

EnOcean HVAC-setback Operational Description

Revision 1.15 for firmware revision 1.0.1.2 and 1.0.1.3

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Timers

Egress Timer

Description: This timer provides a delay between the initiation of a deliberate change to unoccupied state by a keycard switch or away switch and the closing of the relay.

Events: When the egress timer expires, the relay closes.

Configuration: The period of the egress timer can be adjusted via remote management to any number of seconds between 0 and 65535 (18.2 hours). The default setting is 30s.

Occupancy Timer

Description: The occupancy timer provides a delay between the last potential occupancy change and the relay closing. In a system with a magnet contact and an occupancy sensor this is the time after the door closes that the controller will wait to see occupancy. If it does not see occupancy it will close the relay.

Events: When the occupancy timer expires, the relay closes.

Configuration:

The period of the occupancy timer can be set to 5, 15, 30, 60 or 120 minutes. The 120 minute value can be changed via remote management to any number of seconds between 0 and 65535 (18.2 hours).

The occupancy timer can be adjusted through the button interface menu or through simple-tap. See the simple tap section of this document for details in changing the occupancy timer via simple tap.

The default setting is 5 minutes.

Lockout Timer

Description: The lockout timer provides a time after the relay has been closed manually (with a switch) where the relay will not open due to messages from occupancy sensors, even if auto-on is enabled.

Events: None

Configuration: The period of the lockout timer can be adjusted via remote management to any number of seconds between 0 and 65535 (18.2 hours). The default setting is 5 minutes.

Rocker Switch Auto-Off Timer

Description: The rocker switch auto-off timer determines the time after a directly linked switch is pressed in the "on" position before the relay closes (when rocker switch auto-off is enabled).

The relay will close when the rocker switch auto-off timer period has elapsed after a switch has been pressed in the "on" position.

Events: When the rocker switch auto-off timer expires the relay will close.

Configuration: The rocker switch auto-off timer and the occupancy sensor auto-off timer share a single entry in the button interface menu. The types of devices linked to the module determine which timer is affected by a change in setting via the button interface. The period of the rocker switch auto-off timer can be adjusted through the button interface only when no occupancy sensors are directly linked to the module. It can be disabled or set to 0 (disabled), 5, 15, 30 or 60 minutes. The 60 minute value can be changed via remote management to any number of seconds between 0 and 65535 (18.2 hours).

The rocker switch auto-off timer is 0 (disabled) by default.

Occupancy Sensor Auto-Off Timer

Description: The occupancy sensor auto-off timer determines the time after occupancy is detected by a directly linked occupancy sensor before the relay closes (when occupancy sensor auto-off is enabled).

This timer will be reset every time occupancy is seen. If no occupancy is seen for the period of the timer, the relay will close.

Events: When the occupancy sensor auto-off timer expires the relay will close.

Configuration:

The occupancy sensor auto-off timer can be disabled or set to 0 (disabled), 5, 15, 30 or 60 minutes. The 60 minute value can be changed via remote management to any number of seconds between 0 and 65535 (18.2 hours).

The default setting is 15 minutes.

Grace Timer

Description: The grace timer provides a period after the auto-off timer has expired during which the relay will open if a sign of occupancy is detected.

Events: None

Configuration: The grace timer period is always equal to the auto-off timer period.

Door/Window Ajar Timer

Description: The door/window-ajar timer determines how long a window or door can remain open before the relay will close to conserve energy.

Events: When the door/window-ajar timer expires, close the relay.

Configuration: The period of the door/window-ajar timer can be adjusted via remote management to any number of seconds between 0 and 65535 (18.2 hours). The default setting is 2 minutes.

Auto-On Feature

The auto-on feature allows the relay to be opened automatically when occupancy is detected.

The auto-on feature's default state depends on the types of devices that are directly linked to the module. If one or more switches are directly linked to the module auto-on is disabled by default, otherwise auto-on is enabled by default.

Compatible Devices

PTM 200C or Equivalent Rocker Switch (either single or dual rocker)

EEP: F6-02-02

Events – Directly Linked:

1. Press on:
 - Open relay
 - Indicate occupancy to the network
 - If rocker switch auto-off is enabled, start the rocker switch auto-off timer
2. Press off:
 - Close relay
 - If auto-on is enabled start the lockout timer
 - Indicate occupancy to the network

Linking/Un-linking: To link a rocker switch, put the controller in link mode and press the rocker that is to be linked three times in the up (I) direction. In the case of a dual switch, both rockers can be independently linked to the controller. To un-link a rocker switch, perform the same procedure with the controller in un-link mode.

Keycard Switch

EEP: F6-04-01

Events – Directly linked:

1. Keycard inserted:
 - Open relay
 - Stop the egress timer

2. Keycard removed:

- If all keycards (linked directly or through the network) are removed, start the egress timer

Linking/Un-Linking: To link a keycard switch, put the controller in link mode then insert and remove the key card three times within five seconds. To un-link a keycard switch, perform the same procedure with the controller in un-link mode.

Occupancy Sensor

EEP: A5-07-(01, 02, 03)

Events – Directly Linked:

1. Occupancy Detected Message:

- Run occupancy-detected subroutine
- If the occupancy sensor auto-off time is enabled, load the appropriate setting into the occupancy sensor auto-off timer and start it

2. No Occupancy Detected Message:

- No action

Linking/Un-Linking: To link an occupancy sensor, put the controller in link mode and then press the sensor's teach button once. To un-link an occupancy sensor, perform the same procedure with the controller in un-link mode.

Entry Door Surface Contact Sensor

EEP: A5-30-02 or D5-00-01

Events – Directly Linked:

1. Door Opened:

- Start the door/window ajar timer

2. Door Closed:

- If there is an occupancy sensor in the system, start the occupancy timer
- If all door and window contact sensors (linked directly or through the network) are closed, stop and reset the door/window ajar timer

Linking/Un-Linking: To link a surface-mount entry door contact sensor, put the controller in link mode, place the magnet next to the sensor and press the sensor's teach button. To un-link a surface-mount entry door sensor, perform the same procedure with the controller in un-link mode.

Window-Ajar Surface Contact Sensor

EEP: A5-30-02 or D5-00-01

Events – Directly Linked:

1. Window Opened:
 - Run occupancy-detected subroutine
 - Start the door/window ajar timer
2. Window Closed:
 - Run occupancy-detected subroutine
 - If all door and window contact sensors (linked directly or through the network) are closed, stop and reset the door/window ajar timer

Linking/Un-Linking: To link a surface-mount window contact sensor, put the controller in link mode, place the magnet away from the sensor and press the sensor's teach button. To un-link a surface-mount window contact sensor, perform the same procedure with the controller in un-link mode.

Temperature Sensor

EEP: A5-02-05

Events – Directly Linked

Temperature is only able to affect the setback mode when the occupancy status is unoccupied. There are 2 individual temperature setpoints: the heating setpoint and the cooling setpoint. The heating setpoint is 4.4 degC by default and the cooling setpoint is 0 (disabled) by default. If the temperature is below the heating setpoint and the setpoint is enabled (non-zero), the HVAC will transition to normal mode and will not return to setback until the temperature is above the heating setpoint and the debounce timer has expired. If the temperature is above the cooling setpoint and the setpoint is enabled (non-zero), the HVAC will transition to normal mode and will not return to setback until the temperature is below the cooling setpoint and the debounce timer has expired. The debounce timer is set to 15 minutes and cannot be changed. The timer is reset whenever the relay state changes.

Linking: To link a temperature sensor, put the controller in link mode and then press the sensor's teach button once. To un-link a temperature sensor, perform the same procedure with the controller in un-link mode.

Internal Temperature Sensor

The internal temperature sensor is built into the HVAC setback module and therefore it will always affect the module's behavior.

EEP: N/A

Events:

Temperature is only able to affect the setback mode when the occupancy status is unoccupied. There are 2 individual temperature setpoints: the heating setpoint and the cooling setpoint. The heating setpoint is 4.4 degC by default and the cooling setpoint is 0 (disabled) by default. If the temperature is below the heating setpoint and the setpoint is enabled (non-zero), the HVAC will transition to normal mode and will not return to setback until the temperature is above the heating setpoint and the debounce timer has expired. If the temperature is above the cooling setpoint and the setpoint is enabled (non-zero), the HVAC will transition to normal mode and will not return to setback until the temperature is below the cooling setpoint and the debounce timer has expired. The debounce timer is set to 15 minutes and cannot be changed. The timer is reset whenever the relay state changes. This allows the unit 15 minutes to reach a steady state with respect to temperature (due to self heating).

Linking: Because this temperature sensor is built into the HVAC setback module it cannot be linked or unlinked.

***** Occupancy Detected Subroutine:

- If auto-on is enabled and lockout timer is not running open the relay.
- If there is an entry door contact sensor and an occupancy sensor in the system, and no switches are directly linked to this controller, stop the occupancy timer and open the relay.
- If grace timer is running and the lockout timer is not running open the relay.

Remote Management

Remote management allows the user to read and write information to the device as well as force the device into certain states. Remote management messages fall under the SYS_EX message structure. See EnOcean Equipment Profile document. Here is a list of standard EnOcean Remote Management functions that are supported.

- Learn
- Exit Learn
- Action
- Ping
- Read flash (Address 0x7D00 to 0x7FFF and 0x9F00 to 0x9FFF)
- Write flash (Address 0x7D00 to 0x7FFF)
- Unlock
- Set Lock
- Change unlock

See the EnOcean document *Remote Management specification, 19.02.2010* or later for more information on the messaging for the above functions.

The following table describes the manufacturer specific messaging and lays out the SYS-EX data portion of the message:

Message	Sequence	Index	Length	Mfg ID	RPC Code	RPC Data			
	DB0.7...DB0.6	DB0.5...DB0.0	DB1...DB2.7	DB2.6...DB3.4	DB3.3...DB4	DB4	DB5	DB6	DB7
Enter Learn	N/A	0x00	0x01	0x018	0x400	0x01	N/A	N/A	N/A
Enter Unlearn	N/A	0x00	0x01	0x018	0x400	0x02	N/A	N/A	N/A
Exit (un)learn	N/A	0x00	0x01	0x018	0x400	0x03	N/A	N/A	N/A
Reset	N/A	0x00	0x00	0x018	0x401	N/A	N/A	N/A	N/A
Clear All Links	N/A	0x00	0x04	0x018	0x402	0x56	0x65	0x72	0x76
Factory Reset	N/A	0x00	0x04	0x018	0x403	0x56	0x65	0x72	0x76

Configuration Memory Map (use with Read/Write flash)

Through the remote management read/write flash, the user should be able to read and write the following values:

Name	Size (Bytes)	Start Address	Description
Blank Flash Check	2	0x7D00	0xA55A-valid configuration, all other values will prompt a reset to defaults
Unlock Code	4	0x7D02	Remote Management unlock code (range: 0-4294967295)
Egress Timeout	2	0x7D06	Period of the egress timer in seconds (range: 0-65565)
Lockout Timeout	2	0x7D08	Period of lockout timer in seconds (range: 0-65535)

Rocker Switch Auto Off Timeout	2	0x7D0A	Period of Rocker Switch Auto Off timer for timed switches in seconds (range: 0-65535)
Custom Rocker Switch Auto Off Setting	2	0x7D0C	Provides a custom setting accessible through the UI (range: 0-65535)
Occupancy Auto Off Timeout	2	0x7D0E	Period of Occupancy Auto Off timer for occupancy signals (eg. motion) in seconds (range: 0-65535)
Custom Occupancy Auto Off Setting	2	0x7D10	Provides a custom setting accessible through the UI (range: 0-65535)
Occupancy Timeout	2	0x7D12	Period of occupancy timer in seconds (range: 0-65535)
Custom Occupancy Timeout	2	0x7D14	Provides a custom setting accessible through the UI (range: 0-65535)
Door Window Timeout	2	0x7D16	Period of the door/window-ajar timer in seconds (range: 0-65535)
Grace Period Timeout	2	0x7D18	Period of grace timer in seconds (range: 0-65535)
Sensor Heartbeat Timeout	2	0x7D1A	Period of sensor heartbeat timeout in seconds (range: 0-65535)
Heat Setback Point	2	0x7D1C	Heating setpoint in tenths of °C (range: 0-6553.5°C)
Custom Heat Setback Setting	2	0x7D1E	Provides a custom setting accessible through the UI (range: 0-6553.5°C)
Cool Setback Point	2	0x7D20	Cooling setpoint in tenths of °C (range: 0-6553.5°C)
Custom Cool Setback Setting	2	0x7D22	Provides a custom setting accessible through the UI (range: 0-6553.5°C)
Photo Sensor Setpoint	2	0x7D24	Not Used in HVAC
Photo Sensor Hysteresis Percent	2	0x7D26	Not Used in HVAC
Photo Sensor Long Debounce	2	0x7D28	Not Used in HVAC
Photo Sensor Short Debounce	2	0x7D2A	Not Used in HVAC
Repeater Enabled	1	0x7D2C	Repeater setting (0-disabled, 1-enabled 1hop, 2-enabled 2hop)
Status Message Enable	1	0x7D2D	0-disabled, 1-enabled
Auto On Enabled	1	0x7D2E	0-disabled, 1-enabled, 255-Automatically determined
Enable Leds In Go	1	0x7D2F	0-disabled, 1-enabled
Network Joined	1	0x7D30	0x80-Network Joined, all other settings indicate no network joined
Overall Relay Logic Inverted	1	0x7D36	0-normal operation, 1-inversed relay logic
Blink Warn Enabled	1	0x7D37	Not Used in HVAC

Status Messaging

If the status message configuration item is enabled (assessable only through remote management), then the following 4BS message will be transmitted:

Data Byte	Name	Range	Values
DB0	Relay Status	Bit0	0 – Relay Open 1 – Relay Closed
	Relay Logic	Bit1	0 – Standard Relay Operation

			1 – Inverse Relay Operation
	Occupancy Status	Bit2	0 – Occupied 1 – Unoccupied
	Teach Bit	Bit3	0 – Teach Telegram 1 – Data Telegram
	Auto-Off Status	Bit4	0 – Auto-Off Disabled 1 – Auto-Off Enabled
	Auto-On Status	Bit5	0 – Auto-On Disabled 1 – Auto-On Enabled
	Repeater Status	Bit6	0 – Repeater Disabled 1 – Repeater Enabled
	NA	Bit7	NA
DB1	Temperature	Bit0-Bit7	0x00-0xFF = 0-40°C
DB2	Unused	Bit0-Bit7	0
DB3	Device Type	Bit0-Bit7	0x04 – HVAC Setback Module

The status message is disabled by default.