KNX ENO 620/622 (32-channel AP)

Gateway between EnOcean and the KNX bus

Operating and installation manual

Fig. 1: KNX ENO 620

Fig. 2: KNX ENO 622

Application

KNX ENO 620 and 622 serve as gateways between En-Ocean radio sensors and the KNX bus and offer additional control functionality. A device has 32 channels, each of which can be configured with one of the following functions:

- Switch and touch sensor of a switch module
  - Various switching functions
  - Switching and dimming
  - Blind up/down
- Room control unit with the following options:
  - Slide switch/presence key
  - Set value adjustment
  - Multiple contact switch
  - Humidity sensor
- Window contact and window handle
- Binary input
- Light sensor
- Presence detector

In addition, the device contains six control channels that can be connected with the communication objects of a sensor channel or of an external KNX sensor. The following control types can be selected for each channel:

- Light, continuous
- Light, on/off
- Temperature, continuous
- Temperature, on/off
- Common 2-byte-float, on/off
- Common 0...255 (0...100 %), on/off

The KNX ENO 620 and 622 devices differ only in the housing; their functions are identical. KNX ENO 620 has a particularly compact design. KNX ENO 622 is suitable for mounting on a recessed wall box or on material with poor radio penetration properties (e.g. metal or concrete).

Installation and connection

The unit can be on-wall mounted (e.g. on masonry or wood). Select an installation location that lies within the range of the EnOcean sensors being used with the device. Avoid shielding objects (metal cabinets, etc.) and sources of interference (computers, electronic transformers, ballasts, etc.) near the gateway.
Detailed information on coverage planning and HF penetration can be found in the sensor data sheets and at www.enocean.com.
The device is connected to the KNX bus through a bus terminal. Ensure that the polarity of the terminal is as shown on the device. The device is powered via the bus.

Fig. 3: KNX ENO 620

Fig. 4: KNX ENO 622

Initial state

A new gateway has a physical address of 15.15.255. There are no preset group addresses and connections to EnOcean devices.

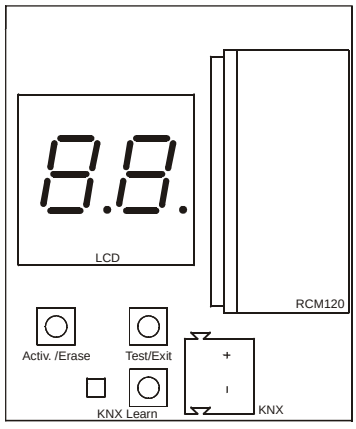

Fig. 5: Device with the top open

To program the physical address (KNX) on the ETS press the programming key (“Learn Key KNX”). The red LED lights up when the learn mode is active ("Learn LED KNX"). It goes out when the device re-

ceives the physical address. The group addresses and parameter settings can then be programmed on the ETS.

Linking with EnOcean devices

Before linking to EnOcean devices, the functions of the individual channels must be programmed with the ETS. Up to four links can be learned per channel for touch sensors, window handles and window contacts. For temperature sensors, light sensors, presence detectors and binary inputs, only one EnOcean device can be learned per channel.

Learn mode

During the learning procedure of EnOcean sensors, the gateway is controlled using the two keys below the display:

- **Short keystroke, left key:** Start learn mode ("Active")
- **Long keystroke**, **left key:** Clear channel ("Erase")
- **Short keystroke**, **right key:** Send test telegram via KNX ("Test")
- **Long keystroke**, **right key:** Leave learn mode ("Exit")

"Long keystroke" means pressing the key for at least 2 seconds.
When the device is in normal mode, brief pressure on the left key switches it into learn mode. Briefly pressing the left key again switches to the next channel. The display alternates between the current channel number and the number of connected EnOcean devices. A dot in the center of the display indicates that the number of EnOcean devices is being displayed.
To the left of the dot is the function that is set for that particular channel in the parameter settings:

- A: Switching
- B: Dimming with stop telegram (b)
- C: Blind
- D: Temperature sensor (d)
- E: Window contact
- F: Other sensor
- -: Channel not in use

To the right of the dot is the number of connected devices. If a further connection to this channel is not possible, the display shows an “F”.
In learn mode, a sending EnOcean device can be connected to a cable if the device type matches the function defined in the parameter settings.
A connection is created by pressing the learn key (temperature sensor, window contact, light sensor, presence detector, binary input) or the key (switch module) on the EnOcean device. The window handle is learned in by moving it to a new position.
If the parameter settings specify that learning takes place by activating the key/window handle three times, the time between the individual activations must not exceed 0.5 seconds.
If “Switching“, “Dimming“ or “Blind“ is selected in the channel parameter settings, the channel can be linked with up to four different rocker switches or keys (with one-key control).
For the rocker functions, two opposite keys on a switch module are grouped to one rocker, so that up to four different rockers can be linked per channel.
By briefly activating the right key, the last values of the communication objects linked to this channel are sent on the bus if the communication objects are assigned group addresses.
Learn mode is terminated with a long keystroke on the right key or automatically if not operated for over 5 minutes.

Deleting assignments

Links to EnOcean devices are deleted by:

- Long keystroke on the left key in learn mode (all links of the current channel)
- Programming of the application program via the ETS (all links of all channels) if this function is selected via the following parameter: "Delete learned EnOcean sensors after programming the ETS application“.

If the function of a channel was changed, partial programming of the parameters via the ETS deletes the links of the changed channel. Programmed group addresses may be lost as a result.

Normal mode

When the telegram of an EnOcean device is received in normal mode, each channel checks whether this device is assigned to it. If so, the number assigned to the respective channel is displayed briefly on the LCD and one or more telegrams relating to the function are sent on the bus. The send interval is determined by the EnOcean device. The gateway only sends a telegram on the KNX bus if a corresponding EnOcean telegram was received.
If a received EnOcean telegram is not associated with a channel, a zero appears on the display.

Gateway functions

One of the following functions can be selected for each of the 32 channels. The selection is made in the Parameters menu of the ETS.

Switching

The following switching functions can be selected in the parameter settings:

- **Toggling (key)**

A short or long keystroke causes the last ON or OFF telegram sent on the bus to be inverted and sent. If the write flag of the corresponding communication object is set in the ETS, the current value can also be set by the bus. In this way, the changeover function (toggle) can be synchronised with other keys on the bus.

- **Off (key)**

A short or long keystroke causes an OFF telegram to be sent.

- **On (key)**

A short or long keystroke causes an ON telegram to be sent.

- **Off/on (rocker top/bottom)**

A short or long keystroke on the top key causes an OFF telegram to be sent. A short or long keystroke on the bottom key causes an ON telegram to be sent.

- **On/off (rocker top/bottom)**

Same as above, but the functions of the top and bottom of the rocker switch are reversed.

- **Value (key)**

A short or long keystroke causes the defined values to be sent. The time that defines a long keystroke can be adjusted.

- **Scene (key)**

A short keystroke causes the defined scene number to be sent. A long keystroke causes the learn telegram for the defined scene to be sent, if activated. The time that defines a long keystroke can be adjusted.

- **Switch**

This function can be used to evaluate different status switches, such as the Funkstuhl seat sensor, Thermokon SR-KCS transmitter for room access cards or Thermokon SR timer switch.

Activation of the switch causes an ON telegram to be sent, and releasing the switch causes an OFF telegram to be sent. In the parameter settings, the sent value can be inverted and sending of telegrams when the switch is activated and released can be suppressed. The telegram sent when the switch is activated can be sent with a switch-on delay. For this, the switch must be activated throughout the delay period.

The telegram sent when the switch is released can be sent with a switch-off delay. For this, the switch must remain deactivated throughout the delay period.

- **Staircase light on/off (rocker top/bottom)**

Activation of the ON key causes an ON telegram to be sent immediately. If the key remains deactivated throughout the switch-off delay period, an OFF telegram is sent at the end of the delay; otherwise, the switch-off delay is restarted every time the key is activated. Activation of the OFF key causes the switch-off delay to end immediately and an OFF telegram is sent. The sent value can be inverted by setting a parameter.

- **Staircase light off/on (rocker top/bottom)**

Same as above, but the functions of the top and bottom of the rocker switch are reversed.

Communication object for "Value":

Comm. object	KNX type	Size
Channel …: Value	5.001 (EIS 6)	1 byte

Communication object for "Scene":

Comm. object	KNX type	Size
Channel…: Scene	18.001 (EIS 6)	1 byte

Communication object for "Switch":

Comm. object	KNX type	Size
Channel …: Switch	1.001 (EIS 1)	1 bit

Communication object for "Staircase light":

Comm. object	KNX type	Size
Channel…: Staircase light	1.001 (EIS 1)	1 bit

Communication object for all other switching functions:

Comm. object	KNX type	Size
Channel …: Switch	1.001 (EIS 1)	1 bit

Dimming with stop telegram

The following functions can be selected to control a dimming actuator:

- **On/off - brighter/darker (one-key control)**

A short keystroke switches the dimmer on or off. A long keystroke changes dimming to a brighter or darker setting. The telegram sent depends on the latest telegram sent by the gateway:

If the last command was "Dim brighter" or switch on, the dimmer is switched off or dimmed down; if the last command was "Dim darker" or switch off, the dimmer is switched on or dimmed up; dimming is stopped when the key is released.

- **On/off- brighter/darker (rocker top/bottom)**

A short keystroke on the top key switches the dimmer on. A short keystroke on the bottom key switches the dimmer off.

A long keystroke on the top key causes dimming to brighten. A long keystroke on the bottom key causes dimming to darken. Dimming stops when the respective key is released.

- **Off/on - darker/brighter (rocker top/bottom)**

Same as above, but the functions of the top and bottom of the rocker switch are reversed.

The time that defines a long keystroke can be adjusted for all three functions.

Comm. object	KNX type	Size
Channel …: Switch	1.001 (EIS 1)	1 bit
Channel …: Dimming	3.007 (EIS 2)	4 bits

Moving blind/slats

The following functions are available for controlling a blind actuator:

- **Slats - blind up/down (one-key control)**

A long keystroke causes the move command for the blind to be sent. The direction of the move command changes every time the key is pressed.
A short keystroke stops the blind. If the blind is already at a standstill, a short keystroke rotates the slats. The direction of rotation sent by the command is opposite to the direction of the last move command sent by the gateway.

- **Slats - blind up/down (rocker top/bottom)**

A long keystroke causes the move command for the blind to be sent. A short keystroke stops the blind, or rotates the slats if the blind is already at a standstill.
The command direction is up for the top key and down for the bottom key.

- **Slats - blind down/up (rocker top/bottom)**

Same as above, but the functions of the top and bottom of the rocker switch are reversed.

The time that defines a long keystroke can be adjusted for all three functions.

Comm. object	KNX type	Size
Channel …: Slats	1.009 (EIS 1)	1 bit
Channel …: Blind	1.008 (EIS 1)	1 bit

Temperature sensor

The following temperature sensors can be learned in:

- Thermokon range SR04/SR07
- Thermokon range SR04 rH (with rel. humidity)
- Omnio range RTF10x
- Siemens range QAX9xx
- Stuhl range 11.F/x
- Thermokon SR65VFG/SR65AKF
- Thermokon SR65/SR65TF

The following communication object is always available for all temperature sensors:

Comm. object	KNX type	Size
Channel …: Temperature	9.001 (EIS 5)	2 bytes

The following sensor options are supported in addition to the temperature:

- **Slide switch/presence key**

Some Thermokon devices have either a presence key or a slide switch.
If the “Presence key” function is selected on the ETS, pressing the key causes the gateway to send an ON telegram. An OFF telegram is not sent in this case.
If the slide switch is selected, the gateway evaluates the status of the switch every time a telegram is sent. If the status has changed, the corresponding telegram is sent.

Comm. object	KNX type	Size
Channel …: Presence	1.001 (EIS 1)	1 bit

- **Set value adjustment**

For the set value adjustment, the temperature that is to be sent when the switch is positioned all the way to the left and right can be set. These two limit values are used to calculate the values sent for the positions between these limits. The resolution is 0.5°C. If the right limit is lower than the left limit, the values are exchanged. The maximum adjustable range of the limit values is from -30 °C to +30 °C.

Comm. object	KNX type	Size
Channel …: Set value temperature	9.002 (EIS 5)	2 bytes

- **Multiple contact switch**

Depending on the device type, different functions are available:
The Omnio, Siemens and Stuhl devices can be equipped with a multiple contact switch with 4 stages for the "Automatic", "Day", "Night" and "Frost" control modes. When the switch is set to one of these stages, an ON telegram is sent for that mode.

Communication objects for these devices:

Comm. object	KNX type	Size
Channel …: Automatic	1.001 (EIS 1)	1 bit
Channel …: Day	1.001 (EIS 1)	1 bit
Channel …: Night	1.001 (EIS 1)	1 bit
Channel …: Frost	1.001 (EIS 1)	1 bit

The Thermokon devices can be equipped with a multiple contact switch with 5 stages: "AUTO", "0", "I", "I" and "III". When the switch is set to stages “I“, “II“ or “III“, the percentage set in the parameter settings is sent as a telegram.
When the switch is set to stage “0“, a value of “0%“ is sent. An OFF telegram is also sent, for example to close the valves. When the switch is changed from the “0” stage to another stage, an ON telegram is sent, for example to open the valves again.
When the switch is set to the “AUTO“ stage, an ON telegram is sent from the corresponding communication object. When the switch is changed from the “AUTO“ stage to another stage, an OFF telegram is sent.

Communication objects for these devices:

Comm. object	KNX type	Size
Channel …: Fan speed	5.001 (EIS 6)	1 byte
Channel …: Automatic	1.001 (EIS 1)	1 bit
Channel …: Valves	1.001 (EIS 1)	1 bit

- **Humidity sensor**

When this Thermokon range is selected, the relative humidity value delivered by the sensor can also be sent with the following communication object:

Comm. object	KNX type	Size
Channel …: Rel. humidity	9.007 (EIS 5)	2 bytes

Window sensor

- **Thermokon window contact SRW01**
- **Omnio window contact FK101**

Up to four EnOcean window contacts can be linked to one channel. Whether or not a telegram should be sent when a window is opened or closed, and if so which one, can be set in the parameter settings. When a single open window is detected, the telegram for open windows is sent. The telegram for closed windows is not sent until the last window is closed.
The telegram sent when a window is opened can be sent with a switch-on delay. For this, the window must remain open throughout the delay period.
The telegram sent when a window is closed can be sent with a switch-off delay. For this, the window must remain closed throughout the delay period.

Comm. object	KNX type	Size
Channel …: Window	1.001 (EIS 1)	1 bit

- **Hoppe window handle "SecuSignal"**

Up to three positions can be identified by means of this window handle, as described in the handle operating manual; these can represent "Window open", "Window tilted" and "Window closed", for example. When the handle is moved to one of the positions, the value defined in the parameter settings is sent. In addition, up to two communication objects for binary telegrams are available when the handle is moved to the respective position.
Up to four handles can be learned into one channel. When the handles are moved to the positions for an open or tilted window, the telegrams defined for these positions are always sent. The telegrams for the closed position are only sent if all learned handles of a channel are in the closed window position. Several examples from the status table follow:

Window 1	Window 2	Window 3	Window 4	Shared status
Open	Open	Open	Open	Open
Open	Tilted	Open	Open	Open
Open	Closed	Tilted	Closed	Open
Closed	Closed	Closed	Tilted	Open
Closed	Closed	Closed	Closed	Closed

The following communication objects are available for this sensor type:

Comm. object	KNX type	Size
Channel …: Value	5.001 (EIS 6)	1 byte
Channel …: State 1	1.001 (EIS 1)	1 bit
Channel …: State 2	1.001 (EIS 1)	1 bit

Other sensor

- **Thermokon light sensor SR65LI**

If this option is selected, the light value sent by the sensor is sent to the bus with the following communication object:

Comm. Object	KNX type	Size
Channel …: Lux	9.004 (EIS 5)	2 bytes

The light measurement range defined using jumpers on the sensor must be correctly set in the parameter settings.

- **Thermokon digital input SR65DI**

When the contact at the sensor input is closed, the gateway sends an ON telegram. When the contact is opened, it sends an OFF telegram. In the parameter settings, the sent value can be inverted and sending of the telegrams when the contact is closed and opened can be suppressed.
The telegram sent when the contact is closed can be sent with a switch-on delay. For this, the contact must be closed throughout the delay period.
The telegram sent when the contact is opened can be sent with a switch-off delay. For this, the contact must remain open throughout the delay period.

Comm. object	KNX type	Size
Channel …: Binary input	1.001 (EIS 1)	1 bit

- **Thermokon presence detector SR PIR 360°**
- **Thermokon presence detector SR-MDS**

When the detector detects motion, the gateway sends an ON telegram. It sends an OFF telegram after an adjustable time. Sending of the telegrams when motion is detected and after the adjustable time period can be suppressed using a parameter and the telegram being sent can be inverted.
The telegram sent when the detector is triggered can be sent with a switch-on delay. For this, motion must be detected throughout the delay period.
The following communication object is always present for both detectors:

Comm. object	KNX type	Size
Channel …: Movement	1.001 (EIS 1)	1 bit

The SR-MDS detector also sends the light value and

its charging voltage via the following communication objects:

Comm. object	KNX type	Size
Channel …: Lux	9.004 (EIS 5)	2 bytes
Channel …: Charging voltage	9.020 (EIS 5)	2 bytes

Control channels

The described gateway function can be used to send sensor values from EnOcean devices to the KNX bus. However, the control of actuators usually requires an additional controller. For this purpose, the KNX ENO 620/622 contains six control channels, each of which can be adjusted to one of the following types.

Temperature controller, continuous

This controller sends value telegrams (type KNX: 5.001, EIB: EIS 6) as control values, e.g. for servo drives or fans for controlling room temperature. For each current value received by the sensor, a new control value is calculated and sent if necessary.
The input values of the controller can be handled by any KNX device with suitable communication objects. However, the channel is optimised for operating with an EnOcean temperature sensor supported by the gateway. Output objects of a sensor channel and the matching input objects of a control channel can be connected in the same device via group addresses.
The send interval of the temperature sensor is usually adjustable via jumpers in the device. For the sensors tested with the device, the best results were obtained with a send interval of max. 16 minutes. With this value, the sensors were easily able to continue transmitting through the night if installed in a location that was not too dark during the day. The installation location of the sensor is decisive for the effectiveness of the control and should be selected with care and after sufficient testing.
The control value from the controller is calculated by the following method:

Control value change = 42 * (set value – current value)
Control value = old control value + control value change;

Example:
A temperature difference of 3 °C results in a control value change of ~50 % (without limitation).

Communication objects

The devices printed in italics are typical application examples.

Input objects:

- **Presence:** *From a time switch;* presence detector or presence key of a supported room control unit. The presence is switched on with an ON telegram and off with an OFF telegram or after a switch-off delay
- **Temperature:** *From a temperature sensor;* current temperature value; used as the current value for the control
- **Set value adjustment:** *From the set value adjustment of a supported room control unit;* used for set value adjustment but also for specification of a basic set value.
- **Window:** *From a window contact;* When an ON telegram is received via this communication object, the valves switch off after a delay defined in the parameters and the control pauses. When an OFF telegram is received, the delay is switched off and the control is activated.
- **Switch between heating/cooling:** *From the central control unit;* If heating/cooling via a communication object is set in the parameters settings, this communication object is visible. It can be used to change over the operating mode of the channel. Heating is activated with an ON telegram and cooling with an OFF telegram.

Comm. object	KNX type	Size
Channel …: Presence	1.001 (EIS 1)	1 bit
Channel …: Temperature	9.002 (EIS 5)	2 bytes
Channel …: Set value adjustment	9.002 (EIS 5)	2 bytes
Channel …: Frost	1.001 (EIS 1)	1 bit
Channel…: Switch between heating/cooling	1.001 (EIS 1)	1 bit

Output objects:

- **Heating on/off:** *To a boiler or visualisation;* If the sent control value from the heating controller changes from 0 % to a value greater than 0 %, an ON telegram is sent via this communication object; an OFF telegram is sent in the opposite case.
- **Cooling on/off:** *To an air conditioner or visualisation;* If the sent control value from the cooling controller changes from 0 % to a value greater than 0 %, an ON telegram is sent via this communication object; an OFF telegram is sent in the opposite case.
- **Heating value:** *To a drive;* control value from the heating controller
- **Cooling value:** *To a fan or flap control;* control value from cooling controller

Comm. object	KNX type	Size
Channel…: Heating on/off	1.001 (EIS 1)	1 bit
Channel…: Cooling on/off	1.001 (EIS 1)	1 bit
Channel …: Heating value	5.001 (EIS 6)	1 byte
Channel …: Cooling value	5.001 (EIS 6)	1 byte

Parameters

- **Set value:** Basic set value. The current set value for the control is the sum of this value and the value of the "Set value adjustment" communication object.
- **Dead zone without presence:** When presence is switched off, the control values of 0 % are output. The set value of the heating controller is then calculated from the current set value minus the dead zone. The set value of the cooling controller is calculated from the current set value plus the tolerance. With presence, there is a dead zone of +-1K.
  Attention: If the presence input object is not occupied, the dead zone when there is no presence is valid.
- **Maximum step of control value:** The step size of the control value from the controller cannot exceed this value.
- **Switch-off delay after detection of presence:** After this time elapses, the presence is switched off if presence was not switched on again during this time via the communication object.
- **Delay before window is handled as open:** When an ON telegram is received via the "Window" communication object, the valves switch off after this delay and the control pauses. When an OFF telegram is received, the control is activated or the delay is switched off.
- **Wait for switch-off telegram to start switch-off delay:** When set to "No", the switch-off delay is started with every ON telegram via the "Presence" communication object. When set to "Yes", the switch-off delay is started with the first OFF telegram via "Presence" if the control is active.
- **Activate antifreeze when going beyond a temperature:** See description of the next parameter.
- **Control value while antifreeze:** When the received temperature is below this value, the control value defined for frost protection is sent and the control is deactivated.
- **Mode of heating/cooling:** This parameter is used to specify the operating mode in which the device is to be run. Only those communication objects and parameters that are needed for the mode are displayed.

Light controller, continuous

This controller type is provided for constant light control with a dimmer via value telegrams (type KNX: 5.001, EIB: EIS 6). For each current value received by the sensor, a new control value is calculated and sent if necessary.
The inputs of the channel can be connected to any KNX device with suitable communication objects. However, it has been optimised for operation with the Thermokon presence detector SR-MDS. Output objects of a sensor channel and the matching input objects of a control channel can be connected in the same device via group addresses.
If the SR-MDS presence detector is provided with a sufficient amount of energy during the day, it sends current values every ~1.5 min when the brightness changes by more than 10 lux and motion is detected at the same time. It sends current values every ~16.5 min when the brightness changes by less than 10 lux or there is no motion. If the presence state is off and motion is detected, the detector immediately sends an ON telegram. After motion detection and an internal switch-off delay of ~1.5 min., it sends an OFF telegram.
The installation location of the detector is decisive for the effectiveness of the control. The following points should be adhered to:

- If the detector is powered solely by ambient light, it must be supplied with sufficient energy for it to function properly. The installation location should not be too dark.
- The detector must be able to detect motion. For this, the users must be located within the detection range of the detector. The detection range may need to be extended by the use of additional detectors.
- The detector must be able to detect daylight and artificial lighting to a sufficient degree.
- Differences in lighting conditions on bright and overcast days and at different times of the day must be taken into account. A permanent set value that is effective under all conditions should be selected on an overcast day. If the set value is too high, the lighting will switch on too early on overcast days; if the value is too low, the brightness level without daylight may be perceived as being too low.
- Ensure that the distance to the controlled artificial lighting is sufficient as otherwise the control will begin to oscillate.
- The shortest send interval of the SR-MDS detector is ~1.5 min. All light value changes that are briefer than the shortest send interval and more than 10 lux are transmitted to the controller at the latest after this period and processed.

- A set value of 200 lux is preset in the device. A manual override may cause this set value to change until the device is restarted. The users of the control system must be trained on how the controller functions.

To optimise control, it is useful to experiment with different lighting conditions and installation locations of the detector over a period of several days. The adjustment options of the dimmer, such as the minimum

and maximum dimming values and the dimming speed, have an effect on the control and should be taken into account when optimising the settings. Additional information on how the system functions, on selecting an installation location for the detector and on the settings available for the dimmer can be found in the data sheets that come with the devices.
The control value from the controller is calculated by the following method:

Control value change = 75 * ((set value - current value) / set value);
Control value = old control value + control value change;

Examples:
For a set value of 50 lux, a brightness difference of 50 lux causes a control value change of ~30 % (without limitation).

For a set value of 100 lux, a brightness difference of 50 lux causes a control value change of ~15 % (without limitation).

For a set value of 200 lux, a brightness difference of 50 lux causes a control value change of ~7 % (without limitation).

Communication objects

The devices printed in italics are typical application examples.

Input objects:

- **Motion:** *From a presence detector;* starts and stops the light control
- **Light value:** *From a light sensor;* the current light value as the current value of the control
- **Dimmer switch on/off:** *From a key;* With an ON telegram, a control value of 100 % is sent to the dimmer. With an OFF telegram, a control value of 0 % is sent to the dimmer. At the same time, the next received light value is saved as the set value for the control.
- **Dimming:** *From a key;* With dimming telegrams, the dimmer is continuously dimmed up or down via the "Light control dim value" communication object until dimming is stopped. At the same time, the next received light value is saved as the set value for the control.
- **Dim value:** *From the central control unit;* fixed dim value for the actuator. At the same time, the next received light value is saved as the set value for the control.
- **Orientation light value:** *From the central control unit;* fixed dim value; sent at the beginning of the orientation light phase

Comm. object	KNX type	Size
Channel …: Movement	1.001 (EIS 1)	1 bit
Channel …: Light value	9.004 (EIS 5)	2 bytes
Channel …: Dimmer switch on/off	1.001 (EIS 1)	1 bit
Channel …: Dimming	3.007 (EIS 2)	4 bits
Channel …: Dim value	5.001 (EIS 6)	1 byte
Channel …: Orientation light value	5.001 (EIS 6)	1 byte

Output object:

- **Light control value:** *To a dim actuator;* dim value for controlling the actuator

Comm. object	KNX type	Size
Channel …: Light control value	5.001 (EIS 6)	1 byte

Parameters

- **Switch-off delay after detection of presence:** After this time elapses, the controller is switched off and either the orientation light value is output or the dimmer is switched off.
- **Control value at start of control:** The control is started with output of this value if the last received light value was below the current set value; otherwise, it starts with output of the value 0 %.
- **Maximum step of control value:** The step size of the control value from the controller cannot exceed this value.
- **Minimal control value:** If the calculated control values for the control are below this limit, 0 % is sent to switch off the dimmer.
- **Orientation light after download:** After the system is started up or the gateway is programmed via ETS, this value is output at the beginning of the orientation light phase if no new value was received yet via the "Orientation light value" communication object.
- **Duration of orientation light:** In the orientation light phase, the dimmer is switched off after this time elapses by sending the value 0 %.
- **Switch-on level for the light:** If the lighting drops below this light value during control or in the orientation light phase, the valid orientation light phase in each case or the current control value of the control is output; otherwise, 0 % is output.
- **Wait for switch-off telegram to start switch-off delay :** When set to "No", the switch-off delay is restarted with every ON telegram of the detector. When set to "Yes", the switch-off delay is started with the first OFF telegram of the detector if the control is active.

Light controller, on/off

This controller type is available for light control. An upper and lower threshold value at which the controller should switch can be entered. Presence and manual override can be handled as well.

Communication objects

The devices printed in italics are typical application examples of these objects.

Input objects:

- **Input lux:** *From a light sensor;* current value of

control

- **Input presence:** *From a presence detector;* for evaluating presence
- **Input switch on/off manually:** *From a key;* the controller can be manually overridden for an adjustable period

Output object:

- **Output switch on/off:** *To an actuator;* switch output of on/off controller

Comm. object	KNX type	Size
Channel …: Input lux	9.004 (EIS 5)	2 bytes
Channel…: Input presence	1.001 (EIS 1)	1 bit
Channel…: Input switch on/off manually	1.001 (EIS 1)	1 bit
Channel…: Output switch on/off	1.001 (EIS 1)	1 bit

Parameters

- **Operating mode:** This parameter can be used to define how the controller operates:
  - **Switch automatically only by values:** Only telegrams to the value object and manual switching are evaluated by the controller.
  - **Switch on only manually, switch off automatically:** The channel can only be switched on manually. It is switched off when the input value exceeds the switch-off threshold or there is no presence. This is a semiautomatic operating mode with automatic switch-off. It prevents light in an office from being left on accidentally, for example.
  - **Switch automatically by values and presence:** Telegrams to the value object, to the presence object and manual switching are evaluated by the controller.
- **Switch-on telegram when going below a value:** See the description of the next parameter.
- **Switch-off telegram when going beyond a value:** These two parameters define the working range of the control, or the hysteresis.
  Attention: Not every value that can be set here can be represented via the 2-byte-float object type. It is important to check the values at the which the controller actually switches.
- **Wait for switch-off telegram to start switch-off delay :** If the presence is evaluated by the controller, the switch-off delay is restarted with every ON telegram to the presence object when set to "No". When set to "Yes", the switch-off delay is started with the first OFF telegram if the control is active.
- **Switch-off delay after detection of presence:** After this time elapses, the presence is switched off if presence was not switched on again during this time via the communication object.
- **Off-time after switching manually:** If switching manually, the on/off controller stays in the state specified through manual control for the set time period. After this time elapses, the automatic mode is resumed as defined by the operating mode.
- **Inverted sending:** The states sent by the switching output can be inverted here.

Temperature controller, on/off

The operating mode of this controller is identical to that of the on/off light value controller. They differ in that the input object for the current value is of a different type.

Comm. object	KNX type	Size
Channel…: Input temperature	9.002 (EIS 5)	2 bytes

Controller, common 2-byte-float, on/off

The operating mode of this controller is identical to that of the on/off light value controller. Again, they differ in that the input object for the current value is of a different type.

Comm. object	KNX type	Size
Channel…: Input 2-byte-float	9.001 (EIS 5)	2 bytes

Also, the upper and lower limit values must be entered separately using two parameters for value and multiplier.

Controller, common 0…255, on/off

The operating mode of this controller is identical to that of the on/off light value controller. Again, they differ in that the input object for the current value is of a different type.

Comm. object	KNX type	Size
Channel…: Input value 0…255	5.001 (EIS 6)	1 byte

Application example: heating controller

The following figure shows an example of temperature control setup. Both the current temperature and the set value adjustment are sent by a room operating unit. The controller in the gateway calculates the control value and sends it to the heating valve via the KNX bus. If a presence detector or a window contact are integrated in the system, their values can be taken into account by the controller to achieve an optimal level of energy efficiency.

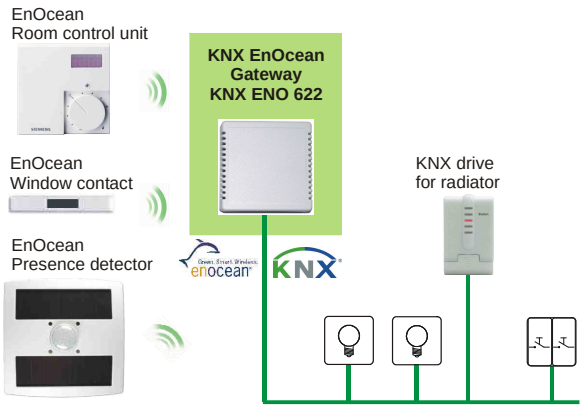

Fig. 6: Application example: heating controller

Application example: light controller

Another example of how to use this system to save energy is the light control system based on KNX ENO 620/622, as shown in the next figure. By parameterising the device accordingly, an energy saving function can be implemented in which the user can switch on the light as needed. The controller switches off the light automatically if the user clearly forgot to switch it off. The automatic mechanism does not interfere with the user and residents or employees can switch on or off the light according to their own needs. The system can optionally be parameterised to switch on the light automatically.

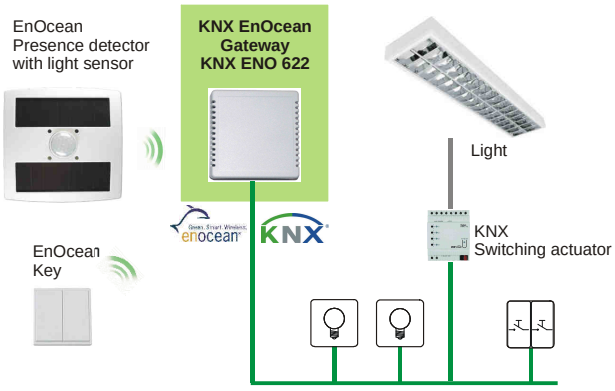

Fig. 7: Application example: light controller

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