

## Smart meter

ORDERING CODE	Z-WAVE FREQUENCY
ZMNHTA1	868,4 MHz
ZMNHTA2	921,4 MHz
ZMNHTA3	908,4 MHz
ZMNHTA4	869,0 MHz
ZMNHTA5	916,0 MHz

This Z-Wave module is used intended for energy measurements in single-phase electrical power network and can be used in residential, industrial and utility applications. Meters measure energy directly in 2-wire networks according to the principle of fast sampling of voltage and current signals. A built-in microprocessor calculates energy, power and power factor from the measured signals.

The module can be controlled through Z-wave network and it acts as repeater in order to improve range and stability of Z-wave network. It is designed to be mounted on DIN rail.

### Installation

- Before the installation disconnect power supply.
- Connect the module according to electrical diagram.
- Locate the antenna far from metal elements (as far as possible).
- Do not shorten the antenna.

### Danger of electrocution!

- Module installation requires a great degree of skill and may be performed only by a qualified and licensed electrician.
- Even when the module is turned off, voltage may be present on its terminals. Any works on configuration changes related to connection mode or load must be always performed by disconnected power supply (disable the fuse).

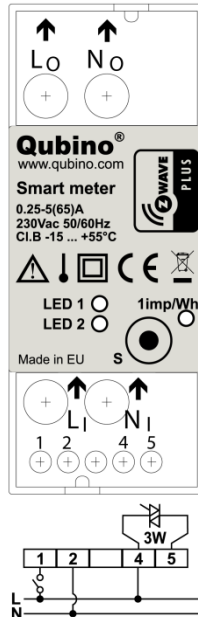
### Note!

Do not connect the module to loads exceeding recommended values. Connect the module only in accordance to the below diagrams. Improper connections may be dangerous. It is recommended to use 65 A fuses for the line protection.

### Package contents

- Smart meter

### Electrical diagram 230VAC



### Notes for the diagram:

- LI** Live input
- NI** Neutral input
- Lo** Live output
- No** Neutral output
- 1** Input for IR external relay / Ext. relay
- 2** Neutral lead for input
- 4** Live lead for External relay output
- 5** Output for External relay (max. 3W)
- S** Service button (used to add or remove module from the Z-Wave network).
- LED1** Green - Power on (solid) / no ID (blinking slow 1s) / Inc./Exc. mode (blinking fast 0,5s)
- LED2** Yellow on – output on (any) / Yellow off – outputs off (both)

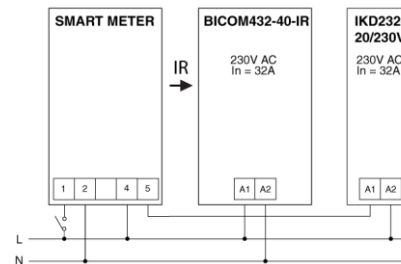
- IR** Output for IR external relay
- 1imp/Wh** Red - Pulse rate

### Measurements

- Voltage V
- Current I
- Power - Active W
- Power – Active total kWh
- Power - Reactive var
- Power – Reactive total kvarh
- Power – Apparent total kVAh
- Power Factor PF

### External relays

It is possible to connect two external relay to Smart meter module. One controlled by built-in optical (IR) communication port on the side, second controlled by output on terminal 5.



### Module Inclusion (Adding to Z-wave network)

- Connect module to power supply
- auto-inclusion (works for about 5 seconds after connected to power supply) or
- press service button **S** for more than 2 second

NOTE: For auto-inclusion procedure, first set main controller into inclusion mode and then connect module to power supply.

### Module Exclusion/Reset (Removing from Z-Wave network)

- Connect module to power supply
- bring module within maximum 1 meter (3 feet) of the main controller,
- enable add/remove mode on main controller
- press service button **S** for more than 6 seconds

By this function all parameters of the module are set to default values and own ID is deleted.

If service button S is pressed more than 2 and less than 6 second module is excluded, but

configuration parameters are not set to default values.

### Association

Association enables Smart meter module to transfer commands inside Z-Wave network directly (without main controller) to other Z-Wave modules.

### Associated Groups:

Group 1: Lifeline group (reserved for communication with the main controller), 1 node allowed.

### Configuration parameters

#### Parameter no. 7 – Input 1 switch function selection

Available configuration parameters (data type is 1 Byte DEC):

- default value 4
- 0 disabled
- 2 IR external relay control – mono stable push button
- 3 IR external relay control - bi stable switch
- 4 External relay control – mono stable push button
- 5 External relay control – bi stable switch

#### Parameter no. 10 - Activate / deactivate functions ALL ON / ALL OFF

Available configuration parameters (data type is 2 Byte DEC):

- default value 255
- 255 - ALL ON active, ALL OFF active.
- 0 - ALL ON is not active, ALL OFF is not active
- 1 - ALL ON is not active, ALL OFF active
- 2 - ALL ON active, ALL OFF is not active

Smart meter module responds to commands ALL ON/ ALL OFF that may be sent by the main controller or by other controller belonging to the system

#### Parameter no. 11 - Automatic turning off IR external relay output after set time

When IR external relay is ON it goes automatically OFF after time defined by this parameter. Timer is reset to zero each time the module receive ON command regardless from where it comes (push button, associated module, controller,..). Available configuration parameters (data type is 2 Byte DEC):

- default value 0
- 0 - Auto OFF disabled
- 1 – 32535 = 1second – 32535 seconds. Auto OFF enabled with define time, step is 1s.

#### Parameter no. 12 - Automatic turning on IR external relay output after set time

When IR external relay is OFF it goes automatically ON after time defined by this parameter. Timer is reset to zero each time the module receive OFF command regardless from where it comes (push button, associated module, controller,..). Available configuration parameters (data type is 2 Byte DEC):

- default value 0
- 0 - Auto ON disabled
- 1 – 32535 = 1second – 32535 seconds. Auto ON enabled with define time, step is 1s.

#### Parameter no. 13 - Automatic turning off External relay output after set time

When External relay is ON it goes automatically OFF after time defined by this parameter. Timer is reset to zero each time the module receive ON command regardless from where it comes (push button, associated module, controller,..). Available configuration parameters (data type is 2 Byte DEC):

- default value 0
- 0 - Auto OFF disabled
- 1 – 32535 = 1second – 32535 seconds. Auto OFF enabled with define time, step is 1s.

#### Parameter no. 14 - Automatic turning on External relay after output set time

When External relay is OFF it goes automatically ON after time defined by this parameter. Timer is reset to zero each time the module receive OFF command regardless from where it comes (push button, associated module, controller,..). Available configuration parameters (data type is 2 Byte DEC):

- default value 0
- 0 - Auto ON disabled
- 1 – 32535 = 1second – 32535 seconds. Auto ON enabled with define time, step is 1s.

#### Parameter no. 40 – Power reporting in Watts on power change

Set value means percentage, set value from 0 – 100 = 0% - 100%. Available configuration parameters (data type is 1 Byte DEC):

- default value 10
  - 0 – Reporting disabled
  - 1 – 100 = 1% - 100% Reporting enabled.
- Power report is send (push) only when actual power in Watts in real time changes for more than set percentage comparing to previous actual power in Watts, step is 1%.

NOTE: if power changed is less than 1W, the report is not send (pushed), independent of percentage set. When reporting Watts, module

will automatically reports also V (Voltage), A (Amperes), Power factor, kVar (Reactive Power).

**Parameter no. 42 – Power reporting in Watts by time interval**

Set value means time interval (0 – 32535) in seconds, when power report is send. Available config. parameters (data type is 2 Byte DEC):

- default value 300 (power report in Watts is send each 300s)
- 0 – Reporting Disabled
- 1 – 32535 = 1 second – 32535 seconds.

Reporting enabled, Power report is send with time interval set by entered value. When reporting Watts, module will automatically reports also V (Voltage), A (Amperes), Power factor, kVar (Reactive Power).

**Parameter no. 45 – Reset Power counters**

Available configuration parameters (data type is 1 Byte DEC):

- default value 0
- 0 no function
- 1 reset counter 1 – kWh
- 2 reset counter 2 – kVARh
- 4 reset counter 3 – kVAh
- 15 reset ALL counters

**Parameter no. 100 – Enable / Disable endpoints IR external relay and External relay**

Enabling IR external relay and External relay or both of them, means that endpoint (IR external relay) and endpoint (External relay) or both will be present on UI. Disabling them will result in hiding endpoints according to parameter set value. Note that hiding endpoint has no impact on its functionality. Available configuration parameters (data type is 1 Byte DEC):

- default value 0
- 0 - Endpoints IR external relay and External relay disabled
- 1 - Endpoints IR external relay disabled, External relay enabled
- 2 - Endpoints IR external relay enabled, External relay disabled
- 3 - Endpoints IR external relay and External relay enabled

NOTE: After parameter change module has to be reconfigured!

**Parameter no. 130 – Serial Number**

Read only

**Parameter no. 131 – Meter Software reference**

Read only

**Parameter no. 132– Meter Hardware reference**

Read only

**Parameter no. 140– Voltage U1**

Read only

**Parameter no. 141– Current I1**

Read only

**Parameter no. 142– Active Power Total (Pt)**

Read only

**Parameter no. 143– Reactive Power Total (Qt)**

Read only

**Parameter no. 144– Power Factor Total (Pft)**

Read only

**Parameter no. 145– Energy Counter 1 – Active power accumulated**

Read only

**Parameter no. 146– Energy Counter 2 – Reactive power accumulated**

Read only

**Parameter no. 147– Energy Counter 3 – Apparent power accumulated**

Read only

**Technical Specifications**

**Main terminals (Li, Ni, Lo, No)**

Contacts capacity: 1.5 ... 16 (25) mm<sup>2</sup>

Connection screws: M5

Max torque: 3.5 Nm (PZ2)

**Optional terminals (1,2,4,5)**

Contact capacity: 0.05 ... 1 (2.5) mm<sup>2</sup>

Screws: M3

Max torque: 0.6 Nm

**Measuring input:**

Type (connection): single phase (1b)

Reference current (Iref): 5 A

Maximum current (Imax): 65 A

Minimum current (Imin): 0.25 A

Starting current: 20 mA

Voltage (Un): 230 V (±20 %)

Power consumption at Un: < 2W

Nominal frequency (fn): 50 and 60 Hz

**Accuracy:**

Active energy and power:

Standard EN 62053-21: class 1

Standard EN 50470-3: class B

Reactive energy:

Standard EN 62053-23: class 2

**Optical communication:**

Type: IR - used to control BICOM432-40-IR

**Input (1):**

Rated voltage: 230 V (± 20%)

Input resistance: 450 kOhm

**Safety:**

Indoor meter: yes

Degree of pollution: 2

Protection class: II

AC voltage test: 4 kV

Installation Category: 300 Vrms cat. III

Standard: EN 50470

**Ambient conditions and EMC:**

According standards for indoor active energy meters.

Temperature and climatic condition according to EN 62052-11

Ambient conditions and Safety:

According standards for indoor active energy meters.

Temperature and climatic condition according to EN 62052-11

Dust/water protection: IP20

Operating temp. range: -10 ... 40°C

Storage temp. Range: -40 ... 70°C

Enclosure material: self extinguish complying UL94 V

Indoor meter: yes

Degree of pollution: 2

AC voltage test: 4 kV

Standard: EN 50470

Wireless range: up to 30 m indoors (depending on building materials)

Weight: 150g

Colour: RAL 7035

**EC Directives conformity:**

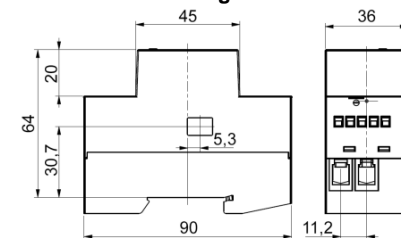
EC Directive on Meas. Instruments 2004/22/EC

EC Directive on EMC 2004/108/EC

EC Directive on Low Voltage 2006/95/EC

EC Directive WEEE 2002/96/EC

**Dimensional drawings:**



**Z-Wave Device Class:**

ZWAVEPLUS\_INFO\_REPORT\_ROLE\_TYPE\_SLAVE\_ALWAYS\_ON

GENERIC\_TYPE\_METER

SPECIFIC\_TYPE\_WHOLE\_HOME\_METER\_SIMPLE

**Z-Wave Supported Command Classes:**

COMMAND\_CLASS\_ZWAVEPLUS\_INFO\_V2

COMMAND\_CLASS\_BASIC

COMMAND\_CLASS\_SWITCH\_ALL

COMMAND\_CLASS\_SWITCH\_BINARY\_V2

COMMAND\_CLASS\_METER\_V4

COMMAND\_CLASS\_MULTI\_CHANNEL\_V4

COMMAND\_CLASS\_MULTI\_CHANNEL\_ASSOCIATION\_V3

COMMAND\_CLASS\_CONFIGURATION

COMMAND\_CLASS\_VERSION\_V2

COMMAND\_CLASS\_MANUFACTURER\_SPECIFIC\_V2

COMMAND\_CLASS\_DEVICE\_RESET\_LOCALLY

COMMAND\_CLASS\_POWERLEVEL

COMMAND\_CLASS\_ASSOCIATION\_V2

COMMAND\_CLASS\_ASSOCIATION\_GRP\_INFO\_V2

COMMAND\_CLASS\_DEVICE\_RESET\_LOCALLY

COMMAND\_CLASS\_MARK

COMMAND\_CLASS\_BASIC

COMMAND\_CLASS\_SWITCH\_BINARY

**Endpoint 1 (IR external relay):**

**Device Class:**

GENERIC\_TYPE\_SWITCH\_BINARY

SPECIFIC\_TYPE\_POWER\_SWITCH\_BINARY

**Command Classes:**

COMMAND\_CLASS\_ZWAVEPLUS\_INFO\_V2

COMMAND\_CLASS\_BASIC

COMMAND\_CLASS\_SWITCH\_BINARY\_V2

COMMAND\_CLASS\_VERSION\_V2

COMMAND\_CLASS\_ASSOCIATION\_V2

COMMAND\_CLASS\_ASSOCIATION\_GRP\_INFO\_V2

COMMAND\_CLASS\_MULTI\_CHANNEL\_ASSOCIATION\_V3

COMMAND\_CLASS\_MARK

COMMAND\_CLASS\_BASIC

**Endpoint 2 (External relay):**

**Device Class:**

GENERIC\_TYPE\_SWITCH\_BINARY

SPECIFIC\_TYPE\_POWER\_SWITCH\_BINARY

**Command Classes:**

COMMAND\_CLASS\_ZWAVEPLUS\_INFO\_V2

COMMAND\_CLASS\_BASIC

COMMAND\_CLASS\_SWITCH\_BINARY\_V2

COMMAND\_CLASS\_VERSION\_V2

COMMAND\_CLASS\_ASSOCIATION\_V2

COMMAND\_CLASS\_ASSOCIATION\_GRP\_INFO\_V2

COMMAND\_CLASS\_MULTI\_CHANNEL\_ASSOCIATION\_V3

COMMAND\_CLASS\_MARK

COMMAND\_CLASS\_BASIC

**NOTE:**

- Endpoints are shown/hidden by Parameter No. 100

- BASIC SET/GET on root device is mapped to basic set/get of both endpoints.

This product can be included and operated in any Z-Wave network with other Z-Wave certified devices from any other manufacturers. All constantly powered nodes in the same network will act as repeaters regardless of the vendor in order to increase reliability of the network.

**Important disclaimer**

Z-Wave wireless communication is inherently not always 100% reliable, and as such, this product should not be used in situations in which life and/or valuables are solely dependent on its function.

**Warning!**

Do not dispose of electrical appliances as unsorted municipal waste, use separate collection facilities.

Contact your local government for information regarding the collection systems available. If electrical appliances are disposed of in landfills or dumps, hazardous substances can leak into the groundwater and get into the food chain, damaging your health and well-being. When replacing old appliances with new once, the retailer is legally obligated to take back your old appliance for disposal at least for free of charge.

This user manual is subject to change and improvement without notice.

**NOTE:** User manual is valid for module with SW version S1 (SW version is part of P/N)!

Example: P/N: ZMNHTAx H1S1P1

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