Qubino

The **INNOVATIVE** and **SMALLEST**

Smart Meter

ORDERING CODE	Z-WAVE FREQUENCY
ZMNHTD1	868,4 MHz
ZMNHTD2	921,4 MHz
ZMNHTD3	908,4 MHz
ZMNHTD4	869,0 MHz
ZMNHTD5	916,0 MHz
ZMNHTD8	865,2 MHz

This Z-Wave module is used 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

- To prevent electrical shock and/or equipment damage, disconnect electrical power: remove main fuse or put on OFF position a main disconnection switch (or circuit breaker if it is compliant to standard IEC947-2), before installation or any servicing.
- Make sure, that no voltage is present in the installation.
- Prevent the disconnecting device from being switched on accidentally.
- 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.

Note!

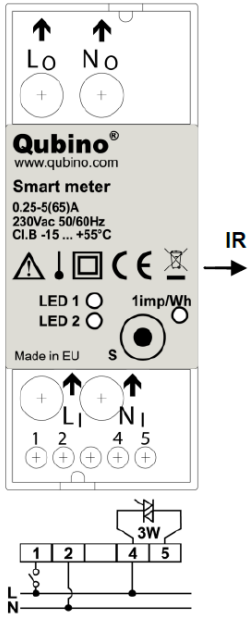
Do not connect the module to loads exceeding recommended values. Connect the module only in accordance to the below diagrams. Improper connections may be dangerous.

Electrical installation must be protected by over current protection fuse with rated current up to 63A, it must be used according to wiring diagram to achieve appropriate overload protection of the module.

Package contents

- Smart Meter

Electrical diagram 230VAC



Notes for the diagram:

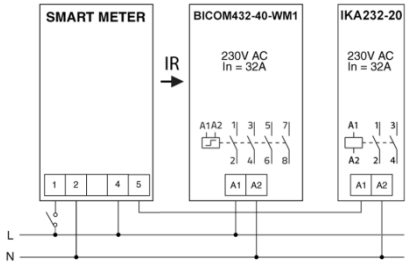
LI	Live input
NI	Neutral input
Lo	Live output
No	Neutral output
1	Input for IR external relay/Ext. relay
2	Neutral lead for input
4	Live lead for External relay output
5	Output for External relay (max. 3W)
S	Service button (used to add or remove module from the Z-Wave network).
LED1	Green - Power on (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 (On – no load indication)

Measurements

Voltage	V
Current	I
Power – Active	W
Power – Active total Import	kWh
Power – Active total Export	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
- enable add/remove mode on main controller
- 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 seconds 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 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 congig. 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 config. 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 0
- 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 config. 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

NOTE1: After parameter change, first exclude module (without setting parameters to default value) and then re include the module.

NOTE 2: If you don't have IR BiComm relay module mounted and you enable IR communication (parameter 100 is 2 or 3) there will be no valid IR relay state reported. It will be reported IR COMMUNICATION ERROR and LED2 will BLINK.

Parameter no. 110 - Maximum Power auto off

Set value means Maximum Power Consumption (0 - 15000) in watts (W), when relays are turned off according to parameters no. 111 and 112. Available configuration parameters (data type is 2 Bytes DEC):

- default value 0
- 0 - no function
- 1 - 15000 = 1 W - 15000 W Maximum Power Consumption.

Parameter no. 111 - Delay overpower off

Set value means number of second to power off relay (defined by parameters no. 110 and 112) before restart (30 - 32535) in seconds (s). Available configuration parameters (data type is 2 Bytes DEC):

- default value 30
- 30 – 32535 = 30 s – 32535 s delay.

Parameter no. 112 - Relay to power off

Set value selects relay to be powered off when threshold is reached (defined by parameters no. 110 and 111). Available config. parameters (data type is 1 Byte DEC):

- default value 0
- 0 - switch between the 2 relays (power off relay 1 first, after power on, if power consumption is still over, power off relay 2, ..)
- 1 - always power off relay 1 (IR external relay)
- 2 - always power off relay 2 (External relay)
- 3 - always power off both relays (relay 1 and relay 2)

Parameter no. 130 – Serial Number

Read only. Unsigned Value (32bit)

Parameter no. 131 – Meter Software reference Read only. Unsigned Value (16bit). 2 decimal places.

Parameter no. 132– Meter Hardware reference Read only. Unsigned Value (16bit), 2 decimal places.

Parameter no. 140– Voltage U1

Read only. Unit: V. Binary Unsigned Value (24bit), 1 decimal place.

Parameter no. 141– Current I1

Read only. Unit: A. Binary Unsigned Value (24bit), 3 decimal places.

Parameter no. 142– Active Power Total (Pt)

Read only. Unit: W. Binary Signed Value (24bit), 1 decimal place.

Parameter no. 143– Reactive Power Total (Qt)

Read only. Unit: kVAR. Binary Signed value (24bit), 1 decimal place.

Parameter no. 144– Power Factor Total (PFt)

Read only. Unsigned Value (16bit), 4 decimal places.

Parameter no. 145– Energy Counter 1 – Active power accumulated (import)

Read only. Unit: Kwh. Signed Long Value (32bit), 1 decimal place.

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

Read only. Unit: kVARh. Signed Long Value (32bit), 1 decimal place.

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

Read only. Unit: KVAh. Signed Long Value (32bit), 1 decimal place.

Parameter no. 148– Energy Counter 4 – Active power accumulated (export)

Read only. Unit: Kwh. Signed Long Value (32bit), 1 decimal place.

Technical Specifications

Main terminals (LI, NI, Lo, No)	
Contacts capacity:	1.5 ... 16 (25) mm^2
Connection screws:	M5
Max torque:	3.5 Nm (PZ2)
Optional terminals (1,2,4,5)	
Contact capacity:	0.05 ... 1 (2.5) mm^2
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 temperature:	-10 ... 40°C
Storage temperature:	-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
Distance:	up to 30 m indoors (depending on building materials)
Weight (with packaging):	150g (170g)
Frequency range:	868.4 MHz, Z-Wave
Installation	Din rail 35mm
Dimensions (W x H x D):	36 x 90 x 64mm
Package dimensions (W x H x D):	40 x 95 x 80mm
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

Z-Wave Device Class:

ZWAVEPLUS_INFO_REPORT_ROLE_TYPE_SLAVE_ALWAYS_0N
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_CRC_16_ENCAP
COMMAND_CLASS_FIRMWARE_UPDATE_MD_V2
COMMAND_CLASS_MARK
COMMAND_CLASS_BASIC
COMMAND_CLASS_SWITCH_BINARY_V2

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_CRC_16_ENCAP
COMMAND_CLASS_MARK
COMMAND_CLASS_BASIC

Endpoint 2 (External relay):

Device Class:

GENERIC_TYPE_SWITCH_BINARY
SPECIFIC_TYPE_POWER_SWITCH_BINARY

Command Classes:

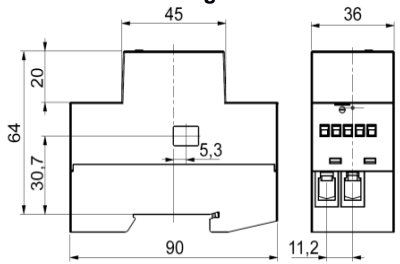
COMMAND_CLASS_ZWAVEPLUS_INFO_V2
COMMAND_CLASS_BASIC
COMMAND_CLASS_SWITCH_BINARY_V2
COMMAND_CLASS_VERSION_V2
COMMAND_CLASS_ASSOCIATION_V2
COMMAND_CLASS_ASSOCIATION_GRP_INFO_V2
COMMAND_CLASS_MULTI_CHANNEL_ASSOCIATION_V3
COMMAND_CLASS_CRC_16_ENCAP
COMMAND_CLASS_MARK
COMMAND_CLASS_BASIC

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.

Dimensional drawings:



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 S3 (SW version is part of P/N)!

Example: P/N: ZMNHTDx Hx**S3**Px

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