Quick start: **Energy Switch EU**

Technical specifications

Normal operating voltage	230Vac/50Hz
Recommended max. load	🔆 3000W 🔆 600W
Frequency range	868.42 MHz
Wireless range	30~100 meters in line of sight
Energy measurement	3 - 4500W (5%) and kWh

Indicator light

Push button

AC Power plug
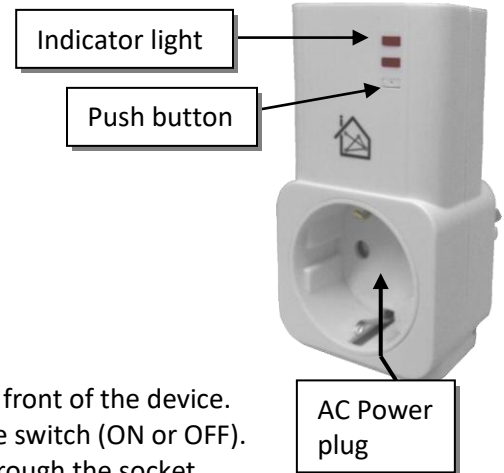
Basic operations

- The *Energy Switch* can be remotely controlled.
- The *Energy Switch* can be controlled by the push button on the front of the device.
- The *Energy Switch*'s indicator light can indicate the status of the switch (ON or OFF).
- The *Energy Switch* can measure the power that is consumed through the socket.
- The *Energy Switch* is a Routing device to make a stronger and wider Z-Wave mesh network.

How it operates

Control and monitor your lightning or any other appliance.
During operation mode it will measure the instance and accumulated energy consumption of the applied appliance.
Easy plug and play.

Mounting

1. Place the *Energy Switch* into an outlet socket.
2. Plug any appliance into the socket of the Energy Switch to control and measure the energy consumption from.

Include or exclude in Z-Wave network [1]

1. Press and hold the push button until the indicator light is blinking than release the button to start the inclusion or exclusion process.
2. When classic inclusion failed the product will start Network Wide Inclusion automatically

Manual control

Press and release the push button of the *Energy Switch* to switch on/off the socket of the *Energy Switch*.
- Manual control by the Push Button can be protected by a configuration parameter.
- Led indicator can be inverted by a configuration parameter.

Remote control

The *Energy Switch* can be remote controlled by several Z-Wave devices.

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[1] Make sure your Z-Wave controller is in the correct operation mode (include or exclude).

Technical Manual: **Energy Switch EU**

Caution:
- This device is using a radio signal that passes through walls, windows and doors. The range is strongly influenced by local conditions such as large metal objects, house wiring, concrete, furniture, refrigerators, microwaves and similar items. On average, the indoor range is approximately 30 meters.
- Do not expose this product to excessive heat or moisture. Dry location use only.
- Prevent long term exposure to direct sunlight.
- Do not attempt to repair this product. If the product is damaged or if you are in doubt about the proper operation, take the product back to the place of purchase.
- Do not clean the product with any liquid.
- Indoor use only.
- Overload will damage this product.

Technical details

Absolute min/max voltage	90-265Vac 40-60Hz
Maximum peak resistive load	16A
Maximum peak inductive load	8A
Frequency range	868.42 MHz
Wireless range	30 ~ 100 meters in line of sight Min. 150 meters with good mesh network (max 4 hops)
Energy measurement	3 – 4500 W (5%) and kWh
Storage temperature	-5°C to +65°C
Storage humidity	10% to 70%
Operating temperature	0°C to 50°C
Operating humidity	30% to 80%
Internal power consumption	0,3 ~ 0,5Watt (when relay and indicator light are off)

Note: When applied to FL lightning or inductive load the max current of 8A may not exceed! We recommend not using more than 15x40W.

Product dimensions (length x width x height)

Energy Switch = 95 x 50 x 35 mm
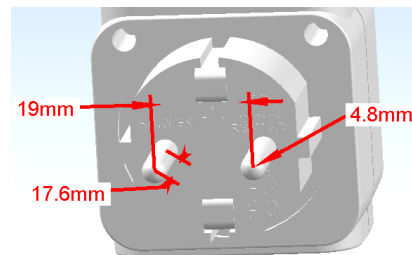
Indication mode

The indicator light gives various statuses of the device as follows:

1. Ready for learn mode: indicator light blinks every second
2. Learn in progress (add):   indicator light 2 times every second
3. Learn in progress (remove):   indicator light 3 times every 1.5 second
4. Learn mode success: indicator light is on for one second
5. Overload detected: indicator light blinks 6 times rapidly

Energy Switch and Energy Switch Plus

The Energy Switch has 2 different variants, these can be recognized by the second indicator light (which is placed directly under the pushbutton). Next to the standard variant, which can be identified by the red light, there is also the Energy Switch Plus. This can be identified by the green light.

Energy Switch:
Red indication light

Energy Switch Plus:
Green indication light

The difference between the two variants is that the Energy Switch Plus can decide if the measured energy is returned (e.g. because of solar panels). The standard Energy Switch can measure used or returned but will see all energy as used.

	Energy Switch	Energy Switch Plus
Can measure used energy.	Yes, will report with Z-Wave as used energy.	Yes, will report with Z-Wave as used energy.
Can measure returned energy.	Yes, will report with Z-Wave as used energy.	Yes, will report with Z-Wave as returned energy.
Can measure used and returned energy.	No, in case there is both used as returned energy registered, all values will be counted up and reported as used.	Yes, in case there is both used as returned energy registered, the values will be counted up separately and reported as used or returned.
Red indicator light	Is on when the energy is used or returned.	Is on when the energy is used.
Green indicator light	N/a	Is on when the energy is returned.

BE NEXT

Supporting Command Classes

Basic type: BASIC_TYPE_ROUTING_SLAVE
Generic type: GENERIC_TYPE_SWITCH_BINARY
Specific type: SPECIFIC_TYPE_POWER_SWITCH_BINARY
Listening: TRUE, Z-Wave Lib: 4.54

class: 0x25 COMMAND_CLASS_SWITCH_BINARY
class: 0x32 COMMAND_CLASS_METER_V4
class: 0x70 COMMAND_CLASS_CONFIGURATION
class: 0x72 COMMAND_CLASS_MANUFACTURER_SPECIFIC
class: 0x73 COMMAND_CLASS_POWERLEVEL
class: 0x75 COMMAND_CLASS_PROTECTION
class: 0x85 COMMAND_CLASS_ASSOCIATION
class: 0x86 COMMAND_CLASS_VERSION
class: 0x27 COMMAND_CLASS_SWITCH_ALL

Routing slave

This Z-Wave product will be used as slave. Slave nodes are nodes in a Z-Wave network that receive commands and perform actions based on the command. A routing slave can route Z-Wave messages to other nodes in the network. This device is always awake and does not go to sleep mode because it is an AC powered device.
This device can act as a wireless repeater to forward commands for another device in the Z-Wave network to expand the range of the network. This function works for every Z-Wave device from any manufacturer when included into the same Z-Wave network.
Unlike a normal slave a routing slave can store a number of static routes which he uses to send a routed RF frame to another node.

Include initiator

The include initiator is used when Primary and Inclusion Controllers include nodes into the network. When both the include initiator have been activated simultaneously the new node will be included to the network (if the node was not included previously).

Exclude initiator

The exclude initiator is used by Primary Controllers to exclude nodes from the network. When the exclude initiator and a slave initiator are activated simultaneously, it will result in the slave being excluded from the network (and reset to Node ID zero). Even if the slave was not part of the network it will still be reset by this action.

Z-Wave compatibility

Because this is a Z-Wave device, it means it can co-operate with other Z-Wave devices of other manufacturers. It can co-exist in a Z-Wave network existing with product from other manufacturers.

Hops & retries

The Z-Wave range has a range of up to 30 meters in line of sight. This signal is not limited to the 30 meter range due to routing the Z-Wave message to other nodes in the network. This way the range of the Z-Wave network can be expanded to 150 meters indoors (limit of 4 hops).

Class 0x20 COMMAND_CLASS_BASIC

The Basic command class only has a supporting role and is mapped to the switch binary command class.

class: 0x25 COMMAND_CLASS_SWITCH_BINARY
The Switch Binary command class can be used to turn the *Energy Switch* on or off.

Value:
- 0x00: OFF
- 0x01 – 0xFF: ON

class: 0x86 COMMAND_CLASS_VERSION
This command class is used to obtain information about the *Energy Switch*. The Z-Wave library type, the Z-Wave protocol version and the application version will be reported.

class: 0x72 COMMAND_CLASS_MANUFACTURER_SPECIFIC
This will report information about the manufacturer. This product will contain the manufacturer ID of *BeNext*. Manufacturer ID of *BeNext* is 138, the ID of this product is 6.

class: 0x32 COMMAND_CLASS_METER_V4
This command is used to read the values from the *Energy Switch*'s energy measuring unit. Data is collected automatically.
A report can be requested containing the accumulated consumption. This can be done using the METER_GET command. The scale must also be entered:

kWh	0x00	Accumulated
W	0x02	instant measured

Note: When devices (supporting Meter command class version 2) receive a Meter Get command of version 1 they must report their default scale which is the accumulated value.

Note2: Every non-supported scale will be ignored by application.

The kWh (accumulated) report, will contain the following:

- The current measurement value (meter value).
- The previous measurement value (previous meter value).
- The time between the measurements (delta time).

The W (instant measured) report will not contain a previous measured value. The rest will be the same.
The valid values for time are 1(0x0001) – 65534(0xFFFE) seconds.

The meter can be reset by using the METER_RESET command.

Note3: In case the power is unplugged it is possible to lose the kWh values. This can be 10 minutes maximal. Every value measured longer then 10 minutes ago is stored and won't be lost when power is unplugged.

Unsolicited METER_REPORT
The *Energy Switch* has a feature that it reports unsolicited that there has been a change in instant meter value. This happens when there is a change in value.

An unsolicited meter report is sent when 3 conditions are true.
- There must be a percentage difference compared to the last sent meter value (configuration parameter 6)
- There must be a watt difference compared to the last sent meter value (configuration parameter 7)
- A certain time must be passed since the last sent meter value (configuration parameter 8)

NOTE: You can disable the unsolicited meter report by configuring parameters 6, 7 & 8 to value 0.

Meter V4 cmd class details for third party controllers:
The meter cmd class exists out of a rate type, meter type, scale, precision and size.
The rate type for import (consumed) = 0x01 and for export (produced) = 0x02
Meter type is 0x01 = Electricity meter
Scale is 0x00 = kwh and 0x02 is Watt

All energy measured for solar production will be reported/requested on rate type 0x02.

class: 0x70 COMMAND_CLASS_CONFIGURATION
With this command class it is possible to change the default settings of the *Energy Switch*. With
CONFIGURATION_SET different configuration parameters can be set. These parameters can be changed:

0. **not used**
1. **Set to default**

Description:	Set all config values to default values (factory settings).
	Read more in chapter Configuration Reset.
Size:	1 byte*
Param1:	All values (0x00 – 0xFF) except for 0x55 can be used to default all the configuration params.
Param2,3,4:	Not used

2. **Measure decimals**

Description:	The number of decimals the instant energy is reported
Default:	0x00
Size:	1 byte*
Param1:	0,1,2,3 (decimals)
	Every value higher then 3 will be reported as the value that is set but handled in SW as if it was 3.
Param2,3,4:	Not used

3. **Power limit**

Description**:**	The relay automatically switches off when the instant measured powered is higher than configured value.
Default:	0x1194 = 4500 W
Size:	2 bytes*
Param1,2:	**T**he value of the power limit
	0 is no power limit selected
	1 – 4500 variable power limit
	> 4500 will be reported as the set value but will be handled in SW as 4500.
Param 3,4:	Not used

4. **Startup with last known socket status**
Description: The state in what the switch is when power is supplied.
Default: 0x00
Size: 1 byte*
Param1:   if 0x00: When power applied socket is always off
If 0x01 – 0xFF: When power applied socket is the state before power was disconnected.

5. **Not used**
Description: n/a
Default: n/a
Size: n/a
param1,2:   n/a
param3,4:   n/a

6. **Auto meter report: percentage**
Description: A percentage that a energy value must be different compared to a previous sent value before a unsolicited meter report is sent
Default: 0x14 (20%)
Size: 1 byte*
param 1:   A value in %.
Minimum value = 10%
Maximum value = 100%
param 2, 3, 4:   not used.

7. **Auto meter report: watt**
Description: A watt value that an energy value must be different compared to a previous sent value before a unsolicited meter report is sent.
Default: 0x0A (10 watt)
Size: 1 bytes*
param 1:   A value in watt.
Minimum value = 5 watt
Maximum value = 255 watt
param 2, 3, 4:   Not used

8. **Auto meter report: time**
Description: A time value that has to be passed compared to a previous sent value before a unsolicited meter report is sent.
Default: 0x14 (20 seconds)
Size: 1 byte*
param 1:   A value in seconds.
Minimum value = 10 seconds
Maximum value = 255 seconds
param 2, 3, 4:   Not used

9. **Relay delay time**
Description: When the relay is switched it can't be switched again until the (manual or Z-Wave) configured time has passed.
Default: 0x32 (500 milliseconds)
Size: 1 bytes*
param 1:   Value * 10 milliseconds
param 2, 3, 4:   Not used

10. **Light indicator**

Description:	Show the led state compared to the relay state
Default:	1
Size:	1 byte*
param 1:	If value is 0: the indicator led is never switched on
	If value is 1: the indicator led is switched on when relay is switched on
	If value is 2: the indicator led is switched on when relay is switched off
param 2, 3, 4:	Not used

* If a size is other then given size the frame is ignored totally so configuration values are **not** changed.

class: 0x85 COMMAND_CLASS_ASSOCIATION

The Association command class is used to associate other devices with the Energy Switch. The devices that are associated can be controlled on application level.

Every time the push button is pressed a switch binary report is sent to the associated node

The Energy Switch can be associated into a grouping. If so, the Energy Switch can be controlled by another Z-Wave device (does not have to be a controller).

Number of groupings: 1
Maximum supported nodes per group: 1

Because only one group is supported grouping identifier is ignored in all cases.

class: 0x73 COMMAND_CLASS_POWERLEVEL

The Powerlevel command class defines the RF transmitting power. This command is used to test the connectivity of a network. The Command makes it possible for supporting controllers to SET/GET the RF transmitting power level of a node and test specific links between nodes.

class: 0x75 COMMAND_CLASS_PROTECTION

The Protection command class is used to protect the device being controlled unintentional or unwanted by e.g. a child. When this is applied the push button will not work.

This can be set using the PROTECTION_SET command. The following three protection states can be used:

    0x00: Unprotected – The device is not protected and can be operated normally with the push button.
    0x01: Protection by sequence: The device can be used by a different way of operating, three
    rapid button presses are used to switch manually.
    0x02: No operation possible – it is not possible to control the device by the push button. Off course
    you can control the device by z-wave.

Note: every other state will be ignored by application.

Configuration Reset

The Energy Switch supports a configuration resets function. Configuration reset means:
    -    All configuration values are defaulted.

This function can be activated by sending a configuration set frame:

CONFIGURATION_SET
Parameter: 0x00
Size: 0x01 (can't be different from 1)
Value: All values (0x00 – 0xFF) except for 0x55.

When the value of configuration value is requested 2 possible values can be returned.

CONFIGURATION_REPORT
Parameter: 0x00
Value 0x55:   Device doesn't have all his factory settings anymore.
                Even when a configuration parameter is changed back to the default value
Value 0xAA: Devices still has all his factory settings.

Back to factory settings

This product has an option to set back to its factory settings. This can be done manually without the interference of a Z-Wave controller. The following things will apply:
-    Product is excluded from its Z-Wave network
-    All associations are cleared
-    All configurations are set back to default settings

To reset the device follow the steps:
1. When the light is off, press and hold the push button for 2 seconds and then release to start the exclusion routine (indicator light start blinking 3 times per second).
2. Now to reset the device, press and release the push button 4 times within 1.5 seconds during the exclusion routine.
3. When 'back to factory settings' is done successfully, the indicator light is turned on for 1 second at the end of the exclusion routine.

Troubleshooting

Frequently Asked Questions

Q: Why does the push button on the switch not work?

A: **1**. Check whether the Protection is enabled or not. If it is, disable the protection and try again.
For more information about disabling the protection please refer to the supporting command classes.
2. During the NWI and the inclusion/exclusion process, the push button will not work.
3. Check if the *Energy Switch* is completely plugged into the socket.

Q: I can't have my *Energy Switch* included into my Z-Wave network, what am I doing wrong?

A: **1**. Is the controller ready to include any device into the Z-Wave network? If the controller is not in
Include or exclude mode, the *Energy Switch* cannot be included or excluded.
2. The *Energy Switch* is already included into a Z-Wave network. Exclude the switch and try to include
it again.

Q: Where can I see the energy consumption measurement?

A: **1**. The energy consumption measurement can be viewed by the use of a Z-Wave controller. You can
request the accumulated or instant measured values by the use of the meter command class.

Q: Why is the energy measurement not working?

A: **1**. A device must be plugged into the socket of the *Energy Switch*. Please check if you had any device
plugged in before checking the energy measurement.

Q: Why does the indicator light not work?

A: **1**. Check if the *Energy Switch* is fully plugged into a socket. The indicator light will not work if there is
no power supplied to the *Energy Switch*.
2. The Indicator light is only on when the *Energy Switch* is on. Press the push button to turn it on.