Box for room automation components, 600 x 250 x 82 (L x W x H in mm)
LBOX-ROC1	System Distribution Box for LROC-40x Room Controller, 519 x 280 x 71 (L x W x H in mm)
LBOX-ROC2	System Distribution Box for LROC-40x Room Controller, 60 W 24 VDC power supply

L-Term Network Terminator

LT-03, LT-13, LT-33

Datasheet #89014719

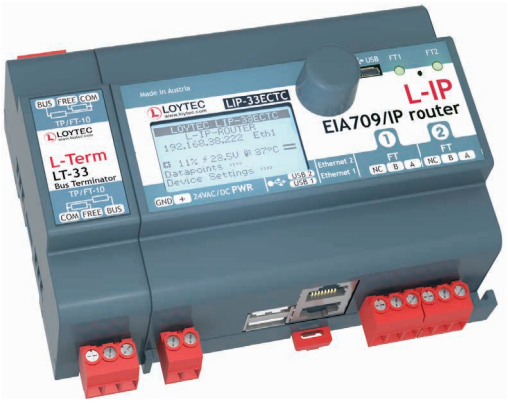


LOYTEC offers several network terminators in DIN rail housing for the LonMark TP/FT-10 and TP/XF-1250 channels.

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, non condensing, 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)

LT-04, LT-B4

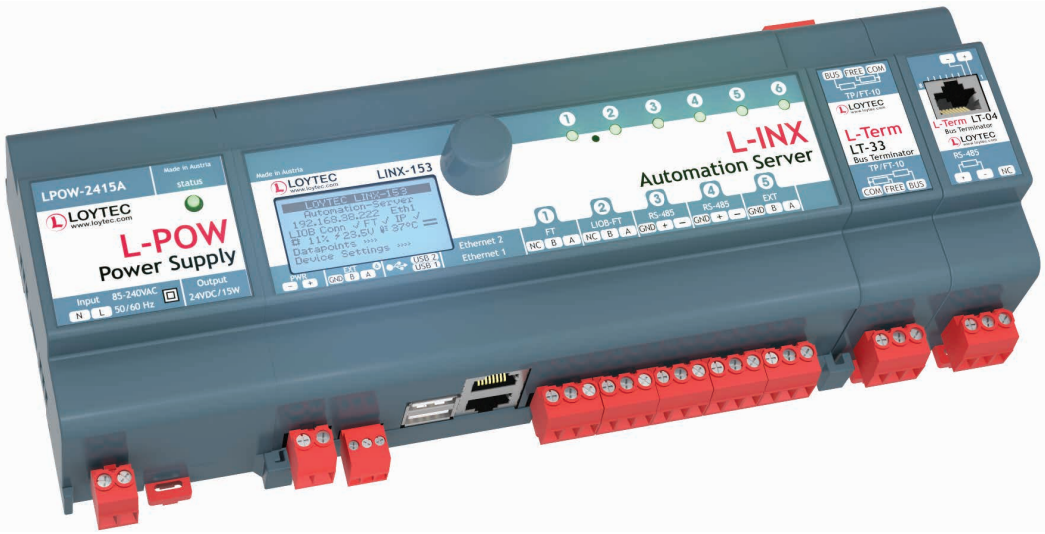
Datasheet #89016319



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 VAC or 24 VDC.



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, non condensing, 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)

L-IOB Adapter

LIOB-A2, LIOB-A4, LIOB-A5

Datasheet #89028319





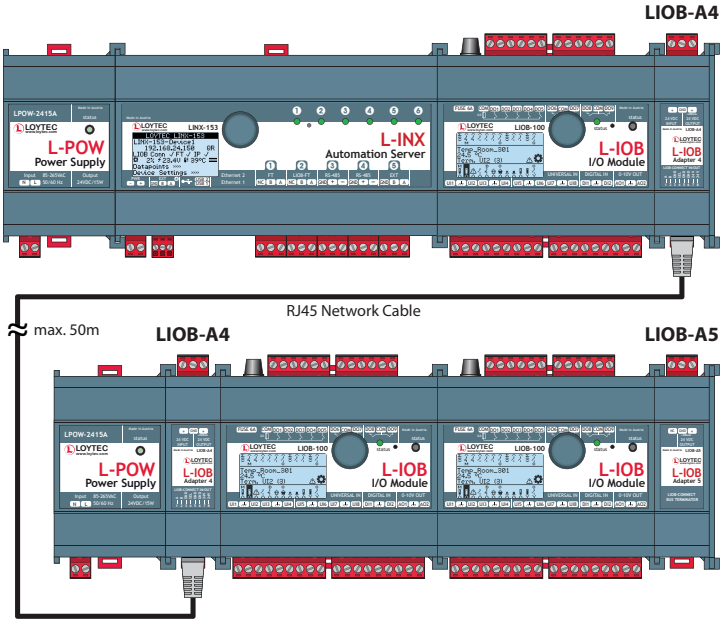
The LIOB-A2/A4 Adapters can be used to extend the LIOB-Connect bus and to connect an external power supply.

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.

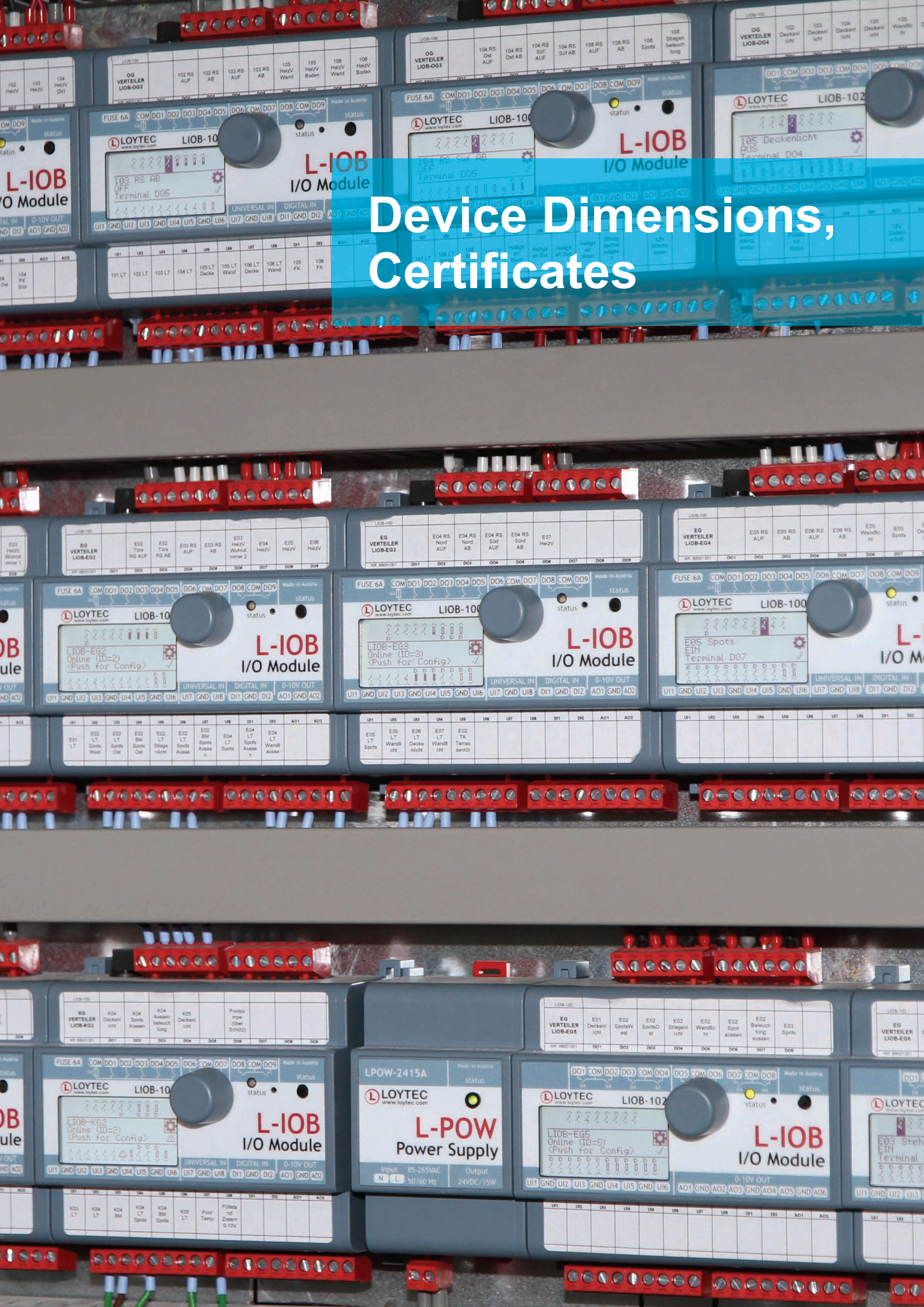
If the length exceeds 1 m, either a LIOB-A2 Adapter or a LIOB-A5 adapter must be used at the end of the last segment as a termination. When using the LIOB-A2 adapter as network terminator, the terminal TERM has to be connected with terminal B.

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 ±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, non condensing, 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



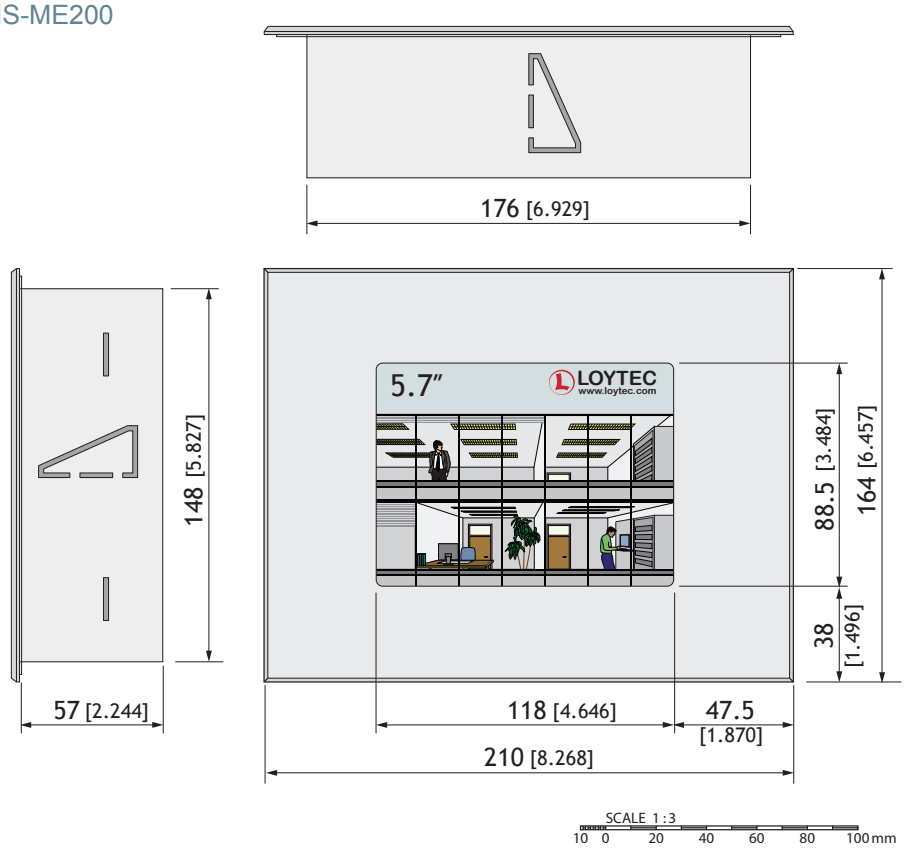
Device Dimensions, Certificates

Dimensions of the devices in mm and [inch]

DIM001

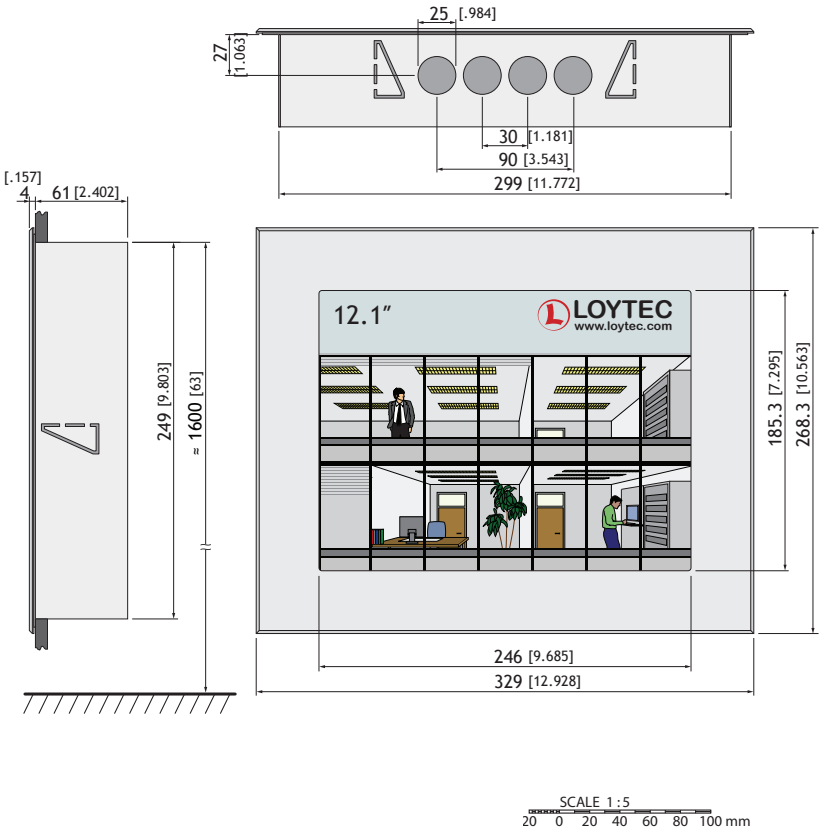
LVIS-3E100

LVIS-ME200



DIM002

LVIS-3ME12-A1

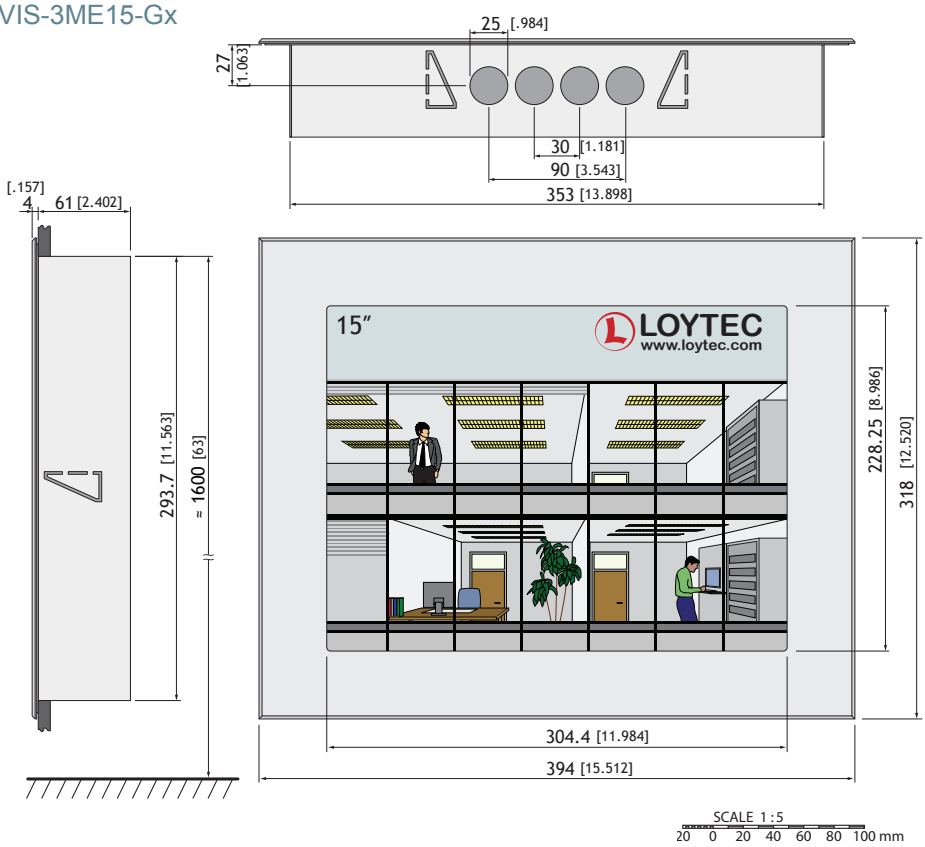


Dimensions of the devices in mm and [inch]

DIM003

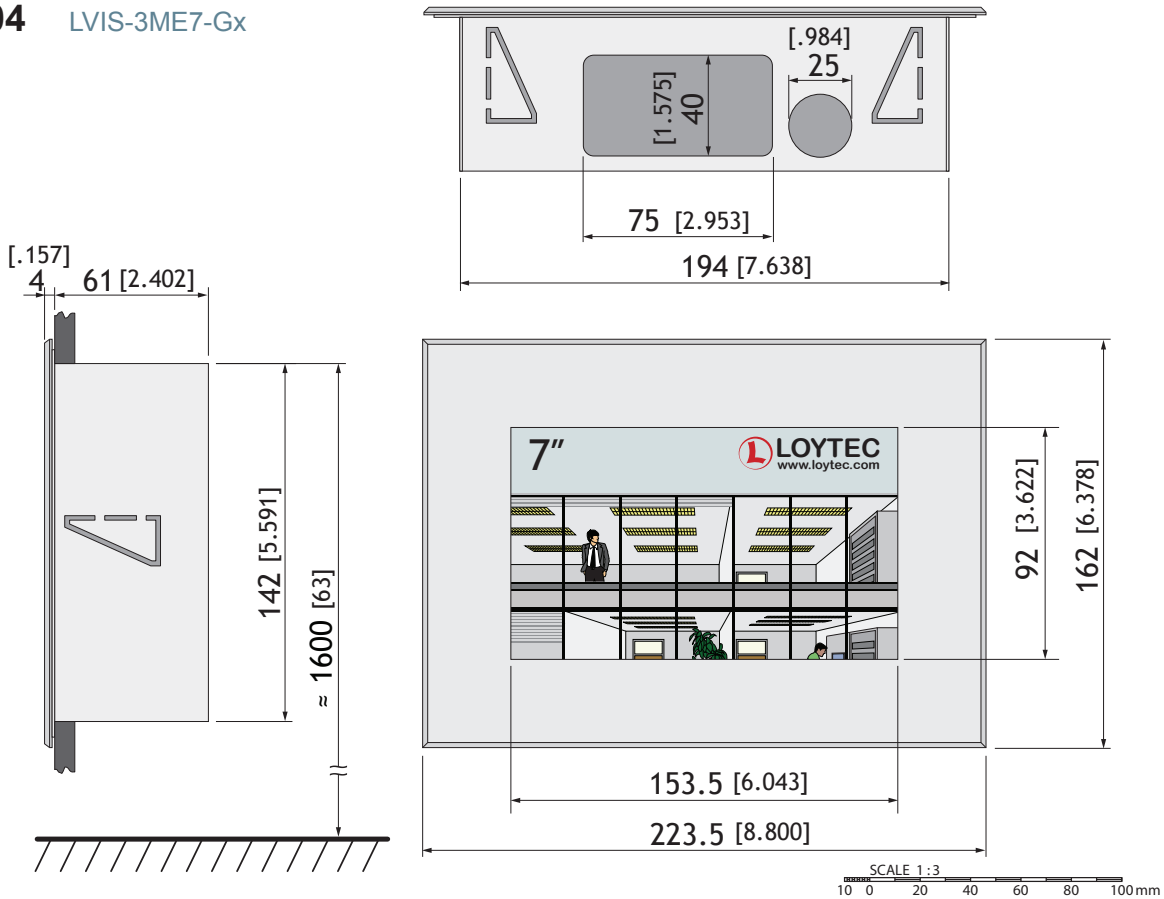
LVIS-3ME15-A1

LVIS-3ME15-Gx



DIM004

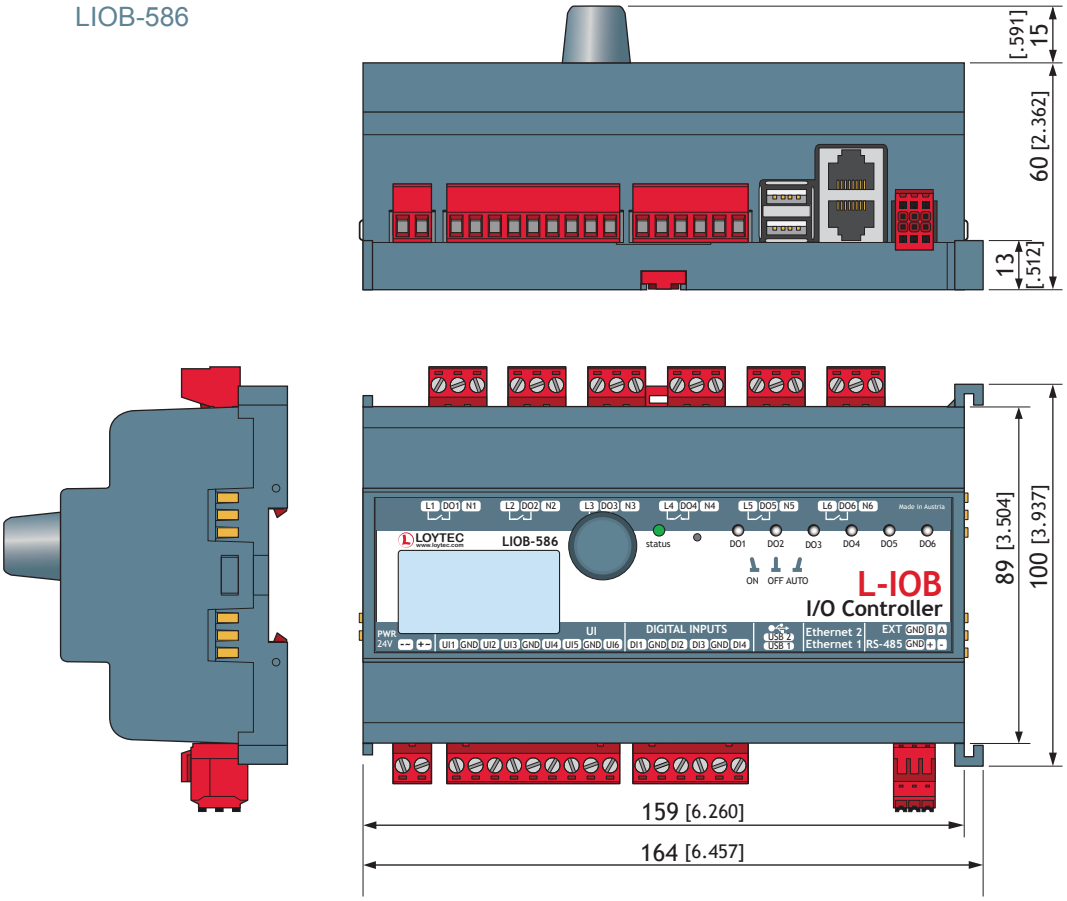
LVIS-3ME7-Gx



Dimensions of the devices in mm and [inch]

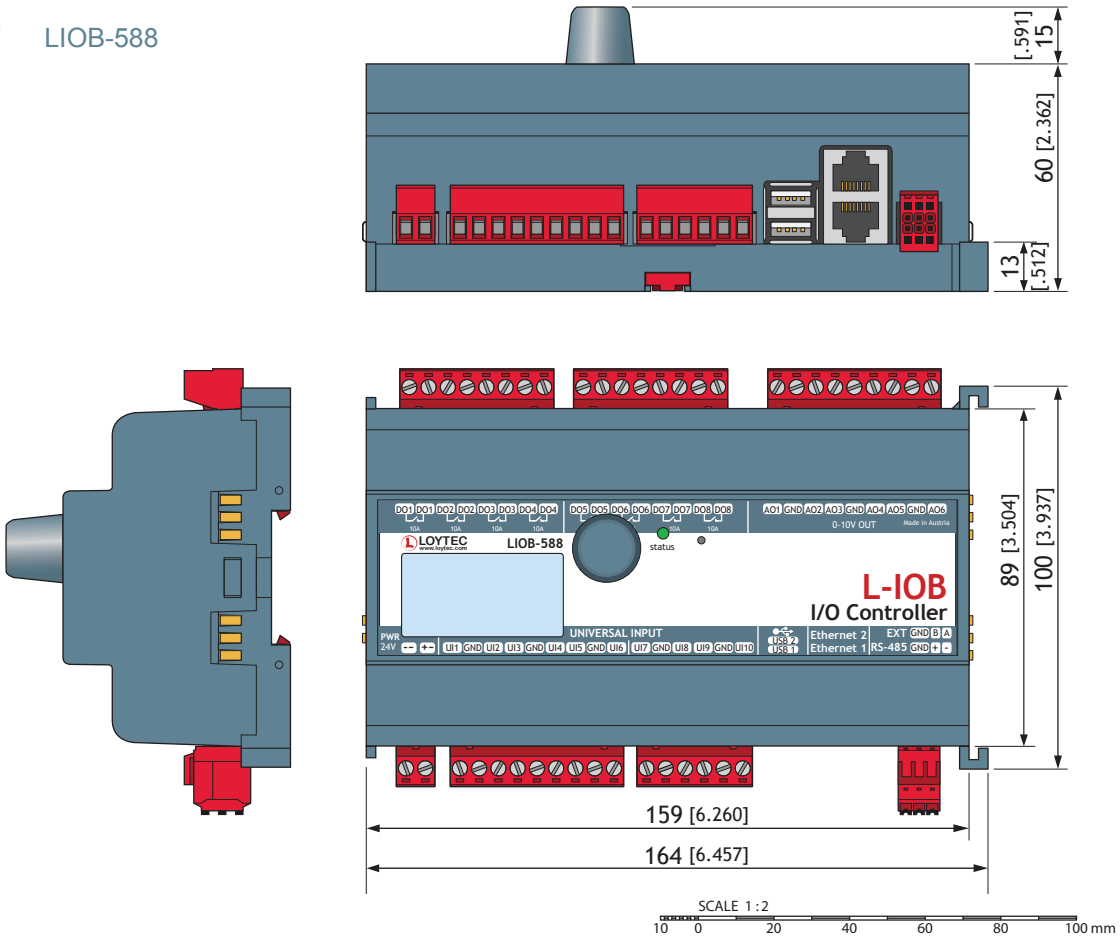
DIM005

LIOB-586



DIM006

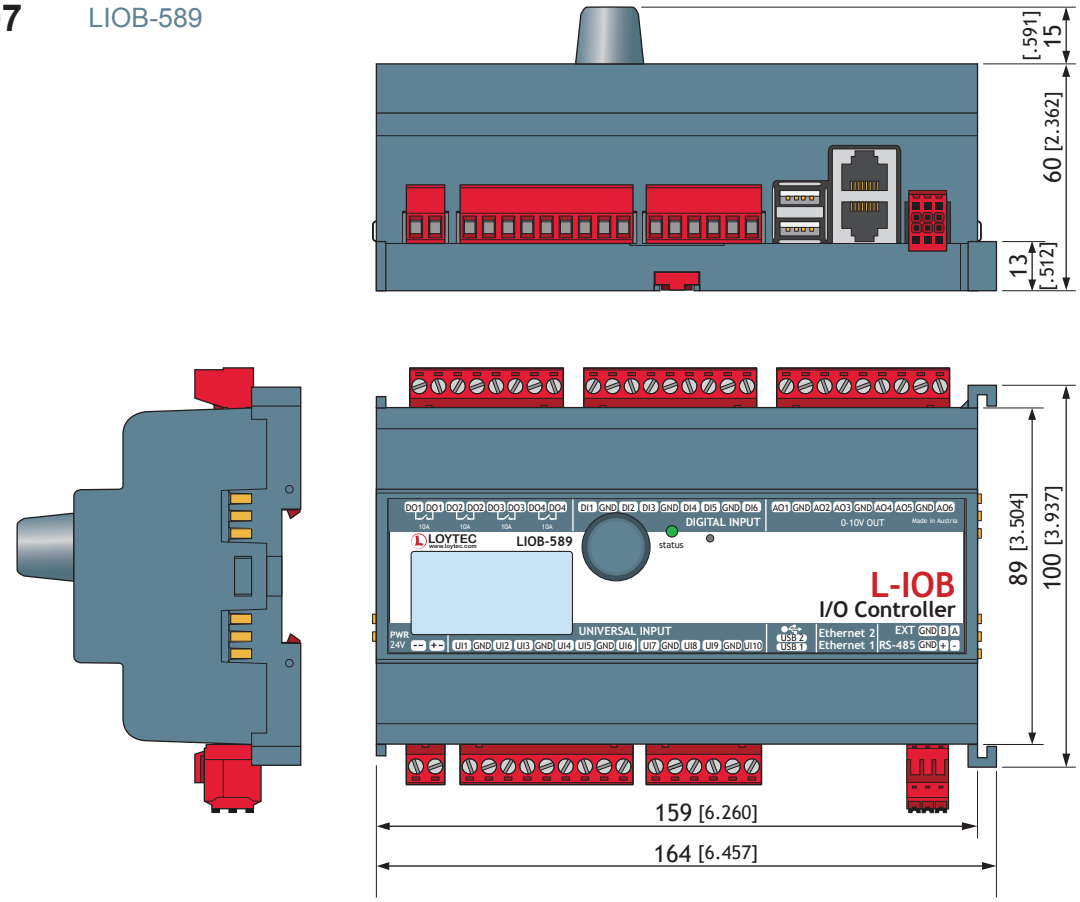
LIOB-588



Dimensions of the devices in mm and [inch]

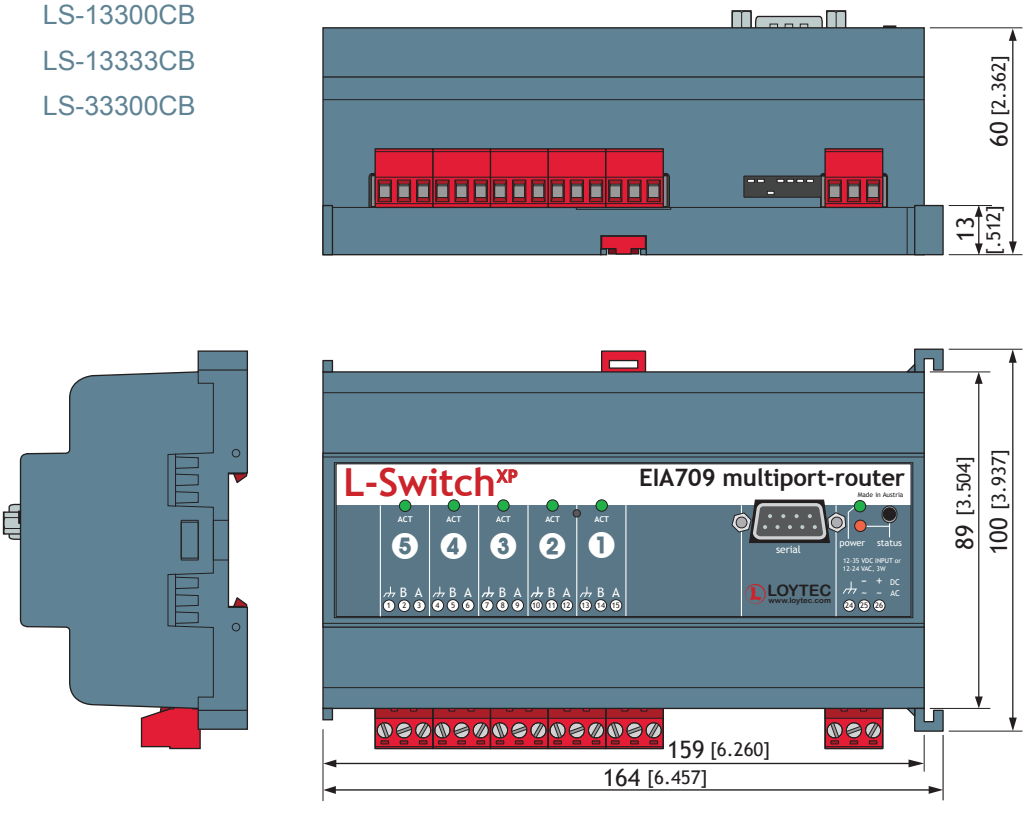
DIM007

LIOB-589



DIM008

LS-11333CB
LS-13300CB
LS-13333CB
LS-33300CB

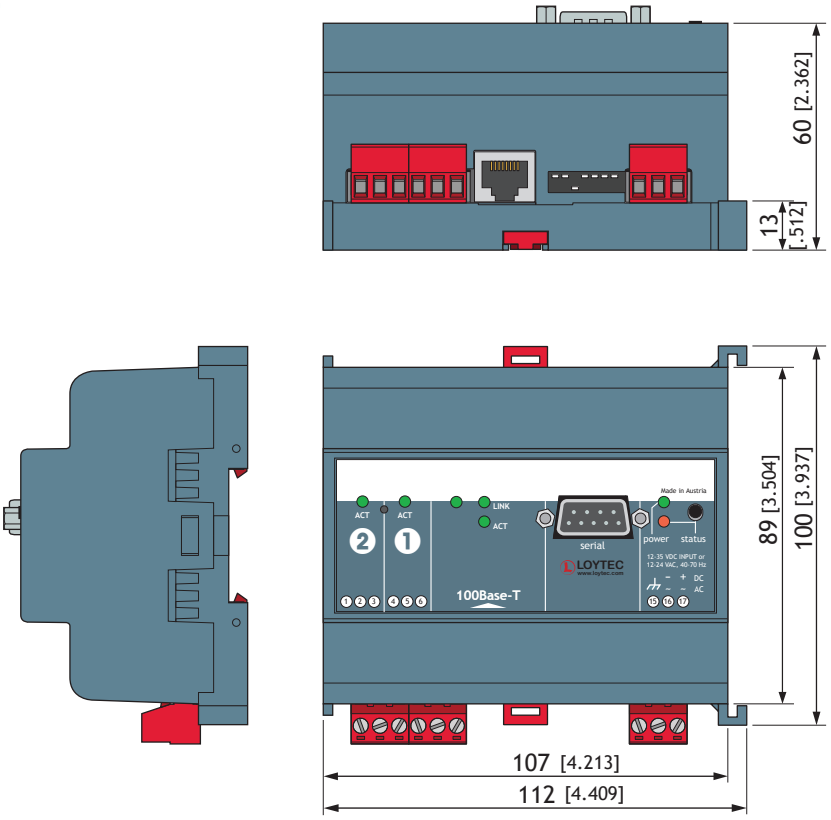


SCALE 1 : 2
10 0 20 40 60 80 100 mm

Dimensions of the devices in mm and [inch]

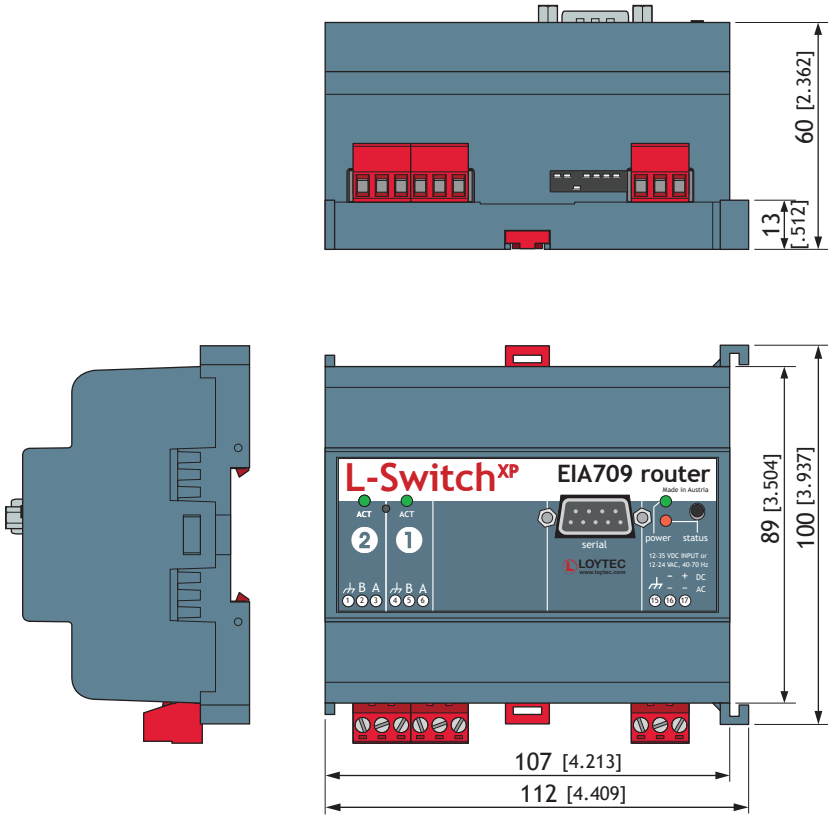
DIM009

LIP-33ECRB
LP-33E100



DIM010

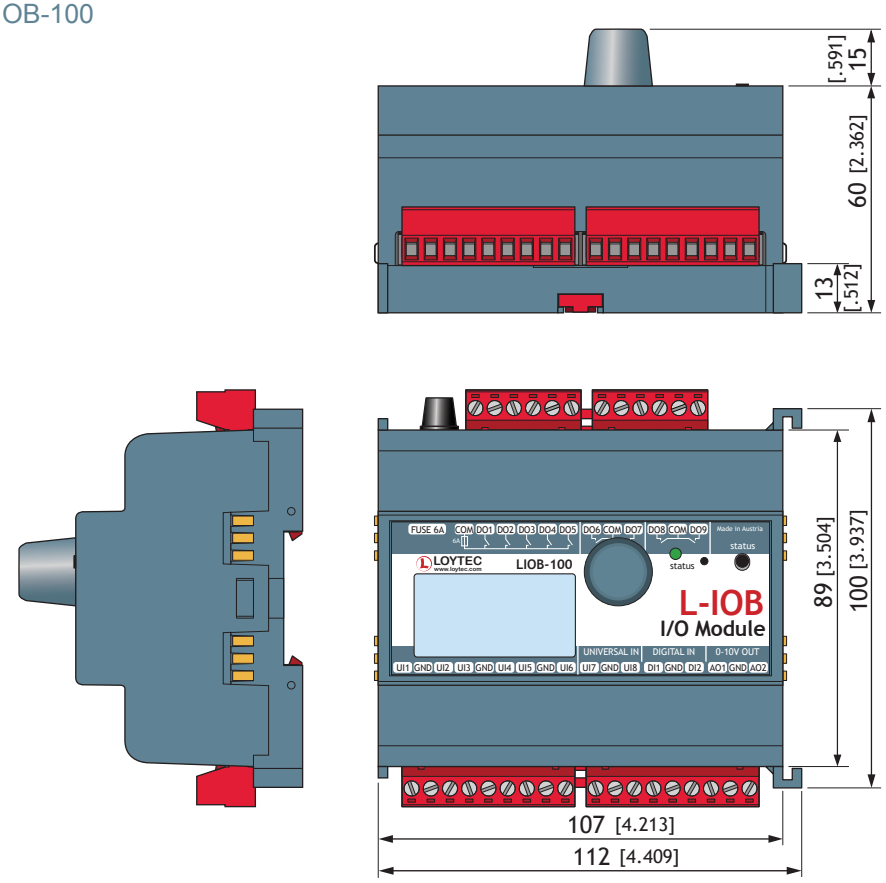
LS-11CB
LS-13CB
LS-33CB



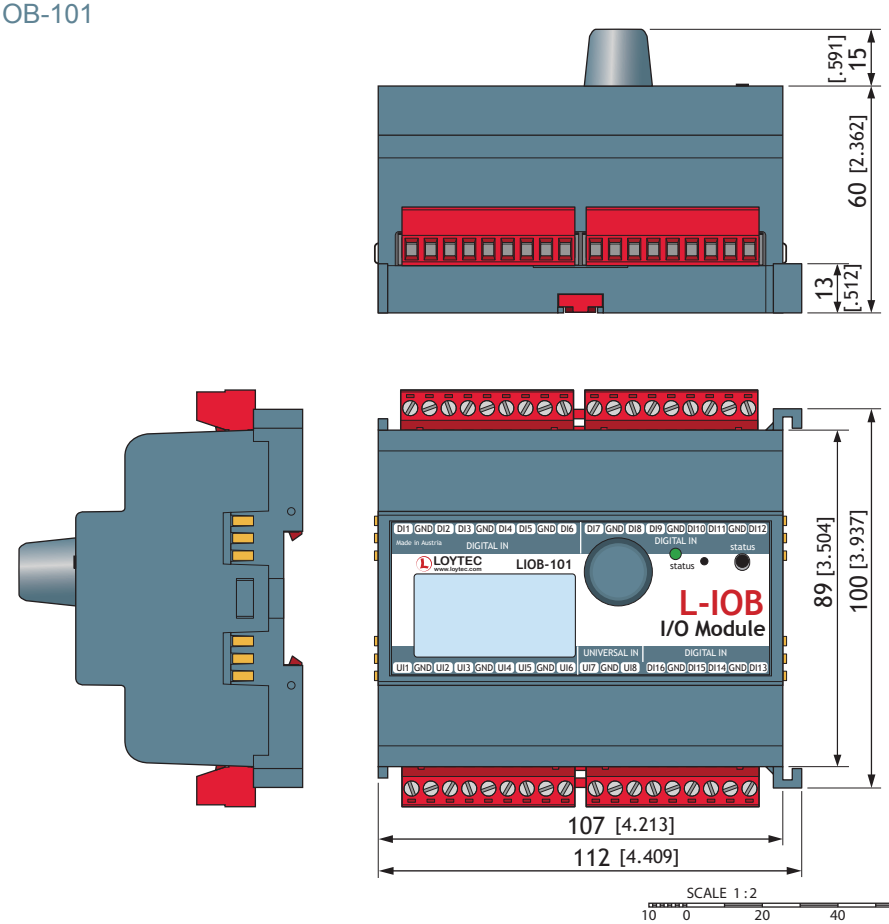
SCALE 1 : 2
10 0 20 40 60 80 100 mm

Dimensions of the devices in mm and [inch]

DIM011 LIOB-100

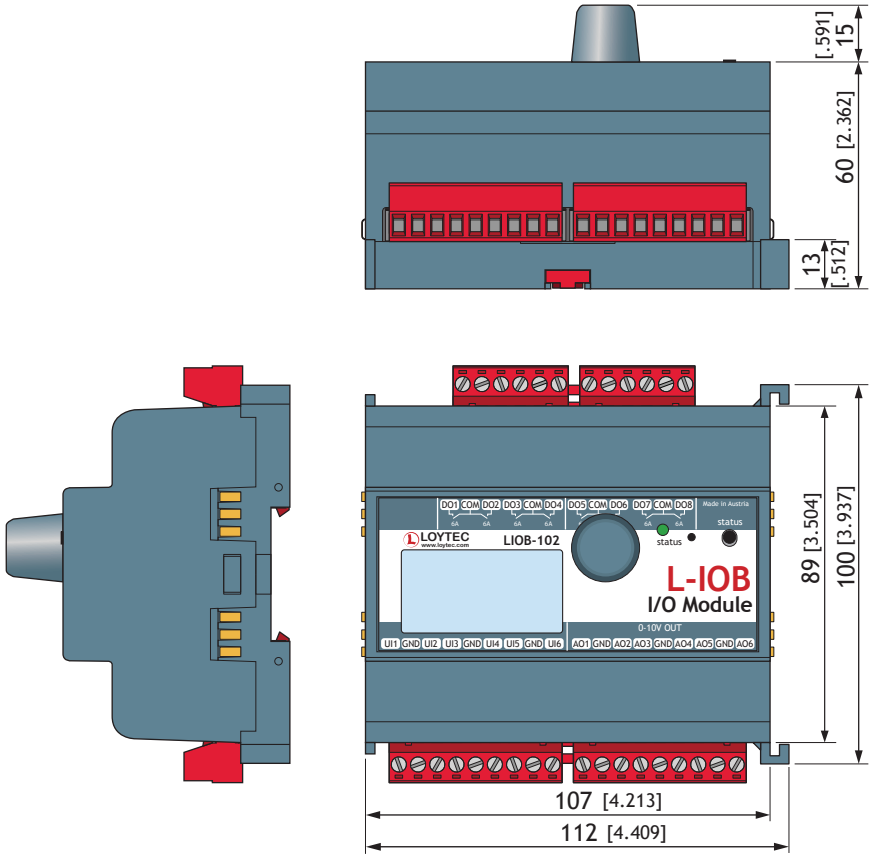


DIM012 LIOB-101

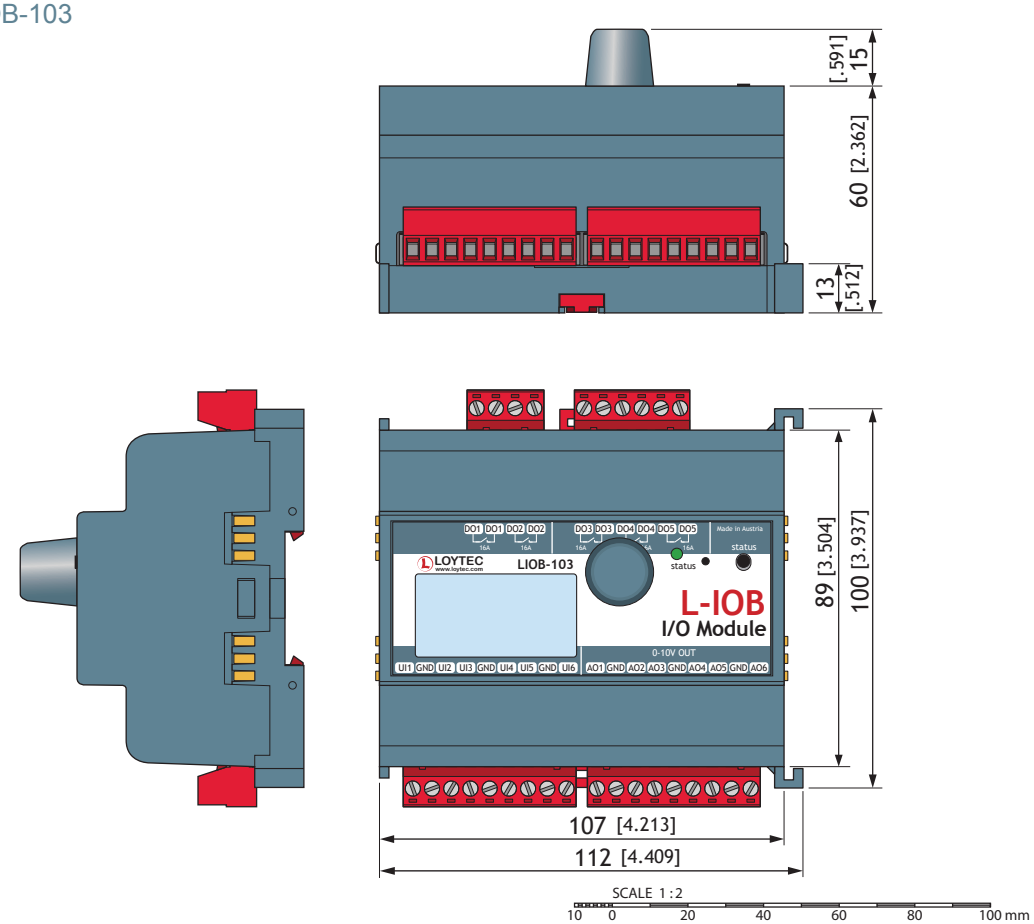


Dimensions of the devices in mm and [inch]

DIM013 LIOB-102



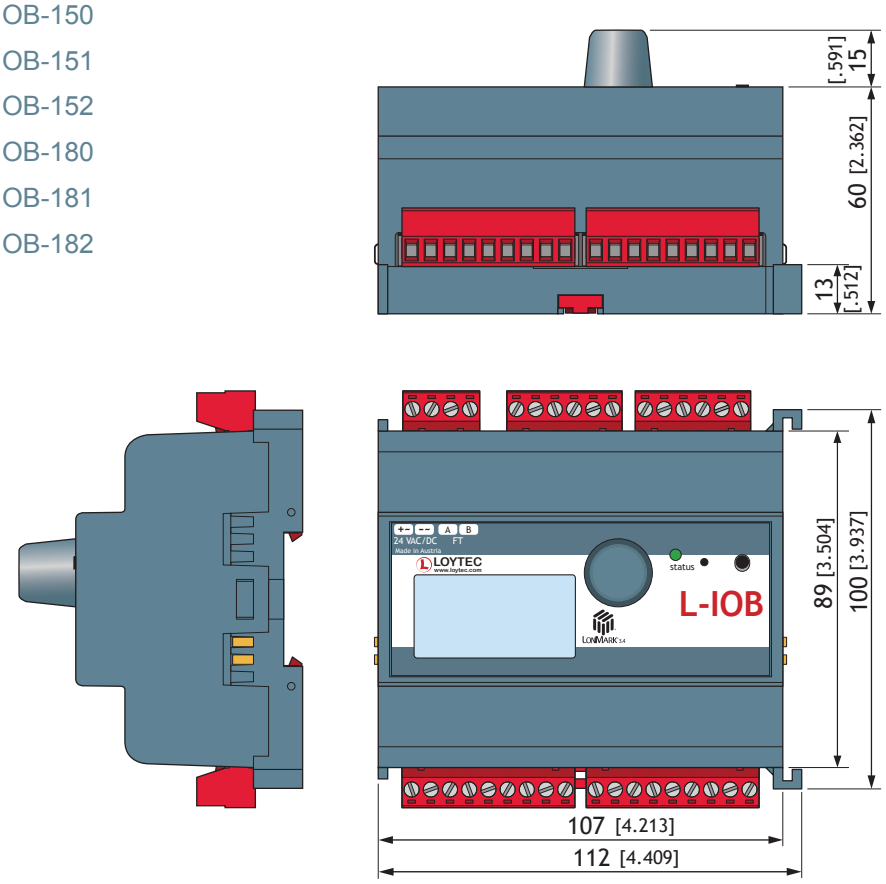
DIM014 LIOB-103



Dimensions of the devices in mm and [inch]

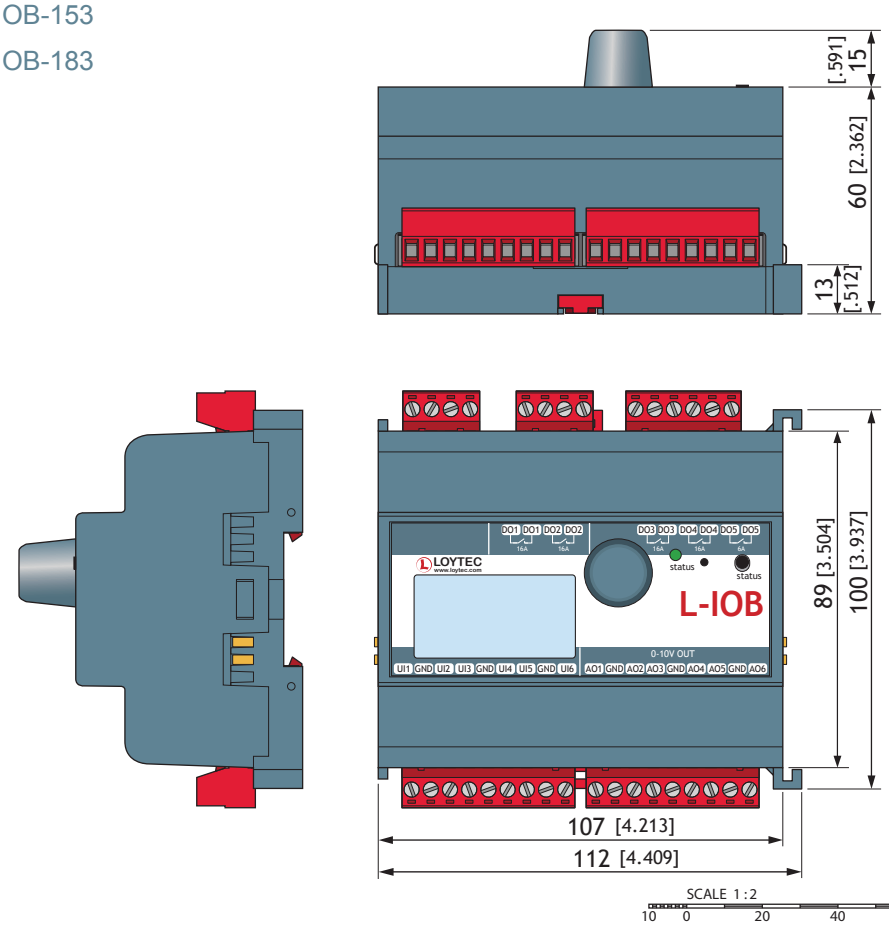
DIM015

LIOB-150
LIOB-151
LIOB-152
LIOB-180
LIOB-181
LIOB-182



DIM016

LIOB-153
LIOB-183

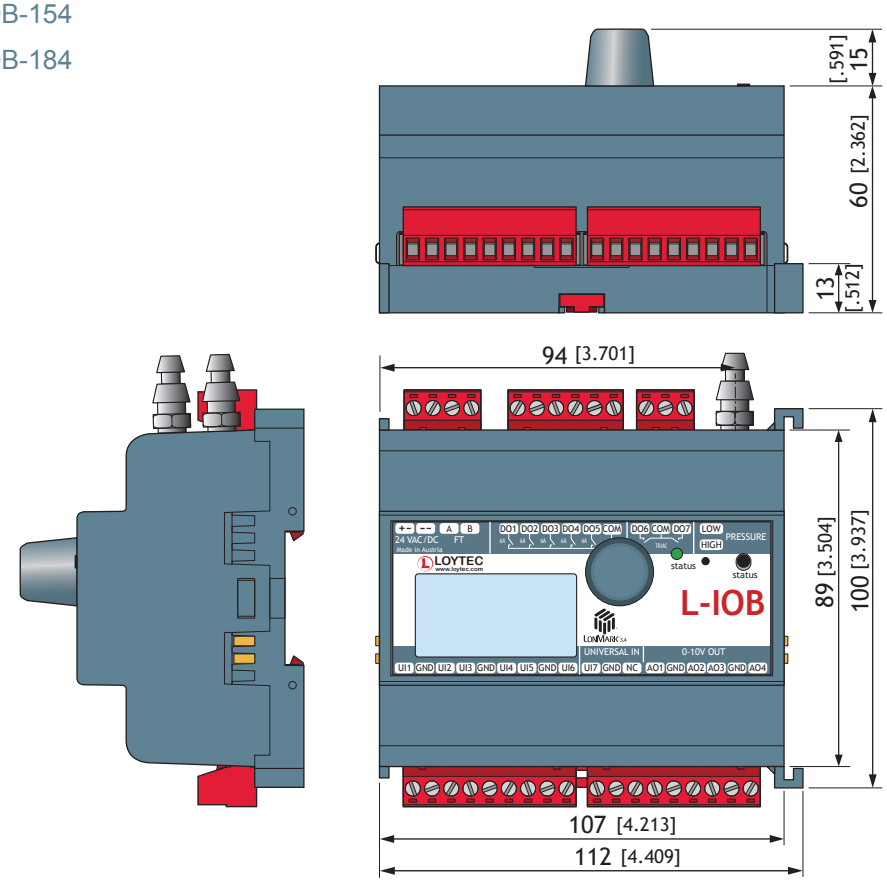


SCALE 1 : 2
10 0 20 40 60 80 100 mm

Dimensions of the devices in mm and [inch]

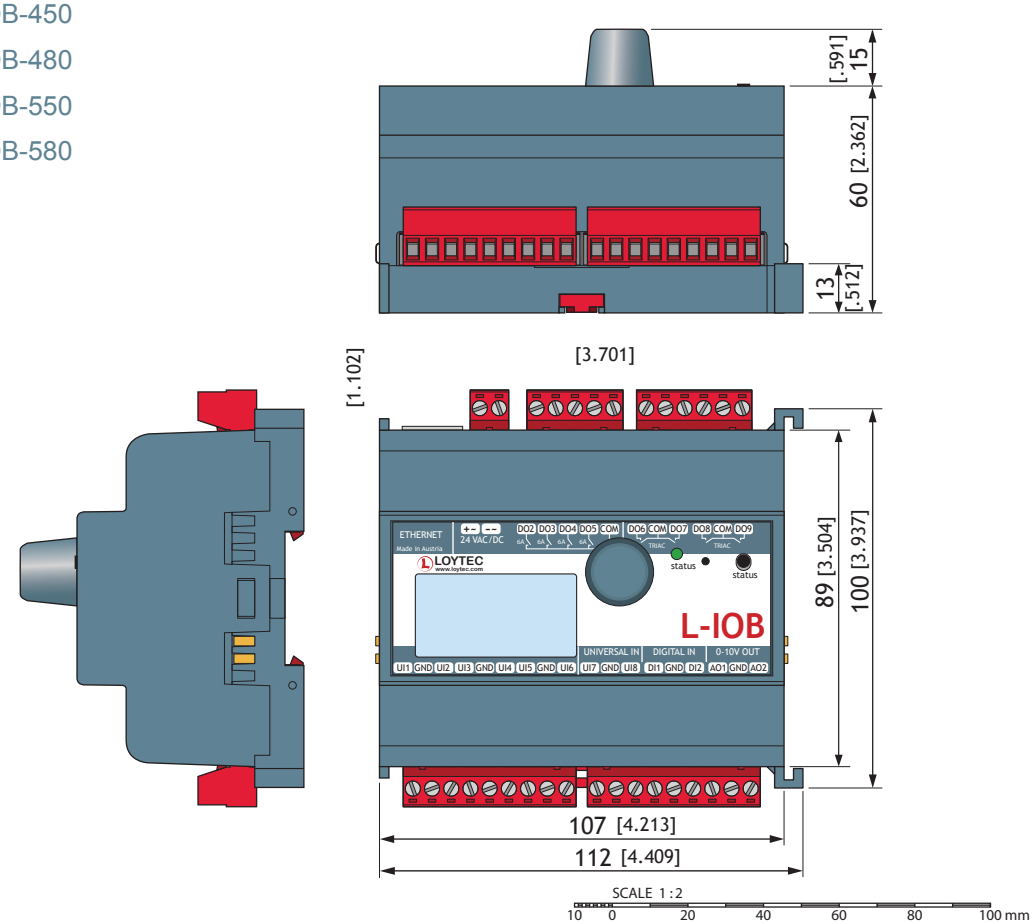
DIM017

LIOB-154
LIOB-184



DIM018

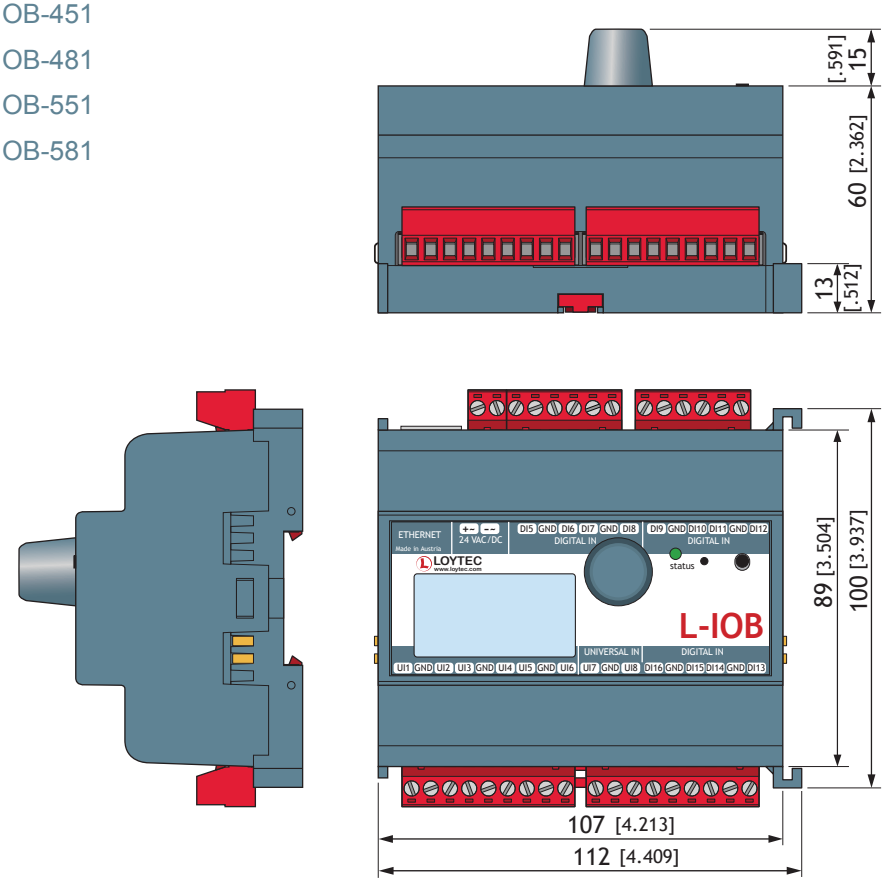
LIOB-450
LIOB-480
LIOB-550
LIOB-580



Dimensions of the devices in mm and [inch]

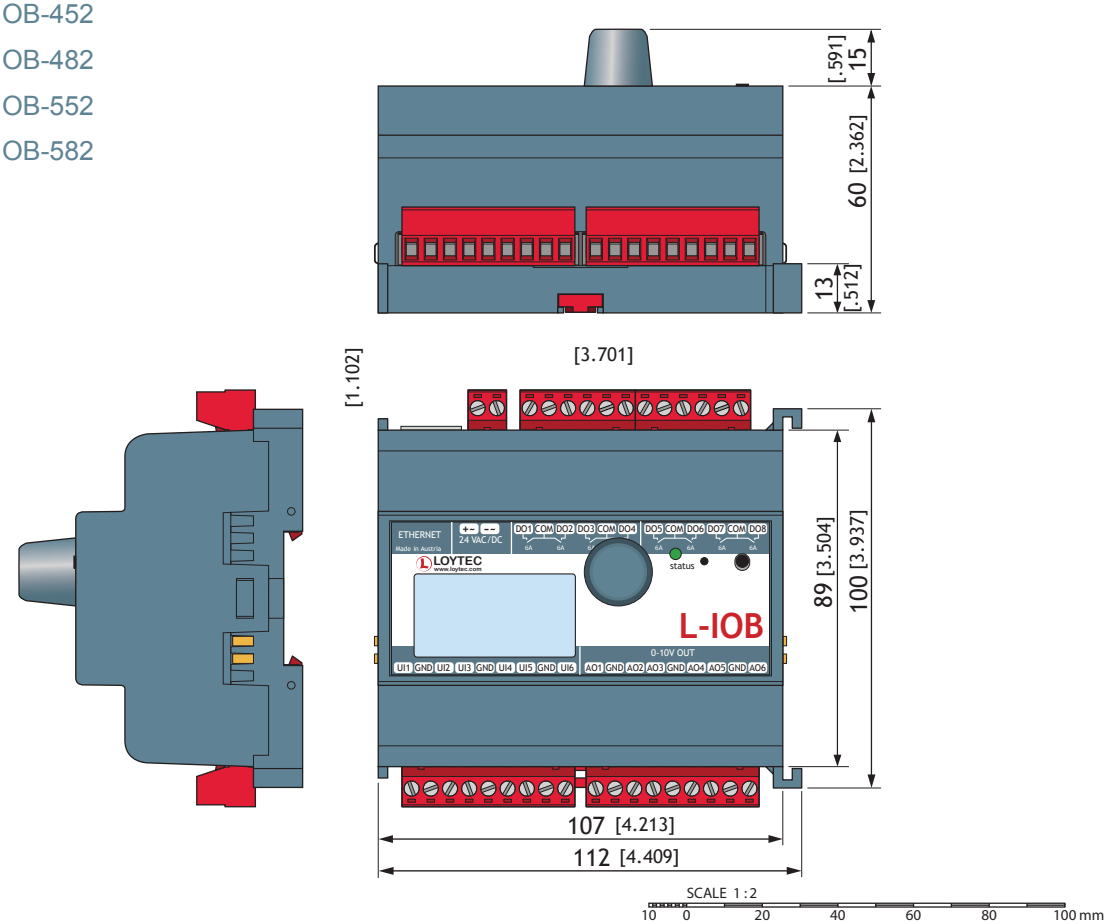
DIM019

LIOB-451
LIOB-481
LIOB-551
LIOB-581



DIM020

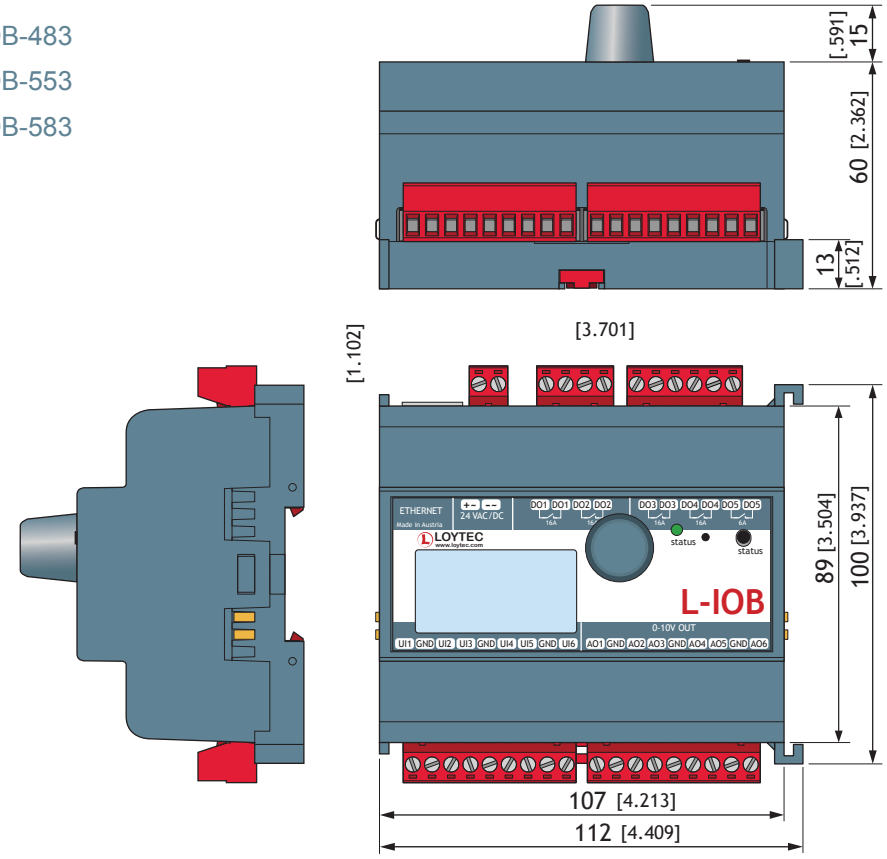
LIOB-452
LIOB-482
LIOB-552
LIOB-582



Dimensions of the devices in mm and [inch]

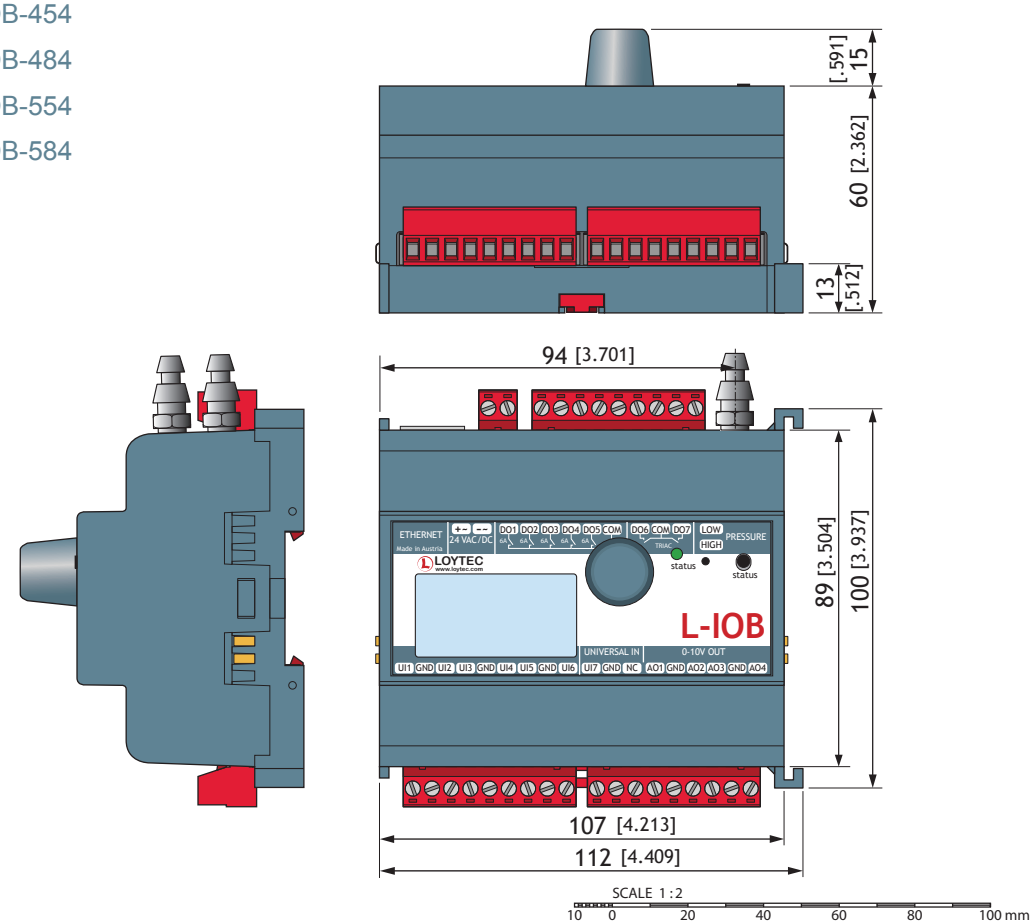
DIM021

LIOB-453
LIOB-483
LIOB-553
LIOB-583



DIM022

LIOB-454
LIOB-484
LIOB-554
LIOB-584

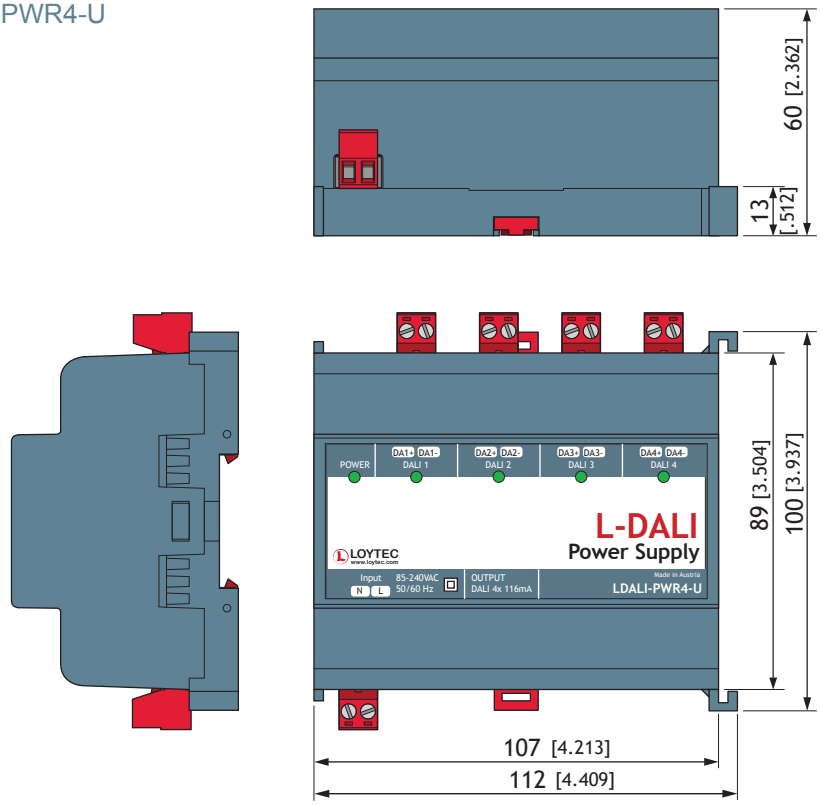


Dimensions of the devices in mm and [inch]

DIM023

LDALI-PWR2-U

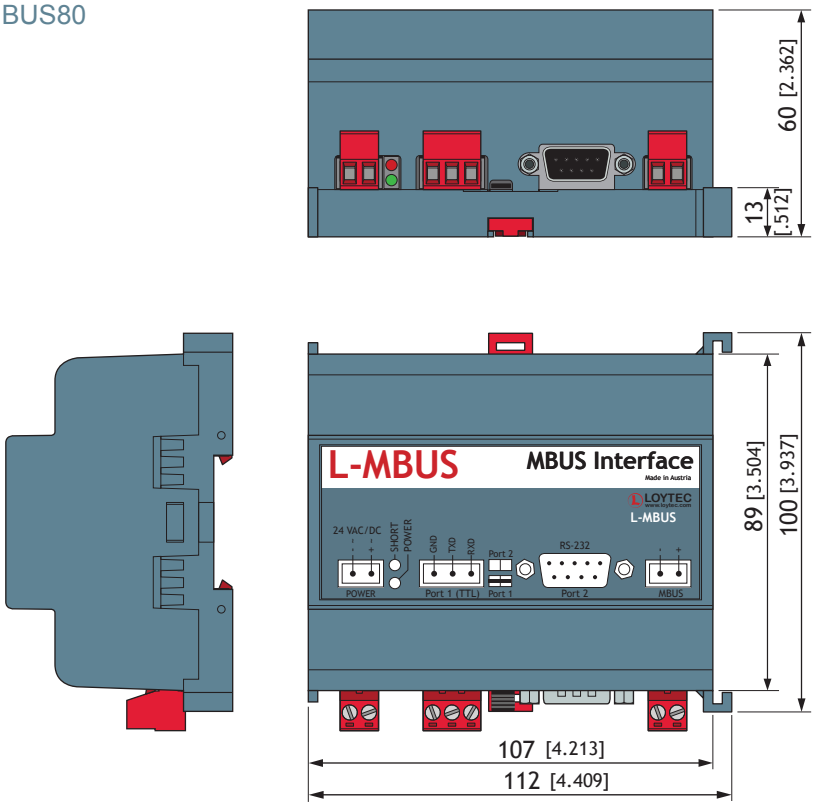
LDALI-PWR4-U



DIM024

L-MBUS20

L-MBUS80

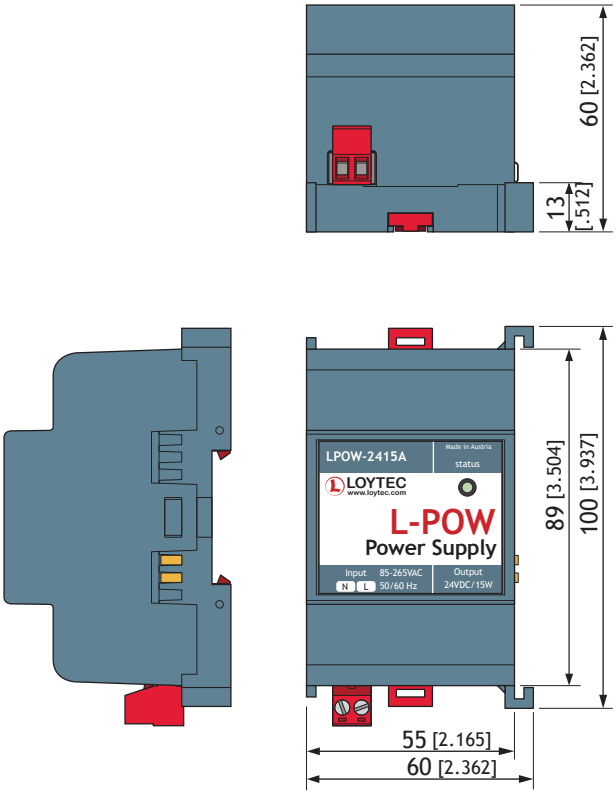


SCALE 1 : 2

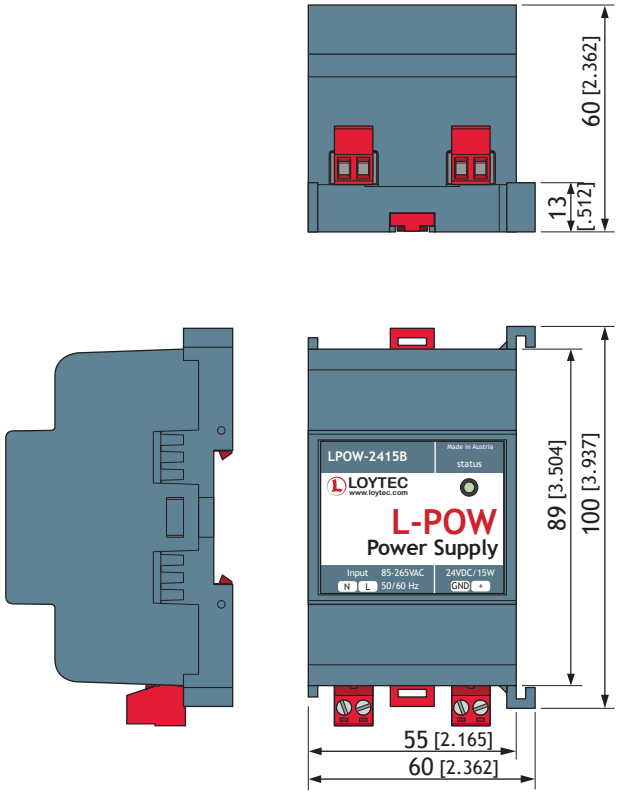
10 0 20 40 60 80 100 mm

Dimensions of the devices in mm and [inch]

DIM025 LPOW-2415A

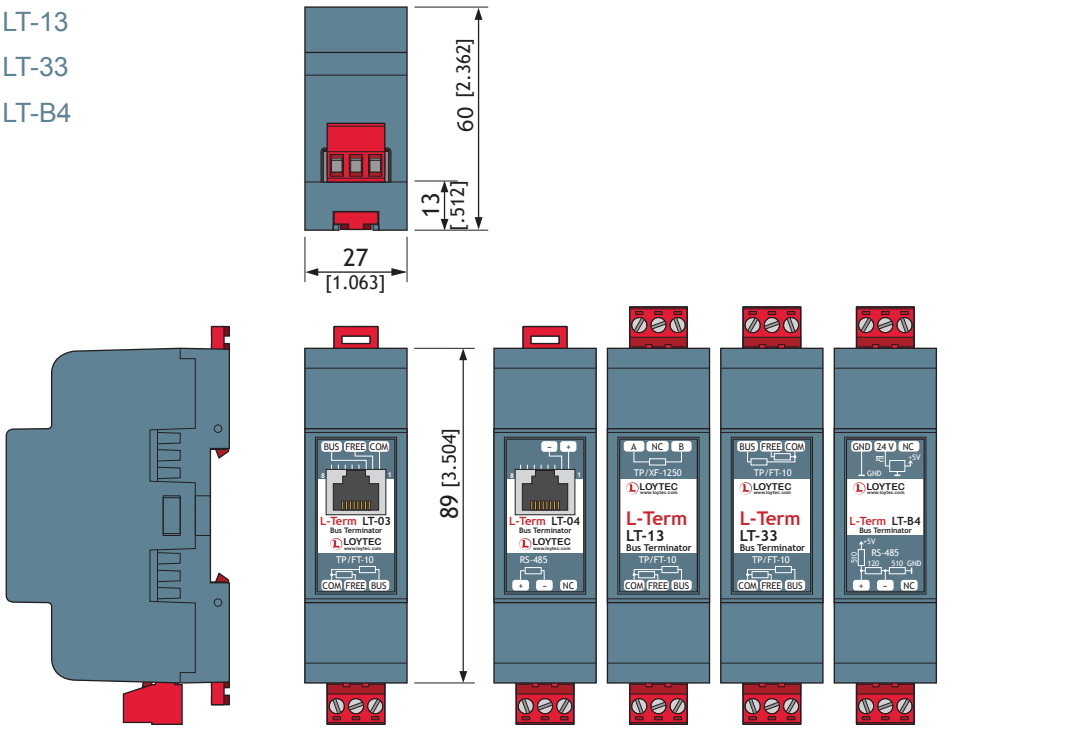


DIM026 LPOW-2415B



DIM027

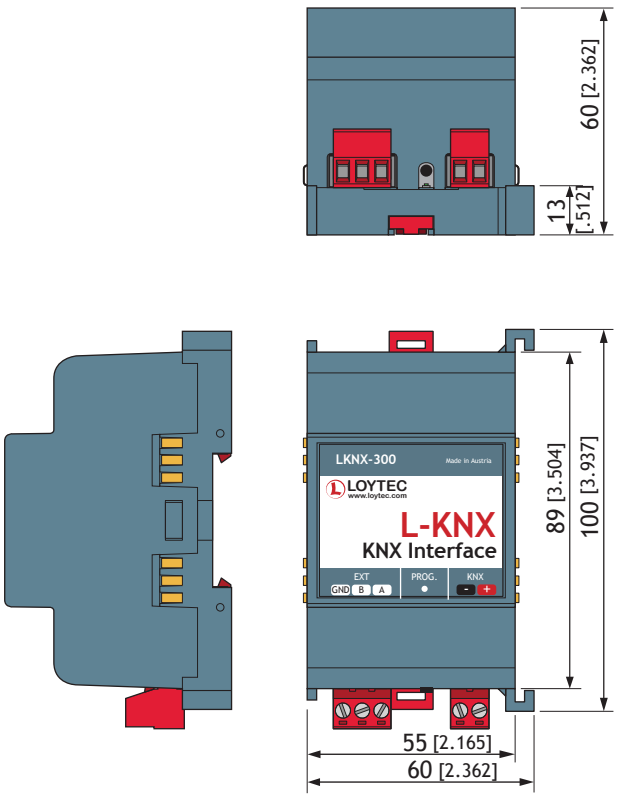
LT-03
LT-04
LT-13
LT-33
LT-B4



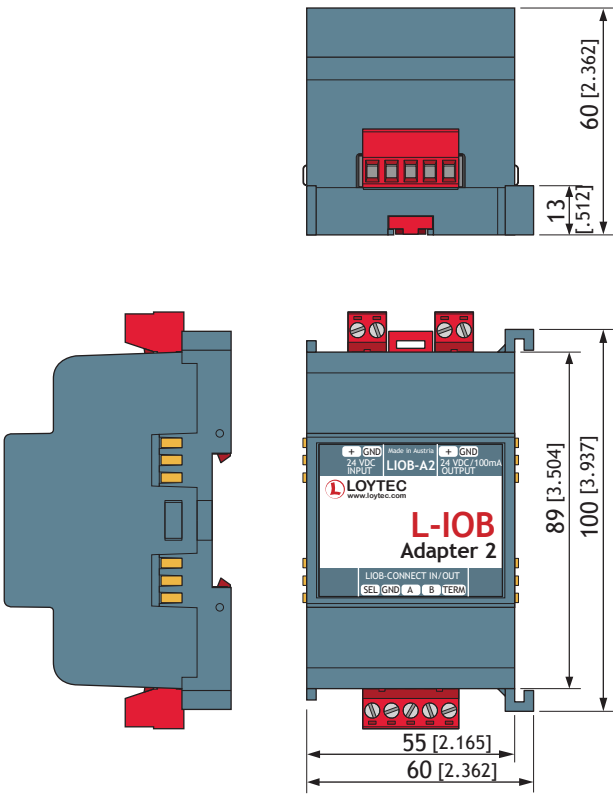
SCALE 1 : 2
10 0 20 40 60 80 100 mm

Dimensions of the devices in mm and [inch]

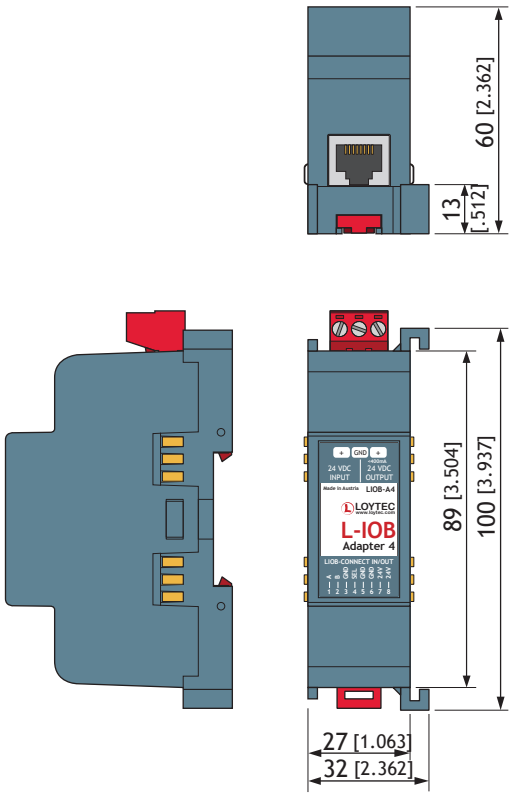
DIM028 LKNX-300



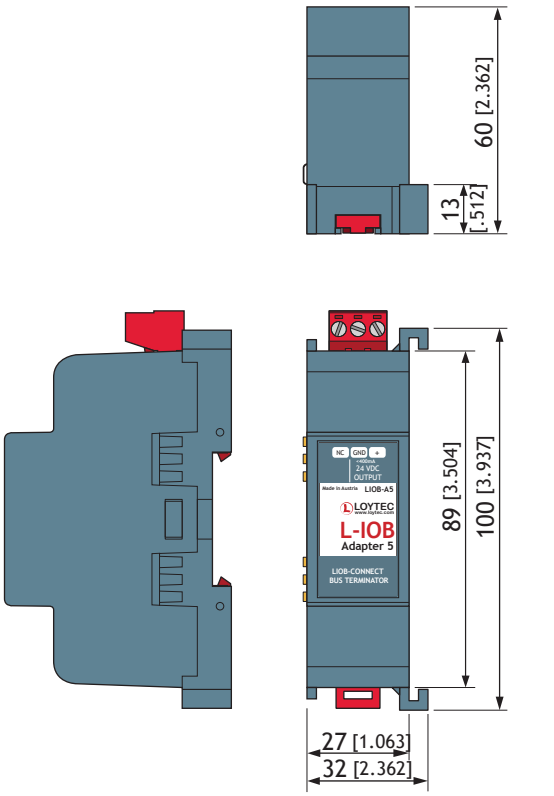
DIM029 LIOB-A2



DIM030 LIOB-A4



DIM031 LIOB-A5



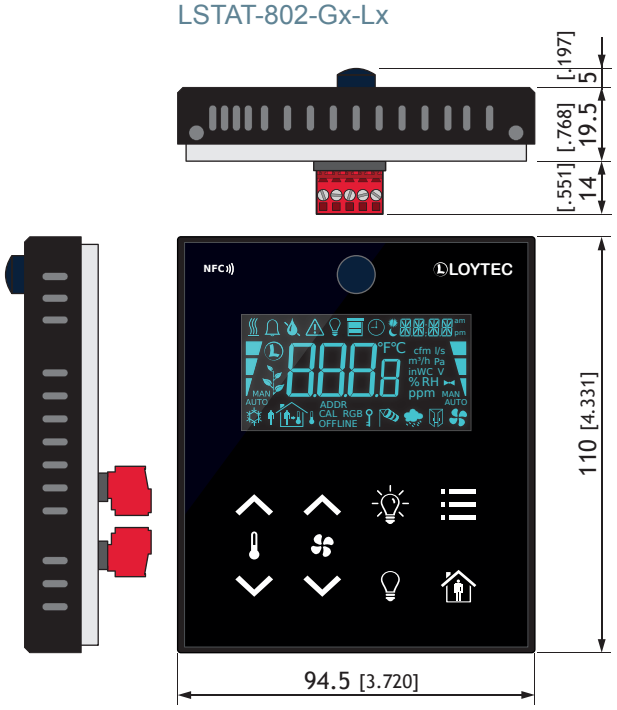
SCALE 1 : 2

10 0 20 40 60 80 100 mm

Dimensions of the devices in mm and [inch]

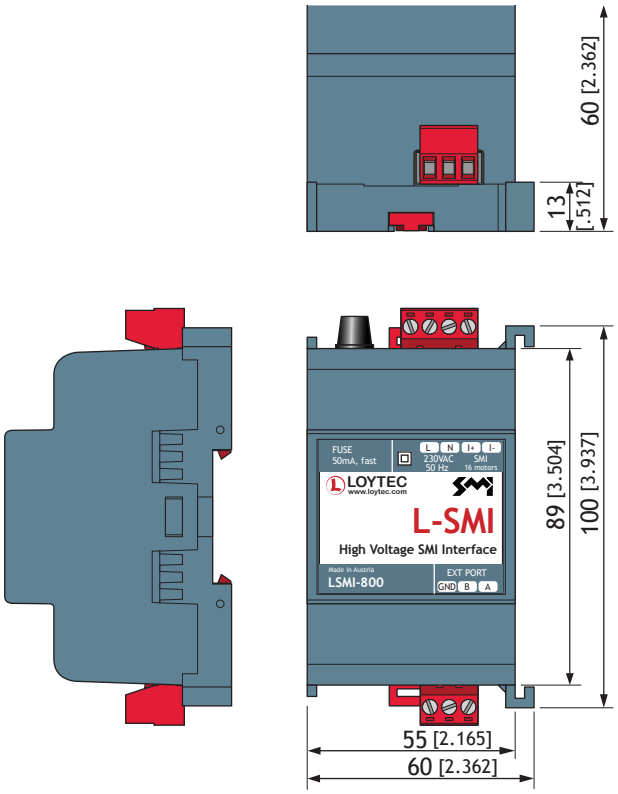
DIM032

LSTAT-800-Gx-Lx
LSTAT-801-Gx-Lx
LSTAT-802-Gx-Lx



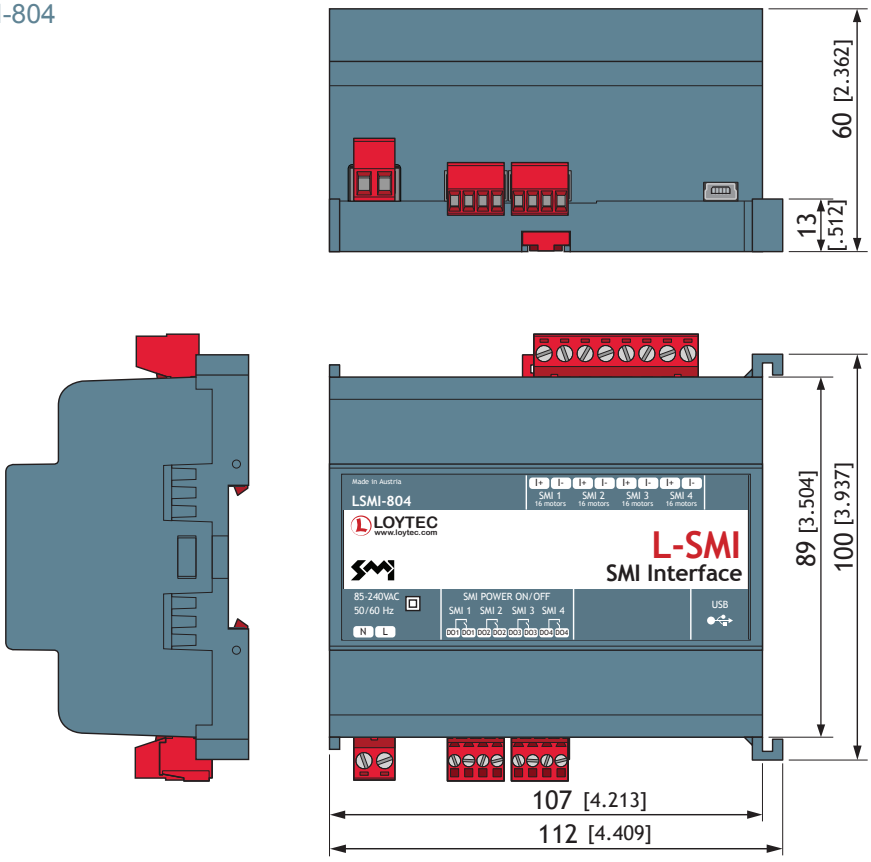
DIM033

LSMI-800



DIM034

LSMI-804

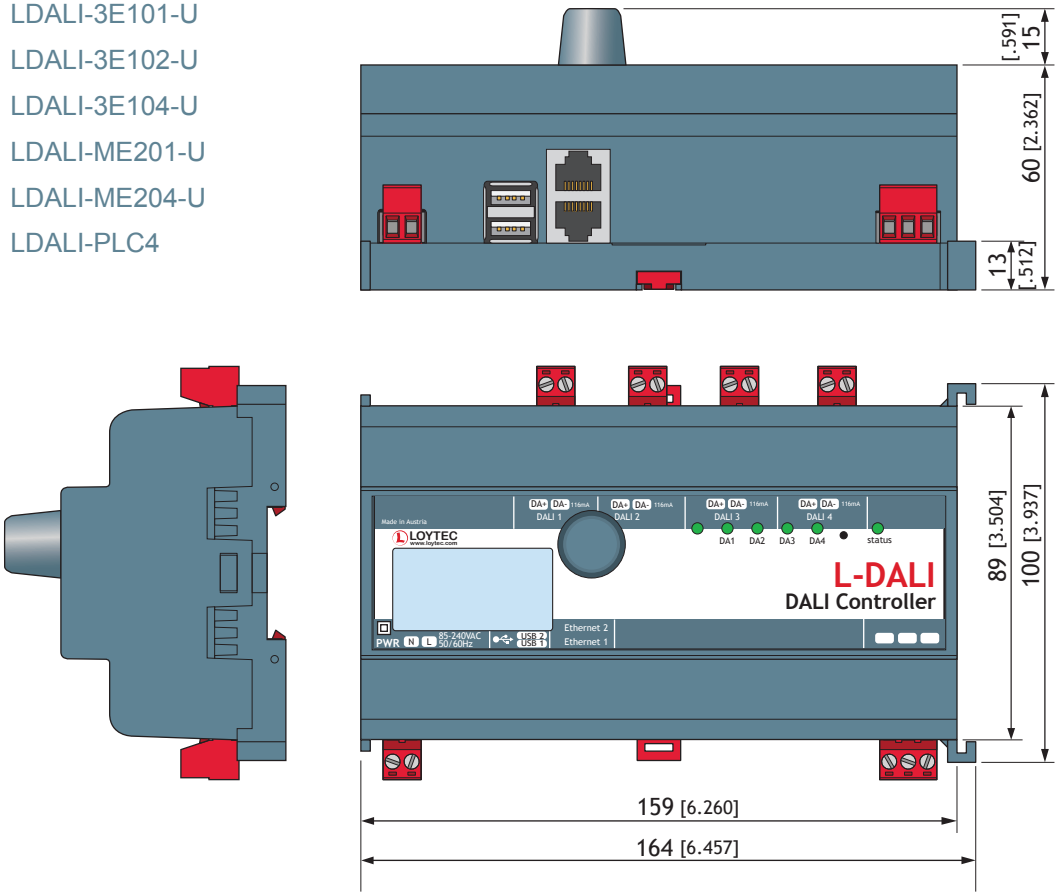


SCALE 1 : 2
10 0 20 40 60 80 100 mm

Dimensions of the devices in mm and [inch]

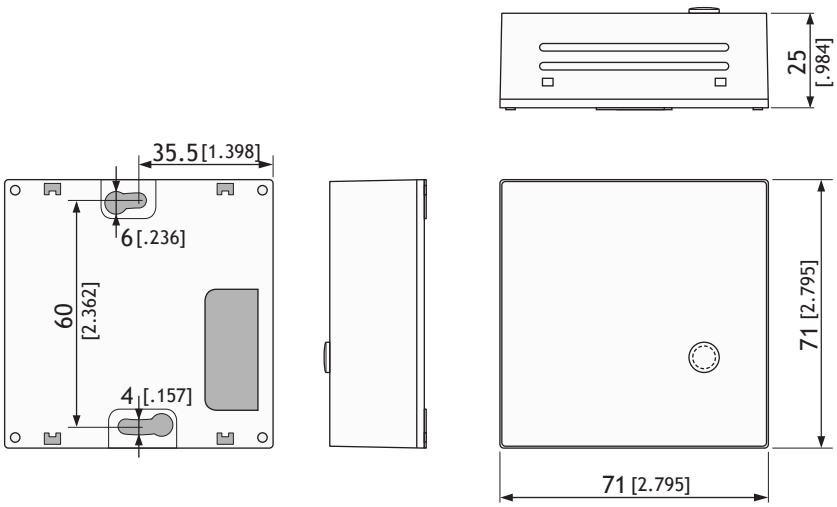
DIM035

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



DIM036

L-TEMP1
L-TEMP2

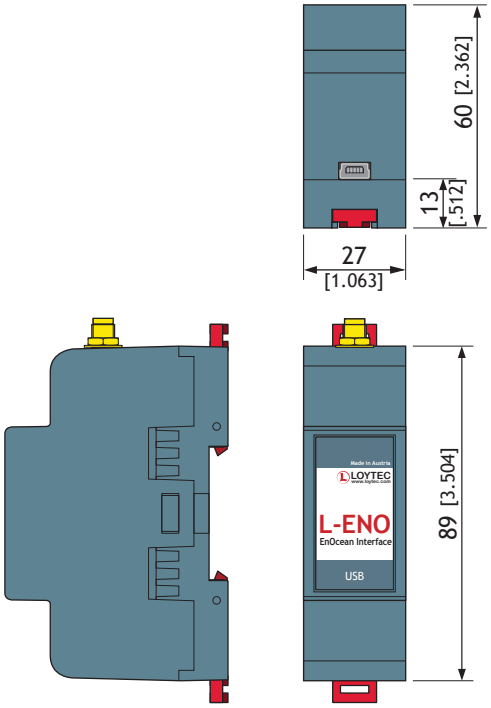


SCALE 1 : 2
10 0 20 40 60 80 100 mm

Dimensions of the devices in mm and [inch]

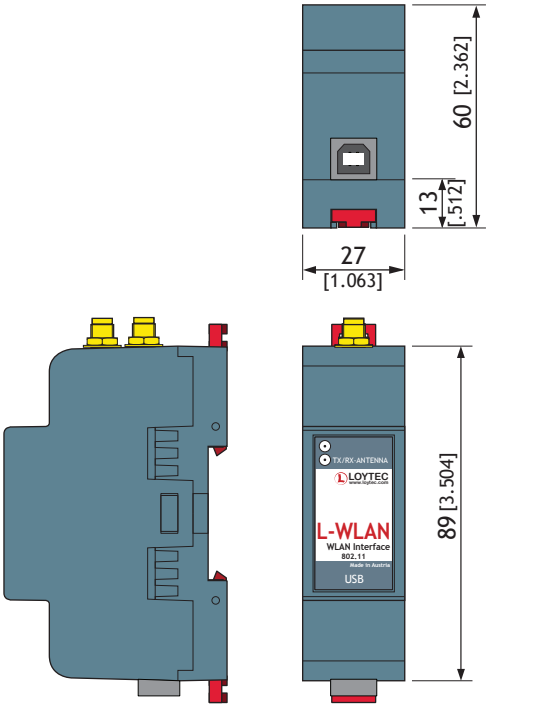
DIM037

LENO-800
LENO-801
LENO-802



DIM038

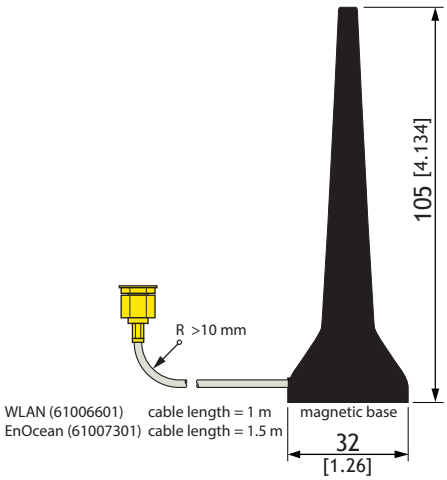
LWLAN-800





DIM039

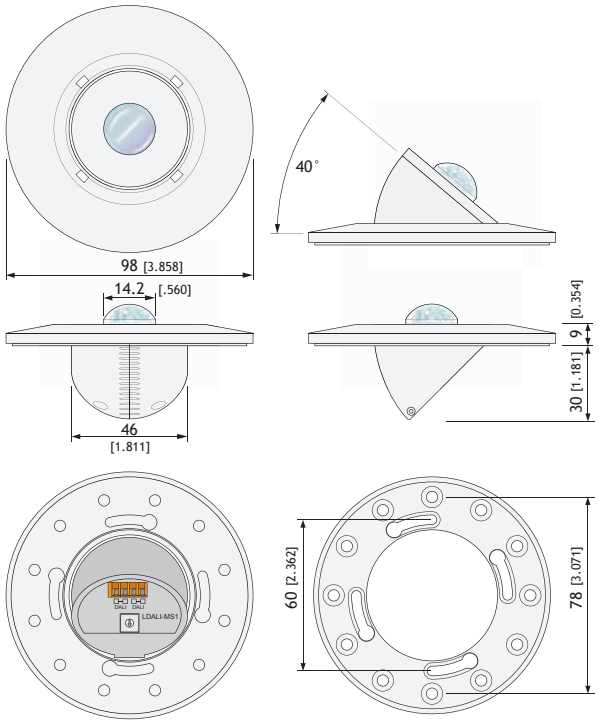
WLAN Antenna 2.4 GHz
EnOcean Antenna 868/905 MHz





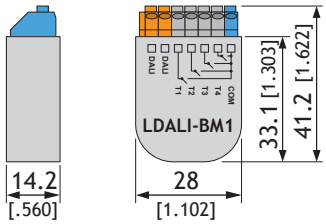
Dimensions of the devices in mm and [inch]

DIM040 LDALI-MS1

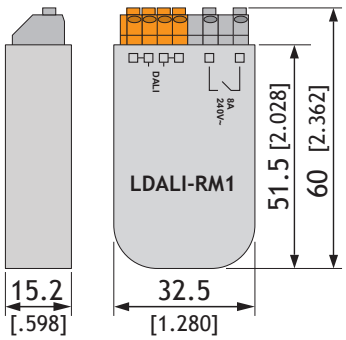


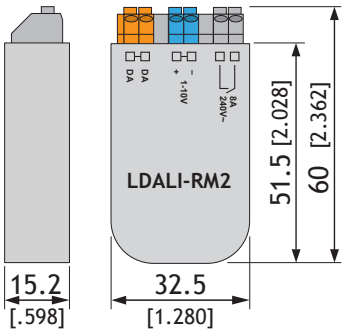


DIM041 LDALI-BM1



DIM042 LDALI-RM1 LDALI-RM2



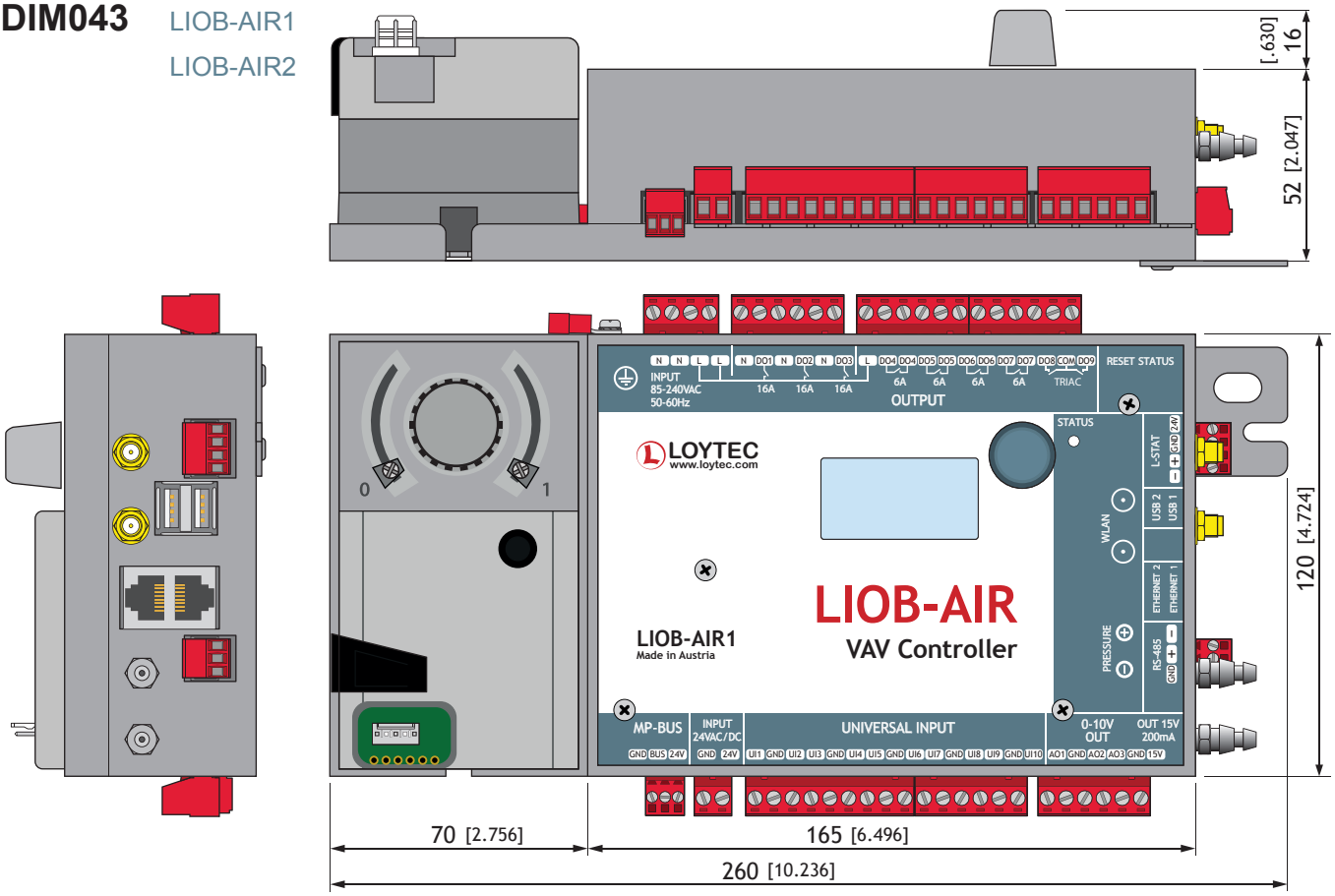




Dimensions of the devices in mm and [inch]

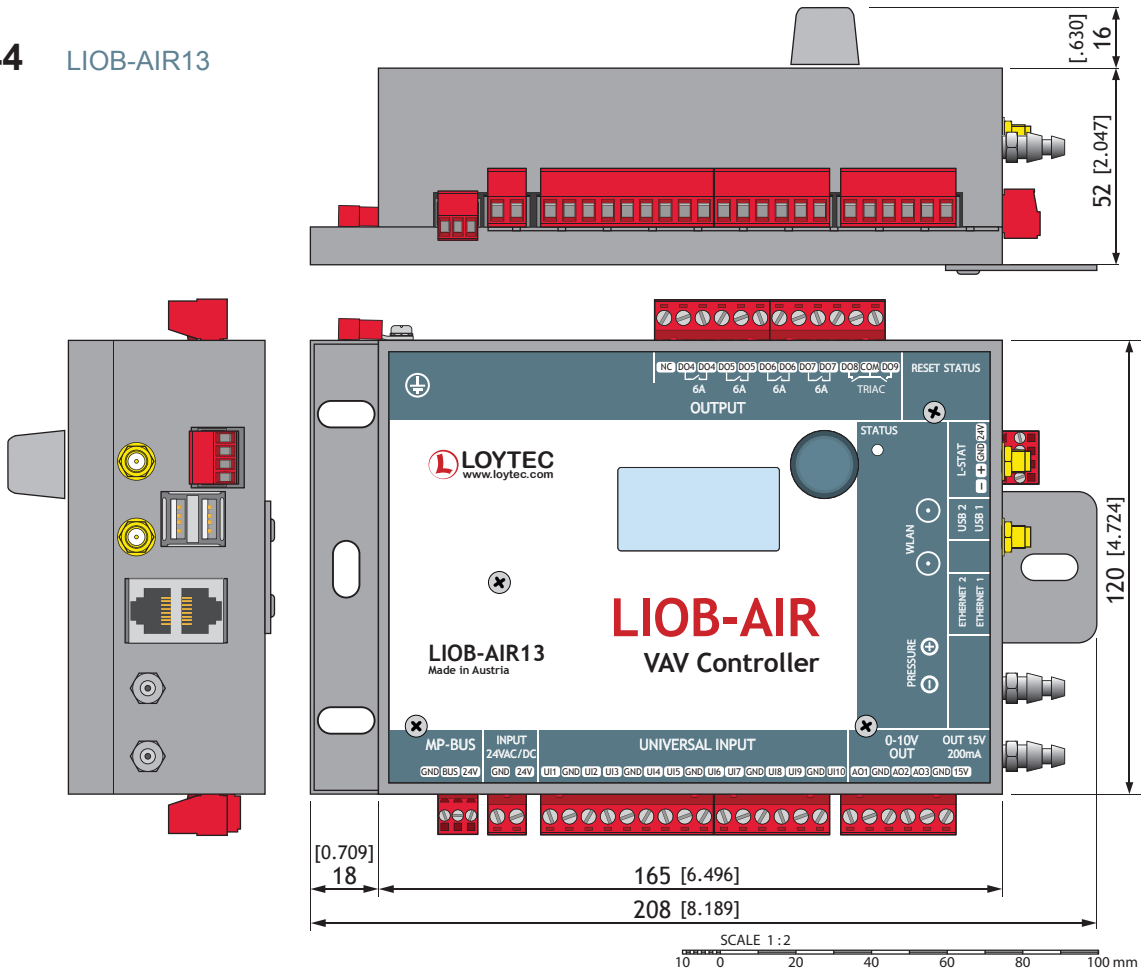
DIM043

LIOB-AIR1
LIOB-AIR2



DIM044

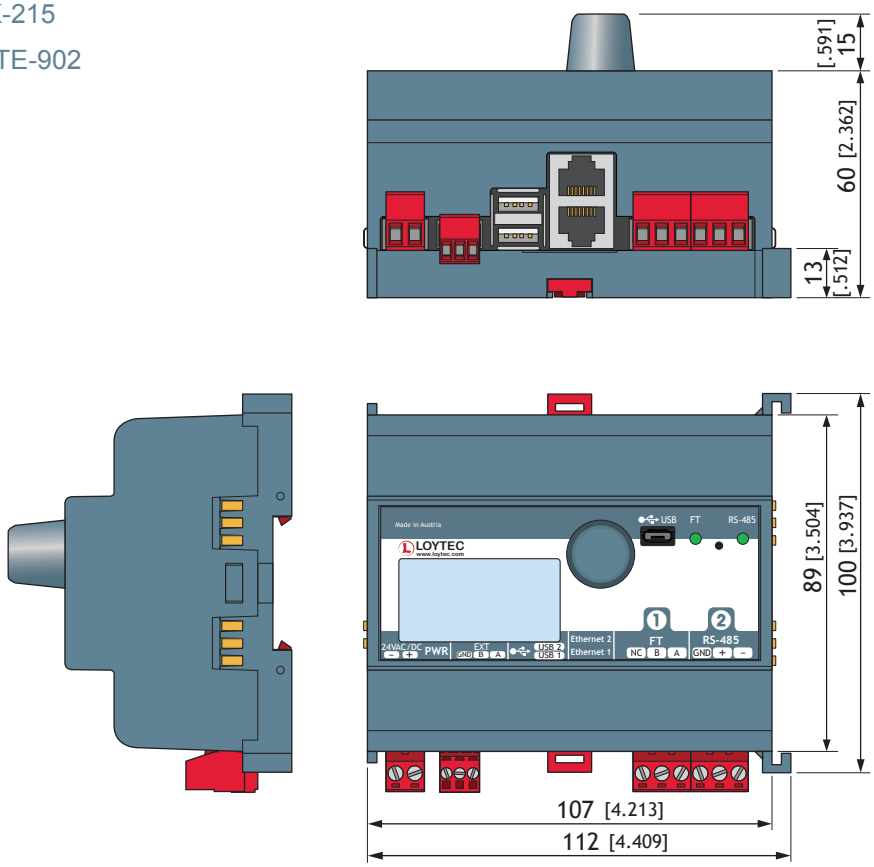
LIOB-AIR13



Dimensions of the devices in mm and [inch]

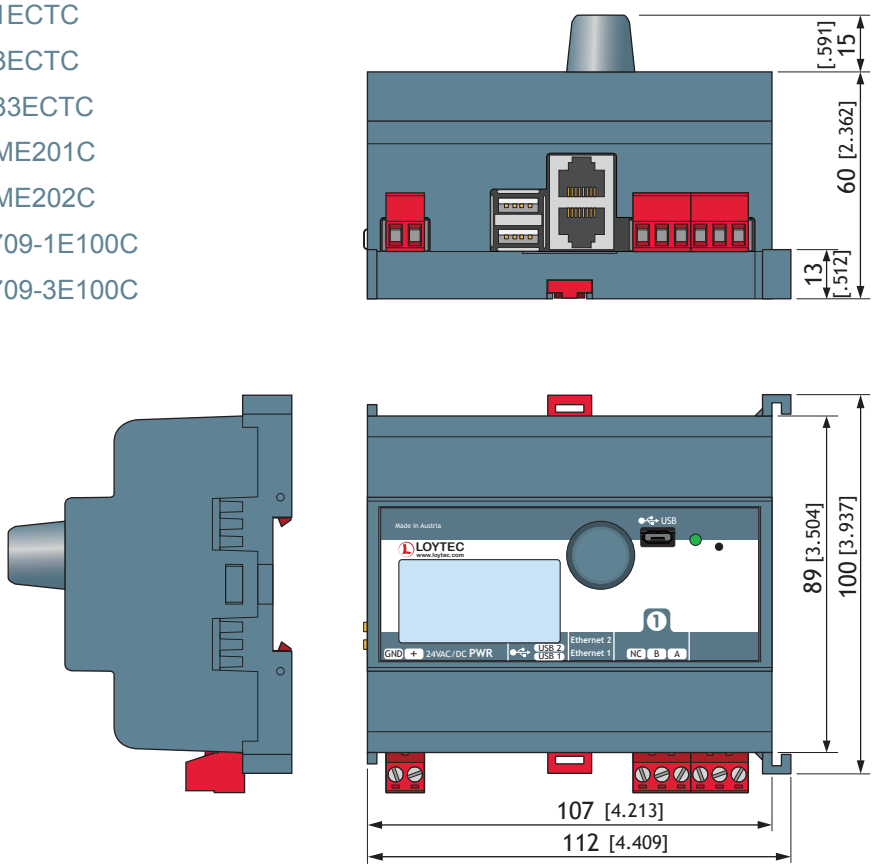
DIM045

LINX-215
LGATE-902



DIM046

LIP-1ECTC
LIP-3ECTC
LIP-33ECTC
LIP-ME201C
LIP-ME202C
NIC709-1E100C
NIC709-3E100C

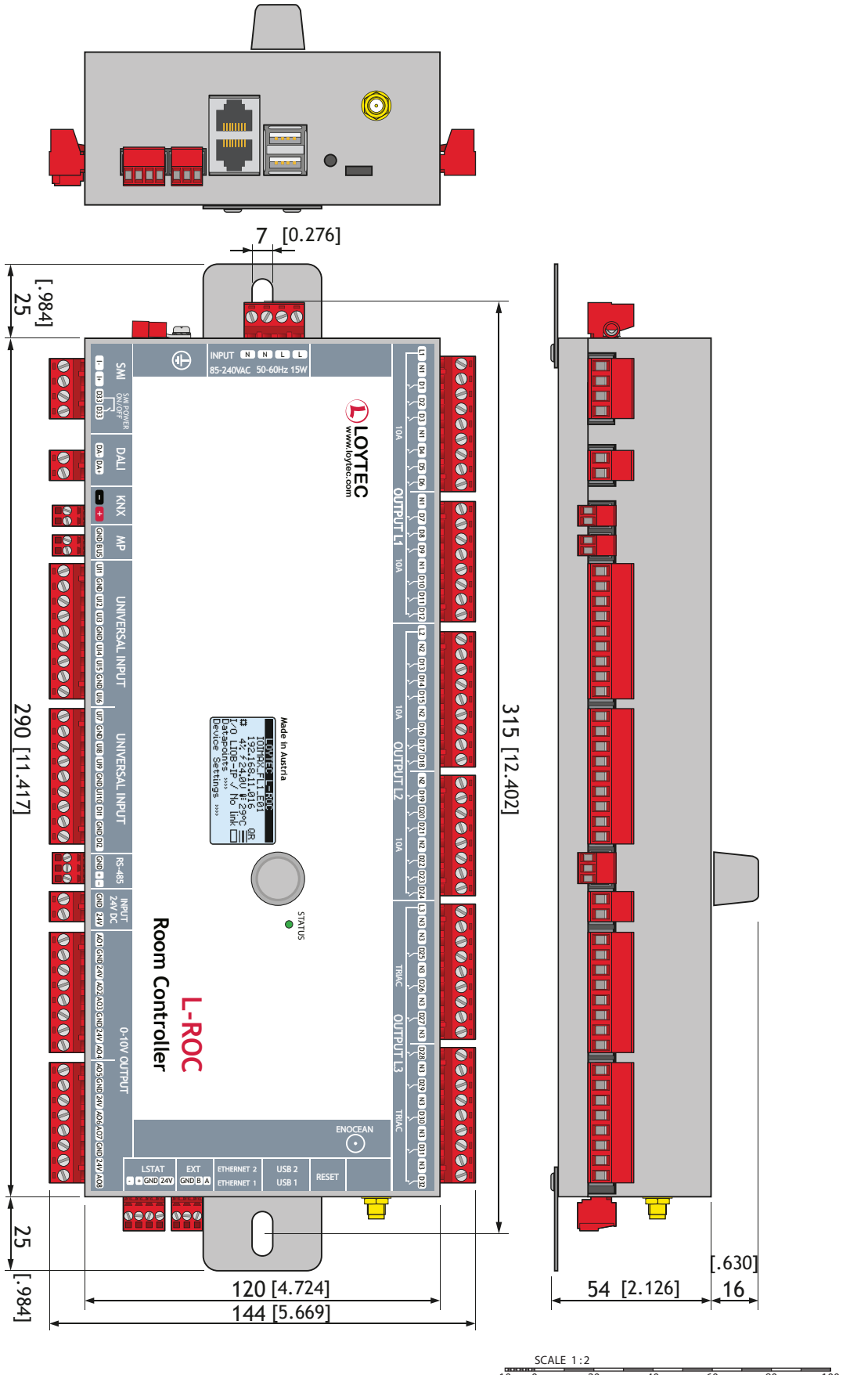


SCALE 1 : 2
10 0 20 40 60 80 100 mm

Dimensions of the devices in mm and [inch]

DIM047

LROC-400
LROC-401
LROC-402

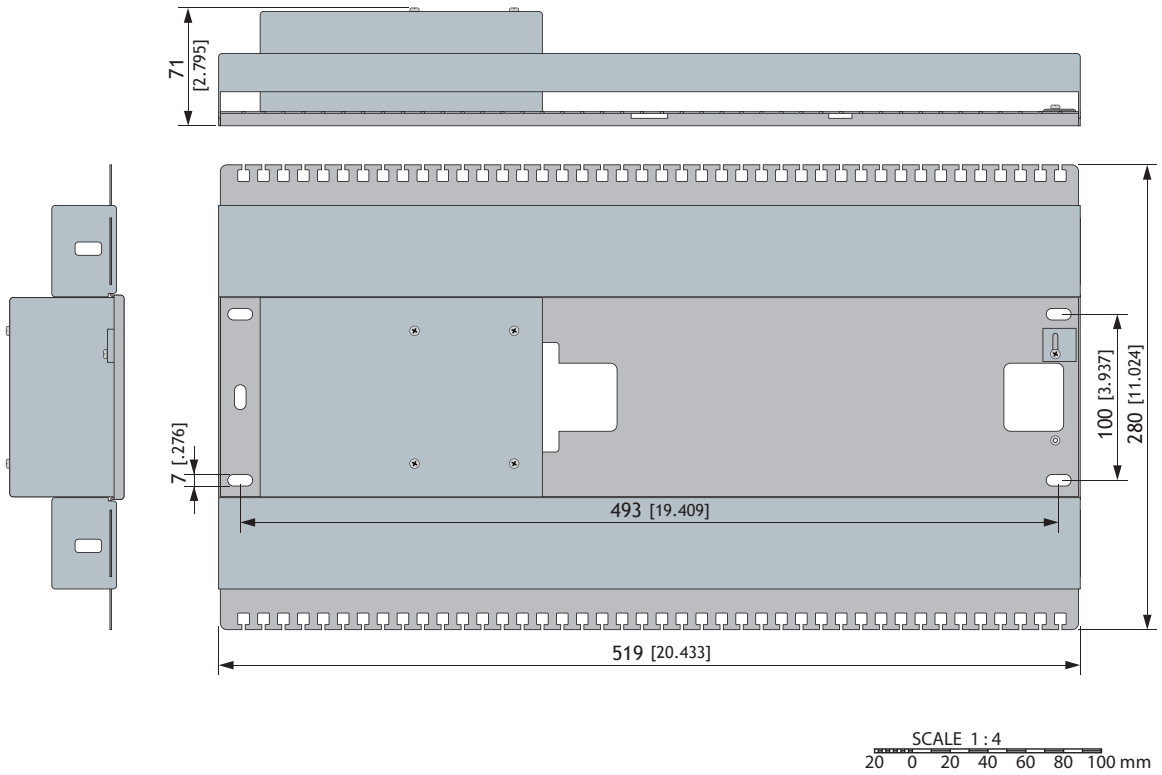


Dimensions of the devices in mm and [inch]

DIM048

LBOX-ROC1

LBOX-ROC2



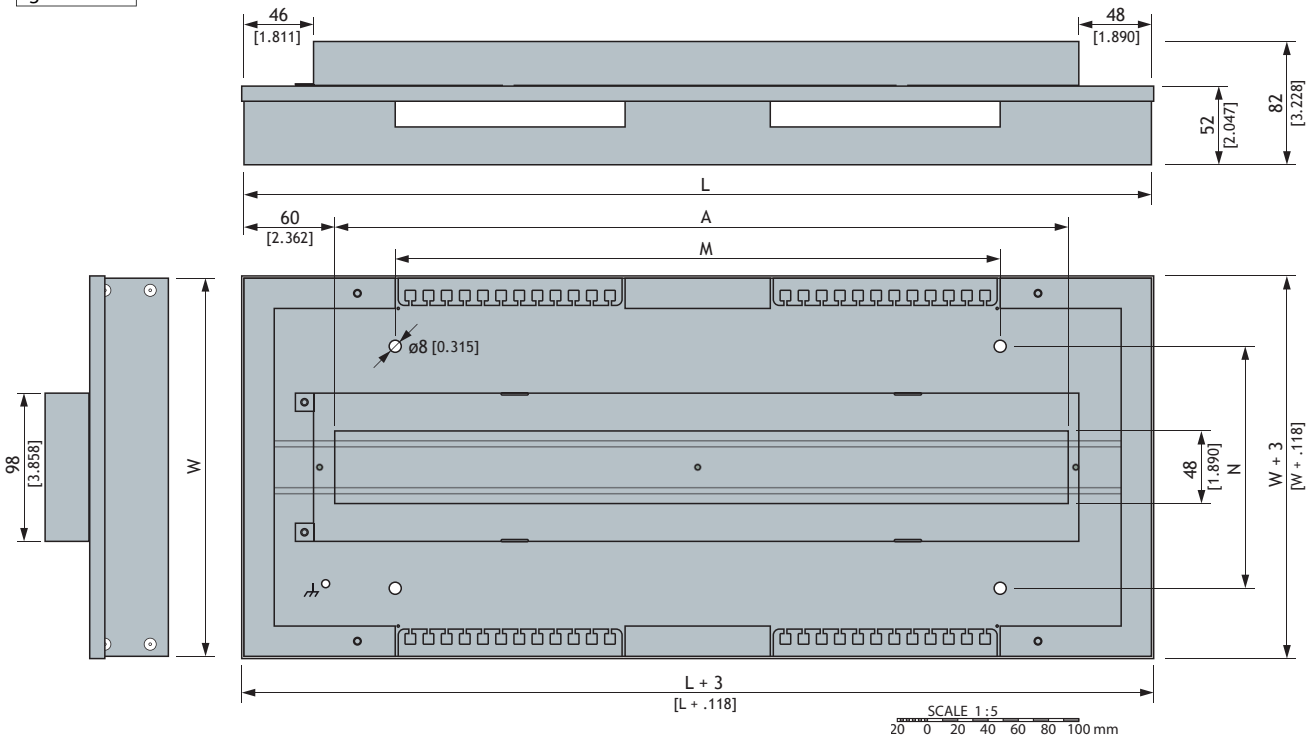
DIM049

LBOX-600

Metal
DC01
Sendzimir
galvanized

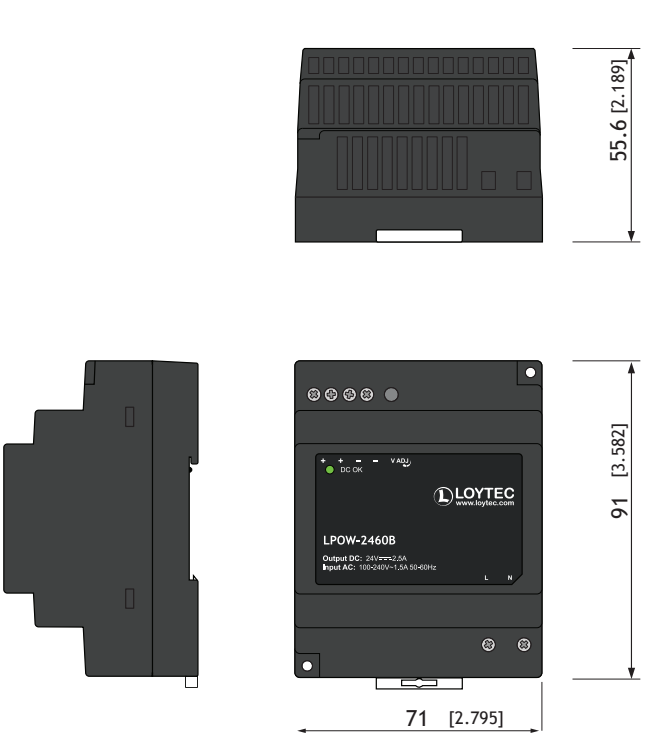
	L	W	A	M	N
LBOX-600	600 [23.622]	250 [9.843]	485 [19.094]	400 [15.748]	160 [6.299]

M, N … mounting hole dimensions, ø 8.0 [0.315]

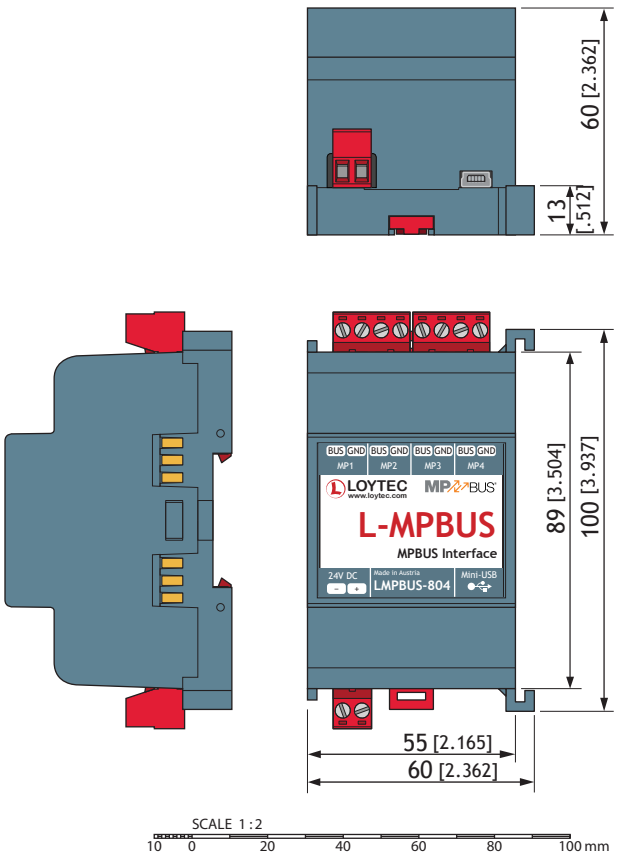


Dimensions of the devices in mm and [inch]

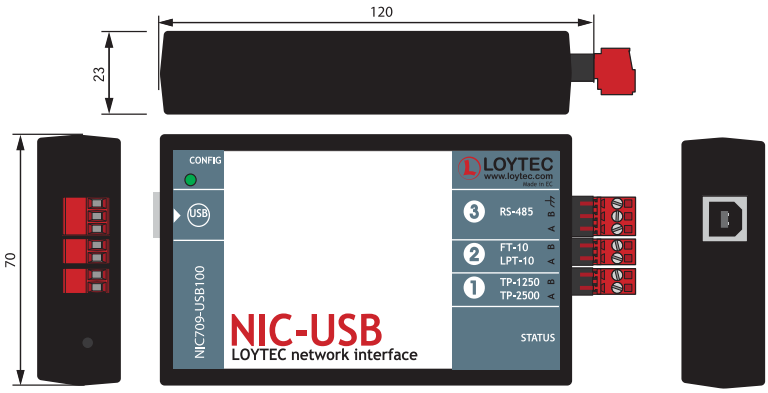
DIM050 LPOW-2460B



DIM051 LMPBUS-804



DIM052 NIC709-USB100

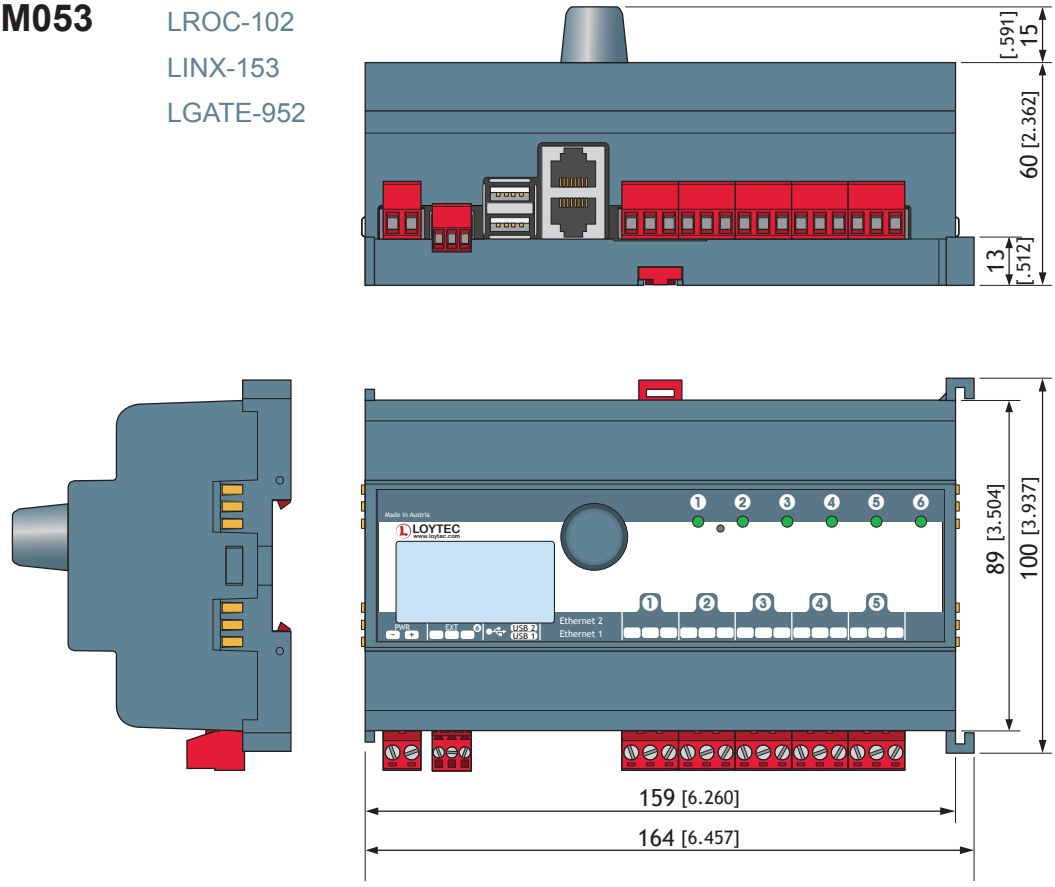


SCALE 1:2
10 0 20 40 60 80 100 mm

Dimensions of the devices in mm and [inch]

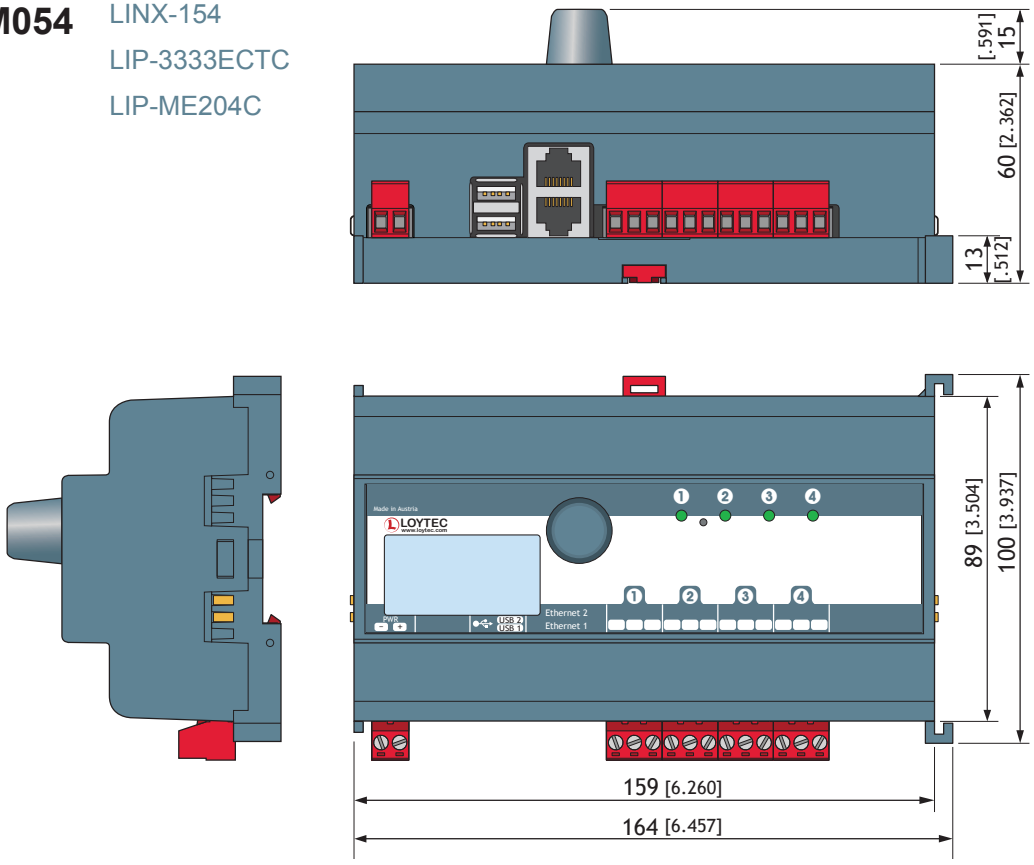
DIM053

LROC-102
LINX-153
LGATE-952



DIM054

LINX-154
LIP-3333ECTC
LIP-ME204C



SCALE 1:2
10 0 20 40 60 80 100 mm

Certificates







LonMark Certified Products

The L-IOB I/O Modules are officially certified as LonMark products:

- LIOB-150 LIOB-FT I/O Module
- LIOB-151, LIOB-152, and LIOB-153 LIOB-FT I/O Modules
- LIOB-154 LIOB-FT I/O Module
- LIOB-450, LIOB-451, LIOB-452, LIOB-453, and LIOB-454 LIOB-IP852 I/O Modules



BACnet CONFORMANCE CERTIFICATE

No. BTL-30142

WSPCert attests the conformance of the following BACnet implementation to the BACnet standard ISO 16484-5 protocol revision 1.12. The attested conformance refers to the BACnet Interoperability Building Blocks (BIBBs) listed on the BTL Listing bearing the above-mentioned BTL-number.

The BACnet implementation has fulfilled the requirements according to the test standard ISO 16484-6, the BTL Test Plan 12.0 and the BTL Test Policies, see Test Report number VG 2015_11422 of MBS.

Product name (B-BC)
BACnet Building Controller **Models LINX-150, LINX-151, LINX-153, LINX-154, LINX-200, LINX-201, LINX-210, LINX-211, LINX-220, LINX-221, LINX2, LGATE-900, LGATE-902, LGATE-950, LGATE-951, LGATE-952**
Software version
6.0
Vendor
LOYTEC electronics GmbH Blumengasse 35 1170 Wien, Austria

This certificate is valid until **31-Mar-2022**.

11-Apr-2016
Date of Initial Certification

Dipl.-Ing. G. Weinmann
Head of Certification Body

© 2017 by BACnet International. All rights reserved

Certification verified by
WSPCert Dr.-Ing. Frank Bitter
Kapsulrieweg 7, 70374 Stuttgart, Germany
Phone: +49 (0)711 9509020, email: info@wspcert.de

BACnet Conformance Certificates

The complete family of the BACnet enabled L-INX Automation Servers and L-GATE Gateways are BTL tested and certified according to the standard ISO 16484-6:2016 as BACnet Building Controllers (B-BC).



BACnet CONFORMANCE CERTIFICATE

No. BTL-30143

WSPCert attests the conformance of the following BACnet implementation to the BACnet standard ISO 16484-5 protocol revision 1.12. The attested conformance refers to the BACnet Interoperability Building Blocks (BIBBs) listed on the BTL Listing bearing the above-mentioned BTL-number.

The BACnet implementation has fulfilled the requirements according to the test standard ISO 16484-6, the BTL Test Plan 12.0 and the BTL Test Policies, see Test Report number VG 2015_11422 of MBS.

Product name (B-BC)
BACnet Building Controller **Models LROC-100, LROC-101, LROC-102, LIP-ME201, LIP-ME201C, LIP-ME202C, LIP-ME204, LIP-ME204C, LDALI-PLC4, LDALI-ME201U, LDALI-ME204U**
Software version
6.0
Vendor
LOYTEC electronics GmbH Blumengasse 35 1170 Wien, Austria

This certificate is valid until **31-Mar-2022**.

11-Apr-2016
Date of Initial Certification

Dipl.-Ing. G. Weinmann
Head of Certification Body

© 2017 by BACnet International. All rights reserved

Certification verified by
WSPCert Dr.-Ing. Frank Bitter
Kapsulrieweg 7, 70374 Stuttgart, Germany
Phone: +49 (0)711 9509020, email: info@wspcert.de

The LIP-ME20x BACnet/IP to BACnet MS/TP Router, the LROC-10x Controller, the LDALI-ME20x and the LDALI-PLC4 Controller are BTL tested and certified according to the standard ISO 16484-6:2016 as BACnet Building Controllers (B-BC).



BACnet CONFORMANCE CERTIFICATE

No. BTL-30144

WSPCert attests the conformance of the following BACnet implementation to the BACnet standard ISO 16484-5 protocol revision 1.12. The attested conformance refers to the BACnet Interoperability Building Blocks (BIBBs) listed on the BTL Listing bearing the above-mentioned BTL-number.

The BACnet implementation has fulfilled the requirements according to the test standard ISO 16484-6, the BTL Test Plan 12.0 and the BTL Test Policies, see Test Report number VG 2015_11422 of MBS.

Product name (B-BC)
BACnet module for **LIOB-5xx, LROC-4xx and LIOB-AIRx**
Software version
6.0
Vendor
LOYTEC electronics GmbH Blumengasse 35 1170 Wien, Austria

This certificate is valid until **31-Mar-2022**.

11-Apr-2016
Date of Initial Certification

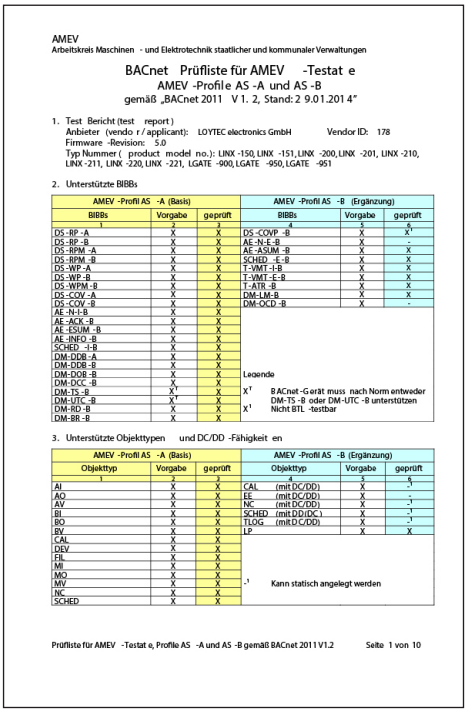
Dipl.-Ing. G. Weinmann
Head of Certification Body

© 2017 by BACnet International. All rights reserved

Certification verified by
WSPCert Dr.-Ing. Frank Bitter
Kapsulrieweg 7, 70374 Stuttgart, Germany
Phone: +49 (0)711 9509020, email: info@wspcert.de

The LIOB-BIP I/O Modules LIOB-55x, the LIOB-BIP I/O Controllers LIOB-58x, the LIOB-AIRx Controllers and the LROC-4xx Controllers are BTL tested and certified according to the standard ISO 16484-6:2016 as BACnet Building Controllers (B-BC).

Certificates



AMEV
Arbeitskreis Maschinen - und Elektrotechnik staatlicher und kommunaler Verwaltungen

BACnet Prüfliste für AMEV -Testat e
AMEV -Profile AS -A und AS -B
gemäß „BACnet 2011 V1. 2, Stand: 2 9.01.201 4"

1. Test Bericht (test report)
Anbieter (vendo r / applicant): LOYTEC electronics GmbH Vendor ID: 178
Firmware -Revision: 5.0
Typ Nummer (product model no.): LINX -150, LINX -151, LINX -200, LINX -201, LINX -210, LINX -211, LINX -220, LINX -221, LGATE -900, LGATE -950, LGATE -951

2. Unterstützte BIBBs

AMEV -Profil AS -A (Basis)			AMEV -Profil AS -B (Ergänzung)		
BIBBs	Vorgabe	geprüft	BIBBs	Vorgabe	geprüft
1	2	3	4	5	6
DS-RP -A	X	X	DS -COVP -B	X	X[1]
DS-RP -B	X	X	AE-N-E-B	X	-
DS-RPM -A	X	X	AE-ASUM -B	X	X
DS-RPM -B	X	X	SCHED -E-B	X	X
DS-WP -A	X	X	T-VMT-I-B	X	X
DS-WP -B	X	X	T-VMT-E-B	X	X
DS-WPM -B	X	X	T-ATR -B	X	X
DS-COV -A	X	X	DM-LM-B	X	X
DS-COV -B	X	X	DM-OCD -B	X	-
AE-N-I-B	X	X			
AE-ACK -B	X	X			
AE-ESUM -B	X	X			
AE-INFO -B	X	X			
SCHED -I-B	X	X			
DM-DDB -A	X	X			
DM-DDB -B	X	X			
DM-DOB -B	X	X	Legende		
DM-DCC -B	X	X			
DM-TS -B	X[1]	X	X[1] BACnet -Gerät muss nach Norm entweder DM-TS -B oder DM-UTC -B unterstützen		
DM-UTC -B	X[1]	X			
DM-RD -B	X	X	X[1] Nicht BTL -testbar		
DM-BR -B	X	X			

3. Unterstützte Objekttypen und DC/DD -Fähigkeit en

AMEV -Profil AS -A (Basis)			AMEV -Profil AS -B (Ergänzung)		
Objekttyp	Vorgabe	geprüft	Objekttyp	Vorgabe	geprüft
1	2	3	4	5	6
AI	X	X	CAL (mit DC/DD)	X	-[1]
AO	X	X	EE (mit DC/DD)	X	-
AV	X	X	NC (mit DC/DD)	X	-[1]
BI	X	X	SCHED (mit DD/DC)	X	-[1]
BO	X	X	TLOG (mit DC/DD)	X	-[1]
BV	X	X	LP	X	X
CAL	X	X			
DEV	X	X			
FIL	X	X			
MI	X	X			
MO	X	X			
MV	X	X	-[1] Kann statisch angelegt werden		
NC	X	X			
SCHED	X	X			

Prüfliste für AMEV -Testat e, Profile AS -A und AS -B gemäß BACnet 2011 V1.2 Seite 1 von 10

AMEV Self-declarations

The German study group of public and municipal administrations for machines and electrical facilities in buildings (AMEV) presents the AMEV profiles A and B presenting the recommended minimum feature set of BACnet devices regarding object types, services, etc. With the AMEV attestations, a BTL test laboratory can certify the AMEV profile of a certified BACnet device. A selection of BACnet compliant L-IOB I/O controllers and modules, L-INX automation servers and L-GATE gateways meets the AMEV profile AS-A according to BACnet 2011 V1.2.



Government Certified

We are proud to be licensed to carry the Austrian coat of arms for all business matters. This certificate is granted by the ministry of economics to companies with exceptional achievements for the Austrian industry and their nationwide prominent role within their market segment.



STANDARD MOTOR INTERFACE

Zertifikat

Nr. Z1607-1, Rev. 1

für Firma
LOYTEC electronics GmbH
Blumengasse 35
AT-Wien

für die Produkte:
LSMI-800
LSMI-804
LROC-40x

Die eingereichten Unterlagen sind vollständig und bestätigen die Übereinstimmung der SMI-Schnittstelle mit den Anforderungen:
Regulation for Certification and Registration, Rev. 1.1
SMI-Hardware, Spezifikation Rev. 2.0
SMI Data format, Rev. 2.3.2
SMI System specification, Rev. 1.9-E
SMI-Prüfvorschrift, Teil 1, Aktor, Rev. 2.5

Eingereichte Unterlagen:
- Prüfprotokolle nach SMI-Prüfvorschrift, Teil 1, Rev. 2.5 für LSMI-800, LSM-804 und LROC-40x mit Datum vom 7. Juni 2016:
  - Prüfprotokolle
  - Bilder LSMI-800, LSMI-804 und LROC-40x
  - Entwurf Datenblatt LSMI-800, LSMI-804 und LROC-40x
- E-Mail mit Antrag für Zertifizierung vom 9. Juni 2016
- Ergänzende Informationen mit Installationsanleitung LSMI-800 vom 21. Juni 2016
- Ergänzende Informationen mit Installationsanleitungen LSMI-804 und LROC-40x vom 5. Juli 2016

Steckborn, den 7. Juli 2016

SMI Standard Motor Interface e.V.
Geschäftsstelle

Otmar Stillhard

SMI Certificate

The LSMI-800, LSMI-804 and LROC-40x are certified and registered according to the Standard Motor Interface certification process (www.standard-motor-interface.com).



CERTIFICATE OF COMPLIANCE

Certificate Number 20160803-E475420
Report Reference E475420-20160727
Issue Date 2016-AUGUST-03

Issued to: LOYTEC electronics GmbH
Blumengasse 35
1170 Wien AUSTRIA

This is to certify that representative samples of: MISCELLANEOUS CONTROLS
LVIS-3ME7-G1, LVIS-3ME7-G2, LVIS-3ME12-A1, LVIS-3ME15-A1, LVIS-3ME15-G1, LVIS-3ME15-G2, LVIS-3ME15-G3

LSTAT-80x-y-Lz where x can be 0 or 1 or 2, y can be G1 or G2 or G3 and z can be any digit from 1 to 6

Have been investigated by UL in accordance with the Standard(s) indicated on this Certificate.

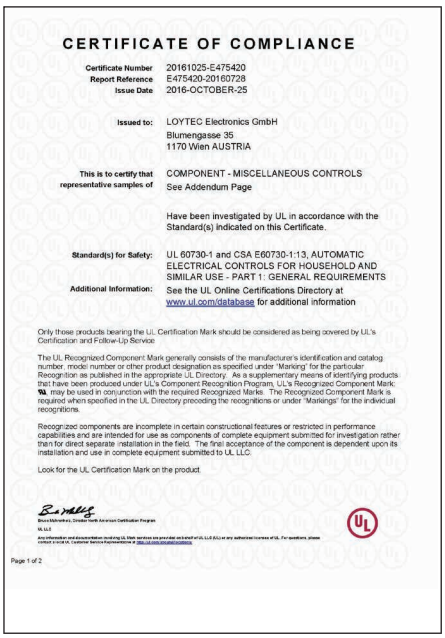
Standard(s) for Safety: UL 60730-1 - AUTOMATIC ELECTRICAL CONTROLS FOR HOUSEHOLD AND SIMILAR USE - PART 1: GENERAL REQUIREMENTS.
CSA E60730-1:13 - AUTOMATIC ELECTRICAL CONTROLS FOR HOUSEHOLD AND SIMILAR USE - PART 1: GENERAL REQUIREMENTS.

Additional Information: See the UL Online Certifications Directory at www.ul.com/database for additional information

Only those products bearing the UL Certification Mark should be considered as being covered by UL's Certification and Follow-Up Service.

Look for the UL Certification Mark on the product.

Page 1 of 1



CERTIFICATE OF COMPLIANCE

Certificate Number 20161025-E475420
Report Reference E475420-20160728
Issue Date 2016-OCTOBER-25

Issued to: LOYTEC Electronics GmbH
Blumengasse 35
1170 Wien AUSTRIA

This is to certify that representative samples of: COMPONENT - MISCELLANEOUS CONTROLS
See Addendum Page

Have been investigated by UL in accordance with the Standard(s) indicated on this Certificate.

Standard(s) for Safety: UL 60730-1 and CSA E60730-1:13, AUTOMATIC ELECTRICAL CONTROLS FOR HOUSEHOLD AND SIMILAR USE - PART 1: GENERAL REQUIREMENTS

Additional Information: See the UL Online Certifications Directory at www.ul.com/database for additional information

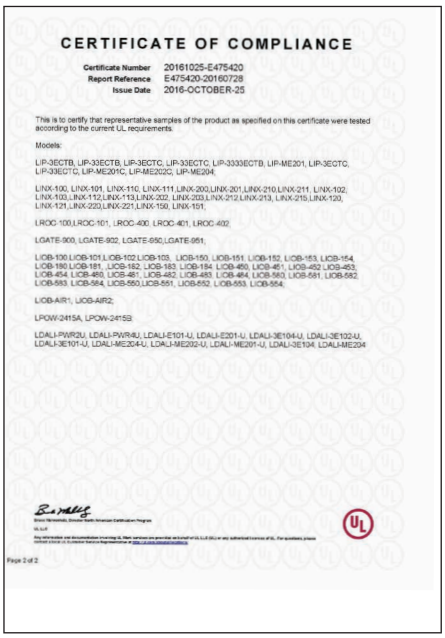
Only those products bearing the UL Certification Mark should be considered as being covered by UL's Certification and Follow-Up Service.

The UL Recognized Component Mark generally consists of the manufacturer's identification and catalog number, model number or other product designation as specified under "Marking" for the particular Recognition as published in the appropriate UL Directory. As a supplementary means of identifying products that have been produced under UL's Component Recognition Program, UL's Recognized Component Mark, , may be used in conjunction with the required Recognized Marks. The Recognized Component Mark is required when specified in the UL Directory preceding the recognitions or under "Markings" for the individual recognitions.

Recognized components are incomplete in certain constructional features or restricted in performance capabilities and are intended for use as components of complete equipment submitted for investigation rather than for direct separate installation in the field. The final acceptance of the component is dependent upon its installation and use in complete equipment submitted to UL LLC.

Look for the UL Certification Mark on the product.

Page 1 of 2



CERTIFICATE OF COMPLIANCE

Certificate Number 20161025-E475420
Report Reference E475420-20160728
Issue Date 2016-OCTOBER-25

This is to certify that representative samples of the product as specified on this certificate were tested according to the current UL requirements.

Models:

LIP-3ECTB, LIP-33ECTB, LIP-3ECTC, LIP-33ECTC, LIP-3333ECTB, LIP-ME201, LIP-3ECTC, LIP-33ECTC, LIP-ME201C, LIP-ME202C, LIP-ME204,

LINX-100, LINX-101, LINX-110, LINX-111,LINX-200,LINX-201,LINX-210,LINX-211, LINX-102, LINX-103,,LINX-112,LINX-113,LINX-202, LINX-203,LINX-212,LINX-213, LINX-215,LINX-120, LINX-121,,LINX-220,LINX-221,LINX-150, LINX-151,

LROC-100,LROC-101, LROC-400, LROC-401, LROC-402,

LGATE-900, LGATE-902, LGATE-950,LGATE-951,

LIOB-100,LIOB-101,LIOB-102,LIOB-103, LIOB-150, LIOB-151, LIOB-152, LIOB-153, LIOB-154, LIOB-180,LIOB-181, LIOB-182, LIOB-183, LIOB-184, LIOB-450, LIOB-451, LIOB-452,LIOB-453, LIOB-454, LIOB-480, LIOB-481, LIOB-482, LIOB-483, LIOB-484, LIOB-580, LIOB-581, LIOB-582, LIOB-583, LIOB-584, LIOB-590,LIOB-591, LIOB-592, LIOB-593, LIOB-594,

LIOB-AIR1, LIOB-AIR2,

LPOW-2415A, LPOW-2415B

LDALI-PWR2U, LDALI-PWR4U, LDALI-E101-U, LDALI-E201-U, LDALI-3E104-U, LDALI-3E102-U, LDALI-3E101-U, LDALI-ME204-U, LDALI-ME202-U, LDALI-ME201-U, LDALI-3E104, LDALI-ME204

Page 2 of 2

UL Certificate

The LOYTEC products are certified and registered according to the UL certification process.

Certificates



CERTIFICATE

TÜV AUSTRIA

Management system as per
EN ISO 9001:2015

In accordance with TÜV AUSTRIA CERT procedures, it is hereby certified that

LOYTEC
www.loytec.com
LOYTEC electronics GmbH
Blumengasse 35
A-1170 Wien

applies a management system in line with the above standard for the following scope

development, production and distribution
of electronic devices and components

Certificate Registration No. 2010032000455 Valid until 2019-06-11

Certification Body
at TÜV AUSTRIA CERT GMBH

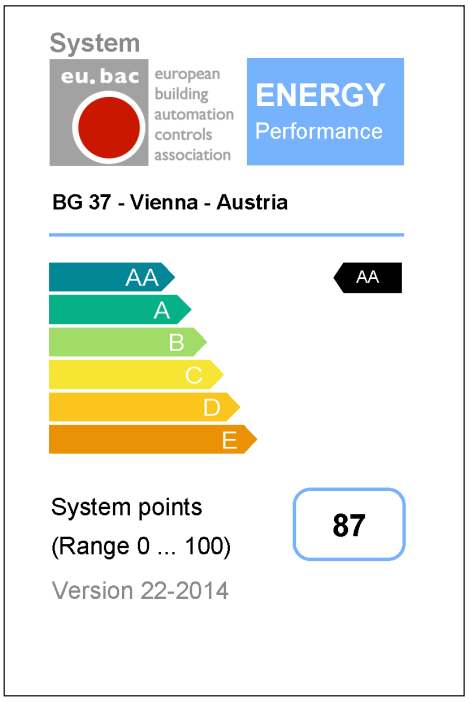
Vienna, 2016-06-23

This certification was conducted in accordance with TÜV AUSTRIA CERT auditing and certification procedures and is subject to regular surveillance audits.
TÜV AUSTRIA CERT GMBH Krugerstraße 16 A-1015 Wien www.tuv.at

ZERTIFIKAT | CERTIFICATE | CERTIFICAT | CERTIFICADO | СЕРТИФИКАТ | 证书 | 인증서

EN ISO 9001:2015

We realize that the quality of our products substantially influences the overall performance of our customers' systems. Therefore we are committed to deliver high quality as defined by ISO 9001:2015. Our quality goals and their realization are documented in our quality management handbook and in process documents.



System

eu.bac european building automation controls association

ENERGY Performance

BG 37 - Vienna - Austria

AA
A
B
C
D
E

AA

System points
(Range 0 ... 100)

87

Version 22-2014

eu.bac System Certification

Thanks to the efficiency features of the room automation system L-ROC, LOYTEC was able to acquire an eu.bac system certification of the highest class AA, reaching 87 out of 100 possible points, for the new building at Blumengasse 37 in March 2014. The registered eu.bac Cert Mark symbolizes energy efficiency and quality and is also the European quality label for products in the field of building automation.

AST, LC3020, L-Chip, L-Core, L-DALI, L-ENO, L-GATE, L-INX, L-IOB, LIOB-AIR, LIOB-Connect, LIOB-FT, L-IP, L-KNX, L-MBUS, L-MPBUS, L-OPC, LPA, L-POW, L-Proxy, L-ROC, L-STAT, L-STUDIO, L-Switch^{XP}, L-TEMP, L-Term, L-VIS, L-WEB, L-WLAN, L-SMI, LTRAIN, NIC, ORION Stack, Smart Auto-Connect, buildings under control are trademarks of LOYTEC electronics GmbH.

Echelon, LON, LONWORKS, LNS, LonMaker, and Neuron are trademarks of Echelon Corporation registered in the United States and other countries. LonMark and the LonMark Logo are registered trademarks owned by LonMark International. BACnet is a registered trade mark of the American Society of Heating, Refrigerating and Air Conditioning Engineers, Inc. (ASHRAE).

KNX Association cvba is the owner of the worldwide standard for Home and Building Control: KNX and also the owner of the KNX trademark logo worldwide.

EnOcean® and the EnOcean logo are registered trademarks of EnOcean GmbH.

Other trademarks and trade names used in this document refer either to the entities claiming the markets and names, or to their products. LOYTEC disclaims proprietary interest in the markets and names of others.

Statements in this report that relate to future results and events are based on the company's current expectations. Actual results in future periods may differ materially from those currently expected or desired because of a number of risks and uncertainties.

No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of LOYTEC and Delta Group. Product specifications, availability, and design are subject to change without prior notice.

© Photos:

ANRIR/Shutterstock, Zastolskiy Victor/Shutterstock, Jens Schöninger/PIXELIO, Michael Ottersbach/PIXELIO, escapechen/PIXELIO, Gemini Arts/PIXELIO, GiRom/PIXELIO, Rainer Sturm/PIXELIO



Headquarters

256 Yangguang Road, Neihu, Taipei 11491, Taiwan
TEL : +886-2-8797-2088
FAX : +886-2-2659-8731
Email: bas.sales@deltaww.com

USA

Delta Americas Headquarters
46101 Fremont Blvd, Fremont, CA 94538, U.S.A.
TEL : +1-510-668-5100
FAX : +1-510-668-0680

Europe

Delta Electronics (Italy) S.r.l.
Piazza Grazioli 18 00186 Roma Italy
TEL : +39 06 69941209

India

Delta India Electronics Pvt. Ltd.
Plot No 43 Sector 35, HSIIDC
Gurgaon, PIN 122001, Haryana, India
TEL : +91-124-4874900
FAX : +91-124-4874945

Delta_BMCS_Catalog_201801_eng_ 04007419