NorthQ

Power Reader

(NQ-9021)

Technical Integration

Z-Wave Commands

Power Reader

NQ-9021

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Overall device information

Basic type: BASIC_TYPE_ROUTING_SLAVE
Generic type : GENERIC_TYPE_METER
Specific type : SPECIFIC_TYPE_SIMPLE_METER

General description

The basic purpose of the device is to count impulses / flashes from a metering device and to save impulse count in nonvolatile memory with 15 minutes interval.

It's possible to retrieve the historical data saved in nvram using the Z-Wave AEC framework.

The device supports remote firmware update. Note that doing remote firmware updates destroys all saved samples in the sensor.

Command classes supported

- COMMAND_CLASS_BASIC
- COMMAND_CLASS_CRC16_ENCAP
- COMMAND_CLASS_WAKE_UP
- COMMAND_CLASS_MANUFACTURER_PROPRIETARY
- COMMAND_CLASS_VERSION
- COMMAND_CLASS_BATTERY
- COMMAND_CLASS_METER_V2
- COMMAND_CLASS_METER_TBL_MONITOR
- COMMAND_CLASS_CONFIGURATION
- COMMAND_CLASS_FIRMWARE_UPDATE_MD_V2
- COMMAND_CLASS_TIME_PARAMETERS

Guide for Power Reader - Battery – version

When using the battery powered– version of the Power Reader the registered consumption data from the power meter will be transferred every 15 minutes in order to optimize the battery performance.

The wireless transmitter in the Power Reader is able to perform a variety of functions by pressing the grey sensor button, located in the bottom of transmitter:

The push button on the device works as described below:

- 1 press: Enter wakeup (real-time) mode + sends wakeup duration config report
- 2 presses: Exit wakeup mode (→ go to normal mode)
- 3 presses: Send Node information frame + Enter inclusion/exclusion mode
- 5 presses: Start auto calibration (mechanical meters only)
- 7 presses: Reset to factory defaults (Also clears Z-Wave associations)

Normal Mode

In normal mode the Power Reader will wakeup and transfer data to the controller every 15 minutes. This is done to maximize battery lifetime.

Press the sensor button 1 time to enter Wakeup (real-time) mode

If you wish to receive live data you can put the Power Reader into wakeup mode (real-time mode) and then receive power consumption every 5 seconds.

By pressing the sensor button 1 time. - The LED will flash once and the Power Reader will enter wakeup mode (real-time) for approx. 15 min. After 15 minutes it will automatically revert to normal mode where data is transmitted every 15 minutes (see more info about normal mode below).

NOTE: Be aware that battery life expectancy will be significantly reduced by frequent use of real-time mode.

When sensor is in wakeup mode (real-time) the LED will flash every time a pulse has been detected/counted.

Press the sensor button 2 times to Exit wakeup mode -> Normal mode

The Power Reader operates normally by transferring the data collected from the wireless transmitter to the controller every 15 minutes - this is called Normal Mode. However, If the Power Reader has been put into Wakeup (Real-time) mode, it can be returned to Normal Mode by pressing two times on the sensor button. - The LED will flash twice and Power Reader will then again be transmitting data every 15 minutes.

NB! In normal mode the sensor LED will not flash every time a pulse has been detected.

Inclusion Mode

Press the sensor button 3 times to include the sensor

To create a connection between the wireless transmitter and the controller, it is necessary to include the sensor using the inclusion function: First insure that the controller on the Z-wave network is set to inclusion mode - Press three times on the sensor button – The LED will flash 3 times. Subsequently, the wireless transmitter will attempt to gain contact with the controller and include the device into the network. This is only needed the first time you want to add the device to the Z-Wave network.

Exclusion Mode

Press the sensor button 3 times to exclude the sensor

To remove the connection between the wireless transmitter and the controller; it is necessary to exclude the sensor from the controller. First make sure that the controller on the Z-Wave network is set to exclusion mode. Then press three times on the sensor button – The LED will flash 3 times. Subsequently, the wireless transmitter will attempt to gain contact with the controller and exclude the device from the Z-wave network.

The Z-Wave standard allows products from different vendors and categories to work in conjunction as part of the same Z-Wave network, furthermore enabling the units to work as repeaters despite vendor origin.

Press the sensor button 5 times - Calibration

When mounting the Power Reader on a mechanical meter it is necessary to calibrate the sensor head to ensure a correct reading of consumption. Mount now the sensor on the meter and press 5 times on the sensor button to start the calibration. –The LED will then start flashing to indicate that calibration has begun.

The calibration takes approx. 5-10 minutes, and the LED will start to flash gradually in a slower pace while calibration is carried out.

When calibration is completed the LED will turn off. Hereafter you will see the LED flash once each time the Power Reader will register a rotation/pulse from the meter.

NOTE: If the LED does not turn off and begins to flash rapidly (instead of turning off) after the calibration has completed, this means that the Power Reader cannot make proper reading and you must therefore try to place the sensor head on a different position on the meter and repeat calibration one more time. If calibration is still unsuccessful you must try alternative mounting of the sensor e.g. by placing the sensor head on the side of the meter or place it vertically.

Press & hold the sensor button for 5 seconds. - Tuning Function

In order to optimize the reading of consumption data from mechanical power meters, it may be necessary to make a final adjustment of the sensor head. Press & hold the sensor button for 5 seconds to begin the tuning function. **NB! This function is normally not used.**

Press the sensor button 7 times – RESET

By pressing 7 times on the sensor button the system will make a complete RESET to factory default.

The LED will flash 3 times and then become steady for approximately 5 seconds - then it will flash

3 times in a row and finally it will return with 3 more flashes to indicate that the sensor has been RESET.

Detailed description of each command class

Basic command class

Implemented according to **device class** specification. BASIC_SET unsupported, BASIC_GET always returns a BASIC_REPORT with the value 0x1 (meter type)

Battery command class

Implemented according to command class specification.

Value of 255 is not used for low battery reporting. (0-100 is reported from sensor)

Configuration command class

This class is used for setting certain vendor specific configuration variables.

See the following table for configuration variables:

Id	Name	Size	Range	Default value	Description
0x01	Pulse factor	4 bytes	1 – 655350	10000	How many pulses*10 per kWh
0x02	Sensor type	1 byte	1 – 2	2	0 = Unconfigured 1 = Pulse meter 2 = Mechanical meter
0x03	IR Listen period	1 byte	0 – 127	0	Additional time for feedback measurement. Should always be 0.

Id	Name	Size	Range	Default value	Description
0x04	IR Pulse Width	1 byte	0 – 127	50	Adjusts transmit signal so received signal will in average be equal to this values. Auto calibration might select another value than this.
0x05	Poll / Wake up frequency	1 byte	1 – 50	20	Wake device up this many times per second. This value also controls number of measurements per second on mechanical meters
0x06	Reserved	1 byte	1 – 127	(dynamic)	Reserved
0x07	Reserved	1 byte	1 – 127	(dynamic)	Reserved
0x08	Wake up interval	2 byte	1 – 32767	900	Do not use. Set this value using WAKE_UP_INTERVAL _SET instead.
0x09	Pulse count	4 bytes	0 – (2^31)-1	0	Current pulse count in device (pulse count / pulse factor = kWh)
0x0A	Keep alive period	2 bytes	0-32767	3*20	How many “ticks” before going back to sleep in normal wakeup mode.
0x0B	Real-time mode	2 bytes	0—32767	0 (sleep mode)	Set this to enter real-time mode from remote. Contains “seconds * poll frequency” before going back to sleep. If you press the button once this value will be set.
0x0C	Serial number	4 bytes	0 – (2^31)-1	(unique)	Do not use. Use COMMAND_CLASS_M ANUFACTURER_SPECI FIC version 2 instead.

Firmware update command class

Implemented according to command class specification. It is implemented in a way that does not require user attention (No button press needed).

If you want to support firmware updates of Power Reader please contact NorthQ directly.

Manufacturer specific command class

Implemented according to command class specification.

Manufacturer specific command class

See Appendix A.

Meter command class

Implemented according to command class specification and according to the following information.

Command class version	2
Meter type	Electric meter (0x1)
Scales supported	kWh
Default scale (for version 1 support)	kWh

Meter Reset Command is not supported.

Time parameters command class

Implemented according to command class specification. If it is used for real time clock remember to always use UTC time.

Version command class

Implemented according to command class specification.

Wakeup command class

Implemented according to command class specification. (Version 1)

CRC16 encapsulation command class

Implemented according to command class specification.