PHILIPS

dynalite

PDDEG-S

BACnet Integration

Application Note

BACnet device settings

Generic BACnet settings can be found under **PDDEG-S > Device properties > BACnet**. BACnet is enabled by default. Every BACnet device must have a unique BACnet device ID within the BACnet network. Both BACnet device ID and network ID are provided by the BACnet administrator. The default BACnet port is 47808 (0xBAC0) but may be changed if required.

Note: A reboot is required for changes to take effect. A reset is not sufficient.

BACnet	
Enabled	Enabled
Port	47808
Network ID	1
Device ID	22

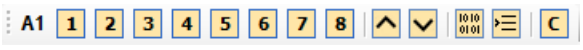
BACnet data point testing

Once you have completed the BACnet Configuration Wizard in the PDDEG-S, the final step before hand over to the BMS contractor is to check that each point is functioning correctly. For more information on configuring BACnet on the PDDEG-S. please refer to the Ethernet Gateways Commissioning Guide.

Using System Builder and a BACnet client such as, Yet Another BACnet Explorer (YABE) or BACnet Discovery Tool (BDT), test each point by:

- Setting a data point value from the BACnet client and monitoring the message in the SB Network Log (writing).
- Setting a data point value from SB and monitoring the corresponding data point value in the BACnet client (reading).

The System Builder Virtual Panel and DyNet Packet Sender enables you to send out the DyNet messages that are read by the BACnet client (Click C or press Alt + F9 to ensure the virtual panel is configured to the area selected in the Areas View).



The example commands are mostly in DyNet1 format and need to be sent from the serial spur. Depending on your specific setup these commands might need to be routed through a translation gateway first before reaching the PDDEG-S BACnet gateway.

Note that it is possible to have two System Builder windows open where one is connected to the (IP) trunk and one to the (serial) spur. In case messages remain unanswered check your trunk and spur routing and how each instance of System Builder is connecting to the system.

BACnet point objects

No.	Function	Object type	Data Type	Read/ Write	Point description
1	Total Offline Devices	Job, Floor	Analog	R	*Count of any offline devices for a Job or Floor.
2	Total Driver and Lamp Faults	Job, Floor, Area	Analog	R	Count of any offline drivers or lamps for a Job, Floor or Area.
3	Offline Device Alarm	Job, Floor	Binary	R	*Indicator of any offline devices for a Job or Floor.
4	Driver or Lamp Fault Alarm	Job, Floor, Area	Binary	R	Indicator of any offline drivers or lamps for a Job, Floor or Area.
5	System Manager Offline Device Alarm	SM	Binary	R	*Indicator that System Manager has identified one or more offline devices.
6	System Manager Driver or Lamp Fault Alarm	SM	Binary	R	Indicator that System Manager has identified one or more driver or lamp failures.
7	Preset	Area	Analog	R/W	Read and write the preset number for an Area.
8	Current Temperature	Area	Analog	R	Read the current Temperature (Celsius) for an Area.
9	Temperature Setpoint	Area	Analog	R/W	Read and write the temperature setpoint for an Area.
10	Channel Level	Channel	Analog	R/W	Read and write the level of a single channel within an Area.
11	Driver Status	Driver	Binary	R	Read if a single driver in a fixture is online or offline.
12	Lamp Status	Driver	Binary	R	Read if a single lamp in a fixture is working or not working.
13	Channel Runtime	Driver	Analog	R	Circuit/driver usage in minutes.
14	Device Offline Status	Device	Binary	R	*Read if a single device in the system is online or offline.
15	Light Level (Lux)	Device	Analog	R	*Read the LUX level from a single DyNet Sensor.

Totals

1. Total Offline Devices

Read data point

The PDDEG-S aggregates the count of offline devices and reports this via the Total Offline Devices BACnet point. It is NOT necessary to enable the individual Device Offline Status points for each device. It will monitor the individual device's status in the background.

Example for a project with 250 devices:

- 1 point if only the Total Offline Devices point is enabled on project level
- 251 points if both Total Offline Devices (project level) and individual Device Offline Status points are enabled.

The PDDEG-S will poll device status automatically on an hourly basis. Besides this, it will monitor sign-on requests and replies to track device status. If a sign-on request remains unanswered 3x, the PDDEG-S will consider the device to be offline until a sign-on reply is received. It does not track the Device Offline Metric messages.

2. Total Driver and Lamp Faults

Read data point

The PDDEG-S aggregates the count of driver and lamp faults and reports this via the **Total Driver and Lamp Faults** BACnet point. This point will monitor the status of all drivers and lamps in the background. It is not required to enable the individual points to get an aggregated result.

The **Total Driver and Lamp Faults** point relies on the DALI channel replies. See Driver status and Lamp status for more detail.

Alarms

3. Offline Device Alarm

Read data point

This point is a logical function of the **Device Offline Status** points. If one or more devices are offline, this point will be True. If no device is offline, the value will be False. It is not mandatory to have Device Offline Status enabled for individual devices.

The PDDEG-S will poll device status automatically on an hourly basis. Besides this, it will monitor sign-on requests and replies to track the device status. If a sign on request remains unanswered 3x, the PDDEG-S will consider the device to be offline until a sign-on reply is received. It does not track the Device Offline Metric messages.

4. Driver or Lamp Fault Alarm

Read data point

This point is a logical function of the **Driver Status** and **Lamp Status** points. If one or more of these points reports a fault this value will be True. If no Driver or Lamp is offline, the value will be False. It is not mandatory to have **Driver status** and **Lamp status** enabled for this BACnet point.

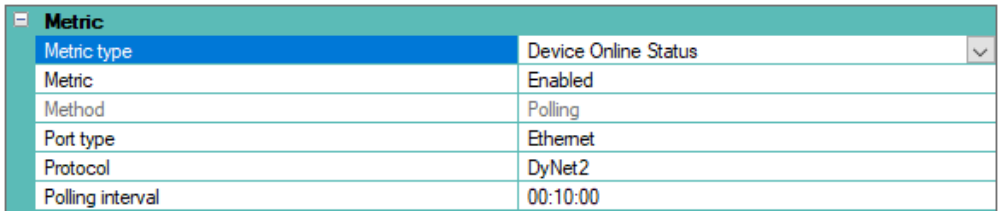
The **Driver or Lamp Alarm** point relies on the DALI channel replies. See Driver and Lamp status for more detail.

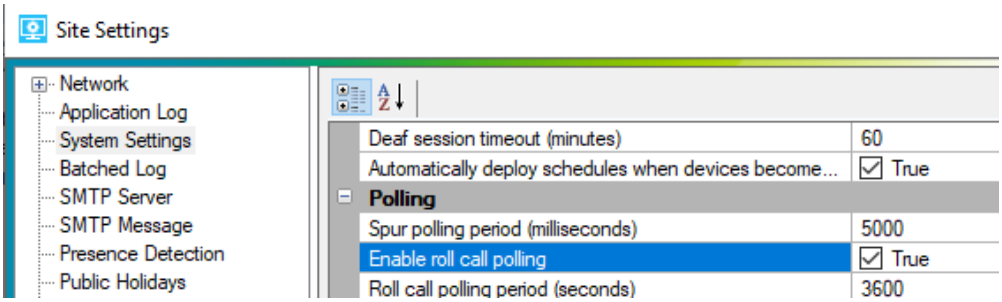
5. System Manager Offline Device Alarm

Read data point

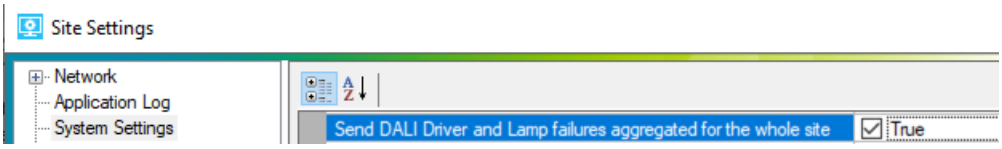
When System Manager is present it can monitor offline devices. If one or more are offline, it will set the **System Manager Offline Device Alarm** BACnet point to True.

In contrast to the **Offline Device Alarm** it doesn't depend on other BACnet points and doesn't use the hourly PDDEG-S polling mechanism. Instead, it relies on the PDDEG-S metric **Device Online Status** to be enabled and SM configuration tool, **Site Settings > System Settings > Enable roll call polling** to be set to True.





When System Manager is configured to detect offline devices, this information needs to be forwarded to the BACnet gateway. In the SM configuration tool, **Site settings > System Settings > Polling > Send DALI driver and Lamp failure aggregated for the whole site** must be set to True.



If devices go offline, it will be reported with the Report Device Offline command. Add this command to the DyNet Sender and toggle the 6th byte between 0x00 and higher and check that the System Manager Offline Device Alarm is updating accordingly.

Report 0 Device Offline: 1C,00,04,47,00,00,FF

Report 1 Device Offline: 1C,00,04,47,00,01,FF

1C 00 04 47 00 01 FF 99	Area All (Area 0) - Report Area Status - Device Offline Total = 1
1C 00 04 47 00 00 FF 9A	Area All (Area 0) - Report Area Status - Device Offline Total = 0

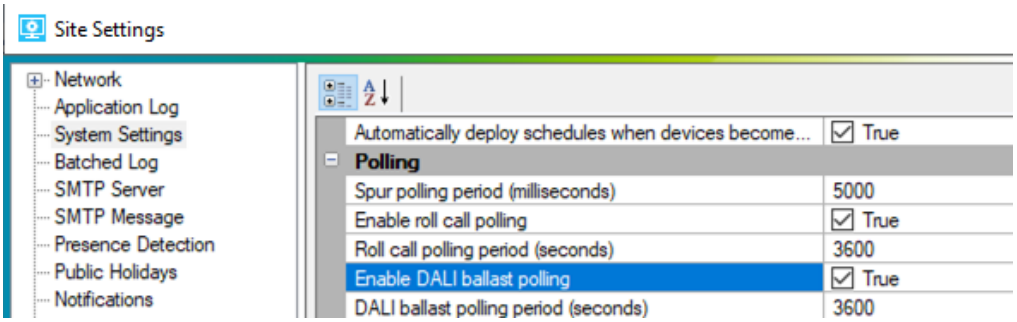
Note: This command is sent via area 0 (zero). If an extra PDEG is added when you have separate BMS and Dynalite networks, **Area zero transmit** must be enabled on the extra PDEG (on both trunk and spur ports) and on the PDDEG-S Comm port.

6. System Manager Driver or Lamp Fault Alarm

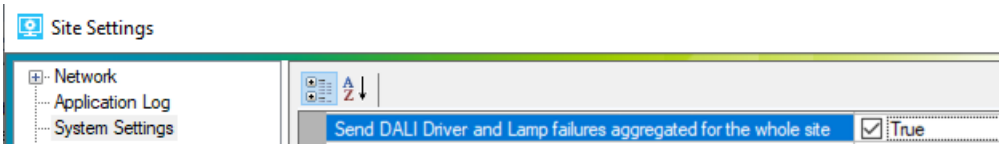
Read data point

When System Manager is present it can monitor driver and lamp failures. If one or more have failed, it will set the **System Manager Driver or Lamp Fault Alarm** BACnet point to True.

In contrast to the **Driver or Lamp Fault Alarm** it doesn't depend on other BACnet points and doesn't use the hourly PDDEG-S polling. Instead, it relies on the regular DALI Driver and Lamp Status polling. **Device Properties > DALI > DALI Enable DALI status polling and ballast failure alarms** must be enabled in DALI controllers and SM Configuration tool, **Site settings > System Settings > Polling > Enable DALI ballast polling** must be set to True.



When System Manager is configured to detect driver and lamp status, this status needs to be forwarded to the BACnet gateway. In the SM configuration tool, **Site settings > System Settings > Polling > Send DALI driver and Lamp failure aggregated for the whole site** must be set to True.



If drivers or lamps go offline, it is reported with the Report area status command. Add this command to the DyNet sender and toggle the 6th byte between 0x00 and any other value and check that the SM Driver or Lamp fault alarm is updated accordingly.

Report 0 Ballast (Driver) Offline: 1C,00,01,47,00,00,FF

Report 3 Ballast (Driver) Offline: 1C,00,01,47,00,03,FF

1C 00 01 47 00 03 FF 9A	Area All (Area 0) - Report Area Status - Ballast Offline Total = 3
1C 00 01 47 00 00 FF 9D	Area All (Area 0) - Report Area Status - Ballast Offline Total = 0

Note: Driver and Lamp status are reported separately on the BACnet side.

Logical Areas and Channels

7. Preset

Write data point

In the BACnet client, enter a preset number in an area's Preset object. Although the BACnet point type is an analogue value it only accepts integers (1,2,3,4 etc.). Observe the preset change in the lighting and in the SB Network Log.

Preset number range: 0 to 65534. Max number of presets supported varies per controller (e.g., DDBC120-DALI supports 64 presets). Panic preset message uses preset 65534.

Recall Preset: 1C,<Area>,64,00,00,00,FF

1C 03 64 00 00 00 FF 7E	Area Reception (3) Recall Preset High (1) with a fade of 2.00s	In

Read data point

In SB Areas View, select an area. With the DyNet Packet Sender, select Request Current Preset.

click ▶ Send. Observe the matching area's Preset data point value in the BACnet client.

Request Current Preset: 1C,<Area>,00,63,00,00,FF

1C 03 03 62 00 00 FF 7D	Area Reception (3) Current Preset Is Off (4), Offset Is 0	In
1C 03 00 63 00 00 FF 7F	Area Reception (3) Request Current Preset	Out

8. Current Temperature

To keep the BACnet Current Temperature point in sync, enable **Broadcast temperature** on only one device (with a temperature sensor) in an area. This will report the actual temperature when the **Max trigger time** expires and if the **Min trigger time** expires and the temperature has changed more than the **Delta value**.

Temperature Sensor	
Control	Enabled
Broadcast temperature	Enabled
Respond to temperature requests	Enabled
Measured temperature offset (˚C)	0
Min trigger time	00:00:30
Max trigger time	00:15:00
Delta value (˚C)	0,2

Read data point

In SB Areas View, select an area. With the DyNet Packet Sender, add Request Actual Temperature.

click ▶ Send. Observe the matching area's Temperature data point value change in the BACnet client.

Request Actual Temperature: 1C,<Area>,0C,49,00,00,FF

Reply Actual Temperature: 1C,<Area>,0C,4A,11,1B,FF (+17.27 C)

1C 06 0C 4A 11 1B FF 5D	Area Reception (6) Reply Temperature : +17.27 ˚C	In
1C 06 0C 49 00 00 FF 8A	Area Reception (6) Request Actual Temperature	Out

9. Temperature Setpoint

Write data point

In the BACnet client, enter a temperature in an area's Temperature Setpoint object. Observe the temperature setpoint change in the SB Network Log.

Set Temperature setpoint: 1C,<Area>,0D,48,14,00,FF

Data	Description	Direction
1C 06 0D 48 14 00 FF 76	Area Reception (6) Set Temperature set point to +20.00 °C	In

Read data point

In SB Areas View, select an area. With the DyNet Packet Sender, create a Request Setpoint Temperature command.

click ▶ Send. Observe the matching area's Temperature Setpoint data point value change in the BACnet client.

Request User Temperature setpoint: 1C,<Area>,0D,49,00,00,FF

1C 06 0D 49 00 00 FF 89	Area Reception (6) Request User Temperature set point	Out

10. Channel Level

The PDDEG-S will automatically update the channel level points with every preset change. It does not require specific polling to keep the channel level points up to date.

When a preset is received, it initially updates the logical channel levels according to the Project.xml file. After that, roll call polling of the logical channel level values can take over 1 minute to update. In case the channel levels in the PDDEG-S are not in sync with load controller preset levels due to a Program Preset or Save Current Preset function, the logical channel level roll call polling will keep it in sync (with a small delay).

Write data point

In the BACnet client, enter a level in an area's Channel Level object. Observe the lighting channel level change and in the SB Network Log.

Channel level range: 0% to 100% (use integer values only)

Recall level: 1C,03,FF,80,FF,64,FF

1C 03 FF 80 FF 64 FF 00	Area Reception (3) Channel 1 Recall level 0% with a fade of 2.00s	In

Read data point

In SB Areas View, select an area. With the DyNet Packet Sender, select Request Channel Level and

click ▶ Send. Observe the matching area's Channel Level data point value change in the BACnet client.

Request level: 1C,03,00,61,00,00,FF

1C 03 00 60 01 01 FF 80	Area Reception (3) Channel 1 Target Level is 100%, Current Level is 100%	In
1C 03 00 61 00 00 FF 81	Area Reception (3) Channel 1 Request Current Level	Out

Drivers

11. Driver Status

The PDDEG-S will listen to DALI status messages which are send by the DALI controllers. When **DALI controller > Device properties > DALI > DALI status polling and ballast failure alarms** is enabled, the DALI controller will automatically report changes in DALI Driver status.

When querying the driver status from the Outputs editor or when hovering over a DALI fixture icon on the floorplan, this triggers a request to poll the channel status. The channel status reply will update the BACnet driver status points.

Read data point

A driver status fault can be forced by removing a luminaire from the DALI bus and waiting for the internal polling of the DALI controller to detect and report the status change. Connecting the luminaire back will clear the failure. This will result in the following DyNet messages:

Report Channel status: 5C, <device code>, <boxnumber>,4D,02,<channel number>,01 (driver online)

Report Channel status: 5C, <device code>, <boxnumber>,4D,02,<channel number>,02 (driver offline)

5C 65 04 4D 02 02 01 E9	Report Channel Status - Query ballast connected (Channel 3, Online)
5C 65 04 4D 02 02 02 E8	Report Channel Status - Query ballast connected (Channel 3, Offline)
5C 65 04 4D 02 00 01 EB	Report Channel Status - Query ballast connected (Channel 1, Online)
5C 65 04 4D 02 00 02 EA	Report Channel Status - Query ballast connected (Channel 1, Offline)

This can also be simulated from the SB DyNet Sender if the drivers are known from the DALI controller Outputs editor. Copy and paste the command above into the DyNet sender and update the device code, box number and channel number accordingly.

12. Lamp Status

The PDDEG-S will listen to DALI status messages which are sent by the DALI controllers. When **DALI controller > Device properties > DALI > DALI status polling and ballast failure alarms** is enabled, the DALI controller will automatically report changes in the DALI lamp status.

When querying the driver status from the Outputs editor or when hovering over a DALI fixture icon on the floorplan, this triggers a request to poll the channel status. The channel status reply will update the BACnet lamp status points.

Read data point

Forcing a lamp failure must not be performed due to safety concerns, as it requires the lamp/LED board to be disconnected from a (powered) DALI driver.

If a lamp failure must be tested it can be simulated by using the DyNet sender. It would require the physical channels to be present in the DALI controller and assigned to a fixture icon on the floorplan. When the commands below are sent, the status change will be reflected in the fixture icon on the floorplan and on the Lamp status BACnet points. Make sure the device code, box number and channel numbers are updated to match your setup.

Report Channel status: 5C, <device code>, <boxnumber>,4D,04,<channel number>,00 (lamp failed)

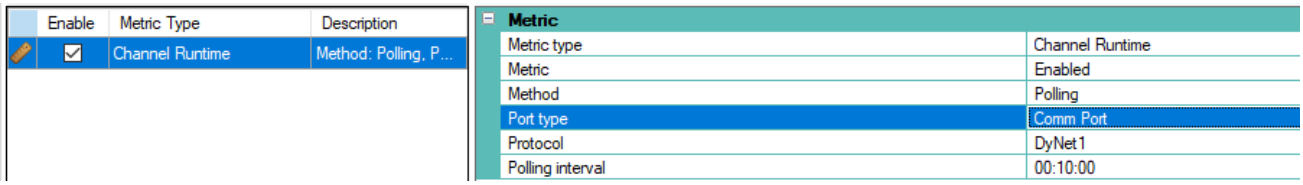
Report Channel status: 5C, <device code>, <boxnumber>,4D,04,<channel number>,01 (Lamp OK)

5C 65 04 4D 04 03 00 E7	Report Channel Status - Lamp Failure (Channel 4, Lamp Failed)
5C 65 04 4D 04 03 01 E6	Report Channel Status - Lamp Failure (Channel 4, Lamp OK)
5C 65 04 4D 04 01 00 E9	Report Channel Status - Lamp Failure (Channel 2, Lamp Failed)
5C 65 04 4D 04 01 01 E8	Report Channel Status - Lamp Failure (Channel 2, Lamp OK)

Devices

13. Channel Runtime

To automatically update channel runtime in the PDDEG-S, set **Metric** to Enabled and set **Method** to Polling.



Enable	Metric Type	Description
☑	Channel Runtime	Method: Polling, P...

Metric	
Metric type	Channel Runtime
Metric	Enabled
Method	Polling
Port type	Comm Port
Protocol	DyNet1
Polling interval	00:10:00

Depending on your trunk and spur topology, the parameters for **Port type** and **Protocol** may need to be changed. For a single spur project (devices connected via RS-485), select **Comm port** and **DyNet1** respectively. When the PDDEG-S is installed as a building supervisor and communicating with other devices via Ethernet, select **Ethernet Client** and **DyNet2**. Either way, ensure that the polling commands are being answered before checking the BACnet point value updates.

Read data point

In the DyNet Packet Sender, Create a Request Channel Runtime message:

Request Channel runtime: 5C,60,01,B4,01,00,00

click ▶ Send. Observe the matching area's Channel runtime point value change in the BACnet client.

Report Channel runtime: 5C,60,01,B5,01,00,12

5C 60 01 B5 01 00 02 8B	Report Channel Runtime (Channel 1, Runtime 2 hours)	In
5C 60 01 B4 01 00 00 8E	Request Channel Runtime (Channel 1)	Out

14. Device Offline Status

The PDDEG-S will poll device status automatically on an hourly basis. Besides this, it will monitor sign-on requests and replies to track the device status. If a sign on request remains unanswered 3x, the PDDEG-S will consider the device to be offline until a sign-on reply is received. It does not track the Device Offline Metric messages.

AC 02 80 C3 00 23 FD 00 53 01 69 65	Request the device sign on
AC 04 81 80 00 0B DA 00 01 0A 0A 00 2F 71 22 00 00 00 3E 6D	Reply serial number - Main device (Serial Number: 3109154)
AC 04 81 80 00 0B DA 00 01 0A 0A 00 2F 71 22 00 00 00 3E 6D	Reply serial number - Main device (Serial Number: 3109154)
AC 02 80 DA 00 01 80 00 0B 0A E5 9E	Request serial number - Main device
AC 02 80 DA 00 01 80 00 0B 0A E5 9E	Request serial number - Main device
AC 04 81 80 00 0B AA 55 55 01 00 00 03 40 07 07 00 00 F8 62	Reply Device Signon (F/W Version v03.40, Max Rx Packet Size 32, Max Tx Packet Size 32, Port ID 0, Slave Device No 0)
AC 02 80 C3 00 23 80 00 0B 01 E5 A0	Request the device sign on
AC 04 81 80 00 0C DA 00 01 0A 0A 00 2F 71 21 00 00 00 47 6D	Reply serial number - Main device (Serial Number: 3109153)
AC 04 81 80 00 0C DA 00 01 0A 0A 00 2F 71 21 00 00 00 47 6D	Reply serial number - Main device (Serial Number: 3109153)
AC 02 80 DA 00 01 80 00 0C 0A E7 9F	Request serial number - Main device
AC 02 80 DA 00 01 80 00 0C 0A E7 9F	Request serial number - Main device
AC 04 81 80 00 0C AA 55 55 01 00 00 03 40 07 07 00 00 05 63	Reply Device Signon (F/W Version v03.40, Max Rx Packet Size 32, Max Tx Packet Size 32, Port ID 0, Slave Device No 0)
AC 02 80 C3 00 23 80 00 0C 01 E7 A1	Request the device sign on
AC 02 80 C3 00 23 65 00 04 01 6B 7E	Request the device sign on

Devices may have physical outputs which control luminaires on different floorplans. In those cases, the device will be listed under the floorplan which holds the 1st physical channel of the controller. Ethernet devices are listed under the Unplaced Devices folder.

Read data point

In System Builder, send a sign-on request for one of the devices and check the reply. After polling, the BACnet point indicates the device online/offline status.

AC 04 81 60 00 01 DA 00 01 0A 0A 00 10 FE ...	Reply serial number - Main device (Serial Number: 1113750)	In
AC 02 80 DA 00 01 60 00 01 0A 51 74	Request serial number - Main device	In
AC 04 81 60 00 01 60 00 01 01 00 00 04 60 F...	Reply Device Signon (F/W Version v04.60, Max Rx Packet Size ?, Max Tx Packet Size ?, Port ID 0, Slave Device No 0)	In
5C 60 01 80 00 00 00 C3	Request Firmware Version (Master Processor)	Out

Note: DALI Devices are not currently supported.

15. Light Level (Lux)

To automatically update this BACnet point, in the sensor properties, under the light control – closed loop tab, enable **Reporting***. When enabled, the sensor reports the lux level every **Max reporting period** or when the **Min reporting period** has expired and the **Delta value (Lux)** is exceeded.

*Legacy sensors don't natively support this feature. In those rare cases a task is required to push the lux values automatically.

Reporting	
Reporting	Enabled
Min reporting period (sec)	5
Max reporting period (sec)	30
Delta value (Lux)	16

ID	Local Time	Relative Time	Data	Description
1713	10:22:30.628	00:00:29.812	AC 04 83 B3 00 06 AA 55 55 00 04 03 00 00 00 00 00 30 AD 77	Reply PE Cell status - Filtered LL, user cal (Min 0, Max 0 - 48)
1712	10:22:00.816	00:00:30.007	AC 04 83 B3 00 06 AA 55 55 00 04 03 00 00 00 00 00 30 AD 77	Reply PE Cell status - Filtered LL, user cal (Min 0, Max 0 - 48)
1711	10:21:30.809	00:00:29.103	AC 04 83 B3 00 06 AA 55 55 00 04 03 00 00 00 00 00 31 AE 78	Reply PE Cell status - Filtered LL, user cal (Min 0, Max 0 - 49)
1710	10:21:01.706	00:00:29.211	AC 04 83 B3 00 06 AA 55 55 00 04 03 00 00 00 00 00 31 AE 78	Reply PE Cell status - Filtered LL, user cal (Min 0, Max 0 - 49)
1709	10:20:32.495	00:00:29.407	AC 04 83 B3 00 06 AA 55 55 00 04 03 00 00 00 00 00 30 AD 77	Reply PE Cell status - Filtered LL, user cal (Min 0, Max 0 - 48)
1708	10:20:03.088	00:00:29.611	AC 04 83 B3 00 06 AA 55 55 00 04 03 00 00 00 00 00 2F AC 76	Reply PE Cell status - Filtered LL, user cal (Min 0, Max 0 - 47)
1707	10:19:33.477	00:00:02.286	AC 04 83 B3 00 06 AA 55 55 00 04 03 00 00 00 00 00 2E AB 75	Reply PE Cell status - Filtered LL, user cal (Min 0, Max 0 - 46)

Read data point

In the DyNet Packet Sender, select Reply PE Cell status – Filtered Raw LL

click ▶ Send. Observe the Sensor's Lux Level point value change in the BACnet client.

Lux Level: AC,05,83,B2,00,01,B2,00,01,00,04,01,00,00,00,00,00,41,20,00,00,00,E2,00

AC 04 83 B2 00 01 B2 00 01 00 04 03 00 00 00 00 01 8D 2D 2E	Reply PE Cell status - Filtered LL, user cal (Min 0, Max 0 - 397)
5C B2 01 B7 01 00 00 39	Request Physical Status

Note: DALI Devices are not currently supported.