Helvar

BACnet Gateway (436)

User Guide

Doc. No. D009284 issue 1

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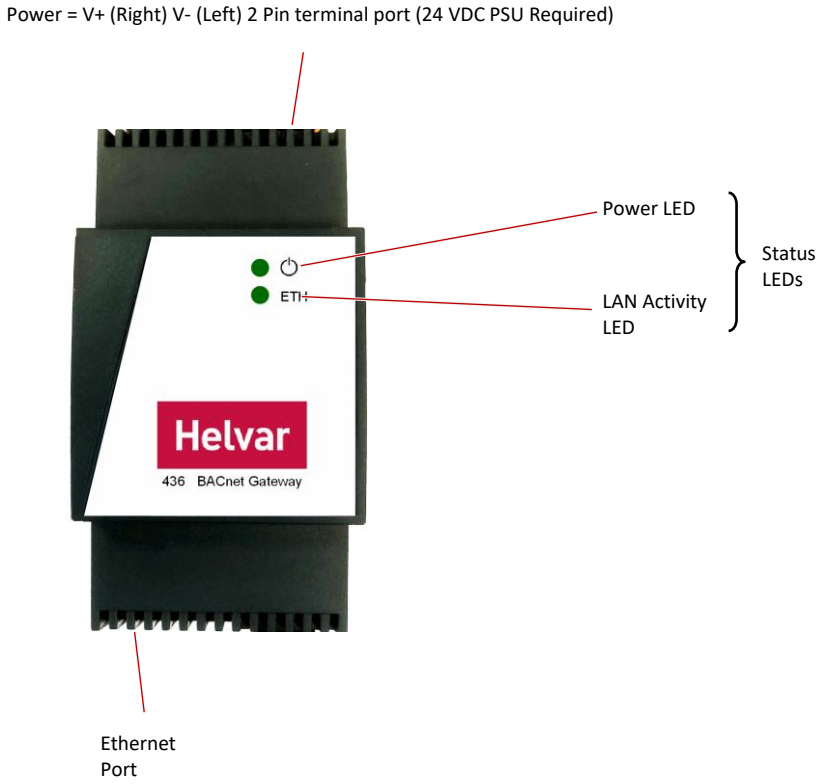
Contents

1. Introduction

The 436 BACnet Gateway provides a simple interface to a Helvar router system and allows lighting system data to appear in a BACnet Building energy Management System (BeMS).



Note: Typically, individual systems (energy control, lighting, boiler and air-conditioning systems, etc.) are measured separately for CO_2 accountability. Therefore, installing the BACnet Gateway and combining the various systems can help an effective BeMS be more energy efficient and comply with national building regulations.

The 436 allows a Building Management System (BMS) or BeMS to control and monitor the lighting system as well as obtain device status and group power consumption information. BACnet/IP clients can easily connect with the gateway via a TCP/IP network.

The 436 BACnet Gateway has been specifically designed to expose the 'router', 'group' and 'device' parameters from Helvar routers in a designated workgroup through the TCP/IP network. The BACnet/IP BMS can use this information to control and monitor the lighting, energy and environmental conditions.

1.1. Device limits and compatibility

The 436 BACnet Gateway has the following limitations and compatibility requirements:

- Limits:
  - Single workgroup
  - Max. 20 routers
  - Max. 300 groups
  - Max. 2000 BACnet/IP points (overall limit)

  Note: certain project installations may require reduced limits if higher data frequency required. See section 2.4.4. note *2
- Compatibility:
  - Router firmware version 5.2 or above. Some features require higher versions, see section 2.4.4
  - Router IP addresses need to have the same first and second octets, i.e. '10.254.x.x'.
  - Web browsers: Firefox (recommended) and Chrome.

1.2. Description of the unit

The 436 BACnet Gateway includes internal HTML configuration pages designed to simplify the engineering and setting of the interface. These pages make it easier to configure the communication requirements. The connected Helvar routers appear as a single BACnet device in the BACnet/IP BeMS, whereas the predetermined parameters appear as predetermined BACnet object types.

From the configuration pages you can do the following:

- Identify:
  - Each Helvar router in a defined workgroup.
  - The required Helvar router and DALI device parameters.
  - Which BACnet Object type is assigned to each parameter.
- Simplify the configuration of the BACnet/IP communication requirements and allow for connected routers and devices to appear on the BACnet/IP BMS.

1.2.1. Front panel LEDs

The LEDs on the unit indicate the general status of the BACnet Gateway, including power, ready and LAN communication activity.

- Power LED

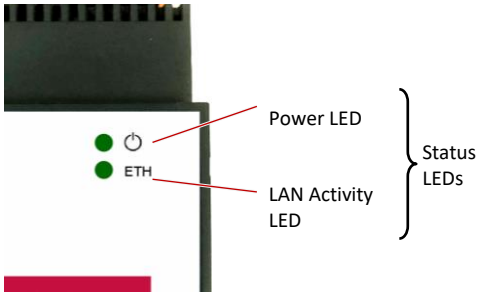
  This  LED indicates the current status of the power applied to the unit.

  When continuously illuminated the 24VDC power is supplied. If the LED is off, the power is not supplied or has failed.

- Ethernet (Activity) LED

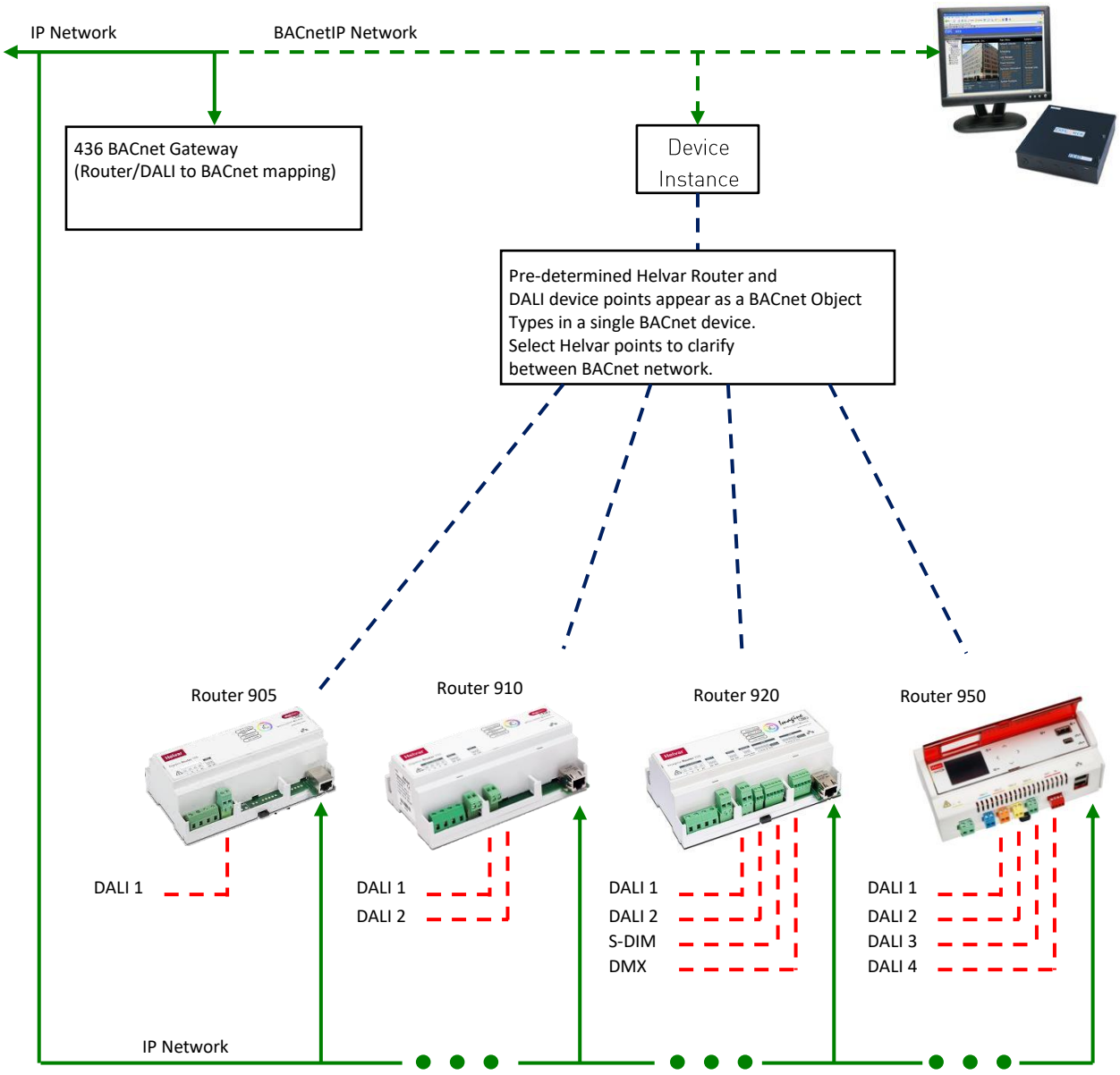
  This Eth LED indicates the communication between this unit and the supervisory computer or controller connected via the Ethernet.

  When incoming communications traffic is detected, the LED will illuminate, but will extinguish if outgoing communications traffic is detected.



1.3. System overview

The BACnet Gateway provides direct interface between Helvar routers, including the devices connected to them (such as ballasts, LED drivers, luminaires and sensors), and a BACnet/IP BMS. Thus, the BACnet/IP BeMS can access the values recorded in the Helvar 950, 905, 910 and 920 routers and in the DALI devices.



1.3.1. Helvar devices and DALI networks

The Helvar 950, 905, 910 and 920 routers use the Ethernet connection as a network backbone to combine DALI, SDIM and DMX networks. The DALI and SDIM networks appear as Helvar router subnets in the 436 browser interface.

DALI (Digital Addressable Lighting Interface) is a standardised (IEC 62386) protocol that, among other things, provides individual addressing and monitoring of lighting devices. It allows you to connect of up to 64 DALI devices on a single and simple two-wire network and communicate with them individually, collectively or in groups. You can thus instruct DALI loads to turn on and off and to dim up and down. Additional operational status information is available from each of them, confirming its ability to operate effectively or to confirm a fault condition.

	DALI 1	DALI 2	DALI 3	DALI 4	SDIM	DMX (NOT EXPOSED)
905	64 Devices	N/A	N/A	N/A	N/A	N/A
910	64 Devices	64 Devices	N/A	N/A	N/A	N/A
920	64 Devices	64 Devices	N/A	N/A	252 addresses	512 in/out addresses
950	64+64 Devices	64+64 Devices	64+64 Devices	64+64 Devices	N/A	N/A

SDIM and DMX are low-loss RS485 Type (multistranded, twisted and shielded), three or four cores and screen networks, max. 1 km cable length.

Tip: For DALI, SDIM and DMX network installation, refer to the Helvar 950, 905, 910 and 920 routers documentation. See also the Designer 5 Recommended Best Practices document for networking and system guidelines.

1.3.2. BACnet/IP network

Specifically designed for building automation and control networks, the BACnet/IP protocol provides a standard way of representing the functions from third-party devices to exchange data over a computer network. It operates on a client/server principle: the BACnet Gateway is the server, and either a BACnet device or the BACnet Explorer is the client. The network uses standard cat 5e cabling to transfer 'service' requests from each client to the server, which performs the service and then reports the result to the client. Local IP network policy is used to address BACnet devices.

Each 'service' request includes a default set of 'objects'. These may represent either a single physical point or logical groupings of points that perform a specific function. An 'object' is simply a collection of properties (such as 'Object_Name', 'Object_Type' or 'Present_Value') that describe the behaviour and operation of the BACnet device.

Note: For BACnet compliance details, refer to Annex A – Protocol Implementation Conformance Statement (Normative)

2. Configuration

This section describes the process of allowing a BACnet client on the BACnet/IP-based control system to access the data recorded by the connected Helvar routers. It explains the specific configuration of the following:

- Each of the devices connected to the BACnet Gateway.
- The communication protocols used by the hardware connected to the 436 BACnet Gateway.
- The parameters used to specify the data that the BACnet client will access on the BACnet/IP based control system.

2.1. Configuration pages

You can configure the BACnet Gateway via the internal configuration pages. These settings define the operation of the unit; they are password protected to prevent unauthorised access.

The internal configuration pages include the following:

- Admin: To configure the login security (password) of the unit, the firmware version and the documentation.
- Map points: To link and assign the required Helvar router points detected by the unit, to a predetermined 'object type' in this BACnet device.
- IP config: To configure the unique identity of the BACnet Gateway on the IP (Internet Protocol) network.
- Comms settings: To configure the communications network parameters that correspond to the communications with the Helvar routers and with the BACnet/IP network.
- Back up and restore: To save the internal configuration and apply an existing backup file or firmware update file.

Remember: To apply the changes, press **Save** or the corresponding **Save** button. You may need to wait until the unit reboots and **Refresh** the browser.

To cancel all the unsaved changes, and **Refresh** the browser.

2.2. Connect to the 436 BACnet Gateway

After the BACnet Gateway has been correctly installed (see the *Installation Leaflet* supplied with each unit), you need to configure the communication protocols and the required parameters.

Each unit is supplied with a default IP address that identifies the unit on the IP network. You must replace this IP address with a unique IP address as required by the applicable local network policy.

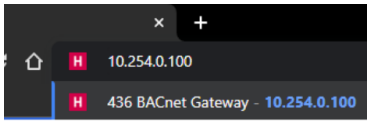
Before configuring the unit, make sure that the connected computer has a compatible IP address, i.e. an IP address in the same IP range as the BACnet Gateway. Otherwise, change the computer's IP address.

To connect to the BACnet Gateway:

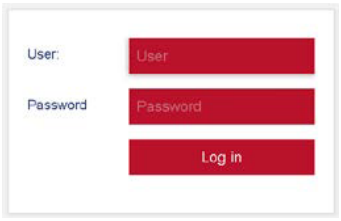
1. After physically connecting the unit to the computer (see the *Installation Guide*), open a browser application (Firefox recommended).
2. In the browser Navigation toolbar, type the required IP address using the standard 32-bit dotted-decimal notation.

   Default IP address: 10.254.0.100 (255.0.0.0)

   The **Login** page will appear.



3. Type the **User name** and **Password** (both are case sensitive), and then press **Log in**.
   - **User name**: Admin
   - **Password**: password



Tip: If the 'Login' page fails to appear, use the ping test to confirm that the expected IP address is used.

If the valid 'User name' and 'Password' fails to launch the configuration page, clear the browser cache, and then contact technical support for instructions.

4. Press Helvar (top right) to display the **Home** page. This provides access to the configuration pages.

Tip: Zoom out to display more information.

2.3. Configure the Comms interface

The **IP config** and **Comms settings** menu options allow you to configure the communication protocols needed to transmit data between:

- The Helvar routers and the BACnet Gateway.
- The BACnet Gateway and the BACnet client on the BACnet/IP based control system.

Caution: Configure the IP address, the subnet mask and the default gateway according to the applicable local network policy.

2.3.1. Configure the IP config settings

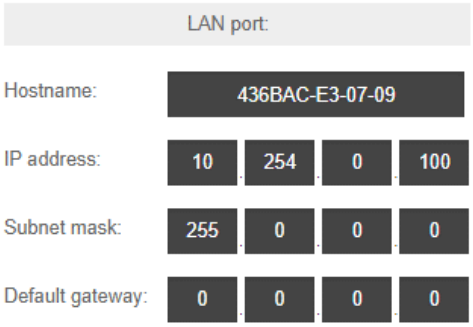
The parameters on the IP config page are used to configure the unique identity of the BACnet Gateway on the IP (Internet Protocol) network.

Caution: The unit must use an IP address compatible with both Helvar routers and the BACnet BMS; for example, 10.254.1.x (255.0.0.0).

1. Press ☰, and then select **IP config** to display the TCP/IP parameters that identify the BACnet Gateway on the LAN. You can use a specific range of configured IP addresses to group units in networks or subnets.

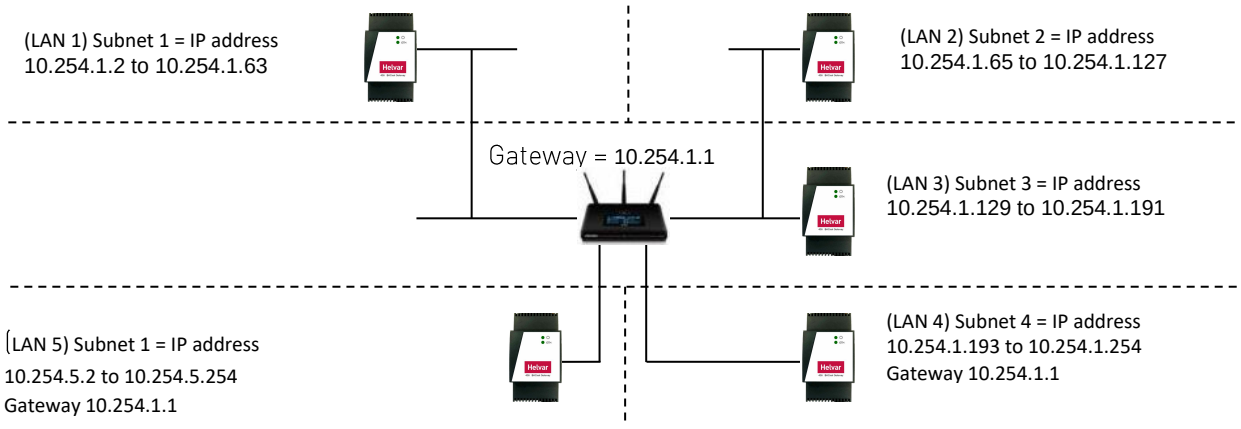
   - If necessary, edit the **Hostname**. This is a 15 character label (letters, numbers, '-' and '_') assigned to this unit and linked to the IP address.

     Default: Helvar-<last 3 pairs of hardware MAC address>.



2. Change the IP address, subnet mask, and default gateway according to the applicable local network policy. The IP address provides a unique identification of the BACnet Gateway in the defined subnet mask on the IP network. The subnet mask is a configurable range of accessible IP addresses. The default gateway is used to direct communications to IP addresses that are not in the defined subnet mask.

Note: Use the Helvar search tool provided (available from the Homepage > **Support** page) to detect the 436 Gateway(s) on the IP network. You can also use a BACnet Explorer to detect the unit on the BACnet/IP network.



3. Press **Save**, and then reboot the BACnet Gateway.

   The unit restarts (as confirmed by a beep) and loads the **Login** page.

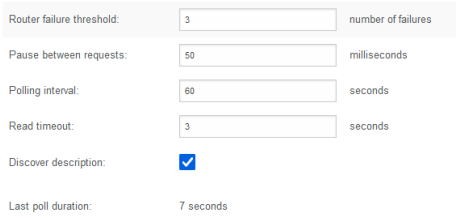
Caution: Assign a different IP address to each gateway before networking them. The BACnet device instance number also requires changing in order to differentiate the gateways on the BACnet/IP network.

Remember: When you reboot the unit, the connection to it stops. To ensure that the browser shows the latest data, clear the browser cache (Ctrl+Shift+Del and the top four options enabled as a minimum) before login.

2.3.2. Configure the comms settings

The comms settings allow you to configure the unit as a gateway from the Helvar routers using the Helvar proprietary communications protocol to the BACnet/IP network.

1. Press  , and then select **Comms settings** to define the network connection details required for receiving and transmitting data between the Helvar routers and the BACnet/IP supervisor on the BACnet/IP network.
2. Configure the HelvarNet settings. These parameters define the connection details for communicating with the Helvar routers. Do not modify the default values unless specifically instructed to do so.



   - **Router failure threshold**.

     Default: 3; range: 1–10 message failures.

     This value defines the number of consecutive failed requests from a Helvar router, and determines when a 'Router failure' state is indicated.

   - **Pause between requests**.

     Default: 50; range: 1 ms – 2000 ms

     This value defines the delay between sending a data request to one Helvar router and the next Helvar router.

   - **Polling interval**.

     Default: 60; range: 10 s – 1800 s

     This value defines when the next data request cycle with the configured Helvar routers is attempted; for example, every 60 seconds.

Caution: This value must be greater than the 'Last poll duration' value. Otherwise, 'Router failure' BACnet Objects may be asserted.

   - **Read timeout**.

     Default: 5; range: 2 s – 10 s

     This value defines the number of seconds that the device must wait for a response from a Helvar router. After this period has elapsed, the device proceeds to the next configured Helvar router. When a Helvar router fails to respond to the number of consecutive requests set in the **Router failure threshold** text box, a 'Router failure' state is indicated.

- If necessary, set the 'Discover description'.

  Default: Disabled

  This defines the use of the group and device descriptions in the Routers on the Helvar network. If disabled, the groups and device descriptions are automatically generated by this device. If enabled, the groups and device descriptions are taken directly from the Routers.

Caution When Discover descriptions is used, it will increase the time taken to display the Routers, networks, devices, and groups on the Map points page.

- Last poll duration value.

  This value shows the number of seconds that it has taken to poll all the configured Helvar routers.

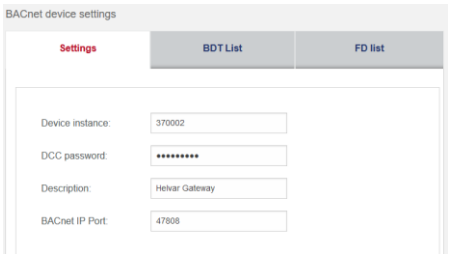
3. Configure the BACnet device settings. These settings define the connection details for the unit to appear as a BACnet device on the BACnet/IP based control system.

Note: Each BACnet device includes a default set of properties that are displayed in a BACnet Explorer. They are described in the BACnet PICS: see Annex A – Protocol Implementation Conformance Statement (Normative).

- Device instance.

  Default: 370001; range: 1 – 999999.

  This number identifies the unit on the BACnet/IP based control system. Change this number if you have more than one 436 on the BACnet/IP network.



Caution: If the network has more than one 436, each unit requires individual **Device instance** numbers.

- DCC password (max. 30 characters).

  This is used to permit the DCC (Device Communication Control) and RD (Reinitialise Device) operations.

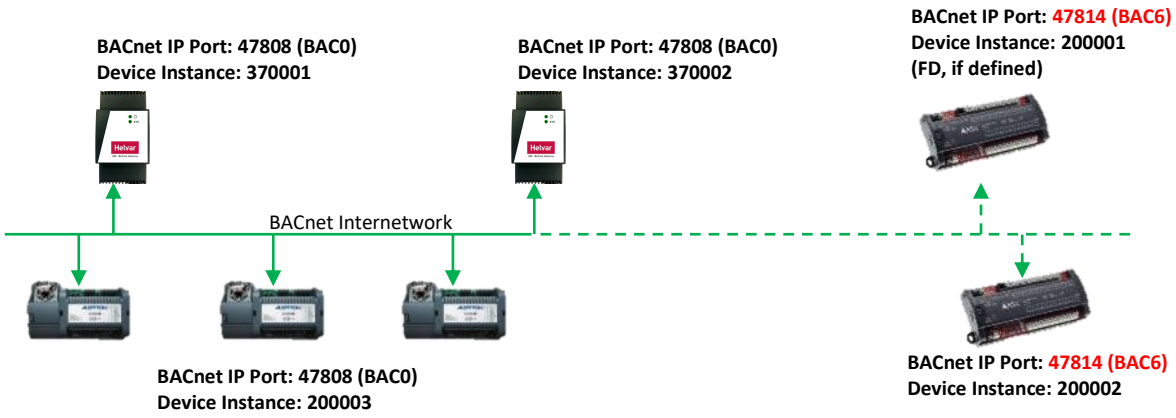
- Description.

  You can enter any desired descriptive information in the BACnet/IP based control system. This information will be read by the communication partners.

- If necessary, edit the 'BACnet IP Port'.

  Default: 47808(BAC0), range 1 to 65534.

This is used to define the BACnetIP port used to communicate with this device.



Caution — Ensure a unique 'Network number' is configured for each 436 Interface/Report on the BACnetIP network and all devices that need to communicate with each other are using the same 'BACnetIP Port'.

- If necessary, edit the 'APDU timeout'.

  Default: 3000ms, range: 100ms - 6000ms

  This defines how much time a client waits for a response from a BACnet device.

- If necessary, edit the 'Retries'.

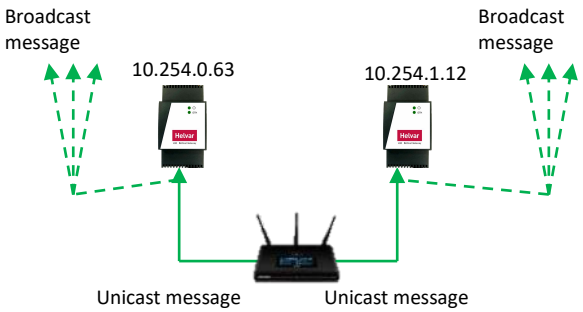
  Default: 3, range: 1 - 9 retries

  This defines the number of consecutive failed requests by this device and any other BACnet devices it is communicating with.

Tip: The 'APDU Timeout' and 'Retries' may be increased for especially slow networks or networks with a high number of errors (e.g., wireless LANs).

Note — The APDUs (Application Layer Protocol Data Units) are used in BACnet to convey the information contained in the application service primitives and associated parameters. BACnet APDUs consist of protocol control information and, possibly, user data. The variable portion of each APDU may contain service-specific information.

- If necessary, set 'BBMD enable'.



This manages when this device will be used to receive a unicast 'Who-is' message from a device on a different subnet range and send a 'Who-is' broadcast message to devices in this subnet range. It is used in conjunction with the 'BDT List' and 'FD List' pages shown beside the 'Settings' option.

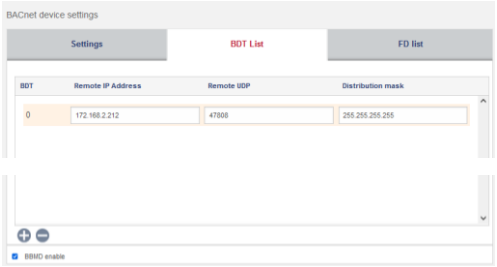
Tip! IP routers do NOT permit broadcast messages. A BBMD (BACnet Broadcast Message Device) sends a unicast message to the specified BBMD device on the other subnet range.

Note A 'Who-is' message is sent by other BACnet devices that need to acquire the address information of other devices without creating more network traffic. Other BACnet devices respond with an 'I-am' message. This hardware automatically send an 'I-am' message on start up.

- If necessary, manage the BBMD connections.

  Press ' ⊕ ' to add a BBMD reference. Enter the BACnet BBMD IP Address.

  If necessary, change the Remote UDP (BACnet network number).



Tip! The 'Remote subnet' should remain at 255.255.255.255. This will allow the broadcast 'Who-is' message across the entire 'Remote IP Address' range.

  If necessary, press ' ⊖ ' to remove a selected BBMD reference.

- If necessary, view the 'FD List' (Foreign Device List) showing a list of devices on different subnet ranges, the TTL (Time To Leave) and Seconds Remaining.

Note An FD is a device on a different IP Subnet, or one that is using a different BACnet Port Number (e.g. Not 47808) registered to communicate via the BBMD according to the TTL timer.

Note The device details will be removed when the TTL has occurred.

4. Press **Save** to apply the changes.

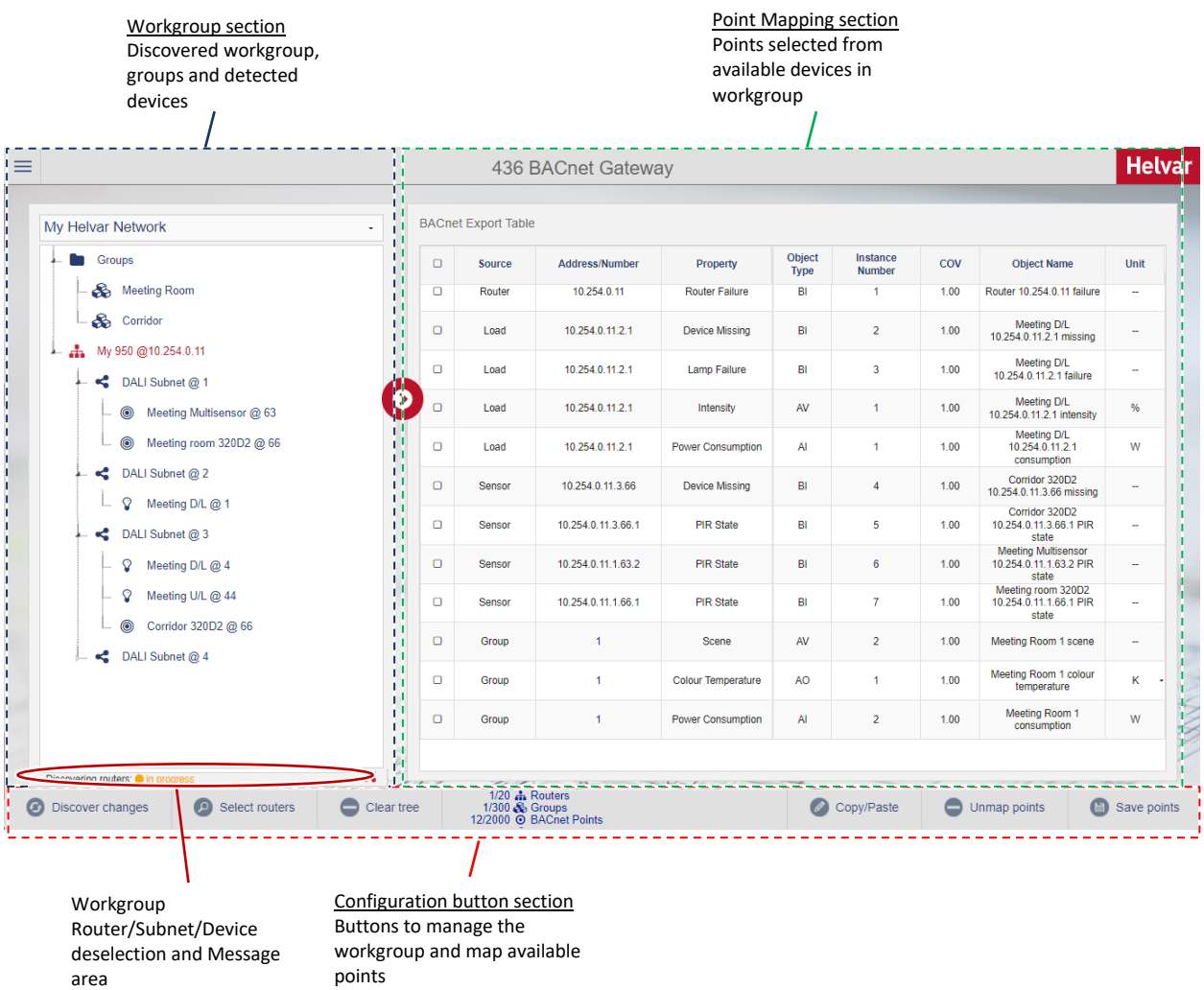
2.4. Configure the Map points

The **Map points** page is used to expose predetermined parameters in a single workgroup to a BACnet Supervisor (BACnet client) on the BACnet/IP based control system. These predetermined parameters are available from discovered Helvar routers and Helvar router subnet devices.

Tip: Use Helvar Designer software to configure the lighting system and to assign IP addresses to Helvar routers. All Helvar programming should be completed before you map the points to the 436 Gateway

1. Press , and then select **Map points** to display the **BACnet Export Table**, where you can select Groups Router and Router Subnet device parameters from existing workgroups.

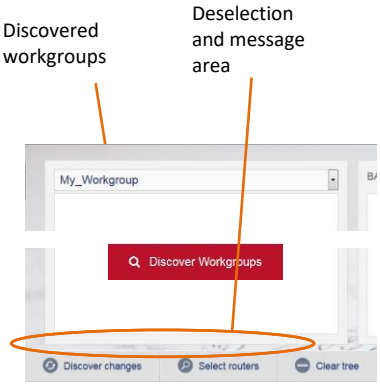
Note: The 920 router DMX subnet is not displayed as no export information is supported for DMX devices.



2.4.1. Discover and select workgroups and devices

When you first install 436 BACnet Gateway devices, you must assign the following:

- An existing Helvar workgroup for Helvar routers and Helvar routers subnet devices.
- Groups to be discovered.



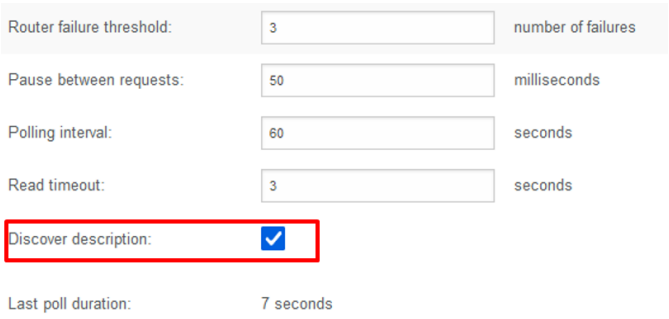
To discover existing workgroups and devices:

1. Press **Discover workgroups** to populate the list of available workgroups and to display additional configuration buttons.
2. Do one of the following:
   - Press **Discover selected workgroup** to discover Helvar routers in the selected workgroup.
   - Select the required workgroup from the list of available workgroups, and then press **Discover selected workgroup**.
3. If necessary, press **Discover changes** to detect changes to the selected workgroup.
4. Press **Select routers** to show all Helvar routers in the selected workgroup.

Note

If device and group names are not discovered and required, ensure the "Discover description" option is ticked in the HelvarNet Settings (see section 2.3.2). If some devices or names are not discovered first time, try discovering changes or clearing the tree and discovering again. This could happen if there is a busy network.

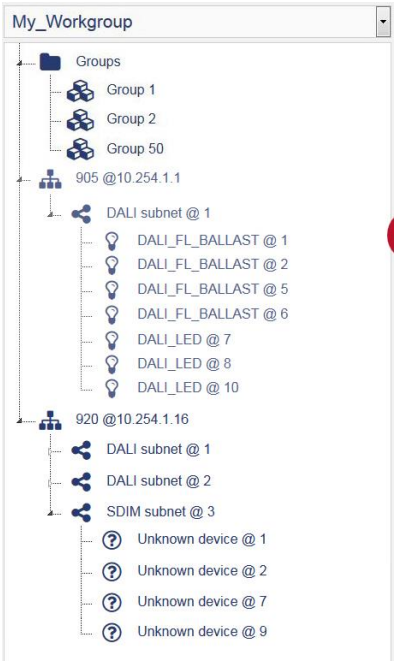
Ticking this option will result in a longer discovery time.



5. Select the routers with parameters that require mapping to the BACnet BMS. The maximum number that you can select is 20.

Tip: Detected Helvar routers are identified by the router type and IP Address, i.e. router 920 at IP Address 10.254.1.16.

6. Press **Discover selected** to detect all router and the devices connected to the available router subnets. This will display the network tree associated with the selected workgroup.



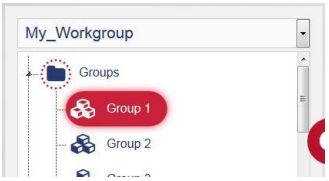
   - Press **Clear tree** to remove all discovered Helvar routers, groups and connected devices detected in the selected workgroup.

Tip: You can use the workgroup tree to confirm that the expected routers and connected devices are available.

2.4.2. Configure the mapping to BACnet object types

Each group, Helvar router and connected device includes parameters that can be mapped to BACnet Object types. They are available to the BACnet/IP network via the BACnet Gateway.

1. Expand the **Groups** folder or the required router.



   - Expand **Groups** to show all the groups configured in this workgroup.
   - Expand the router (e.g. 920 @ 10.254.1.16) to show all the available router subnets in this workgroup.

2. Do the following to add parameters to predetermined BACnet Object types.

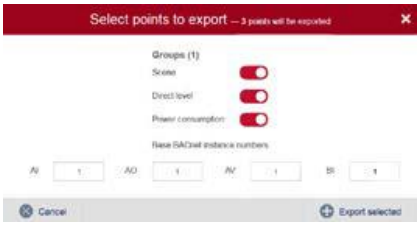
   i. Select a group in the applicable workgroup, and then press  to display the **Select points to export** dialog box.

Tip: To add group parameters from all groups, select the 'Groups' folder.

ii. Turn on the switch corresponding to the parameter that you want to map: Scene, Direct Level and Power Consumption.

iii. Define the Base BACnet instance number for the equivalent group parameters.

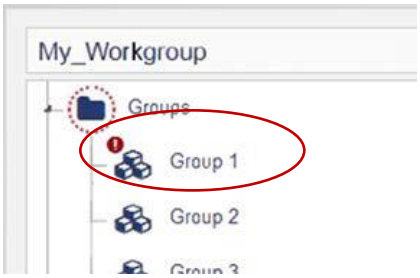
iv. Press Export selected to add the enabled parameters and default properties to the BACnet table.



Notes:

The **Groups** icon indicates that you have selected some parameters.

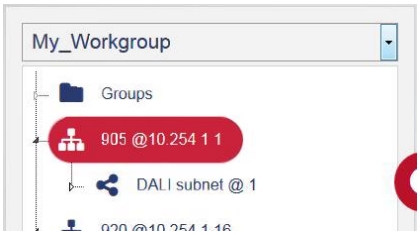
The exclamation mark icon shows that not all group parameters have been selected/exported.



v. Check the default BACnet configuration applied.

Note:

You need to add at least one router to the export table for control and monitoring of groups.



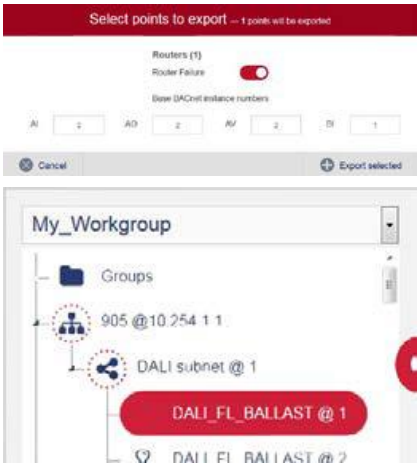
To add router parameters:

i. Select a router shown in the defined workgroup, and then press  to display a list of points that can be mapped to BACnet Object types.

ii. Turn on the Router failure switch.

iii. Type the BACnet instance number for the selected router.

iv. Press Export selected to add the enabled parameters and default properties to the configuration table.



v. Check the default BACnet configuration applied.

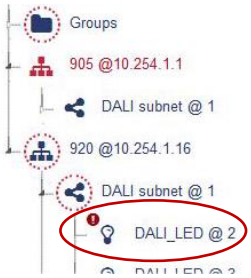
To add subnet device parameters:

i. Expand the applicable router subnet, select the required device, and then press  to display the points that can be mapped to BACnet object types.

ii. Turn on the switch corresponding to the parameter that you want to map: **Device Missing** or **Lamp Failure**.

iii. Type the BACnet instance number for the equivalent subnet device parameters.

iv. Press **Export selected** to add the enabled parameters and default properties to the configuration table.



Notes: The Helvar router and Helvar router subnet icons indicate that parameters have been selected.

The exclamation mark icon indicates that not all 'Device' parameters have been selected/exported.

v. Check the default BACnet configuration applied.

3. Press **Save points** to apply the selected configuration and verify that the selected parameters are defined correctly.

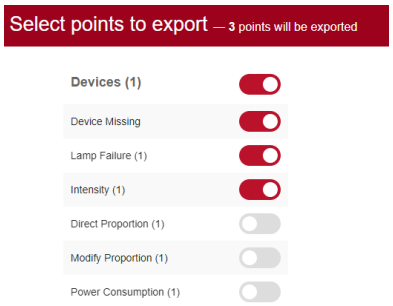
Note: The bottom bar shows the current total number of configured device limitations.

Default BACnet Export Points

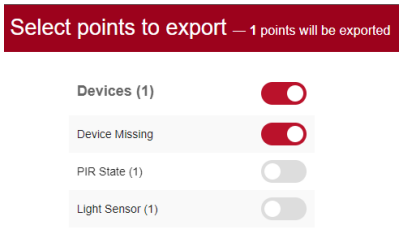
To save commissioning time, selected essential export points have been turned on has default and the remaining off as default. The user can then further customise which points export during commissioning. The top toggle switch can be used to deselect or select all.

Group Defaults: Scene

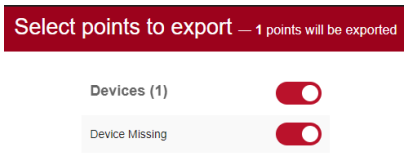
Load Default: Device Missing, Lamp Fail, Intensity



Sensor Default: Device Missing



Panel or Input Default: Device Missing



2.4.3. Edit the BACnet table

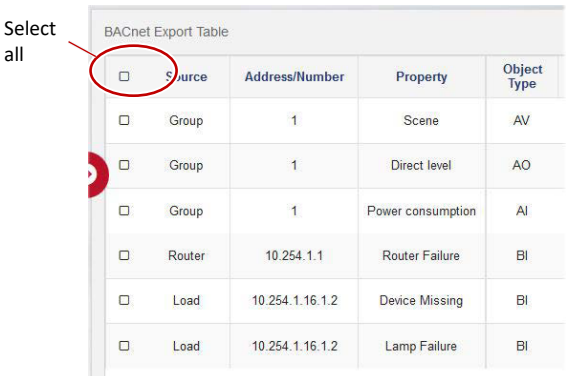
The BACnet table allows you to view and edit the mapping configuration of the group, the Helvar router and the Helvar router subnet device parameters to the BACnet object instances. Each BACnet object instance includes a default set of properties that are displayed in the BACnet Explorer.

Note: The BACnet Protocol Implementation Conformance Statement (PICS) describes the implementation of BACnet protocol in the BACnet Gateway: see Annex A – Protocol Implementation Conformance Statement (Normative).

To edit the BACnet table:

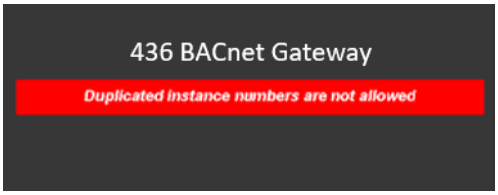
1. Select a parameter in the BACnet Points table, and ensure that the **Source**, **Address/Number**, **Property** and **Object Type** fields are correct.

   Source: **Group**, **Router** or **Load**.



Note: 'Load' refers to parameters derived from devices connected to the Helvar router subnets.

- **Address/Number**: Group number, Helvar router IP Address or Helvar router IP Address and subnet device address.
- **Property**: Parameter label.
- **Object type**: AV (analogue value – read/write), AO (analogue output – write only), AI (analogue input – read only) or BI (binary input– read only).

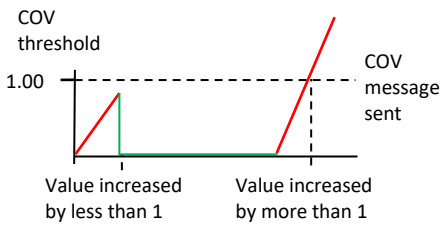


2. If necessary, remove a configuration point. Select the corresponding row (the first column shows ☑), and then press **Unmap points**.

Tip: To remove all configured points, set the top most tick box ☑, and then press **Unmap points**.

Note: Check the default BACnet Object name applied. Group parameters appear as '<Group No.> <parameter name>', router parameters appear as 'Router <IP address> <parameter name>', and subnet devices appear as 'Load <IP address.subnet.device address>' <parameter name'.

Instance Number	COV	Object Name	Unit
1	1.00	Group 1 scene	–
1	1.00	Group 1 direct level	%
1	1.00	Group 1 consumption	W
1	1.00	Router 10.254.1.1 failure	--
2	1.00	Load 10.254.1.16.1.2 missing	--
3	1.00	Load 10.254.1.16.1.2 failure	--



3. Make sure that the **Instance Number**, **COV** and **Object Name** are correct.
   - If necessary, edit the **Instance Number**. This is a unique object type number that identifies the location of the BACnet point in this device. It is derived from the Base BACnet instance numbers (see Configure the mapping to BACnet object types).

Caution: A warning message appears if a duplicated BACnet Object type, AV, AO, AI or BI instance number is detected.

   - If necessary, edit the **COV** (Change Of Value) field. This value determines when the BACnet device sends a COV message to the BACnet client. If the value changes by 1 or more, a COV message is sent. It is displayed as **Object Name** in the BACnet Explorer.

Note: Typically, BACnet servers wait for a BACnet client to request data before responding, but this optional BACnet property sends a COV message when the COV threshold is exceeded.

- If necessary, edit the **Object Name**. An **Object Name** is automatically generated and derived from the **Source**, **Address/Number** and **Property** fields.

Caution: A warning message appears if a duplicated BACnet **Object Name** is detected.

4. Ensure that the **Unit** field is correct.

   Unit: **%** or **W**

Note: The **%** unit refers to the **Direct level** parameter. It writes the percentage of light used in the corresponding group. The **W** unit refers to the **Power consumption** parameter. It reads the amount of power used in the corresponding group.

5. Press **Save points** to apply the changes.

2.4.4 BACnet Gateway Points List

This table shows the list of points available via the BACnet Gateway. Sub note information and best use can be found on the next page.

BACnet Object Type	Category	Parameter Name
AI (Analog Input)	Group	Active Power Consumption (DALI-2 Part 252 or Helvar Calculated) *1 *2 Set Point (for selected regions only) Temperature (for selected regions only
	Device	Sensor Light Level *2 Control Gear Operating Time (DALI-2 Part 253) *1 Light Sourcing Operating time (DALI-2 Part 253) *1
	Emergency	Emergency Function Test State*4 Emergency Duration Test State*4 Emergency Battery Charge Emergency Battery Time Emergency Total Lamp Time Emergency Battery Endurance Emergency Actual Test Duration
AO (Analog Output)	Group	Direct Level Intensity Colour Temperature Colour Coordinates Direct Proportion Modify Proportion Store as Scene *3
	Device	Direct Proportion Modified Proportion Store as Scene *3
	Emergency	n/a
AV (Analog Value)	Group	Scene
	Device	Intensity Colour Temperature Colour Coordinates
	Emergency	n/a
BI (Binary Input)	Group	n/a
	Device	Router Fail Device missing Lamp failure Sensor PIR State *2
	Emergency	Emergency Battery Failure
BO (Binary Output)	Group	Temporary Max Level Enable Temporary Min Level Enable
	Device	n/a
	Emergency	Emergency Function Test *4 Emergency Duration Test *4 Stop Emergency Tests *4 Reset Emergency Battery and Lamp Table

Sub notes Explanations

*1 DALI-2 Parts 252 and 253: This feature requires Routers with version 5.8.5 or above and DALI-2 LED drivers which support the relevant optional parts of the DALI-2 standard. The 436 is unable to determine if the DALI-2 LED driver supports these parts or not hence the option will show in the export window for all DALI loads and the user will need to deter which is appropriate to export.

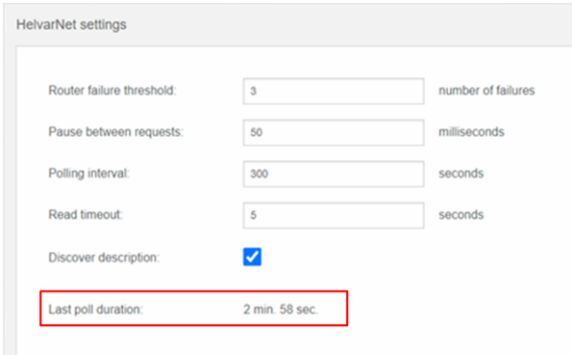
Helvar Calculated Power Consumption data is supported for all loads and available from version 5.2 or above. This requires manual adding of data in Helvar Designer before meaningful data is available from the 436.

*2 Certain project installations may require reduced exported points if higher data frequency required. The 436 has a system polling cycle typically between 1 to 5 minutes depending on how many points are mapped to the gateway and how many retries are required to retrieve data from the workgroup in case of high traffic, errors or bad comms.

Caution: If events and data such as PIR status, light level sensor measurements and active power consumption are required more frequently than 5 minutes, it is recommended to balance the capacity of points exported with the desired poll duration (i.e. reduce number of exported points to reduce poll cycle time). The "Last poll duration" timing is displayed in the HelvarNet comms settings described in section 2.3.2 (image below). The user can use this reading to balance the required timing vs the number of points exported on the 436.

The Sensor PIR state is the raw data from the sensor without any hysteresis. There may also be several sensors controlling the same group. The BACnet Client should incorporate their own hysteresis and grouping as required if for example turning on and off HVAC for the entire space based on this data. Alternatively if occupancy status for a group of sensors with hysteresis is required, this can be achieved by monitoring the different Group Scene points instead of individual sensor PIR states. Group Scenes 1-12 are on (occupied) scenes 13 is automatic off by PIR (unoccupied) scene, 14 is a transition scene from occupied to unoccupied) and 15 and 16 are manual off scenes

Do not modify the default values in the HelvarNet comms settings unless specifically instructed to do so.



*3 Store as Scene. The value sent from the BACnet client will be the scene number only for either the chosen group or device. Block 1 is only supported, and force store is fixed to enabled meaning if previously set to ignore in the Helvar Designer Scene Table, this will get over written.

Note whichever levels the load(s) is currently at will be automatically stored to the scene number sent by BACnet client overwriting any previous stored values including ignore.

*[4] AI Points: Emergency Function and Duration State are the primary result of the emergency device test result. The result of either Function or Duration state will return a value as shown in the table below which should be interrupted by the BACnet Client as the corresponding state (test result)

BO Points: Emergency Function Test and Emergency Duration Test are triggers to start the associated emergency test.

BO Point: Stop Emergency Tests will Stop any pending or started tests.

Other emergency points are additional data available where needed by the BMS to provide more insight for the emergency test states.

Emergency State Values

States (Test Result)	Values
Pass	0
Lamp Failure	1
Battery Failure	2
Faulty	4
Failure	8
Test Pending	16
Unknown	32

2.4.5 Using the Copy/Paste function

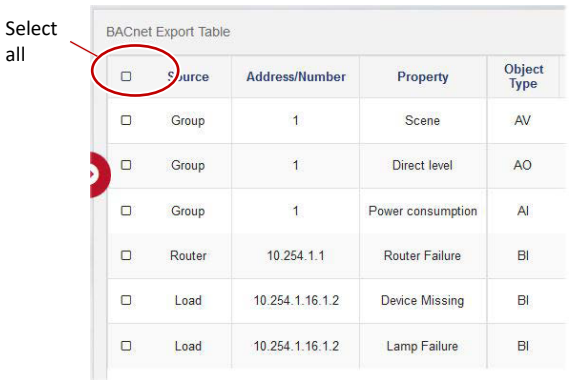
The Map points page includes a copy/paste function that is used to allow quick BACnet Object configuration of all selected points from the discovered Helvar routers.

Remember Use only alphanumeric characters, a-z, A-Z, 0-9, . and – when using a spreadsheet to define your Helvar router points and the corresponding BACnet Object.

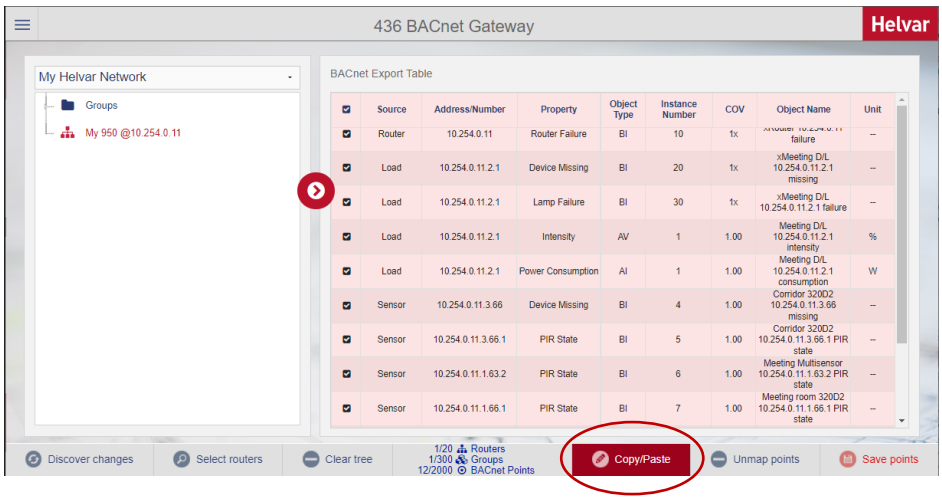
To copy the existing configuration, to get a template for future configuration or for a record of the mapping of Helvar Router points to BACnet Objects

1. Ensure all required points from all Helvar routers are added to the BACnet Export Table before copying.
2. Select one or more points from the BACnet Export Table.

Tip: Enable the tickbox to the left of the Source in the table header to select all the existing configuration.

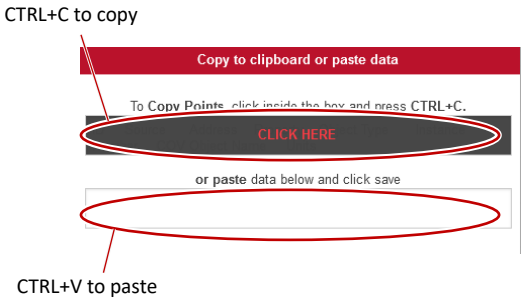


1. Press the Copy/Paste button to show the Copy/Paste page.



2. To copy the selected point configuration, use 'Copy to clipboard' to add all the selected rows to the computer clipboard, open a compatible spreadsheet application, e.g. Excel, and paste using keyboard shortcut commands.

   Edit the compatible spreadsheet application, as necessary.



Caution — Ensure each BACnet Object Type Instance MUST have a unique BACnet Instance Number (Col: F) and Object Name (Col: H).

H2 — DALI Emergency Non-Maintained 10.254.0.2.3.1 missing

	A	B	C	D	E	F	G	H	I
1	ID	Source	Address	Property	Object Type	Instance Number	COV	Object Name	Units
2	1	Load	10.254.0.2.3.1	Device Missing	BI	1	1	DALI Emergency Non-Maintained 10.254.0.2.3.1 missing	--
3	2	Load	10.254.0.2.3.1	Lamp Failure	BI	2	1	DALI Emergency Non-Maintained 10.254.0.2.3.1 failure	--
4	3	Load	10.254.0.2.3.1	Emergency Function Test	BO	1	1	DALI Emergency Non-Maintained 10.254.0.2.3.1 function test	--
5	4	Load	10.254.0.2.3.1	Emergency Duration Test	BO	2	1	DALI Emergency Non-Maintained 10.254.0.2.3.1 duration test	--
6	5	Load	10.254.0.2.3.1	Stop Emergency Tests	BO	3	1	DALI Emergency Non-Maintained 10.254.0.2.3.1 stop tests	--
7	6	Load	10.254.0.2.3.1	Function Test Time	AI	1	1	DALI Emergency Non-Maintained 10.254.0.2.3.1 function test time	Sec
8	7	Load	10.254.0.2.3.1	Function Test State	AI	2	1	DALI Emergency Non-Maintained 10.254.0.2.3.1 function test state	--
9	8	Load	10.254.0.2.3.1	Duration Test Time	AI	3	1	DALI Emergency Non-Maintained 10.254.0.2.3.1 duration test time	Sec
10	9	Load	10.254.0.2.3.1	Intensity	AV	1	1	DALI Emergency Non-Maintained 10.254.0.2.3.1 intensity	%
11	10	Load	10.254.0.2.3.1	Direct Proportion	AO	1	1	DALI Emergency Non-Maintained 10.254.0.2.3.1 direct proportion	%
12	11	Load	10.254.0.2.3.1	Modify Proportion	AO	2	1	DALI Emergency Non-Maintained 10.254.0.2.3.1 modify proportion	%

Do NOT change in spreadsheet — Changes possible in spreadsheet

The Units (Col:I) must be set according to the corresponding BACnet Object Name.

Each column in the spreadsheet corresponds to the equivalent field in the BACnet Export Table.

3. To paste the spreadsheet configuration, select the first completed spreadsheet cell (e.g. A:1) and the last completed spreadsheet cell (e.g. I:n), copy configuration using standard keyboard shortcut (ctrl+c), then use the right hand mouse button in the white square and select 'Paste' from the context menu to add the copied information to this page.

Caution — The Paste function will not be able to populate a 436 Gateway that does NOT have devices/parameters from the connected Helvar Routers selected, and will overwrite an existing configuration. It will fail if the spreadsheet does not include an existing ID or if the ID cell of an existing point is not completed.

2.5. Backup and restore settings

The Back up and Restore page provides functions that allows you to manage the configuration in the 436 BACnet Gateway. The functions generate a file that replicates the configuration contained in the unit. You can then use this file to restore the unit to an earlier state without losing data. The IP configuration of the 436 may also change to the restore file settings (see Restore: Backup configuration or change device firmware).

2.5.1. Create a backup

The Back up button exports a copy of the configuration in this device. It creates a backup of the configuration to a defined media/location. You can use this backup to restore the device to an earlier state (see Restore: Backup configuration or change device firmware).

Tip: Use the backup function ('Back up and restore' page), before performing any additional changes and after checking that any configuration changes operate correctly. If it is not possible to complete the update, this function will allow you to restore the unit to a known operating condition without losing data.

To create a backup file:

1. Press ☰, and then select **Back up** to prepare device specific configuration files ready for downloading an encrypted backup file. When completed, a confirmation dialog box appears.

Caution: Browsers may automatically download the file to the computer 'Downloads' folder. This will overwrite any file with the same filename.

Note: The **Backup** files do not have a file extension. They contain only configuration files, including the 'IP config' settings, 'HelvarNet settings', 'BACnet settings', and 'Map points' page configuration.

2. Rename the backup to clarify the origin, i.e. the IP address of the device, and then press **Save file**.

Caution: Do NOT select 'Open file'. Using 'Open file' may corrupt the backup file.

3. Locate the required back up destination, i.e. a hard drive, USB memory stick, or a removable drive, and then press **Save**.

2.5.2. Restore: Backup configuration or change device firmware

The **Restore** function returns the BACnet Gateway to an earlier state without losing data. This is useful if it the unit is not operating correctly because of a configuration change or a problem with an application. It is also useful for disaster recovery if the unit fails completely.

By restoring the BACnet Gateway to an earlier state (a version before it began to display problems), it may be possible to resolve the problems caused by a serious system issue or data loss. In addition, you can use the **Restore** function to configure another unit before you fit it to an existing system, thus reducing the repeat engineering time.

This feature is also used to apply firmware update files as necessary.

To restore a backup file:

1. Press ☰, and then select **Restore** to launch a browse dialog box.

2. Locate and select the required backup or firmware update file, and then press **Open**.

   This will upload the selected file and extract the information from the backup or update file.

If restoring a backup file, the existing configuration will be overwritten.

If restoring a firmware update file, the unit firmware will be overwritten, and the configuration files will remain unaffected.

Tip: The device beeps steadily while the backup or update files are being loaded. A fanfare indicates that the process is complete, and the device restarts automatically.
The 'Login' page will appear when the IP connection has been re-established. This may take several minutes and may require a Refresh of the browser.
To confirm that updates have been successfully applied, press 'Show version info' button on the 'Home' page.

2.6. Configure the Login Security

When first installed, the configuration pages are protected by a user name and a default password (see the *Installation Guide*). You must type them before you can access the configuration of the device. After the device has been installed, change the default password to prevent unauthorised access.

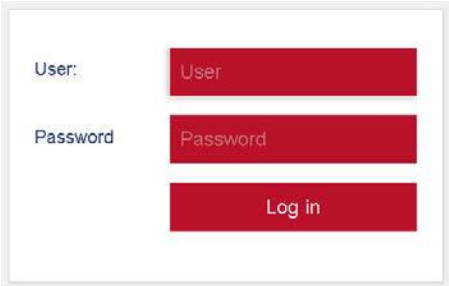
Caution: Changing and retaining the password is the responsibility of the user/customer. However, it may be possible to restore the default password. If required, contact your Helvar support representative for further details.

To configure the password:

1. Do one of the following:

- If necessary, press **Admin** (on the **Home** page) to display the **Change password** page.

  This page displays the **User**, **Password** and **New password** text boxes, which allow you to change the current password.



- Press  , and then select **Change Password** to display the **Change password** page.

Tip: Press **Go back** to return to the configuration pages.

Press **Logout** (at any time) to exit the configuration pages immediately.

2. Type the default **User** name `(Admin)`.
3. Type the current password.

Caution: Login security can be successfully controlled only if the password is carefully distributed.

4. Type a new password (40 characters max.) in the **New Password** text box. This password overwrites the previous password.

Tip: A random combination of numbers and uppercase and lowercase letters provide a secure password setup.

5. Press **Save** to apply the changes and return to the **Login** page.

3. Order code

436+PSU: BACnet Gateway with 24 VDC 1A PSU.

4. Protocol Implementation Conformance (PIC) Statement

Helvar's 436 BACnet Gateway is an OEM product from Synapsys Solutions Ltd and is a variant of the Synapsys SIP2. The following Protocol Implementation Conformance (PIC) statement gives the full compliance by Synapsys for all variants of the SIP2 gateway.

The Helvar 436 variant offers a reduced selection of the full BACnet/IP capability that is available from the SIP2. The standard object types supported for the Helvar 436 are: analogue value, analogue input, analogue output, and binary inputs.

Annex A – Protocol Implementation Conformance Statement (Normative)

(This annex is part of this standard and is required for its use.)

BACnet Protocol Implementation Conformance Statement

Date: 1 March 2022

Vendor Name: Synapsys Solutions Ltd

Product Name: Synapsys SIP2

Product Model Number: N/A

Application Software Version: 1.05

Firmware Revision: 0.8.3

BACnet Protocol Revision: 12

Product Description

This software module is used across Synapsys SIP products range and exposes values typically from Helvar Routers other over BACnet IP.

BACnet Standardized Device Profile (Annex L):

- ☐ BACnet Operator Workstation (B-OWS)
- ☐ BACnet Advanced Operator Workstation (B-AWS)
- ☐ BACnet Operator Display (B-OD)
- ☐ BACnet Building Controller (B-BC)
- ☐ BACnet Advanced Application Controller (B-AAC)
- ☒ BACnet Application Specific Controller (B-ASC)
- ☐ BACnet Smart Sensor (B-SS)
- ☐ BACnet Smart Actuator (B-SA)

List all BACnet Interoperability Building Blocks Supported (Annex K):

DS-RP-B, DS-RPM-B, DS-WP-B, DS-WPM-B, DS-COV-B,

DM-DDB-A, DM-DDB-B, DM-DOB-B, DM-DCC-B, DM-TS-B, DM-UTC-B

Segmentation Capability:

None

Standard Object Types Supported:

DEVICE:

Dynamically creatable: No

Dynamically deletable: No

Optional properties: Description, Local_Time, UTC_Offset, Local_Date, Daylight_Savings_Status, Location, Active_COV_Subscriptions

Writable properties: –

Conditionally writable properties: –

Proprietary properties: –

Property range restrictions:

APDU_Timeout: 0-65535

Number_Of_APDU_Retries: 0-255

ANALOG_INPUT

Dynamically creatable: No

Dynamically deletable: No

Optional properties: Description, Reliability, COV_Increment

Writable properties: Present_Value and Reliability when Out_Of_Service is TRUE, Out_Of_Service (These are saved in volatile memory; changes are lost after reboot)

Conditionally writable properties: –

Proprietary properties: –

Property range restrictions: –

ANALOG_VALUE

Dynamically creatable: No

Dynamically deletable: No

Optional properties: Description, Reliability, Priority_Array, COV_Increment, Relinquish_Default

Writable properties: Present_Value, Reliability when Out_Of_Service is TRUE, Out_Of_Service (These are saved in volatile memory; changes are lost after reboot)

Conditionally writable properties: –

Proprietary properties: –

Property range restrictions: –

ANALOG_OUTPUT

Dynamically creatable: No

Dynamically deletable: No

Optional properties: Description, Reliability, COV_Increment

Writable properties: Present_Value, Reliability when Out_Of_Service is TRUE, Out_Of_Service (These are saved in volatile memory; changes are lost after reboot)

Conditionally writable properties: –

Proprietary properties: –

Property range restrictions: –

BINARY_INPUT

Dynamically creatable: No

Dynamically deletable: No

Optional properties: Description, Reliability

Writable properties: Present_Value and Reliability when Out_Of_Service is TRUE, Out_Of_Service (These are saved in volatile memory; changes are lost after reboot)

Conditionally writable properties: –

Proprietary properties: –

Property range restrictions: –

BINARY_VALUE

Dynamically creatable: No

Dynamically deletable: No

Optional properties: Description, Reliability, Priority_Array, Relinquish_Default

Writable properties: Present_Value, Reliability when Out_Of_Service is TRUE, Out_Of_Service (These are saved in volatile memory; changes are lost after reboot)

Conditionally writable properties: –

Proprietary properties: –

Property range restrictions: –

BINARY_OUTPUT

Dynamically creatable: No

Dynamically deletable: No

Optional properties: Description, Reliability

Writable properties: Present_Value, Reliability when Out_Of_Service is TRUE, Out_Of_Service (These are saved in volatile memory; changes are lost after reboot)

Conditionally writable properties: –

Proprietary properties: –

Property range restrictions: –

MULTISTATE_INPUT

Dynamically creatable: No

Dynamically deletable: No

Optional properties: Description, Reliability, State_Text

Writable properties: Present_Value and Reliability when Out_Of_Service is TRUE, Out_Of_Service (These are saved in volatile memory; changes are lost after reboot)

Conditionally writable properties: –

Proprietary properties: –

Property range restrictions: Max. 128 states, each state max. 19 characters.

MULTISTATE_VALUE

Dynamically creatable: No

Dynamically deletable: No

Optional properties: Description, Reliability, Priority_Array, State_Text, Relinquish_Default

Writable properties: Present_Value, Reliability when Out_Of_Service is TRUE, Out_Of_Service (These are saved in volatile memory; changes are lost after reboot)

Conditionally writable properties: –

Proprietary properties: –

Property range restrictions: Max. 128 states, each state max. 19 characters

MULTISTATE_OUTPUT

Dynamically creatable: No

Dynamically deletable: No

Optional properties: Description, Reliability, State_Text

Writable properties: Present_Value, Reliability when Out_Of_Service is TRUE, Out_Of_Service (These are saved in volatile memory; changes are lost after reboot)

Conditionally writable properties: –

Proprietary properties: –

Property range restrictions: Max. 128 states, each state max. 19 characters

Data Link Layer Options:

- ☒ BACnet IP, (Annex J)
- ☐ BACnet IP, (Annex J), Foreign Device
- ☐ ISO 8802-3, Ethernet (Clause 7)
- ☐ ATA 878.1, 2.5 Mb. ARCNET (Clause 8)
- ☐ ATA 878.1, EIA-485 ARCNET (Clause 8), baud rate(s) _____
- ☐ MS/TP master (Clause 9), baud rate(s): _____
- ☐ MS/TP slave (Clause 9), baud rate(s): _____
- ☐ Point-To-Point, EIA 232 (Clause 10), baud rate(s): _____
- ☐ Point-To-Point, modem, (Clause 10), baud rate(s): _____
- ☐ LonTalk, (Clause 11), medium: _____
- ☐ BACnet/ZigBee (ANNEX 0)
- ☐ Other: _____

Device Address Binding:

Is static device binding supported? (This is currently necessary for two-way communication with MS/TP slaves and certain other devices.) ☐ Yes ☒ No

Networking Options:

- ☐ Router, Clause 6 – List all routing configurations, e.g., ARCNET-Ethernet, Ethernet-MS/TP, etc.
- ☐ Router, Clause 6 – List all routing configurations, e.g., ARCNET-Ethernet, Ethernet-MS/TP, etc.
- ☐ Annex H, BACnet Tunneling Router over IP
- ☒ BACnet/IP Broadcast Management Device (BBMD)

  Does the BBMD support registrations by Foreign Devices? ☒ Yes ☐ No

  Does the BBMD support network address translation? ☐ Yes ☒ No

Network Security Options:

- ☒ Non-secure Device – capable of operating without BACnet Network Security
- ☐ Secure Device – capable of using BACnet Network Security (NS-SD BIBB)
- ☐ Multiple Application – Specific Keys:
- ☐ Supports encryption (NS-ED BIBB)
- ☐ Key Server (NS-KS BIBB)

Character Sets Supported:

Indicating support for multiple character sets does not imply that they can all be supported simultaneously.

☒ ISO 10646 (UTF-8)	☐ IBM /Microsoft DBCS	☐ ISO 8859-1
☐ ISO 10646 (UCS-2)	☐ ISO 10646 (UCS-4)	☐ JIS X 0208

If this product is a communication gateway, describe the types of non-BACnet equipment/networks(s) that the gateway supports:

This product is a gateway. It typically exposes Modbus, Mbus but also other building protocols to BACnet IP. The non-BACnet equipment depends on product model.