

TRILUX
SIMPLIFY YOUR LIGHT.



BACnet

LIVELINK ONE

BACNET INTERFACE

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1. INTRODUCTION

BACnet – the Building Automation and Control Network – is the world's leading technology for data communication in building automation, as specified in DIN EN ISO 16484. BACnet enables vendor-independent interoperability for networked systems and installations in building services engineering, and supports a comprehensive range of building automation applications.

A key feature of our LiveLink system is its open architecture and the use of standardised interfaces. LiveLink Premium, in particular, enables integration with higher-level building management systems for interaction and data exchange.

The existing IP network infrastructure of the LiveLink Premium system and its system components enables straightforward integration into BACnet/IP-based building automation systems.

2. LIVELINK ONE – BACNET INTERFACE

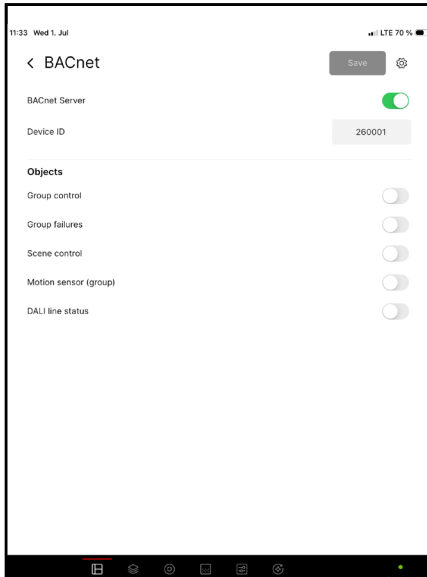
The LiveLink ONE app can be used to enable the BACnet interface of the LiveLink Premium system. The system is configured as a BACnet server, providing data to other BACnet-enabled devices that act as BACnet clients.

Once enabled, the LiveLink system provides access to the following BACnet objects:

- Group control: access to all luminaire groups and control of brightness and colour temperature of the groups.
- Group faults: information indicating whether one or more luminaires in a luminaire group are reporting a fault (DALI lamp fault or no longer accessible).
- Scene control: access to all light scenes and possible calling of a light scene.
- Motion sensor (group): information indicating whether a sensor in the luminaire group is detecting movement.
- DALI line status: information indicating whether one or more devices connected to a DALI line are reporting a fault.

3. CONFIGURATION OF THE BACNET INTERFACE IN THE LIVELINK ONE APP

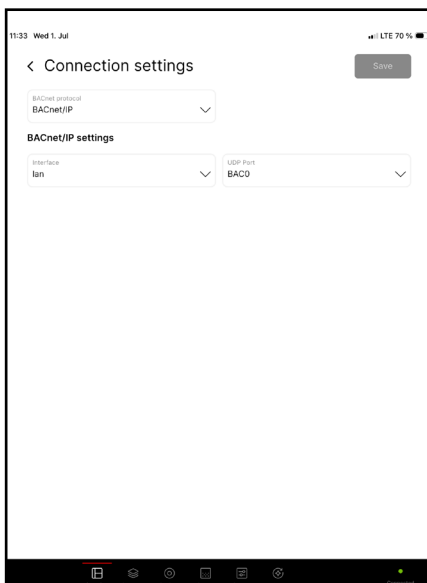
Configuring the BACnet interface enables devices from different manufacturers to be interconnected across the building automation system. The function is located in the central Settings menu on the overview screen, in the Interfaces submenu.



BACnet server: when the BACnet interface is enabled, the LiveLink system is set by default as a BACnet server.

Device ID: unique device ID of the BACnet device for identification in the network (default setting 260001). If multiple LiveLink systems are integrated into a BACnet network, the device ID of the systems must be changed manually. It must be ensured that each ID is unique within the network.

Objects: enabling the available BACnet objects.



You can access the connection settings through the "Settings" menu.

BACnet protocol: selection between BACnet/IP and BACnet/SC (see Page 12).

Interface: selection of the network interface for connecting to the BACnet system

- **LAN** (for local networks)
- **WAN** (for connections across multiple sites or via the internet)

UDP port: 16 ports are designated for BACnet communication (0xBAC0 to 0xBACF). The default port is 0xBAC0.

4. LIVELINK DEVICE OBJECT

Each BACnet device must be assigned its own device object to uniquely identify the device.

Bacnet property

Active COV Subscriptions

APDU Timeout	3000	Time interval before a telegram requiring acknowledgement is repeated (3000 ms).
Application Software Version	{Text string}	LiveLink firmware version number.
Database Revision	{Integer}	Database revision number
Daylight Savings Status	True	BACnet status parameter that indicates whether summer time (true) or winter time/standard time (false) is currently in use.
Description	{Text string}	Device description of the LiveLink system.
Device Address Binding	{BACnet Address Binding List}	Linking of the BACnet Device ID (see Chapter 3) to the physical network address.
Firmware Version	{Text string}	Version number of the BACnet device software.
Local Date	{LiveLink system date}	Current date of the LiveLink system.
Local Time	{LiveLink system time}	Current time of the LiveLink system.
Location	{Text string}	Installation site (location) of the LiveLink system.
Max APDU Length Accepted	1476	Maximum telegram size that can be received and processed in an Application Protocol Data Unit (APDU) (1476 bytes).
Model Name	LiveLink	Model identifier of the LiveLink system.
Number Of APDU Retries	3	Repeat rate for a faulty telegram.
Object Identifier	OBJECT_DEVICE:100	Unique identifier within a BACnet network.
Object List	Object [] Array	Array containing all available BACnet objects.
Object Name	SimpleServer	Object name of the data point.
Protocol Object Types Supported	{32-bit sequence}	Supported BACnet object types: Bit 1: analog output Bit 2: analog value Bit 3: binary input Bit 5: binary value Bit 8: device Bit 19: multi-state value
Protocol Revision	24	Version number for internal protocol functions (defined in the ANSI/ASHRAE 135 standard) which specifies which BACnet services and properties are supported by a building automation device (Revision 24).

Protocol Services Supported	{40-bit sequence}	Supported BACnet services
Protocol Version	1	Protocol version
Segmentation Supported	3 : None	Ability of a device to split large APDUs (Application Protocol Data Units) into several smaller data packets (segments) or to reassemble them
System Status	0 : Operational	System status of the LiveLink system: • OPERATIONAL (0): device is operating normally and without faults. • OPERATIONAL_WITHOUT_FAULT_DETECTION (1): device is operating but cannot detect faults/mal-functions. • DOWNLOAD_REQUIRED (2): device or its components require a firmware update or a configuration or program download (e.g. after a reset). • DOWNLOAD_IN_PROGRESS (3): download or update is currently being installed on the device. • NON_OPERATIONAL (4): device is out of service (e.g. hardware fault, switched off manually). • BACKUP_IN_PROGRESS (5): a backup of the device data is currently being created. • DOWNLOAD_FAILED (6): configuration or firmware download has failed.
UTC Offset	-60	Time difference between local standard time and Coordinated Universal Time (UTC) (-60 minutes).
Vendor Identifier	1208	Unique numeric manufacturer ID.
Vendor Name	TRILUX GmbH & Co. KG	Manufacturer name

5. “GROUP CONTROL” BACNET OBJECTS

“Group Control” BACnet objects provide access to all luminaire groups and enable the brightness and colour temperature of the groups to be controlled.

5.1. Brightness control

Bacnet property

Event State	0 : Normal	Current state of the object: • "0": Normal • "1": Fault/malfunction • "2": Deviation • "3": Limit exceeded • "4": Limit fallen below • "5": Safety alarm
Object identifier	OBJECT_ANALOG_OUTPUT:0	Object type (10 bits) and instance number (22 bits): Analog input, instance number "0"
Object Name	{LiveLink group name}	Name of the object as plain text (string).
Object Type	1 : Object Analog Output	Object type: "1", analog output
Out Of Service	False	Indicates whether the object is 'out of service' (TRUE: manual value / FALSE: actual object value).
Present Value	{32-bit floating-point number}	Current (actual) measurement or operating value of the object.
Priority Value	Object [] array	The Priority Value (the Priority Array) refers to a 16-level priority table. It specifies which command is permitted to overwrite the current value (Present Value) of an object. • Level 1 - 2: Highest priority for critical alarms • Level 3 - 6: Manual interventions via the building management system (BMS) or touch panels. • Level 8 - 12: Time programs, schedulers. • Level 16: Standard operating mode / automatic LiveLink is set by default to communicate at priority level 16.
Relinquish Default	0	Fallback value of the object
Status Flags	0000	Display of the current operating status of the object in the building automation system: 1. Bit 1 (IN_ALARM): Active alarm is present (TRUE) or system is in normal state according to event state (FALSE). 2. Bit 2 (FAULT): Fault is present (TRUE) or no fault detected (FALSE). 3. Bit 3 (OVERRIDDEN): Value was overwritten locally (TRUE), or not overwritten (FALSE) 4. Bit 4 (OUT_OF_SERVICE): Object is out of service (TRUE) or in normal operation (FALSE).
Units	98 : Percent	Physical or technical unit of measurement for the object: Unit Code "98", percent.

5.2. Colour temperature control

Bacnet property

Event State	0 : Normal	Current state of the object: • “0”: Normal • “1”: Fault/malfunction • “2”: Deviation • “3”: Limit exceeded • “4”: Limit fallen below • “5”: Safety alarm
Object identifier	OBJECT_ANALOG_OUT-PUT:0	Object type (10 bits) and instance number (22 bits): Analog input, instance number “0”
Object Name	{LiveLink group name}	Name of the object as plain text (string).
Object Type	1 : Object Analog Output	Object type: “1”, analog output
Out Of Service	False	Indicates whether the object is ‘out of service’ (TRUE: manual value / FALSE: actual object value).
Present Value	{32-bit floating-point value}	Current (actual) measured or operating value of the object.
Priority Value	Object [] array	The Priority Value (the Priority Array) refers to a 16-level priority table. It specifies which command is permitted to overwrite the current value (Present Value) of an object. • Level 1 - 2: highest priority for critical alarms • Level 3 - 6: manual interventions via the building management system (BMS) or touch panels. • Level 8 - 12: time programs, schedulers. • Level 16: standard operating mode / automatic LiveLink is set by default to communicate at priority level 16.
Relinquish Default	0	Fallback value of the object
Status Flags	0000	Display of the current operating status of the object in the building automation system: 1. Bit 1 (IN_ALARM): Active alarm is present (TRUE) or system is in normal state according to event state (FALSE). 2. Bit 2 (FAULT): Fault is present (TRUE) or no fault detected (FALSE). 3. Bit 3 (OVERRIDDEN): Value was overwritten locally (TRUE), or not overwritten (FALSE) 4. Bit 4 (OUT_OF_SERVICE): Object is out of service (TRUE) or in normal operation (FALSE).
Units	63 : Kelvin	Physical or technical unit of measurement for the object: Unit Code “63”, Kelvin (K).

6. “GROUP FAULT” BACNET OBJECT

The “Group fault” BACnet object indicates whether one or more luminaires in a luminaire group are reporting a fault (DALI lamp fault or no longer accessible).

As soon as the status of a group changes, a message informing of the status change is automatically sent (BACnet COV subscription – Change of Value).

Bacnet property		
Object identifier	0 : Normal OBJECT_ANALOG_VALUE:0	Object type (10 bits) and instance number (22 bits): Analog Value, instance number “0”
Object Name	Failures of {Live-Link group name}	Name of the object as plain text (string). In this case “Failures of {LiveLink group name}”.
Object Type	2 : Object Analog Value	Object type: “2”, analog value (virtual data point with no direct hardware connectivity)
Present Value	{32-bit floating-point value}	Current (actual) measured or operating value of the object. In this case the present value corresponds to the number of faulty luminaires in a luminaire group.

7. “SCENE CONTROL” BACNET OBJECT

The BACnet ‘Scene Control’ object provides access to all light scenes and scene groups in the LiveLink system and can call these. This includes the start and stop scenes for the automatic functions (schedule, twilight switch, sequences and sensor-triggered scene change).

Bacnet property

Description	Calls Scene	Description of the object.
Event State	0 : Normal	Current state of the object: • “0”: Normal • “1”: Fault/malfunction • “2”: Deviation • “3”: Limit exceeded • “4”: Limit fallen below • “5”: Safety alarm
Number Of States	25	Total number of available states of the multi-state object (integer, 1 to 65535). In this case this corresponds to the number of all existing scenes
Object Identifier	{32-Bit-Gleitkom-OBJECT_MULTI_STATE_VALUE:n	Current (actual) measurement or operating value of the object type (10 bits) and instance number (22 bits): Multi-state value, instance number “0” to “n”
Object Name	Scene Control Value	Name of the object as plain text (string).
Object Type	19 : Object Multi State Value	Object type: “19”, multi state value
Out Of Service	False	Indicates whether the object is ‘out of service’ (TRUE: manual value / FALSE: actual object value).
Present Value	{Integer}	Number of the currently active state (as an integer). The corresponding LiveLink scene is called when the state or value changes.
State Text	Object [] array	Array containing all the associated state texts (plain text descriptions) for the possible states (corresponding to “Number Of States”). In this case this corresponds to all scenes with scene name.

8. “MOTION SENSOR (GROUP)” BACNET OBJECT

The “Motion Sensor (Group)” BACnet object provides information on whether a sensor in a luminaire group has detected movement.

Bacnet property

Description	motion sensors for {LiveLink group name}	Description of the object.
Event State	0 : Normal	Current state of the object: • “0”: Normal • “1”: Fault/malfunction • “2”: Deviation • “3”: Limit exceeded • “4”: Limit fallen below • “5”: Safety alarm
Object Identifier	OBJECT_BINARY_INPUT:0	Object type (10 bits) and instance number (22 bits): Binary input state, instance number “0”
Object Name	motion sensors for {LiveLink group name}	Name of the object as plain text (string).
Object Type	3 : Object Binary Input	Object type: “3”, binary input state
Out Of Service	False	Indicates whether the object is ‘out of service’ (TRUE: manual value / FALSE: actual object value).
Polarity	0 : Normal	Defines signal inversion for binary inputs/outputs. • NORMAL (0): Physical signal and Present Value are consistent. • REVERSE (1): Physical signal and Present Value are inverted.
Present Value	{Enumerated}	Current state of the input (FALSE: no movement / TRUE: movement detected).
Status Flags	0000	Display of the current operating status of the object in the building automation system: 1. Bit 1 (IN_ALARM): Active alarm is present (TRUE) or system is in normal state according to event state (FALSE). 2. Bit 2 (FAULT): Fault is present (TRUE) or no fault detected (FALSE). 3. Bit 3 (OVERRIDDEN): Value was overwritten locally (TRUE), or not overwritten (FALSE) 4. Bit 4 (OUT_OF_SERVICE): Object is out of service (TRUE) or in normal operation (FALSE).

9. “DALI LINE STATUS” BACNET OBJECT

The “DALI Line Status” BACnet object can be used to determine whether one or more devices connected to a DALI line are reporting a fault.

As soon as the status of a DALI line changes, a message informing of the status change is automatically sent (BACnet COV subscription – Change of Value).

Bacnet property		
Object identifier	OBJECT_BINARY_VALUE:0	Object type (10 bits) and instance number (22 bits): Binary Value, instance number “0”
Object Name	{MAC address and gateway port}	Name of the object as plain text (string). In this {MAC address and gateway port}.
Object Type	5 : Object Binary Value	Object type: “5”, binary state (virtual data point with no direct hardware connectivity)
Present Value	{Enumerated}	Current state of the binary value (FALSE: no fault / TRUE: fault detected).

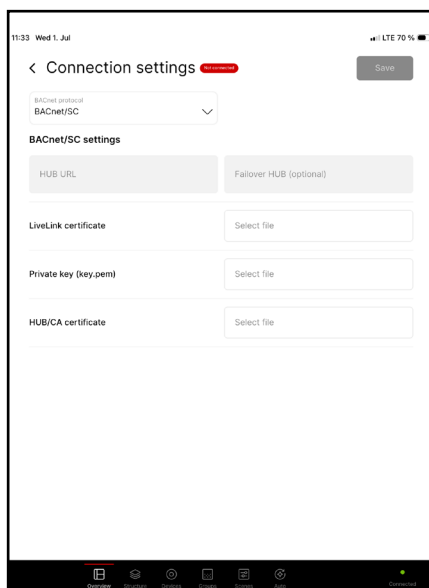
10. SECURE CONNECTIVITY WITH BACNET SECURE CONNECT

If networked systems are not properly protected, building services, and thus the operational processes in a building or organisation, can be disrupted or even manipulated.

As an extension of the BACnet protocol, BACnet Secure Connect (BACnet/SC) is specifically designed to meet the security requirements of building automation systems. It provides additional security measures such as encryption, authentication and access control to ensure the integrity, confidentiality and authenticity of data in building automation. BACnet/SC is a key component of modern building technology, designed to meet the higher security requirements in increasingly networked buildings and to protect people and assets from cyber attacks.

The BACnet Secure Connect (BACnet/SC) connection can be selected in the settings of the BACnet interface.

To set up a secure BACnet/Secure Connect network, a hub is required within the network. This is a key component in the network that analyses, controls and manages the encrypted data traffic between the BACnet devices. In this case, encryption is implemented using TLS 1.3. Optionally, a failover hub can be configured which automatically takes over the tasks of the primary hub in the event of its failure.



HUB URL: The main hub through which all network communication passes.

Failover HUB: The backup hub which kicks in automatically if the main hub fails.

LiveLink certificate: Individual LiveLink device certificate, issued by the Certification Authority (CA).

Private key: Private key generated on the LiveLink device.

HUB/CA certificate: Higher-level root certificate. All devices in the system require this certificate in order to recognise each other as trusted devices.

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