

BC.002 Wireless RF battery pulse counter



The wireless pulse counter on batteries has 2 binary inputs for counting or for time-measuring energy pulses or for measuring temperatures via NTC feeler. The built-in RF868 MHz transmitter receiver can be manually set to LORA or FSK modulation and works with both the MEMo (LoRa protocol) and the Milo (FSK protocol) server. The transmission range with LoRa is soon a few

hundred meters in open air and a few tens of meters indoors. With FSK, every module in the house is reached. The module is powered by 2x standard AA batteries, in addition to consumption, the battery voltage is also shown in the logs of MiLo and MEMo. The battery life will soon be a number of years. Through 8 dipswitches one can do all the desired settings according to the application.

1. CONNECT

There are 2 inputs to use, via the wire connector (pitch 2.54mm)

Note the polarity if the impulse giver is a semiconductor. The maximum voltage drop must be less than 0.7V, and any leakage current less than 1µA. If this does not meet these requirements, an optical insulator must be installed.

The minimum pulse duration must be greater than 10msec and the speed between 2 pulses should not be faster than 10 pulses/sec.

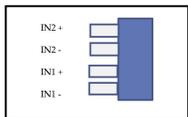
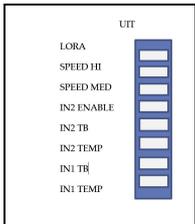
2. Configuration via DIP switches:

The configuration of the module is done by DIP switches. After opening the housing, we see 8 dipswitches and a 4 pole connector for the 2 inputs. When a dip switch is set to the right, it is 'ON', to the left it is 'OFF'.

At the top left of the PCB is a miniature push button for programming.

On the right is the battery compartment, suitable for 2 AA batteries (1.5V/ 1000... 1500mAh)

At the front of the housing there is an 'ON/OFF' switch and 2LEDs.



Pulse inputs (1-2):

connect both binary and analog contacts:

- **Binary:** Potential-free contacts

- **Analog:** NTC feeler (from 2-Wire)

Note: The inputs have a polarity if they are connected to a semiconductor

Explanation of meaning dipswitches:

All settings on the dip switches must be performed when power is switched off. When the power supply is turned on, the settings become active.

LORA:

- The **MiLo** can only communicate with FSK, this switch must then be switched off.
- At the **MEMo2**, communication via LoRa

Note: When working with the MEMo1, via the gateway RF.016, one has the choice between FSK or LORA.. Please note that when choosing LORA, the gateway must also be set to LORA. LORA can only be useful if you have to cover distances greater than 50m, or if communication is not stable.

SPEED HI – SPEED MED:

Since this module mainly works in a 'drag mode', no communication is possible from a master (MILO or RF-GATEWAY or MEMo2) to request data. The BC.002 will itself send data to the master at certain intervals, or when there is a major change in pulse/or time measurement. This from a point of view to extend the battery life. One can opt between 4 times to send the data to the MILO or RF.016. Interval transmission times:

- HI out, MED out: 30min.
- HI off, MED on: 15min.
- HI on, MED out: 10min.
- HI on, MED on: 5min.

However, if more than 10 pulses occur within the time frame of the set interval, an update will be made, so that the logging remains realistic.

IN2 ENABLE:

When only 1 input is needed, one must take the first entrance, and turn off the second (IN2 ENABLE OFF). This is recommended to increase battery life.

IN2 TB – IN2 TEMP (IN1 TB – IN1 TEMP):

These switches determine the type of input:

- TB off, TEMP off : pulse input
- TB on, TEMP from : time base entrance
- TB off, TEMP on : temperature input

PROGRAM KEY:

This key has multiple functions:

The first function: battery control: press this key for a maximum of 2 seconds and release and when during the 2 sec. pressing: :

- Both LEDs flash: battery low !
- only led1 on: battery about 50%
- only led2 on: battery about 75%
- LED1 and LED2 on: battery more than 80%

The second function: program mode for upgrading: see point 3: UPGRADING

The third feature: JOIN network:

To protect the RF network, this module still needs to be included in your network.

On the front there are 2 LEDs: When power supply is turned on, first both LEDs will blink, then even lit LED1, followed by LED2 and **only just after** this start-up you can 'join' by keep on pushing until both LED are ON (ca 6 seconds).

3. JOIN MiLo, MEMo1+RF Gateway, MEMo2and 3

JOIN MILO:

Step 1: Go to control panel and enter the serial number according to the set dip switches. (see more about forming the serial number later). Press "JOIN."

Step 2: Open the housing (if already closed) of the BC.002. Turn on the power supply. Now, **after the start-up phase**, press the 'PROGRAM' key (top left on PCB) and keep pressing until BOTH LEDs burn (about 6 seconds).

Step 3: While the MILO is in scan mode (JOIN key must be red), at correct settings and with a correct serial number, the LEDs will blink within 30 seconds, and then extinguish. The module is now linked to the MILO network.

If this does not work within 30seconds, one can make a second attempt. (Repress PROG key until both LEDs burn) If no link succeeds, check the settings (**MILO = FSK !!**)

Check the serial number. It must also match your settings!

SERIENUMMERS in MILO

The 'basic' serial number of the module is 02Bxxx1, the last digit of which is always '1'. For the configuration of MILO, the last digit must be adjusted according to the input selection:

Last digit:

- 1 FOR INPUT1: pulse: MODE = 'COUNTER'
- 2 FOR INPUT2: pulse: MODE = 'COUNTER'
- 3 for INPUT1: time base: MODE = 'TIMEBASE'
- 4 for INPUT2: time base: MODE = 'TIMEBASE'
- 5 FOR INPUT1: THsensor: MODE = 'SENSOR'
- 6 FOR INPUT2: THsensor: MODE = 'SENSOR'

E.g. Module has basic serial number 02B00001

- input1 measures the active time of a fuel oil burner (4000ml/h) = time base 02B00003;
- Input2 counts (gas) pulses (200 pulses/m3) = 02B00002

JOIN MEMO1 + RG.016:

The configuration of the MEMO or RG.016 is not listed here. See memo1

INNOVATE	IN1 ADDRESS	IN	MODE	ADDR	SUBAD	PARA1
IN1 FAN	IN1 EHM020	1	Teller	1	1	L33
IN2 ZAP	IN2 FUJEL	2	Tip	2	2	
IN3 FAN		3	Histabio			
IN4 ZAP	IN4 SENSOR	4	TH sensor	4	41	
IN5 ZAP		5	Histabio			
IN6 ZAP	RF SENSOR HDG1	6	TH sensor	6	21	B00061
IN7 ZAP	RF PULS B061	7	Teller	7	1	B00061
IN8 ZAP	RF PULS	8	Histabio	8	1	B00054

guide

Step 1: To obtain a link with the RG.016, the RG.016 module must be selected in the control panel of the MEMO1. (vb SN 08G00031 and 08G00032)..

Choose a free channel. Give it a free Modbus address. Choose the 'mode' according to the setting of the dipswitches (TB-TEMP).

- For pulse (mode = COUNTER) or time base (mode = TIME), the subaddress is 1 (input 1) or 2 (input 2).
- In the case of temperature (mode = TH SENSOR), the subaddress must consist of 2 digits: The first digit determines the input (1 or 2), the second the number of successive sensors (1 or 2)

Examples:

- 1 sensor, entrance 1: subaddress = 11
- 1 sensor, ingang 2: subadres = 21
- 2 sensors, ingang 1+2: subadres = 12

Under PARA3, the serial number of the BC.002 is filled in, except for the first two digits. (e.g. 02B00031 = B00031)

Under PARA6, the number of pulses/hours or consumption/hour is set.

Example: e.g. 1000 pulses = 1 m3; or yield after 1 hour specify (MODE 4 =time): e.g. consumed 4000ml of heating oil after 1 hour

Once the RG.016 is set, press 'ZEND'. This module will now be in the 'JOIN' mode for 1 minute. (altering LEDs on the RG.016)

Step 2: Bring BC.002 into join mode. The procedure is now the same as described in MILO.

Turn on the power supply of the BC.002. Now, after the start-up phase, press the 'PROGRAM' key (top left on PCB) and keep pressing until BOTH LEDs burn.

While the RG.016 is in scan mode (max 1 minute), at correct settings and with a correct serial number, the LEDs will blink within 60 seconds, and then extinguish. The module is now linked to the MEMO network.

If this does not work within 60 seconds, one can make a second attempt.

(Re-press ZEND at the RG.016, and press PROG key again from BC.002 until both LEDs burn)

If no link is successful, check the settings (FSK or LORA ditto on RG.016 !!)

JOIN MEMO2-3:

The configuration of the MEMO2-3 is not listed here. See MEMO manual for this.

CHANNEL	BC ID	CH	MODE	ADDR	SUBAD	PARA3	LOCITY	PARA6	PARA8	UNIT
IN1	IN1	0001	TH	1				0000		
IN2	IN2	0002	TH	2				0000		

Step 1: To obtain a link with the MEMO, you must add a BC.002 module in the MEMO control panel to 'MODULES', by typing in the serial number and pressing 'new'.

Depending on the DIP switch setting, you choose per channel (line) for the mode 'time', 'counter', or 'TH sensor'. Then you fill in a unique Modbus address for each channel and choose the right unit. In case 'counter' or 'time' you still enter the pulse's value under PARA6: e.g. 1000 pulses = 1 m3; or give up yield after 1 hour (MODE 4 =time): e.g. consumes 4000ml of heating oil after 1 hour

Once the BC.002 is set, one presses 'ZEND'. This module now gives the message 'module NOK'.

Step 2: Bring BC.002 into join mode. The procedure is now the same as described in MILO.

Turn on the power supply of the BC.002. Now, after the start-up phase, press the 'PROGRAM' key (top left on PCB) and keep pressing until BOTH LEDs burn.

Step 3: Now press the green 'module NOK' button and change it to 'join in 30 sec' press 'ZEND' now and if all goes well the green button changes to 'join OK'

The module is now linked to the MEMO network.

If this does not work within 30 seconds, one can make a second attempt. (Re-press ZEND at the BC.002, and press PROG key again from BC.002 until both LEDs burn)

If no link succeeds, check the settings (FSK or LORA on the BC.002!!).

With the Memo 2 ONLY LoRa is possible.

4. UPGRADING: (VIA MILO and MEMO2 POSSIBLE !)

To allow firmware upgrading, the BC.002 must temporarily have a permanent connection to the MILO or MEMO2.. At de MILO, any module that needs to be upgraded will run, with the MEMO2 you have to select the serial number of the BC.002 module and press UPGRADE button. When it's almost the turn of the relevant BC.002, one has to press the PROGRAM key of the BC.002, until the first LED fire. Now release the key immediately. (longer printing and then one comes into the 'JOIN' mode !!) The LEDs will now light up regularly for 3 minutes.

(if the BC.002 was not yet up after 3 minutes, you should press the PROG key again so that it is back in active mode)

When an upgrade has begun, during this time, the first LED will blink.

After upgrading, the new FW version will be shown in the MILO or

memo2..

Note. Disabling the program mode is possible immediately by pressing the program button again until the LEDs are completely off. The module is now back in the sleep mode.

5. BATTERY LIFE

2 batteries 1.5V type AA are required. The lifespan depends on the number of inputs used, the number of pulses/day and the set rhythm.

Below you will find the average consumption of this module: Calculation on average 8660 pulses/day:

When using standard battery 1500mAh = 1200mAh effective.

- Rhythm 60min = approx 5.2 years
- Rhythm 5min = about 2 years

Note. The above calculations are supposed to be with perfect communication of the module. However, several Rx/Tx attempts may be required, so that the 'rhythm consumption' may be higher. The number of pulses/day can be much higher than this example, and then additional updates are automatically performed.

Na. The humidity of the module also plays a role: it can cause greater leakage and and increase the daily consumption of the battery about 10%.

The battery life therefore depends on several factors, but the choice to take a quality battery (e.g. VARTA INDUSTRIAL) deserves the approval.

6. General note:

- Joining sometimes takes several attempts so check serial numbers, distance, DIP switch settings and put the module in 'JOIN' mode.
- Since the inputs are quite high due to the power consumption, there should be no large distances between the impulse giver and the BC.002 module. A length of 2 meters can be acceptable. If a greater distance is required, one must use shielded (audio) cable, and the shielding is connected to a grounding.
- Check out the **CS.400** and **THE US,230** modules with these can be measured operating hours, consuming in an easy way.
- Customer channels visualization : see MiLo and MEMO manual

7. Technical information:

General:

RF frequency: 40 channels 868-869MHz ifv Mac address master
RF modulation: FSK of LORA (via DIP-switch)

Max RF power: +15dBm Transmission Power: 10mW
 Sensitivity: FSK: -105dBm / LORA: -130dBm
 Range indoor/outdoor: FSK: ca 30m/100m; LORA 100m/500m

Operating conditions:

Operating temperature range: 10 °C to 50 °C
 Storage temperature range: -10 °C to 60 °C
 Maximum humidity: 90%, no moisture condensation
 Max. mounting height : 2000m

Physical properties:

Housing: plastic, self-extinguishing acc. UL94-V0
 Degree of protection: IP20, EN 60529
 Installation indoors or in waterproof housing
 Dimensions (h x b x l): 60mm x 60mm x 19mm
 Weight: about 65 grams

Connections:

2 inputs: digital or analog NTC 10k
 • Digital inputs(IN1... 2): potentially free !!
 The BC.002 gives max 5V/1mA, Closed contact (0-logic) is detected at voltage : < 0.7V) . Puls duration: min. 10 ms, max 10 pulses/second
 • **Analog inputs(IN1... 2):** temperature sensor
 NTC 10k range – 15 to +85°C
 Battery: 2x 1.5V type AA, Minimum 1500mAh

Labels:

RoHS: Ricent-toxic, acc. to guidelines WEEE/RoHS
 CE: In accordance with EMC and low voltage directive: HBES – EN 50090-2-2 and EN60950 – 1: 2006.

8. Installation instructions

The installation must be carried out by an approved installer and in accordance with the rules in force.

During installation, account must be taken of (non-exhaustive list):

- the laws, standards and regulations in force.
- the state of the art at the time of installation.
- this manual which only mentions general provisions and must be read in the context of each specific installation.
- the rules of good craftsmanship.

This manual must be attached to the file of the electrical installation. The 2-Wire website always has the latest manual of the product.

9. Support

Do you want to exchange the product in case of a possible defect? Please contact your wholesaler or the 2-wire support service. The contact details can be found on our website www.2-wire.net/contact/

10. Guarantee conditions

The warranty period is two years from delivery date. The date of delivery is the invoice date of purchase of the product by the consumer. If there is no invoice available, the production date applies.

The consumer is obliged to inform Qonnex bvba in writing of the lack of conformity, and this at the latest within two months of adoption.

In the event of a lack of conformity, the consumer is only entitled to a free repair or replacement of the product, which is determined by Qonnex.

Qonnex is not responsible for any defect or damage caused by improper installation, improper or negligent use, improper operation, product transformation, maintenance in violation of maintenance regulations or an external cause such as moisture damage or damage from span.

The mandatory provisions in national legislation on the sale of consumer goods and the protection of consumers in countries where Qonnex sells directly or through distributors, agents or permanent representatives take precedence over the above provisions

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