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LOYTEC Express

Magazine for Building Automation

New Features in L-INX 5.1:

Enhanced Network Security and EnOcean Support

Support Tip:

Coming on Board: EPLAN

Case Study:

Hypermarket in Alor Setar - Kedah, Malaysia

L-STUDIO Air – Engineering of VAV Systems reinvented

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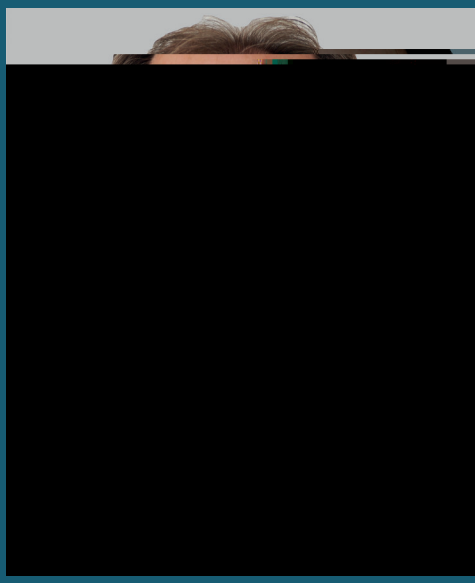
LOYTEC uncompromisingly relies on powerful hardware and IP communication



LOYTEC introduced the revolutionary L-STUDIO AIR at AHR Expo 2015 in Chicago for the first time. The innovative air volume flow control system (VAV) consists of volume flow controller communicating exclusively over IP. The powerful hardware together with the IP communication creates a platform that enables extremely fast engineering of the entire system with L-STUDIO AIR. Ethernet/IP provides the necessary bandwidth for distributed data aggregation, integrated visualization via Web (HTML5), internal device communication, and also seamless connection to control stations.

The exhibition visitors were greatly astonished by the offered performance and the simple handling of the components. Even settled advocates of fieldbuses lost their initial skepticism concerning wiring, configuration, and costs. At first glance, the installation of fieldbus systems seems to be easier. However, reality shows that dual Ethernet LIOB-AIR controllers can be easily and fast connected with each other successively via cost-effective, ready-made, and tested Ethernet patch cables. If Ethernet cables cannot be installed, it is possible to use WLAN integrated on LIOB-AIR devices. For the system, the mix of wired and wireless media remains completely transparent – no "expensively" configured gateways are required. Given the lack of classic DDC's, whose tasks are now performed by distributed controllers, the LIOB-AIR system also scores in terms of costs.

After successful network commissioning, the joy about the system really begins. Irrespective of whether this concerns commissioning, operation, or maintenance, an IP system simply feels better. The download of configuration changes just takes a few seconds, the visualization of data point updates happens with lightning speed, and system wide device backups make maintenance easy, especially in case of a device exchange.

Of course, we have also provided for network security. The current LOYTEC devices therefore support integrated firewalls and secured communication via HTTPS respectively SSL depending on their type. Even configuration changes and downloads can be performed securely.

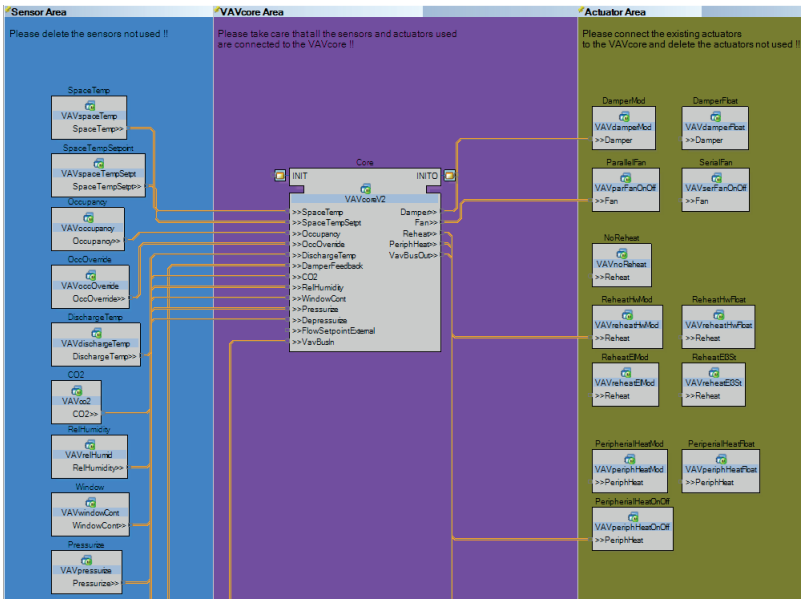
For us, it is obvious that there is no way around IP, neither today nor in future. Therefore, we uncompromisingly rely on open and standardized IP communication for the benefit of our customers.

Hans-Jörg Schweinzer, CEO
LOYTEC electronics GmbH

L-STUDIO Air – Engineering of VAV Systems reinvented

AHR Expo 2015 was the best place to choose for introducing LOYTEC's brand-new L-STUDIO Air to the public. The basic module of the system is the powerful LIOB-AIR1 Controller. This controller is the first representative of LOYTEC's product family of application specific controllers that solely communicate via Ethernet/IP resp. WLAN (also MESH) and are programmed with L-STUDIO.

LIOB-AIR1 is a VAV controller (Variable Air Volume) with powerful hardware resources and comprehensive communication features. It is therefore predestinated for the use in distributed automation networks of any size. In projects, VAV controllers are often used in large numbers and normally require high engineering effort. However, things are completely different using LIOB-AIR! Its flexible application program in combination with the L-STUDIO Air Designer guarantees fast engineering in just a few steps, also with larger projects.



01 Graphical Choice in L-STUDIO for creating the VAV Controller Types

Functional dependencies between single devices (e.g. several devices in a room) and also management functions defined per area (e.g. determination of the current smallest and largest terminal load in a building area) require communicative cross connections between the devices and building areas. A high engineering effort is necessary for projecting and commissioning of devices and communication connections in traditional systems. With the LIOB-AIR Controller and L-STUDIO Air Designer, LOYTEC offers a system that is able to reduce this effort dramatically for system designers.

As to be expected from LOYTEC, LIOB-AIR optimally integrates in new or existing building infrastructure by supporting open communication standards. Besides BACnet, LON, and OPC, LIOB-AIR also speaks EnOcean, MP-Bus, and Modbus. The new LOYTEC L-STAT Room Control Unit with its diverse sensors can be ideally and seamlessly integrated in LIOB-AIR systems.

LIOB-AIR features a flexible VAV controller application with web based visualization, configurable and parameterizable by the user. Hence, the ideal adaption to respective project requirements is possible without any programming skills.

The type-based approach gets things moving

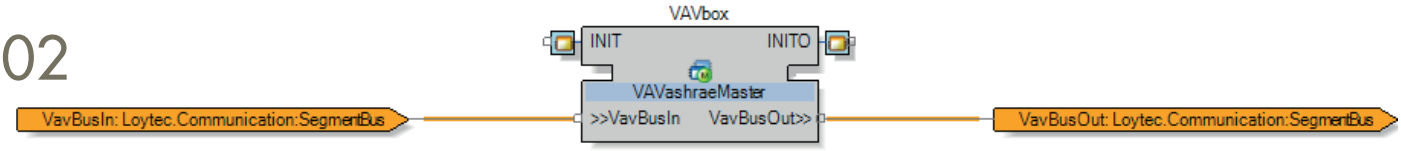
Experience has shown that only a few different VAV controller types are needed in a project, distinguished by the needed controller functions and the type of connected sensors and actuators. As an example, VAV controllers with and without reheat can be mentioned. In the first step of a project, the different VAV controller types are created through a simple graphical selection in L-STUDIO.

The technical planner assists

In the best case, the planner already efficiently planned the structure of a building using types (templates). These types are different areas that appear in the building in the same way repeatedly, e.g. west area in each floor of the building. The instrumentation of these similar building areas with building automation devices is then identically. L-STUDIO enables the user to equip these building areas with the prior created LIOB-AIR VAV controller types which are defined as area types. After that, all occurring combinations can be defined as floor types. This work is completed quickly and the next step can be taken: Creating the LIOB-AIR system for the entire building by compiling floor types using L-STUDIO. The LIOB-AIR building is now completed! The entire process of creating types and building up the system is reduced to a simple drag and drop of function blocks and establishing connections, represented by a simple communication line between the types in the L-STUDIO Engineering Tool. Also here, no programming skills are required. Apart from that, also all communication connections between the devices and the management functions were created automatically.

In the next step, L-STUDIO generates all devices projected beforehand and the user specifies the devices' IP addresses.

02



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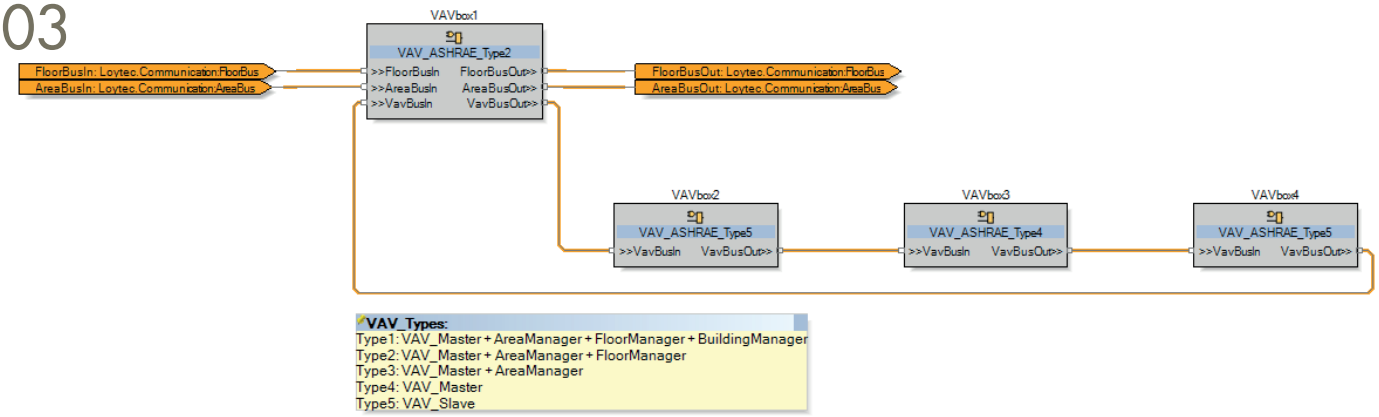

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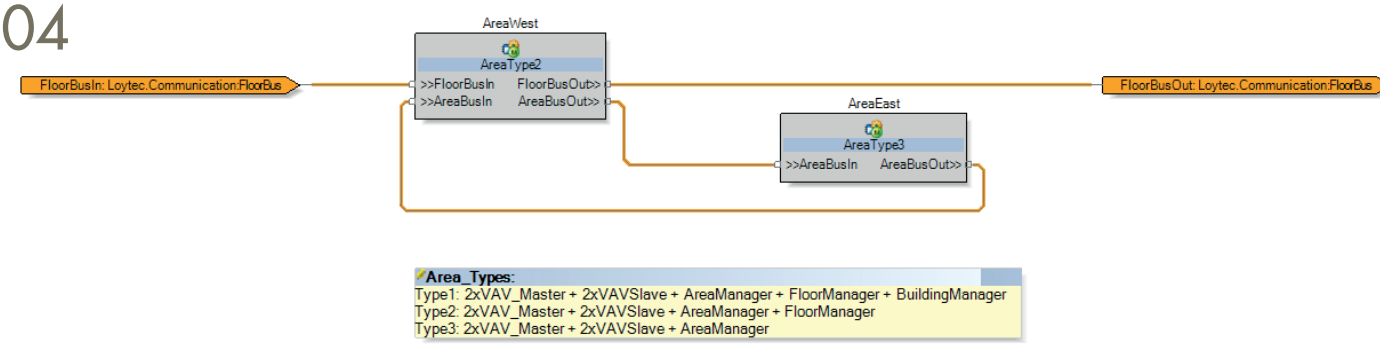

Definition of types using L-STUDIO: Controller types (Fig.2), Area types (Fig.3), Floor types (Fig.4), and Building (Fig.5)

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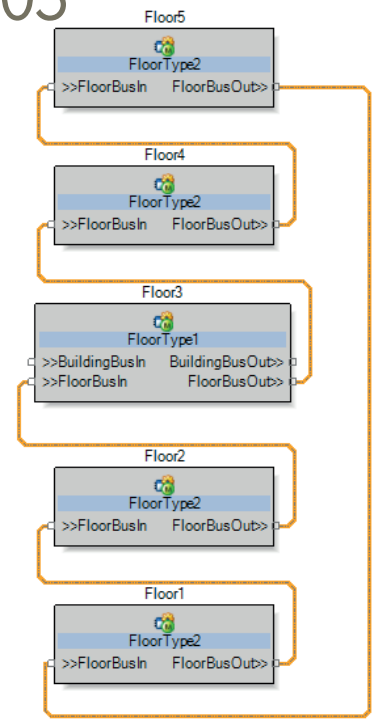

Also here, L-STUDIO assists with efficient functions minimizing the workload to a few minutes even with hundreds of devices.

The system design is now completed and ready for loading into the installed devices. The L-STUDIO deploy function performs this also for the largest buildings in only a couple of minutes. This is possible because of a parallel download of numerous devices via broadband Ethernet/IP.

The VAV controller application has standard parameters whose values are predefined for the normal operation of VAV boxes. Of course, also individual adaptions of parameters to the respective VAV box's physic are necessary. Examples include min. and max. volume flows, or the pitot factor for defining volume flow measurements. Here, the parameter editor of LOYTEC's BMS system LWEB-900 is used. Via a tabular view with multi select editor function, the user can enter parameter values for a VAV box and replicate them in the same dimension for all boxes. Parameters are then loaded into the controller through the building network during the VAV controller's runtime.

LWEB-900 and its device manager allow the user to load the configuration of the VAV boxes including the current parameters from the devices. Furthermore, it enables to perform a complete system back-up.

Additionally, many devices can be updated in parallel with the latest firmware of the VAV controller using the LWEB-900 device manager.

The L-STUDIO project can be fully integrated in LWEB-900, making all data points of the VAV controllers available to the LWEB-900 database without any further user interventions.

For commissioning, each VAV controller offers a web based graphical visualization through LWEB-802/803 that automatically adapts to the controller types described above. The user has extensive opportunities to access immediate notifications, measurements, parameters, and also operating conditions of the VAV controllers both reading and writing. Numerous data is also visualized in form of historical trend logs and supports the entire system to adjust. Actuators or occupancy modes can also be set manually, to evaluate their functionality in detail. Optionally, a three stage calibration of the volume flow measurement is performed.

In the graphical visualization, the user is able to use all functions with complete transparency and also here, no programming skills are required.

Built-in group functions

If a room houses several VAV boxes, grouping of VAV controllers is possible, likewise the integration of exhaust VAV boxes. For that regard, one VAV controller needs to be selected as master and all others as slaves. Additionally, the function supply or exhaust needs to be chosen. Finally, all VAV controllers receive the same room name. The master controller controls the temperature and CO_2 and automatically communicates all set points and possible control variables to the slave controllers. The slave controllers then independently take over the volume flow control and the control of their actuators. The formation of groups just requires entering a few parameters in the LWEB-802/803 visualization, whereby the communication between the devices within a group is automatically established during runtime without any additional engineering. The data currently communicated within a group likewise appears in the graphical visualization.

Thinking in Hierarchies

As already mentioned earlier, a LIOB-AIR system hierarchy consists of a building with numerous floors. Floors, in turn consist of several areas. For large properties, it is also possible to configure a campus with several buildings. For communicating on a superior level, explicitly prepared manger software modules are available: building, floor and

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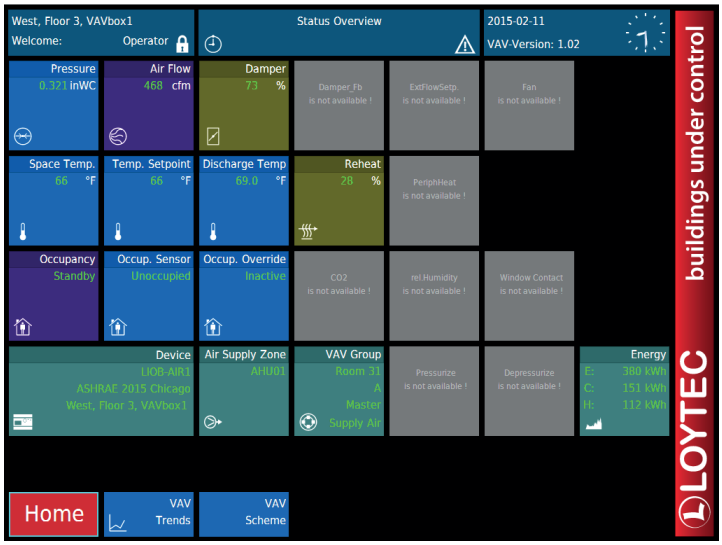

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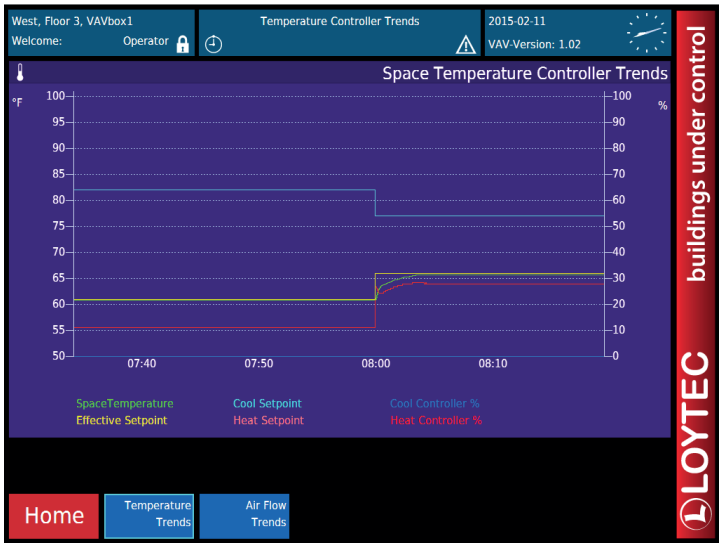

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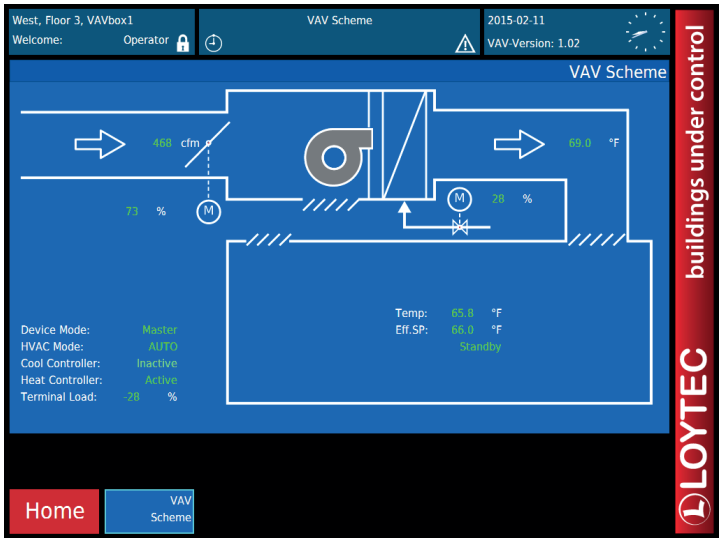


Graphical Visualization: Start screen with VAV status (Fig.6), Temperature trend (Fig.7), VAV scheme (Fig.8)

area manager. Each of them can be activated in only one VAV controller of an area. For this managers, no extra hardware needs to be budgeted. One manager supports up to eight air handling units (AHU) of a building. Consequently, in building up the ventilation system, each VAV controller can be assigned to one of the eight AHUs. The controllers are assigned during runtime in the graphical visualization of the VAV controller by entering the facility's name, e. g AHU1. As with the groups described above, communication between building, floor, area manager and VAV controllers is established automatically.

Data is communicated to the AHU, e.g. min./max./middle room temperature or room load, max. damper positioning, and further information that is necessary to adequately control and regulate the ventilation unit. In turn, the ventilation unit communicates important data like operation, heating, or cooling for an optimum room operation. The communicated data is made available to the user via a prepared graphical visualization in each manager for the respective area.

Balancing made easy

For balancing the channel network, the user has the opportunity to set all VAV boxes of the area to the operating conditions predefined in the controllers using the respective manger, e.g. all VAV boxes, or min. volume flow, or max. volume flow. This is a powerful function that influences operations of numerous VAV boxes of an area, a floor, or a building with just a few clicks and significantly accelerates balancing a channel network.

Ready-made applications

The VAV controller application supports volume flow control with different types of dampers by using the integrated differential pressure sensor. Likewise, electric or warm water reheat, parallel or serial ventilators, and also peripheral heat can be activated. Sensors and actuators are directly connected to the in- and outputs of LIOB-AIR or via different network technologies.

The function of demand controlled ventilation (DCV) determines room utilization through a schedule, occupancy detector, CO_2 or VOC sensor and requests the necessary amount of fresh air from the central air handling unit. This ensures a comfortable room climate with efficient use of energy.

In the background, test functions that ensure a proper system operation and the detection of malfunctioning devices like a blocked damper actuator, a stuck reheat valve, a dead series fan, etc., are permanently performed.

Conclusion

L-STUDIO Air, together with the LIOB-AIR Controllers covers the entire functional spectrum of a VAV system with powerful communication skills that leaves nothing to be desired. With the L-STUDIO Air Designer, also the installation of larger systems in just a few steps without programming skills is possible within short time.

Dipl.-Ing. (FH) Jörg Welskop
LOYTEC electronics GmbH

Jörg Welskop is a profound expert for HVAC automation projects with the focus on open systems. His extensive knowledge of system engineering derives from decade-long activities for various HVAC system engineering companies as a project manager and chief engineer in charge for building automation. As a graduated utility engineer and industrial engineer, he has assisted LOYTEC's support and training units for about four years and is responsible for the LIOB-AIR application development.

M&C Engineering and Trading:

Intelligent System Integration from Malaysia

M&C Engineering and Trading Sdn Bhd (783370-D) was incorporated in 1981. The company is a wholly owned subsidiary of AWC Berhad and is led by Mr. Dato' Ahmad Kabeer Bin Mohamad Nagoor. AWC Berhad is listed on the Main Board of the Bursa Malaysia, formerly known as the Kuala Lumpur Stock Exchange ("KLSE"). M&C Engineering and Trading Sdn Bhd also has a wholly owned subsidiary in Singapore under the name M&C Engineering and Trading Pte Ltd.

M&C Engineering and Trading has over 30 years of experience and posseses a leading position in the supply of HVAC products and building management systems. The company has been extensively recognized by suppliers and customers as a highly sincere and trustworthy company.

A comprehensive range of services is provided to clients, mainly for commercial and industrial engineering requirements such as butterfly valves, actuator, control valves, balancing valves, pipes fitting, high pressure pipes fitting, and building management systems. The solutions offered are tailored to customer's needs, focusing on achieving convenience, cost savings, and also energy conservation and saving for the building.

The added value that is offered to customers is the provision of solutions for a cost effective and efficient operation of HVAC systems through a proper selection and design of correct control components, modifications, upgrading, retro fittings, or improvements of existing HVAC systems, likewise the provision of a comprehensive building management system which adapts to building or user requirements.

AWC ENGINEERING

www.awc.com.my

Dato' Ahmad Kabeer Bin Mohamed Nagoor
Managing Director / Group Chief Executive Officer

Dato' Ahmad Kabeer graduated with a Master's Degree in Finance from the University of St. Louis, Missouri, USA in 1986. Following, he started his career with the Bank of Nova Scotia in the Foreign Exchange Division before becoming a lecturer at the School of Management, Universiti Sains Malaysia from 1988 to 1994. Dato' Ahmad Kabeer Bin Mohamed Nagoor was appointed to the AWC Berhad's Board as a Non-Independent Non-Executive Director in February 2005. In 2007, he was re-designated as the Deputy Chairman of AWC and subsequently he was re-designated as Deputy Executive Chairman in 2012.

New Hypermarket in Alor Setar - Kedah, Malaysia

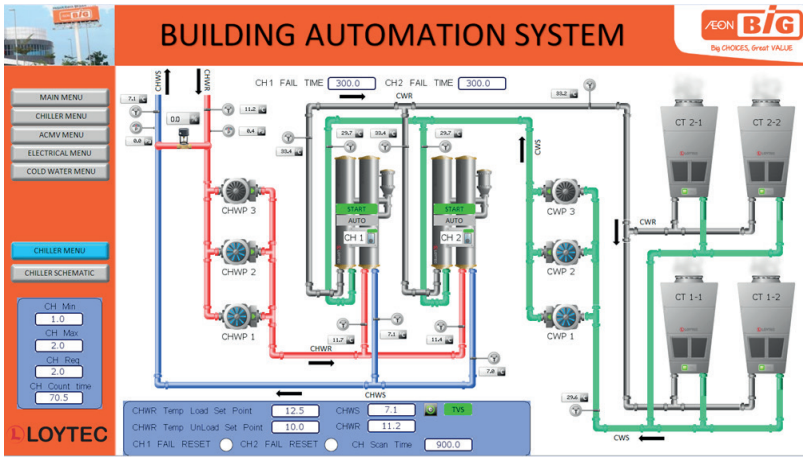
The newest hypermarket in Alor Setar opened its doors to the public on early December 2014, making it the first outlet by a well-known Japanese retail chain in Kedah. Built on 9,144 m², the building houses a hypermarket as well as a shopping area with 55 lots offering various products and services.

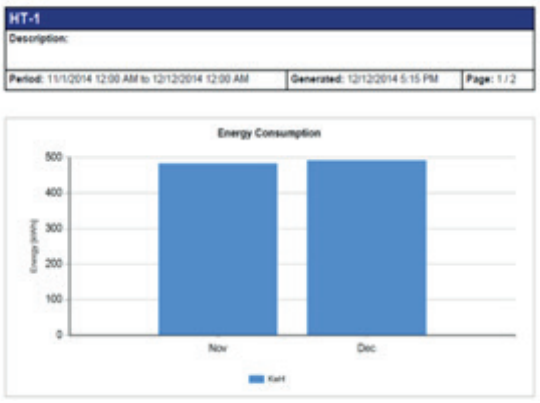
LOYTEC's powerful LINX-110 Automation Servers extended with L-IOB I/O Modules are selected for the control and monitoring of the hypermarkets' systems. Furthermore, a range of LonWorks protocol BTU (British Thermal Unit) meters are integrated into LIOB-FT and digital power meters are incorporated into the Modbus network to communicate with the LINX-110 Automation Servers.

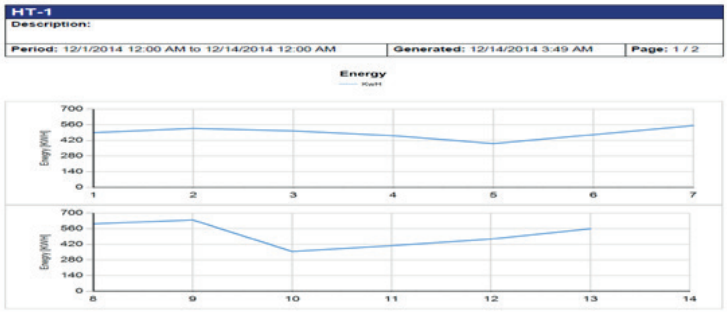
The integral solution for the new hypermarket includes the following features:

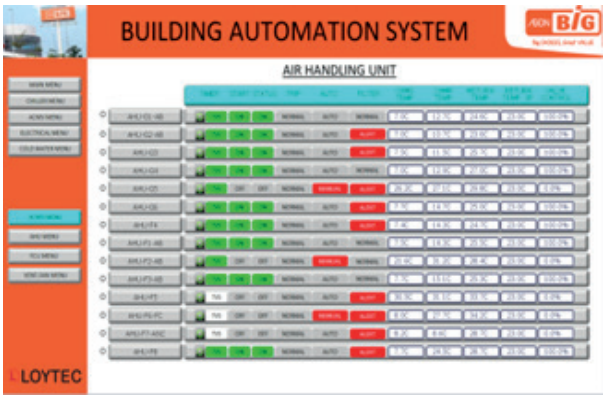
- Control and monitoring of the air handling system,
- Control and monitoring of the chiller plant system,
- Control and monitoring of the ventilation system,
- Monitoring of the electrical system's energy consumption,
- Monitoring of the energy consumption of the tenants for billing,
- Monitoring of the cold water system.

The entire system is visualized by the LWEB-900 client software. All graphical elements are developed by M&C Engineering and Trading and transferred to the workstation on site for the end users' daily operation. The LWEB-900 Building Management System acts as core component for configuration, parameterization, and visualization. The user friendly interface provides management and operating features. Its client-server architecture allows to access operating data of the entire network in real-time. The so-









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phisticated central control system is applied from conception, to implementation, to daily operation of the facilities. As a central component, the LWEB-900 server stores system and operating parameters, historic data, access rights, and device configurations (backup) in corresponding SQL data bases.

By using the LOYTEC integration platform, the L-INX Automation Servers, M&C Engineering and Trading quickly implemented peripheral systems of building engineering. This includes building functions such as chillers, air handling units, ventilation fans, cold water, electrical parameter monitoring, etc. Because of the open communication of all involved parties, the demanding tasks could be implemented with the available technology to the customer's fullest satisfaction.

FACTS

LOCATION

Alor Setar – Kedah, Malaysia

SYSTEM INTEGRATOR

M&C Engineering and Trading Sdn Bhd

LOYTEC COMPONENTS

LWEB-900, 5 x LINX-110, 14 x LIOB-151, 5 x LIOB-152, 5 x LIOB-153

Enhanced Network Security and EnOcean Support

New Features in L-INX 5.1

Dr. Stefan Soucek-Noe

An upgrade to the new L-INX/L-GATE firmware version 5.1 brings major new features enhancing network security and enabling wireless operation by integrating WLAN devices and EnOcean sensors. Basic concepts to operate separate IP networks are added.

Dual Ethernet

L-INX and L-GATE models equipped with two Ethernet connectors can now be configured to work with two entirely isolated IP networks. In this configuration, the Ethernet ports can be plugged into separate Ethernet networks and each of them receives a different IP address.

The port configuration on the Web interface allows precise control over which protocols are enabled on the separate interfaces. Certain protocols are bound to exactly one port (e.g., BACnet/IP) while others can be configured for both. The built-in firewall blocks any other access, which makes security hardening distinctively easier.

The primary reason to enable separate networks is to isolate sensitive and non-secure building automation protocols on the LAN from the access by PCs in an office network or by mobile devices on a WAN. Using the second Ethernet port and secure services over OPC UA maximizes security.

Another use case for separate IP networks is operation on otherwise entirely separated building network providers, e.g. one running BACnet/IP and one running KNXnet/IP. By connecting them to the separate Ethernet ports, the L-INX can gateway between the networks and can run control functions on both of them.

Configuration

To configure separate IP networks, new tabs in the port configuration have been added representing the Ethernet ports: Ethernet 1 (LAN), Ethernet 2 (WAN). The LAN and WAN notation suggests an intended local/public network use. The same concept is also available for wireless IP interfaces described in a separate article on page 22.

The port mode defines how the Ethernet port is configured:

- Disable: The Ethernet port is disabled.
- Separate network: The Ethernet port is enabled and constitutes a separate IP network with its own services.
- Switch Ethernet 1+2: The two Ethernet ports are operated in switch mode. This is the default mode for building a daisy-chained network structure.

IP Settings

When the port mode is set to separate network, the inter-

face needs its own IP address configuration which is shown in Figure 2. The default is DHCP mode for automatic address assignment. Since the separate interface also has its own set of services, the respective protocols can be enabled on the new port.

Device Info Page

The new device info page provides a quick overview of all relevant operational parameters of the L-INX device, such as CPU load, time synchronization, and active protocols. This overview is especially useful when having separate networks configured as all enabled protocols per port are displayed and appear as links for quick access (Figure 3).

IT Integration – SNMP

For accessing vital operational data in standard IT equipment, L-INX devices offer an SNMP management information base (MIB) which contains system registers and OPC-exposed data points. The MIB file can be downloaded from the device. Alarms on the device can be exposed as SNMP traps.

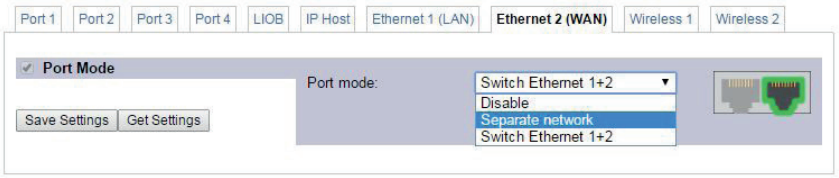
EnOcean

The EnOcean technology is now supported by LOYTEC devices. EnOcean is an international standard (ISO/IEC 14543-3-10) designed for wireless devices optimized for solutions with ultra-low power consumption and energy harvesting. This means EnOcean sensors can be self-powered and draw energy from a button press or a solar cell without the need for a battery.

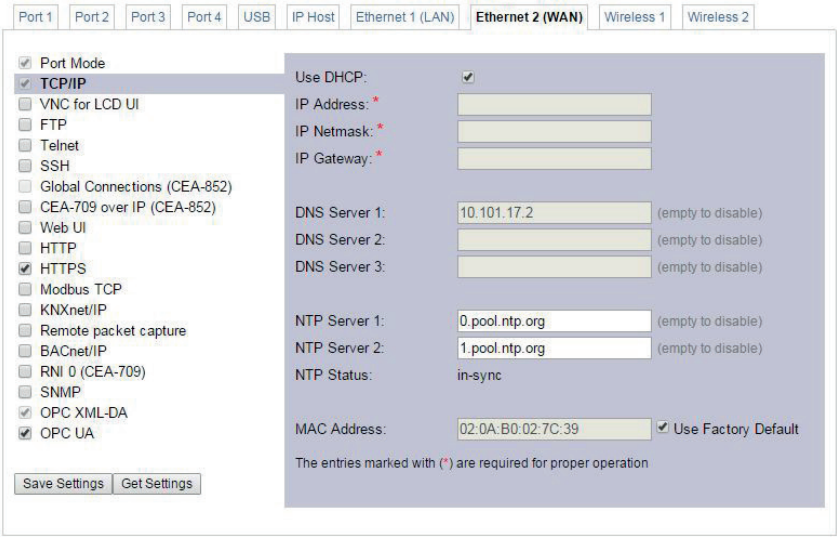
Together with the external LENO-800 interface, which is connected to the USB port of the L-INX, EnOcean sensors and actuators can be easily integrated. The EnOcean functionality can then be enabled in the port configuration settings of the USB port.

LENO-800 interfaces are available for different regions:

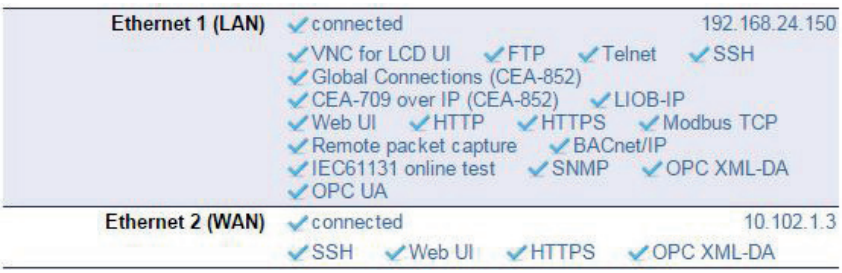
- LENO-800: Europe 868 MHz band
- LENO-801: USA/Canada 902 MHz band



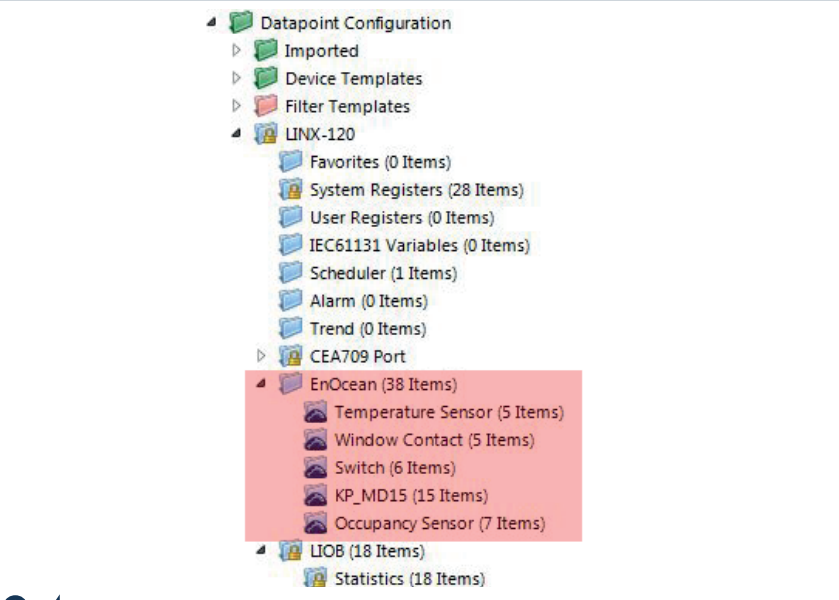
01 Ethernet Port Mode



02 IP settings for a separate network



03 Ethernet status on device info page



04 EnOcean device folders

- LENO-802: Japan 928 MHz band

For secure communication, the L-INX supports the EnOcean encryption option that some devices implement.

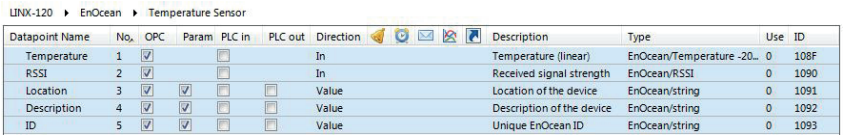
The data point configuration is built using EnOcean device templates. These templates are modeled after the so-called EnOcean equipment profiles (EEPs). A library of device templates is distributed with the Configurator. Device templates for new devices can be requested from LOYTEC and are distributed in separate template files.

Devices are created under the EnOcean port folder as EnOcean device folders (see figures 4 and 5). The data points defined by the device template cannot be deleted or renamed, but OPC and PLC in/out parameters can be modified. The data points Description and Location are parameters and appear in LWEB-900.

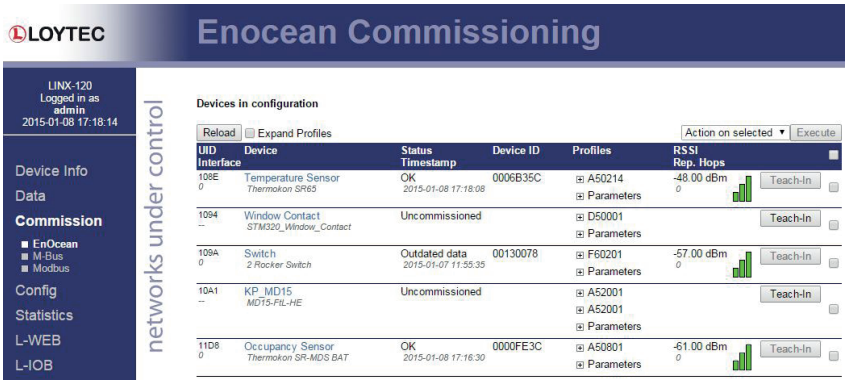
The assignment between a physical device and a device in the configuration is done by a so-called teach-in on the EnOcean commission Web interface. This provides a list of devices, a receive signal strength indicator (RSSI) and a value test as shown in Figure 6.

After clicking the Teach-In button in the device list, the Web interface waits for the Teach-in message sent by an EnOcean device with a matching profile ID. By pressing the button on the EnOcean device, the association is completed.

For troubleshooting, the L-INX has a built-in EnOcean protocol analyzer on the Web interface. The protocol log can be downloaded and stored on the PC.



05 EnOcean device folders



06 Teach-In of EnOcean devices

07 Trend chart on the Web UI

Trend Charts

Trend logs can now be visualized on the Web interface as trend charts. This gives a quick overview on historical data recorded on the L-INX. The chart appears on the Preview tab within a selectable time axis as shown in Figure 7.

Summary

The separate network feature allows different IP ports for isolated networks. Combined with the built-in firewall that allows concise definition of services, maximum security can be reached. SNMP helps IT departments keeping track of LOYTEC devices. Using the new EnOcean technology, the L-INX can integrate wireless sensor networks.

www.loytec.com/support

Coming on board: EPLAN

Dipl.-Ing. Norbert Reiter

The Data Portal of the 30 years old global leading CAE solution EPLAN from Monheim, Germany got a new member. Since October 1st, 2014, LOYTEC and its solutions for building automation are available online. LOYTEC products can be easily downloaded from the EPLAN online service and swiftly integrated into the circuit diagrams and into the EPLAN documentation.

A brief overview of EPLAN and its Data Portal

In 1984, the software company EPLAN was originally founded for the development of its E-CAD tool for the computer-aided designing of circuit diagrams and is today the world market leader in this sector. Since its foundation, EPLAN has developed several new products for various fields of engineering, like fluid power engineering, PCT integration or mechatronics, as well as solutions supporting the development and planning of processes and facilities. According to EPLAN's website, the company provides services for over 40,000 customers in more than 50 countries and issued over 100,000 licences worldwide.

The Data Portal is a platform integrated web service supporting costumers in designing their circuitries and managing their documentation by providing data of devices from different manufacturers in a uniform way. It is an extension, which is automatically added during installation of an EPLAN platform, like e.g. the tool Electric P8. For using the data portal, it is necessary to set up an extra user account, which can be created and maintained with a valid EPLAN licence.

The contents of the LOYTEC device library

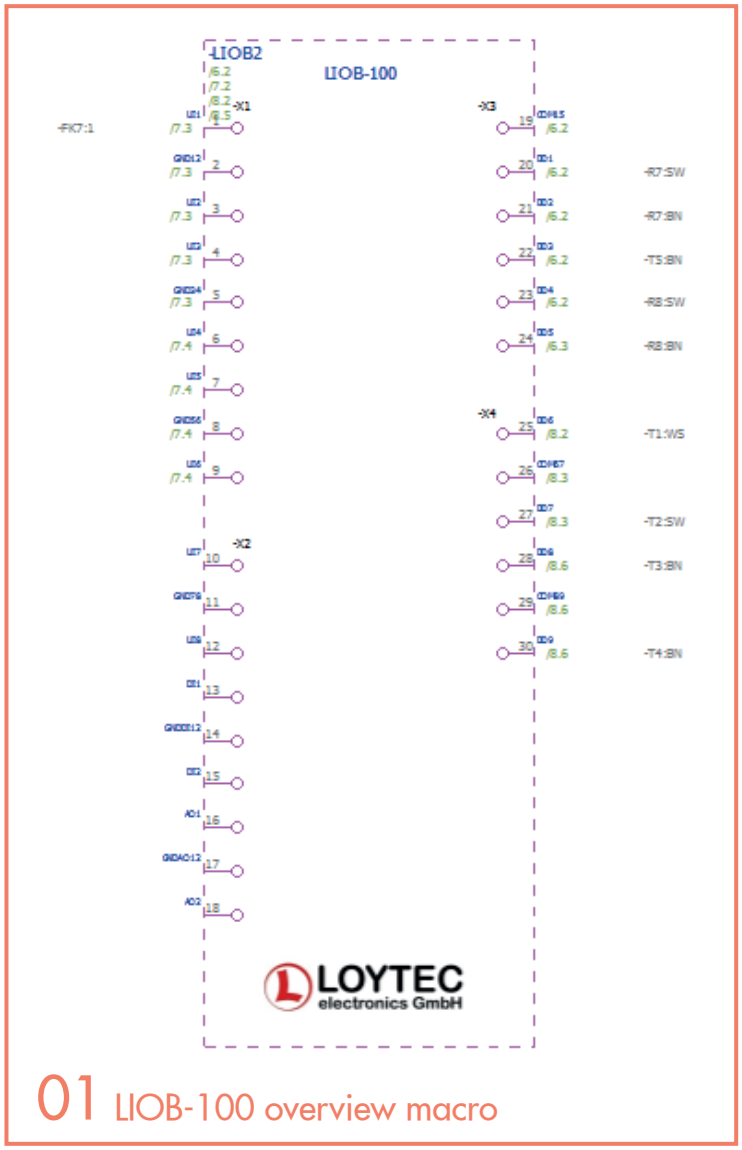
Since fall 2014, LOYTEC products are available as device templates for EPLAN projects. For each device, macros were created and a record for EPLAN's article database was generated. This record collects and maintains all existing macros of one device, as well as additional information about it, like datasheets or order codes, and provides them to the Data Portal as well as to the platform for later usage.

Three different kind of macros for each device are available in the library:

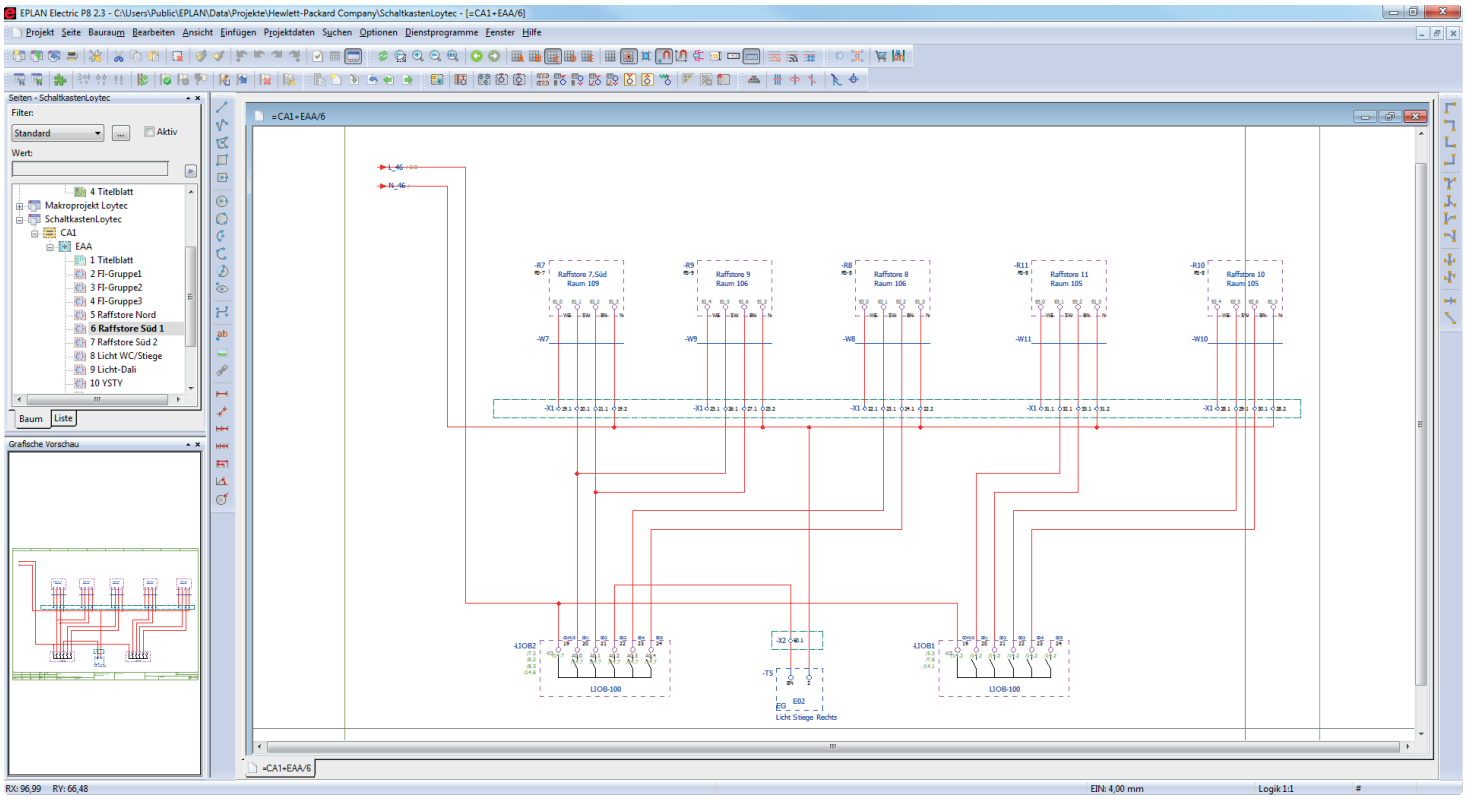
- An overview,
- Several multi-line schematics,
- A 2D graphic.

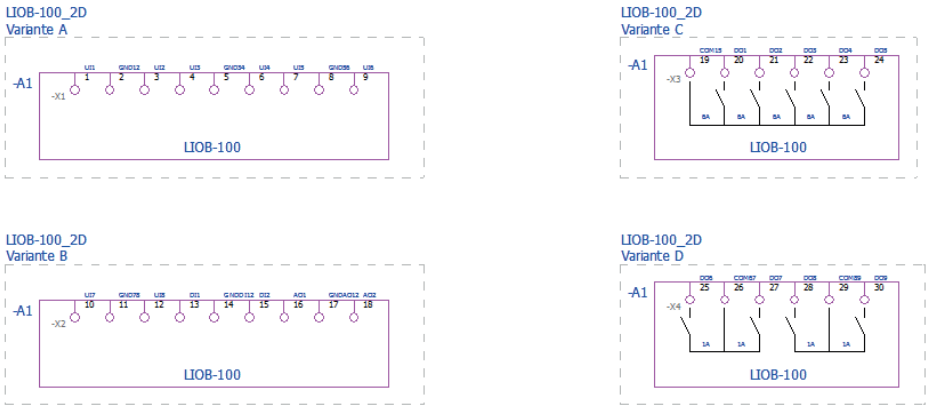
The overview shows the entire device and its connectors. It is solely a graphical macro, this means that no connections can actually be drawn from here. Instead, the overview macro makes it easy for the user to see at one glance where which connector is used by displaying one cross-reference to the page on which the connector is used and one about the device to which the connector is wired (Figure 1).

To actually wire up the connectors in the schematics, the multi-line versions are used. Only the single- and multi-line schematic pages allow the user to draw the circuit diagrams, since only on those pages it is possible for EPLAN to control the logic behind the circuitry. To enable EPLAN's check function to validated circuits containing LOYTEC devices,



01 LIOB-100 overview macro





02 LIOB-100 multi-line schematics

the connectors of each macro were configured according to their physical properties, like power supply connectors or bus connection, analogue or digital I/Os. The configuration of all connectors can also be seen in an overview in the Data Portal, enabling the user to see at one glance whether the device possesses the required connectors or not.

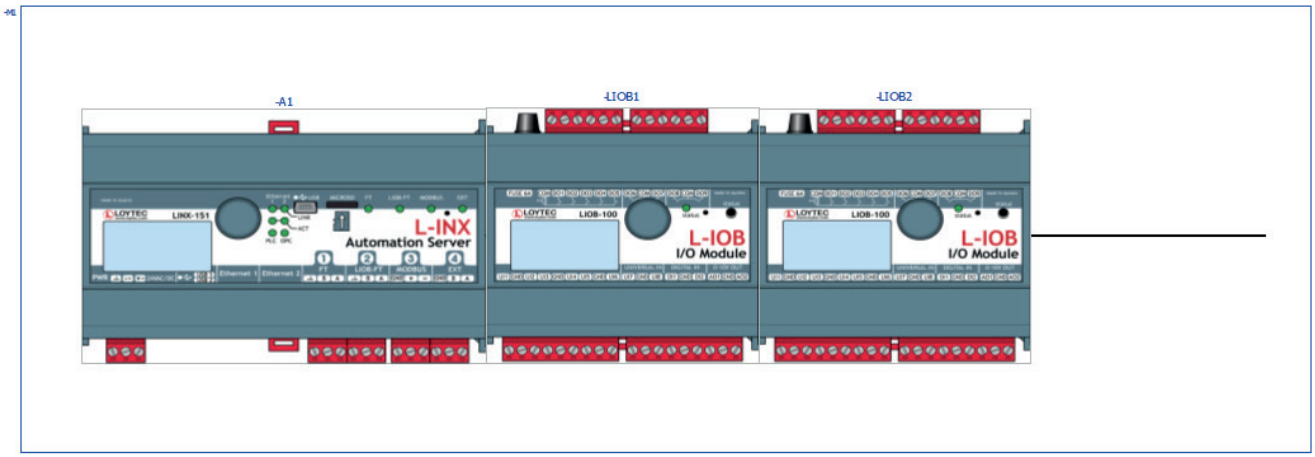
To make working with the multi-line macros clear and as intuitive as possible, one macro per plug was generated (Figure 2). Thus, it is possible to swiftly get the required connectors by switching through the available macros with the tabulator key, without dragging them onto the required pages through the PLC Navigator.

The 2D graphic depicts the device's front in original size and is used for planning the layout and for virtually constructing the electric cabinet (Figure 3).

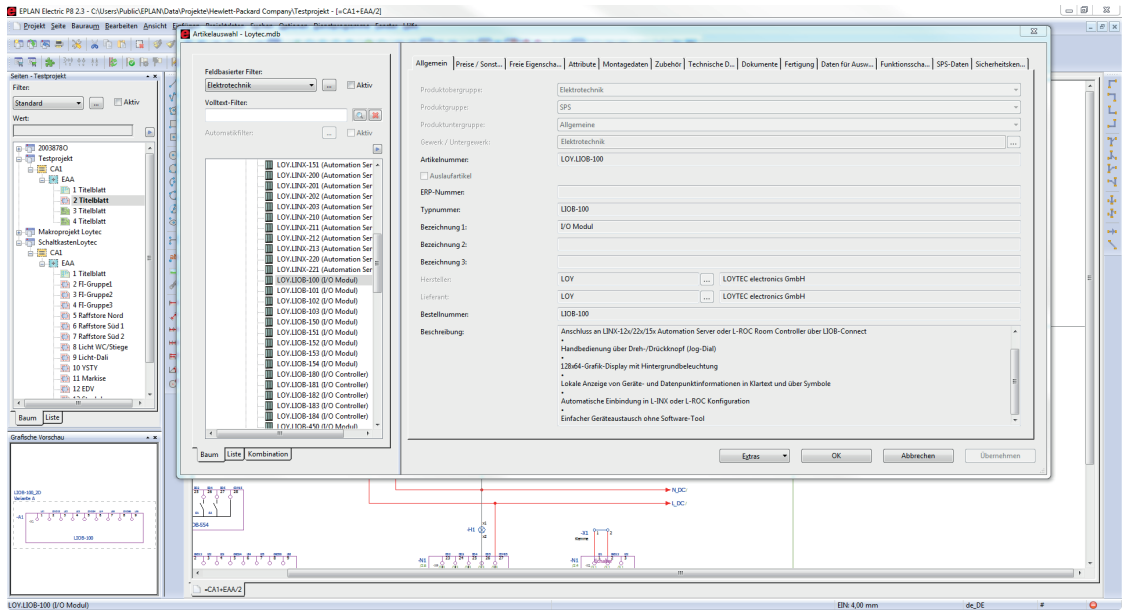
Import of devices

In order to use the devices, it is necessary to import them in a local article database. After logging in with an active and valid EPLAN licence, the device needs to be selected from the manufacturer's catalogue. In the catalogue, each device is displayed together with its most important details like the device's function, its connectors, or which documents are available, etc. The toolbar above each device entry includes symbols for the import. After a device has been imported, an article entry as well as the corresponding macros, images, and document files are copied in the local database and the device can be used in the EPLAN project.

Alternatively, the devices can be downloaded directly from the LOYTEC website, either as an EDZ-file or as an XML-file. The EDZ data format is a quite encompassing data format, since it not only contains the article entries for each device, but also all image files and macros for each device. Moreover, during the import of the device, EPLAN automatically takes care of transferring macros and images into the appropriate EPLAN parent directories. So after the import, no other steps are required and the devices are available for usage right away. However, the EDZ-file can only



03 Electric cabinet construction with LINX-151 and L-IOB I/O modules



04 Article selection in EPLAN

be imported with a valid Data Portal user account.

In contrast, no Data Portal user account is required for the import of XML-files. If an XML-file is imported into the local article database, only the article entries are copied into the required parent directory. The images and macros need to be moved manually, before the devices can properly be used in the EPLAN project.

Regardless of the chosen import option, it is advisable to create a new local article database prior to the import. In case something goes wrong during the import process, only the new and empty database will be affected, which can then be easily discarded.

How to use the device library?

In EPLAN Electric P8, two commands are available for using the devices. The command insert device displays a list containing all devices currently available in the local article database (Figure 4). A small window in the down left corner shows a preview of the deposited macro when an article is selected. After the required device was chosen, EPLAN automatically selects those macros that match the currently active page and attaches the first available variant of the macros to the cursor. As long as the macro is still attached to the mouse cursor, it is possible to switch through the existing variants with the tabulator key. After the macro has been placed, it is still possible to change the macro version through its properties dialog.

The second command insert window macro displays a list, showing all macros that are available for the local EPLAN installation. Besides the device macros, the user can also choose the macro's version. Nevertheless, also here, switching through the versions is possible while the macro is still attached to the cursor.

Both insert options are available on overview pages and on multi-line schematic pages, but not on the panel layout pages. The 2D graphics can only be inserted by using insert device. Before the 2D graphics can be placed, it is necessary to draw a mounting panel with a DIN rail on which the graphic macros can be placed.

It is also possible to use individual connectors in the multi-line schematics. In most cases, they can be taken from the PLC Navigator, which shows all PLC devices used in the project and a list of all their available connectors. But keep in mind that each connector can only be used once in the project. If for instance one individual connector is used on one page, and the macro of the plug contains this connector on another page, the EPLAN's check sends an error message, even though the connector of the macro might not be wired to anything. A possible solution to this problem is to just use the macro and to place an interruption point above the connector, which enables the usage of this connector on other pages by placing another interruption point with the same label on a different page.

Conclusion

The CAE tool EPLAN allows an easy creation of circuit diagrams, enabling a quick design and documentation of circuities. With the new LOYTEC device library that is now available online in the Data Portal and on the LOYTEC website, it is now equally easy to integrate LOYTEC devices into circuit diagrams and into the EPLAN project management.

www.loytec.com/support

Osceola County Health Department

In the last ten years, demand for health care services has increased by 30 %. Osceola County Health Department addresses the lack of health care services in Poinciana Florida. The five million dollar medical facility covers an area of 1,500 m².

Originally, the specifications for HVAC (Heating, Ventilation, and Air Conditioning) control in the building were very basic and simply specified a BACnet control system. However, this left many unanswered questions such as how facility managers and other users operate the system or what type of BACnet system needs to be installed. Fortunately, the LOYTEC Integrator TBI had the answers.

The president of TBI, Rick Joyner quickly made the decisions to accomplish two goals. The first goal addressed the installation of an ALL-IP BACnet system. TBI carried multiple BACnet lines and realized a more reliable BACnet/IP connection that provided higher data capacity than BACnet MS/TP. For this solution, air handling equipment, chillers, and even VAV boxes from LOYTEC were used that communicate over BACnet/IP. Secondarily, LOYTEC devices can host HTML5 graphical projects individually. Mr. Joyner felt that this would be very valuable during the commissioning of the system, and in long term for the staff at the facility to monitor and operate the system.

During commissioning of the system, the third party commissioning test and balance agent (T&B) was positively surprised that they did not need any special programs or software to commission the VAV boxes. They simply used standard browsers and the local LCD display on the devices and could accomplish all balancing tasks without requiring any assistance from TBI to accomplish their work. T&B firm felt that this was one of the simplest projects they ever had.

The owners of the building were equally surprised when they realized what they received. A full, web based system with graphics. The building owners can easily navigate the entire building and operate the system with just little instruction required.

Since the systems at Poinciana Health Care facility went online in September 2013, there haven't been any return calls for service onsite. Additionally, there were no communication issues since the start of the project. Rick Joyner relates that this ALL-IP system is the "way to go" for BACnet. Also the installation of the daisy-chain, redundant Ethernet LOYTEC controllers is very easy and can be done as quickly as the installation of fieldbus controllers.

www.totalbuildingintegrations.com

PRODUCT NEWS

01 L-STAT

L-STAT is LOYTEC's brand new room control device!

The L-STAT is LOYTEC's brand new room control 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, ambient light, 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.

02 Multiport BACnet L-IP Router

The new LIP-ME204 BACnet Router is a true multi-port MS/TP router that comes with two Ethernet ports and four MS/TP ports. The enclosure is 159 mm wide for DIN rail mounting, following DIN 43 880. It has an LCD display with jog-dial operation for simple device setup.

Each of the four MS/TP ports is routed to BACnet/IP and can serve a full-blown MS/TP channel. Communication settings as well as detailed MS/TP token passing statistics are available on the Web interface for each MS/TP port. The port configuration (Figure 1) provides four MS/TP port tabs, on which the ports can be enabled or disabled independently.

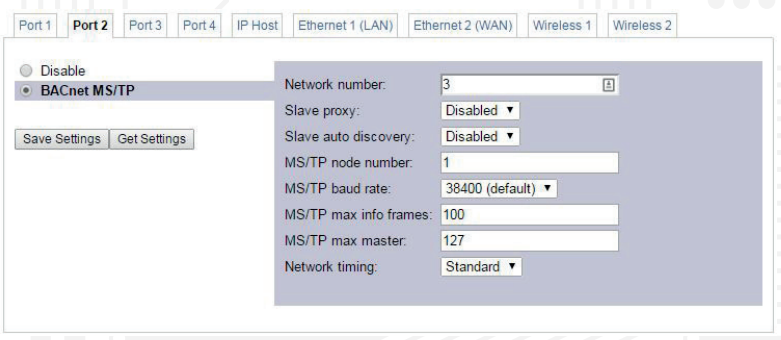
The LIP-ME204 provides all the standard features known from the BTL-certified LIP-ME201, including BBMD function for up to 100 devices, foreign device mode, time master, slave proxy with automatic and manual entries, and device restart notifications. A custom BACnet/IP access control list allows restricting the access to the BACnet/IP network for defined IP address ranges. In the example of Figure 2, the LIP-ME204 will route only traffic from the subnet 192.168.0.0. Other traffic is silently dropped. This gives some extra control over IP hosts that can control MS/TP devices. All configuration tasks can be done directly on the Web interface under the BACnet Config menu.

The remote Wireshark packet capture feature is also available on each of the MS/TP ports. This makes the LIP-ME204 a perfect alternative to installing four separate routers, reducing space and cost. The two Ethernet ports of the LIP-ME204 can be operated in switch mode, which allows a daisy-chain installation of IP devices and reduces cabling effort.

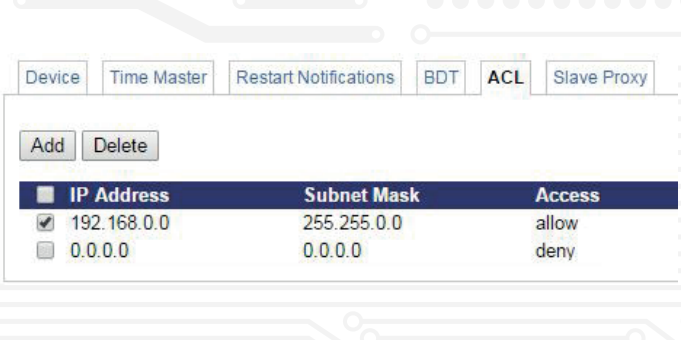
In addition, the LIP-ME204 is also equipped with enhanced security features like a built-in firewall and a secure Web interface for installations using HTTPS with self-signed or installable CA certificates known from L-INX or L-GATE devices. By configuring separate IP networks on the two Ethernet ports, the building's BACnet network on the LAN can be entirely isolated from the configuration interface on the WAN. On top of that, the built-in firewall allows concise definition of available protocols on each IP interface. This makes security hardening a simple task.

For perfect integration into building management software such as the LWEB-900 by LOYTEC, the LIP-ME204 offers an embedded OPC UA server with full-featured certificate authentication. This server exposes important operational parameters as OPC tags. For enhanced maintainability by IT departments, the LIP-ME204 provides the same data also through an integrated SNMP server.

Together with the LWLAN-800 adapter, the LIP-ME204 can operate BACnet/IP on the WLAN. By setting up an access point on the BACnet/IP network, the device can be used to distribute MS/TP channels on a wireless network.



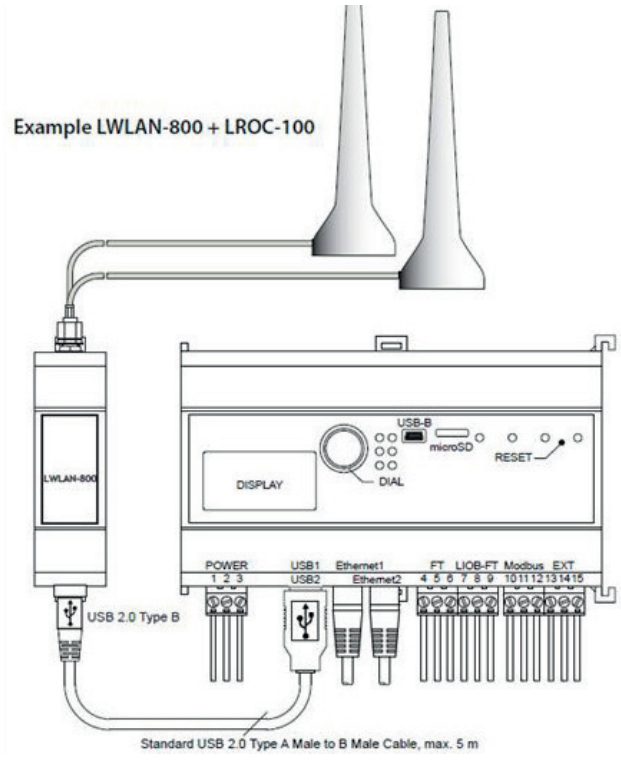
01 Four MS/TP port tabs on the Web interface



02 BACnet Access Control

03 Wireless LAN Support

An alternative communication method to CAT 5 Ethernet wiring is communication in a wireless network. It is clearly stated that CAT 5 Ethernet wiring is the preferred method of networking devices in a building but there are situations that require wireless communication and in those hopefully rare situations, going wireless might be an option to successfully implement a job. This article shows how to plan, install, and configure wireless communication for LOYTEC devices.



01 Hardware setup of the LWLAN-800 wireless interface kit.

Hardware Setup

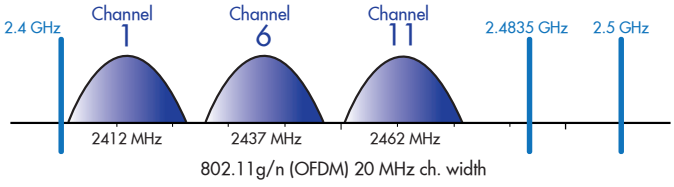
LOYTEC devices that are equipped with a USB connector can attach the LWLAN-800 interface. The USB cable should be as short as possible but in no case longer than 5 m. Attached to the LWLAN-800 interface are 2 diversity antennas shipped with the interface. Make sure that the 2 antennas are mounted outside any metal enclosure and are separated at least 150 mm apart. The L-INX/L-ROC/L-VIS/VAV must have firmware version 5.1 or higher installed in order to support wireless communication. The hardware setup is shown in Figure 1.

Diversity Antenna

All our wireless products support diversity antennas. Due to reflections in buildings, radio waves can be extinguished at certain locations. Physically separating the 2 antennas improves reception quality. Even if one antenna sits in a blind spot, the second antenna will receive the radio signal. The antennas should be at least one wavelength apart, which turns out to be 125 mm in the 2.4 GHz radio band used by LWLAN-800. Please be aware that reception conditions can change over the lifetime of a building since furniture can be moved around, walls can be added or removed etc. Antenna diversity helps to improve radio reception under these changing conditions.

Channel Selection

It is wise to plan the proper channel selection before installing the wireless network. Although channels 1-11 (US) or 1-13 (Europe, Japan) are available, in reality only channels 1, 6, and 11 should be used as shown in Figure 2. The reason is that the WLAN signal occupies 5 channels, hence minimum interference can only be achieved if the WLAN networks are at least 5 channels apart. This channel layout works for 802.11b/g and for 802.11n if the bandwidth is limited to 20 MHz. If the bandwidth for 802.11n is not limited to 20 MHz but uses the full bandwidth of 40 MHz, only one WLAN network can be operated in the 2.4G Hz band. The transmit power is typically limited to 20 dBm which is equivalent to 100 mW.



02 Channel allocation in the 2.4 GHz band. Only channels 1, 6, 11 should be selected.

Range

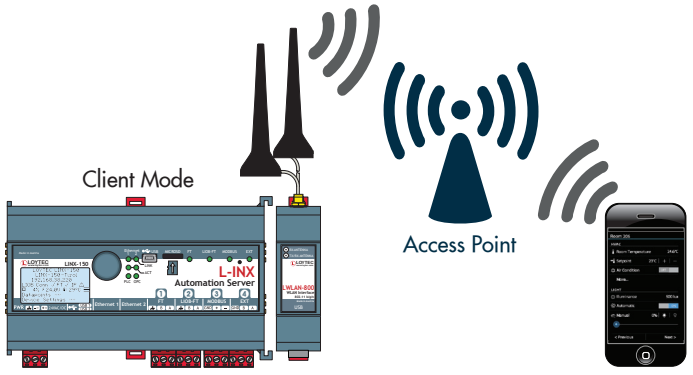
The typical Wi-Fi range in an open space with line of sight is 100 m. This number is drastically reduced by obstacles like walls and reflections inside a building. There is no simple way of determining the actual operating range other than setting up the network and looking at the reception quality figures provided by the device statistics page on the Web UI of the device. Also other devices in the same area have an influence on connection speed and quality like neighboring access points, ZigBee, or Bluetooth devices, microwave ovens, security cameras, cordless phones, etc.

The range can be increased by selecting antennas with higher gain or dedicated directional construction properties. An 8 dBi antenna transmitting at 100 mW will have a similar horizontal range than a 6 dBi antenna transmitting at 500 mW. The 2 antennas shipped with the LWLAN-800 have a gain of 2.0 dBi, an omnidirectional radiation pattern, and a vertical polarity.

Data Security

Since radio waves are not travelling inside a cable but in an open space, everybody in this space can receive the radio signals. Hence it is important to setup wireless security carefully. Never run a wireless network without security settings appropriate for your application. Initially, WEP (Wired Equivalent Privacy) security was used but nowadays, this security mechanism is easily broken and no longer recommended.

WPA (Wi-Fi Protected Access) and WPA2 encryption are state of the art. Especially WPA2 used on modern devices, such as LWLAN-800, is considered secure. Often wireless access points support a setup procedure called Wi-Fi Protected Setup (WPS). Due to a flaw in this feature, the WPA2 security can be bypassed and effectively broken. Hence, we do not support WPS on our products.



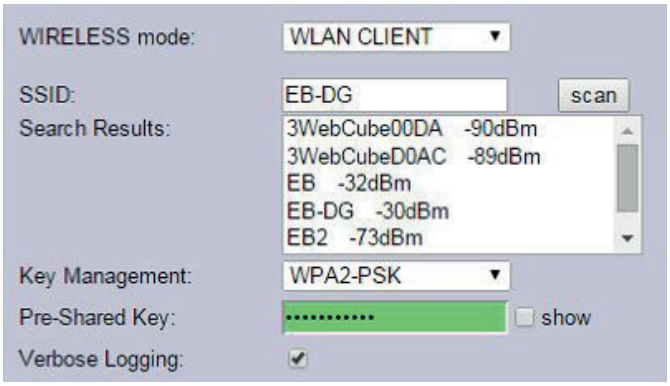
03 Client mode connects to existing WLAN infrastructure.

Safety

Dealing with radio waves always raises concerns regarding their influence on human health. The World Health Organization (WHO) states that there is no risk from low level, long-term exposure to Wi-Fi networks. The UK Health Protection Agency defines that one year of exposure to a Wi-Fi results in the same amount of radiation as a 20 minute mobile phone call.

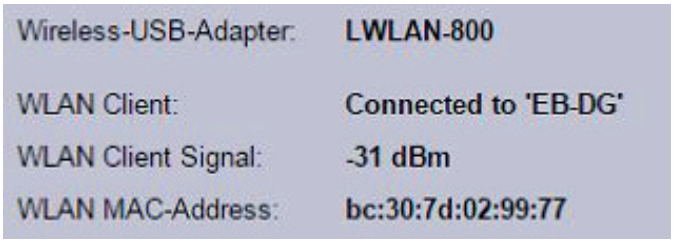
Client Mode

The wireless interface on the L-INX/L-ROC/L-VIS/VAV devices can be configured for the following operating modes: client mode, access point mode, mesh point mode, and mixed mode. When configured in the client operating mode, the L-INX/L-ROC/L-VIS/VAV can connect to an existing wireless network, see Figure 3. The configuration page on the Web UI allows scanning for surrounding networks and also shows the reception signal strength in dBm. A number below -80 dBm indicates poor reception quality and should not be used for a building automation network. After selecting the SSID from the scanned list or entering the SSID manually, the proper security mechanism (WPA2) must be selected and the password (Pre-Shared Key) entered as shown in Figure 4.

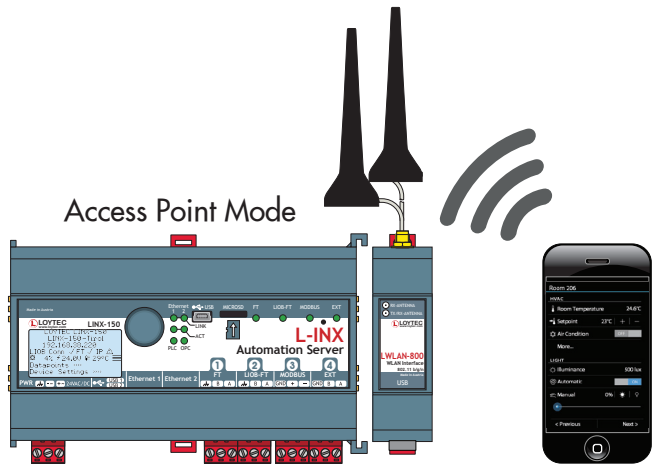


04 Wireless client setup dialog on the web interface.

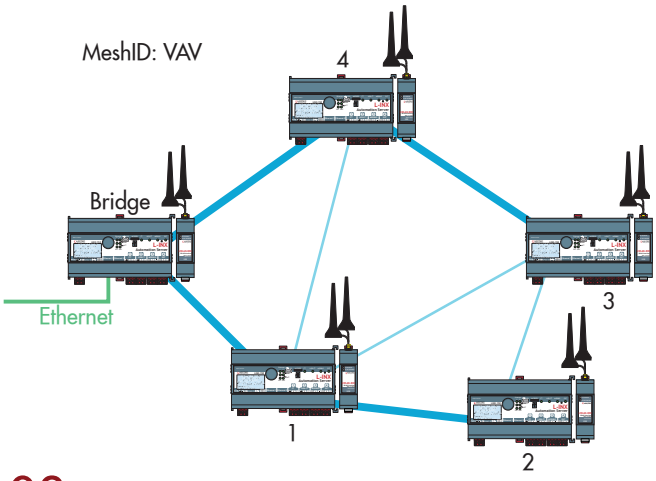
After a reboot, the L-INX/L-ROC/L-VIS/VAV connects to the wireless network and the connection status is shown on the web interface, see Figure 5.



05 Client mode connection status information.



06 In access point mode mobile devices can directly connect to the L-INX/L-ROC/L-VIS.



08 Mesh point network topology. L-INX controllers 1-4 out of reach can still get access to the building automation network infrastructure.

Access Point Mode

In access point mode, the L-INX/L-ROC/L-VIS/VAV acts as an access point and wireless devices can connect, see Figure 6. This is very convenient for device configuration via a mobile phone or tablet since the mobile device doesn't need to be in the customer's network domain in order to connect to the L-INX/L-ROC/L-VIS/VAV. The configuration page on the web interface is shown in Figure 7.

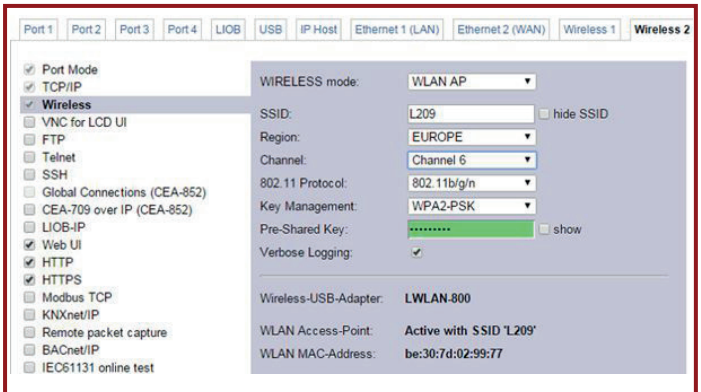
Mesh Point Mode

In mesh point mode, a number of wireless enabled L-INX /L-ROC/L-VIS/VAV devices communicate with each other in a self-healing mesh network topology. No separate wireless network infrastructure with access points is required for the devices to communicate with each other. Devices will route IP traffic across multiple hops and can expand over large areas. One possible network topology is shown in Figure 8.

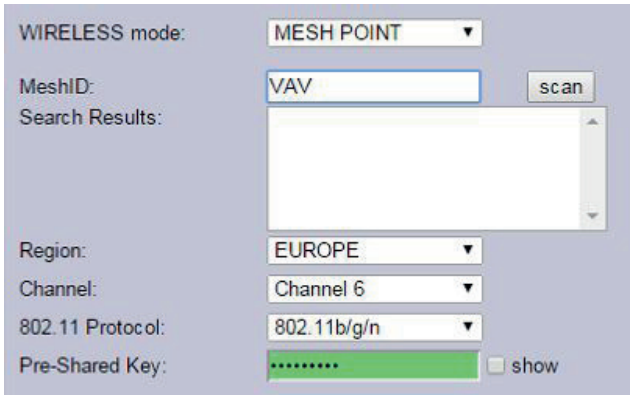
Figure 9 shows the web interface for mesh point configuration. Devices with the same MeshID can communicate with each other. Of course, all mesh points must communicate on the same physical channel. The encryption method used in mesh point mode is AUTHSAE, which is similar to WPA2. For a reliable network operation, the maximum number of hops is limited and depends on the packet error rate in the wireless network. A rule of thumb is 5 hops in a not too noisy network. One L-INX controller is the bridge to the wired building automation network infrastructure.

Mixed Function Wireless 1 and Wireless 2

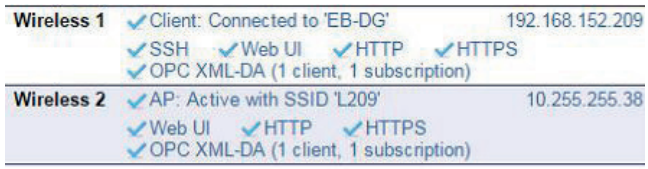
Any L-INX/L-ROC/L-VIS/VAV supports up to 2 wireless network interfaces simultaneously. Wireless 1 and Wireless 2 can be individually configured. It is possible to configure Wireless 1 in client mode in order to connect to an existing wireless network and to configure Wireless 2 in access point mode and have mobile devices connected directly to the L-INX/L-ROC/L-VIS/VAV e.g. for device configuration. Any combination of the 3 operating modes (Client, AP, Mesh) is possible as long as both wireless interfaces



07 Configuration web interface for access point mode.



09 Mesh point configuration web interface.

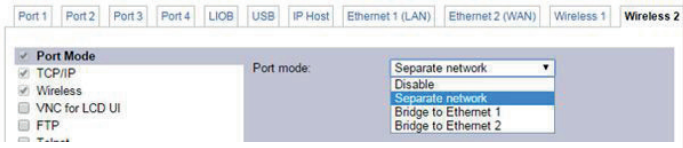


10 Wireless 1 connects to an existing Wi-Fi network, Wireless 2 provides an access point for mobile devices.

1+2 communicate on the same physical channel. A possible configuration is shown in Figure 10.

Separate Network

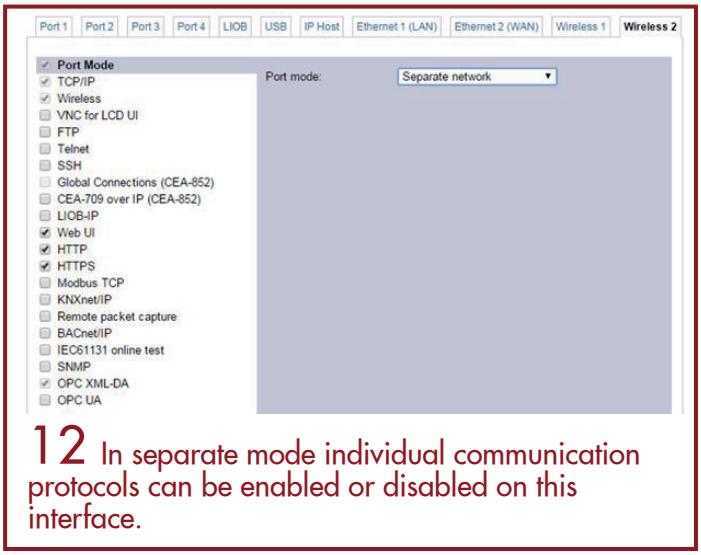
Whenever a wireless network interface is enabled, one must select the port mode between "Separate network" and "Bridged to Ethernet 1" or "Bridged to Ethernet 2" as shown in Figure 11.



11 The wireless interface 1+2 can be separated from the Ethernet interface or bridged to one of the 2 Ethernet ports.

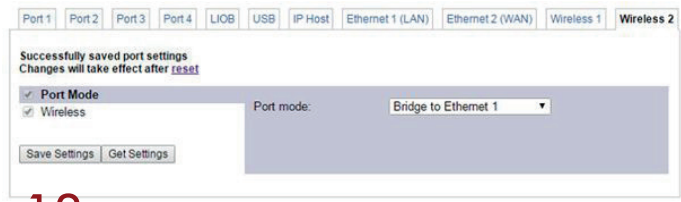
In "Separate network" mode, the wireless interface is separated from the Ethernet network interface 1+2 and the protocols exposed to the wireless interface can be individually enabled and disabled. An example is shown in Figure 12.

Bridged Network



12 In separate mode individual communication protocols can be enabled or disabled on this interface.

If bridged network is selected, one must also choose whether the wireless traffic should be forwarded to Ethernet port 1 or port 2. In this port mode, protocols can neither be enabled nor disabled. Whatever protocol is enabled on the bridged network will be available on the wireless network as well, see Figure 13. In a meshed network topology on one L-INX/L-ROC/L-VIS/VAV, the wireless interface must be bridged to Ethernet 1 or 2 in order to connect the mesh network to the remaining Ethernet network.



13 In bridged mode the protocols enabled on Ethernet 1 will be available on the wireless interface Wireless 2.

Summary

Wireless communication should be seen as an alternative communication channel for situations where running a cable is not an option. Proper planning should be done before installing the devices in the field. Make sure that wireless security is enabled before you leave the job site. Analyze the statistics information on the web interface of your device. If care has been taken during setup, a reliable operation should be guaranteed.

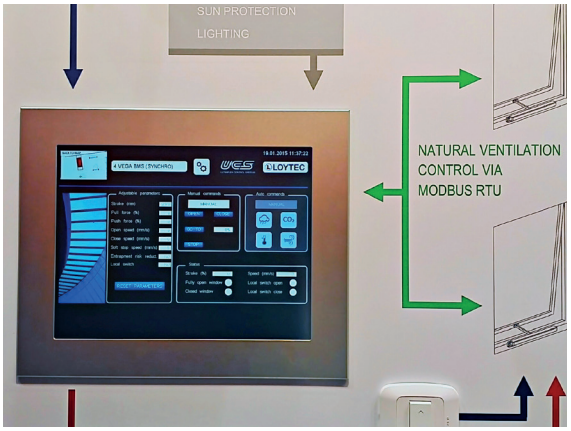
AHR Expo 2015 Chicago, USA

The world's largest HVACR marketplace took place from January 26–28, 2015 in Chicago. 62,000 attendees from more than 140 countries helped the show to set a new record. For the first time, LOYTEC presented its new VAV solution, the LIOB-AIR Controller, who received considerable interest and positive responses. All around, the AHR was an extremely successful and interesting event and we are already looking forward to the next AHR Expo in Orlando in 2016.

LOYTEC for the first time at E-world energy & water

The 15th E-world energy & water closed its doors with a record number on February 12, 2015. 620 exhibitors from 25 countries presented their products solutions and services. Approximately 24,000 international visitors informed themselves about the energy industries' current issues – from energy turnaround to efficient solutions for consumers. As a provider of system solutions for building automation, LOYTEC exhibited for the first time at E-word energy & water, presenting solutions for recording, saving, and visualizing energy consumption and operating conditions.

LOYTEC explored new territory with participating at the energy and water industries leading trade fair. It was gratifying that our products for recording and saving consumption data, especially in distributed real estates and office buildings, raised great interest. Furthermore, it was interesting to learn that the topic "building automation" is totally unknown to most of the visitors. Finally, the possibility of combining building automation and evaluating consumption figures led to stimulating conversations.



LOYTEC at Bau 2015, Munich, Germany

At UCS Ultraflex Control Systems' invitation, LOYTEC had the opportunity to present several products at their booth at BAU 2015 in January. 2015 exhibitors from 42 countries welcomed 251,200 visitors at the sold out world leading trade fair for architecture, materials, and systems in Munich.

With their window actuators and control units, UCS offers worldwide solutions for temperature and CO_2 based natural ventilation. Smoke and heat exhaust systems to protect the building in case of fire are the company's second area of operation. LOYTEC presented their L-VIS Touch Panels, L-IOB I/O Modules, and also the Universal Gateway LGATE-950 for the integration of UCS's window actuators, offering a complete system solution to interesting visitors.

LGATE-950 Gateways open the doors to building automation systems by converting the Modbus protocol to LON, BACnet, KNX, EnOcean, or OPC. These common communication protocols permit simple data exchange between the systems and allow e.g. a seamless integration into room automation. High energy saving potentials can be achieved by combining free cooling with installed cooling systems. L-VIS Touch Panels are used for local visualization and operation of the automated windows. For remote control, L-VIS Touch Panels and also Gateways offer access to client specific graphic pages via a web browser. L-IOB I/O Modules integrate switches and sensors. Altogether, the LOYTEC products expand UCS' product range to a system solution in building automation that raised great interest and led to informative and enduring conversations.

To conclude, our visit at BAU 2015 was a positive on throughout. Providers of systems for doors, smoke and heat exhausts, and windows, or window actuators partly offer networked stand-alone solutions with open communication protocols for the integration in building automation systems. The building automation trade is not yet discovered. However, it is probably only a matter of time before building automation becomes an issue at BAU.

www.loytec.com/event-review

LOYTECs

Prime boiled beef with creamed spinach and roasted potatoes

for 6 servings

Prime boiled beef, the so called Tafelspitz, is a classic of Viennese cuisine! Our employees already enjoyed this delicacy in our in-house restaurant. LOYTEC's chef de cuisine Eugen shows how to prepare this tasty dish. Enjoy!

Prime boiled Beef

1 round of beef, approx. 2 kg (with a little fat)
approx. 750 g beef bones
3 carrots
3 turnips/parsnips
1 small celeriac
1 onion
2 bay leaves
10 peppercorns
2 juniper berries
salt
chopped chives for decoration

Fill a large pot with about 5 liters of cold water. Wash the bones and boil in the water. Remove the sinew and skin from the beef, but leave the fat on. Place the meat, bay leaves, peppercorns, and juniper berries in the water and simmer just below boiling point on low heat for about 2 to 2.5 hours, regularly skimming off the soup.

Halve the unpeeled onion and fry without fat, preferably in a pan on the cut surface until dark brown. Cut the vegetables into large cubes and add with the onion to the meat. Simmer for another hour until the meat is really tender. (Test the meat with a fork to see if it's ready: the fork should

Kitchen ABC

slide in easily when the meat is ready).

Remove the meat, strain the soup, and put the meat back in the soup for a while.

Take Note

The fine soup that now just needs to be seasoned with salt can be served with classic Viennese soup garnishes before the boiled beef is served. However, as long as the meat is sitting in the soup, don't add salt, otherwise it will become red and dry up.

Creamed spinach

1.5 kg leaf spinach
1 onions (small, finely chopped)
370 ml consommé
3 tablespoons of butter
3 tablespoons of flour
1 garlic clove (finely chopped)
A pinch of nutmeg
3 tablespoons of cream double
Cold knobs of butter
Salt, pepper

For preparing the creamed spinach, wash, clean, and destalk the leaf spinach and parboil in hot water for some minutes. Douse with cold water and drain well. Strain the spinach by using a food mill or blender.

Fry the chopped onions in the butter until transparent, dust with flour, and infuse with hot soup. Bring to a boil while stirring continuously using a wire whisk to prevent lumps from forming. Stir in the strained spinach and leave to simmer on a low heat for approximately 10 minutes until it has a creamy consistency.

Season with salt, pepper, nutmeg, and garlic. Stir in the cream double and again bring to a boil until thickening.

Add the cold knobs of butter before serving.

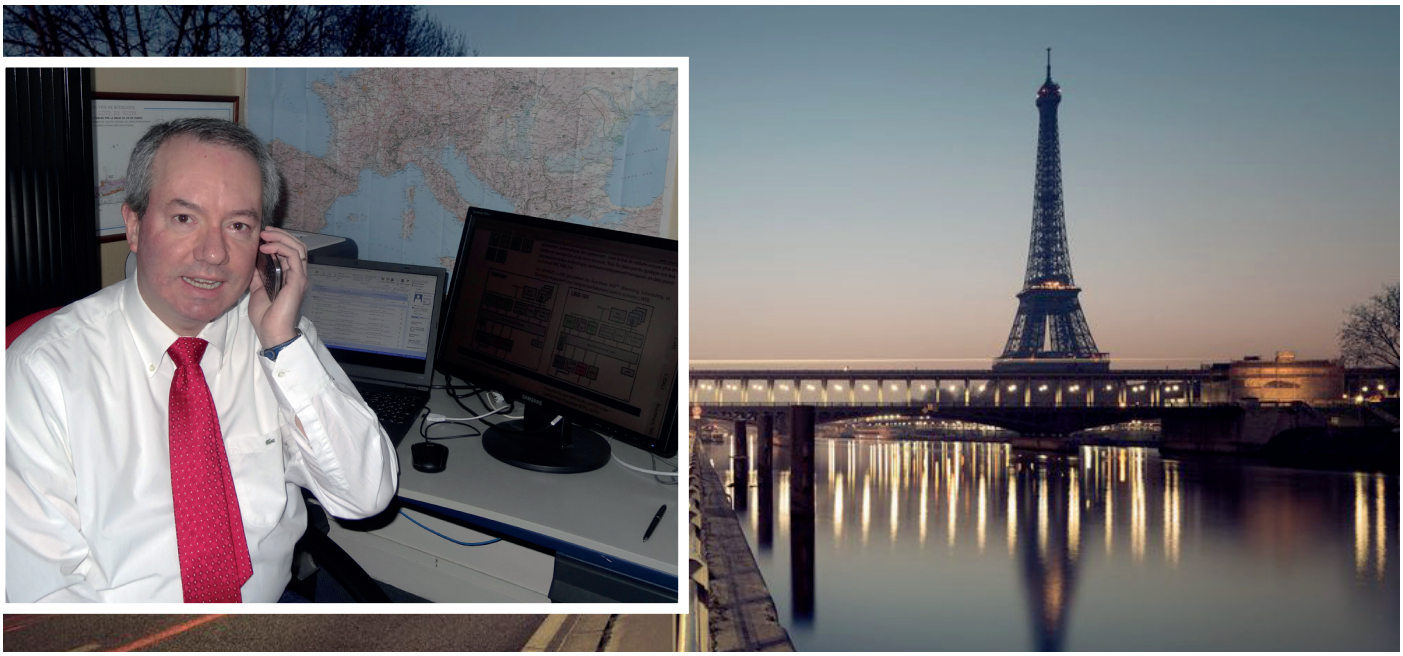
Roasted potatoes

8 potatoes (medium-sized)
2 onions (medium-sized)
Butter
Salt, pepper

Boil the potatoes into salted water until tender. Finely chop the onions and fry in butter until brown.

Peel the boiled potatoes, cut them into small pieces and add them to the fried onions. Mash with a fork and season with salt and pepper.

Finally, slice the meat and arrange on a warmed plate. Pour over a little soup, add salt to taste, and sprinkle with chives. Serve with creamed spinach and roasted potatoes!



"Close to the Customers"

Frédéric Caillet, LOYTEC Sales France

Frédéric Caillet joined the LOYTEC sales team on the 1st of September 2014. Frédéric works in our branch office in Paris and is responsible for growing the business in France.

Fréd has graduated as electronics engineer from the University of Paris XI Orsay. After that, he started to work as a teacher in electronics. Jobs at Thyssen Elevator, Hewlett Packard, Arrow, and Echelon followed before he became part of the LOYTEC family.

In his function as technical sales representative, he aims on increasing the popularity of LOYTEC. Customer visits and special events are therefore high on his agenda. Most French clients are just aware of LOYTEC's traditional infrastructure products, but are not yet educated about LOYTEC's powerful hardware and software solutions. His main focus is therefore on demonstrating the entire LOYTEC product portfolio to existing and future customers who want to start creating solutions for building automation of today and tomorrow. In the past, communication problems and the lack of local presence restricted the business in France to grow. That is why Frédéric's key objective is the organization of a first level customer support. One of his first tasks at LOYTEC was the translation of the product catalogue and the website into French for a better dialogue with the local customers.

"Listen to people and customers before talking!", is Frédéric's work philosophy. In his job, he especially enjoys working with leading edge products. He loves to provide solutions and to fulfill customer's needs with the constantly growing product portfolio of LOYTEC. To combine his passion for traveling and his open minded personality in his job is another thing that he particularly values. For him, LOYTEC's flat hierarchies and the friendly internal communication create a pleasant working atmosphere. Of course, there are also challenges that needs to be tackled. He believes that his special challenge at work is proper time management, as it is often difficult to balance the time between administrative tasks and customer visits.

Of course, Fréd brings along a list of skills and characteristics that help him to succeed in his job. Already during his time as a teacher he discovered his ability of delivering information in a comprehensible way as he gained a very positive student's feedback. A skill he still uses today. Because of his honest personality he follows the concept of trust. He always ensures to tell the truth and for him this is of importance in sales. Also 20 years of experience in a leading building automation company help him to better understand and position LOYTEC products and to deliver their key values to clients. "Because of my past activities both in technical support and sales I feel comfortable with my new challenge at LOYTEC in France", Fréd concludes.

All trainings take place at the LOYTEC headquarters in Vienna, Austria. Trainings at LOYTEC Americas Inc., Pewaukee, WI are available online. The course offer includes trainings in both German and English language. Additional training dates are available on request. For further information, please contact sales@loytec.com.

LTRAIN-GRAPHICS

Graphical Design for L-VIS and L-WEB (2 days)

- Creating L-VIS and LWEB-803 projects with the L-VIS/L-WEB Configurator
- Creating a distributed visualization based on L-INX and LWEB-803
- Efficient project design using templates

2015-03-23 (ENG)
2015-09-21 (GER)
2015-11-09 (ENG)

LTRAIN-LINX

Programming the L-INX Automation Server (3 days)

- Configuration of the L-IOB I/O Modules
- Creating IEC 61131-3 applications
- Testing and debugging the application
- Using Alarming, Scheduling, and Trending (AST™)
- Working with LOYTEC Function Library

2015-03-16 (ENG)
2015-04-13 (GER)
2015-05-04 (GER)
2015-06-15 (ENG)
2015-09-28 (GER)
2015-11-16 (ENG)
2015-11-30 (GER)

LTRAIN-DALI

Lighting Control with L-DALI (2 days)

- Introduction to DALI
- Features of the LOYTEC DALI Controllers
- Configuring LOYTEC DALI Controllers
- Setting up a DALI network
- Troubleshooting the DALI installation

2015-03-30 (ENG)
2015-09-14 (GER)
2015-11-02 (ENG)

LTRAIN-BMS

LWEB-900 Building Management System (2 days)

- Introduction to the LWEB-900 System
- LWEB-900 Project Setup
- Working with LWEB-900 Views
- LWEB-900 User Management

2015-03-19 (ENG)
2015-04-16 (GER)
2015-05-07 (GER)
2015-06-18 (ENG)
2015-10-01 (GER)
2015-11-19 (ENG)
2015-12-03 (GER)

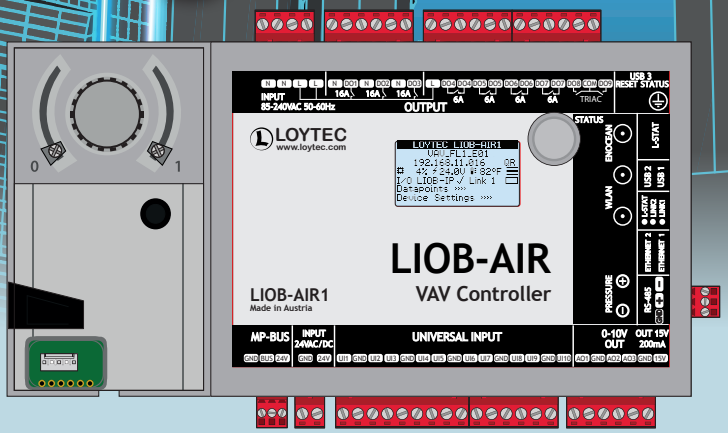
LTRAIN-GATEWAY

Gateway Applications and Data Point Management (2 days)

- LOYTEC data point concept
- CEA-709, BACnet, M-Bus, Modbus, OPC XML-DA
- Local and remote AST™ functions
- Building gateway applications with L-GATE, L-Proxy, and L-INX

2015-03-26 (ENG)
2015-09-17 (GER)
2015-11-05 (ENG)

Innovative Building Automation



LIOB-AIR1– the new revolutionary VAV Controller

- Air Volume Controller with comprehensive features
- Configuration via L-STUDIO
- Communication through Ethernet/IP or WLAN
- BACnet/IP and LonMark IP-852 Interface
- Integrated web visualization
- Integrated trending, alarming, and scheduling
- Integration of L-STAT room control unit per plug'n'play
- Manual control using a jog dial

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