WIRELESS NETWORK

USER MANUAL

868.3 MHz

RFT-868-MAG

Wireless Magnetic Sensor

Device Specifications
- Power Supply: 3V (1xCR2 battery)
- Current Draw in standby mode: 5.5µA
- Temperature Working Range: -10 ÷ +55°C
- Dimensions (L x W x H): 38 x 24 x 98 mm (device), 19 x 14 x 46 mm (magnetic)

Radio Module TRX Features[1]
- Low Rx power consumption: 10mA.
- Low Tx power consumption: 33mA @+10dBm.
- Low Standby consumption: 4 µA.
- Radio Operative Frequency: 868.3 MHz.
- FSK Modulation.
- Good reception sensitivity: down to -100 dBm at 25 kb/s in FSK.
- Transmit power: 7 dBm
- Packet handling feature with data whitening and automatic CRC generation.
- Incoming sync word recognition.
- Distance coverage: up to 20 m indoors (depending on building materials).
- Effective Radiated Power (ERP): 5mW.

RFTide Network Features
- Wireless mesh network topology.
- Proprietary routing protocol and software application.
- Centrally managed network from a Control Unit.
- Advanced Encryption Standard (AES) of the data.

Typical Applications
- Wireless alarm and security systems.
- Wireless sensor networks.
- Automated Meter reading.
- Home and building automation.
- Industrial monitoring and control.
- Remote wireless control.

Revision History

Date	Version	Revision
15/09/2015	1.0	Initial Release

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[1] *Refer to RFTide Transceiver for mesh network datasheet*
http://www.aurelwireless.com/wp-content/uploads/2015/04/650201380G_sf.pdf

CAUTION

➢ **Read this manual before attempting to install the device!**
- Failure to observe recommendations included in this manual may be dangerous or cause a violation of the law. The manufacturer Udoit Srl will not be held responsible for any loss or damage resulting from not following the instruction of operating manual.
- When handled carelessly or used in non-specified environment conditions, the device may not function properly. It's highly recommended to ensure safety and property protection.
- The RFT-868-MAG is a battery-powered device. Using batteries other than specified may result in explosion. Dispose of properly, observing environmental protection rules.

RFT-868-MAG

DESCRIPTION

The RFT-868-MAG is the RFTide magnetic contact device suitable for doors and windows. Basically, it is composed by a magnetic component, a reed switch and a radio module which is used for the communication through the RFTide network.

The alarm is activated by the reed switch, which reveals the magnetic field changes, and through the radio module it will send the information to the control unit.

That kind of device fits the room and offices requirements, it's easy to mount due to its back plate support and the selectable magnet side. Designed for integrating in every indoor environment, aesthetically likable, compact and solid.

The device is powered by CR2 3V battery and has low current consumption in standby mode. However the status is monitored and once low batteries alarm happens a signal through the RFTide network it's automatically forwarded to the Control Unit.

It's available an auxiliary internal terminal strip where it's possible to connect another contact, which will cause an alarm if it's open contact, if the terminal strip is not used it must be shorted or deactivated from the Control Unit. When the AUX-IN is open a proper notification signal will be sent to the Control Unit.

The device is protected against tampering with a notification signal to the Control Unit.
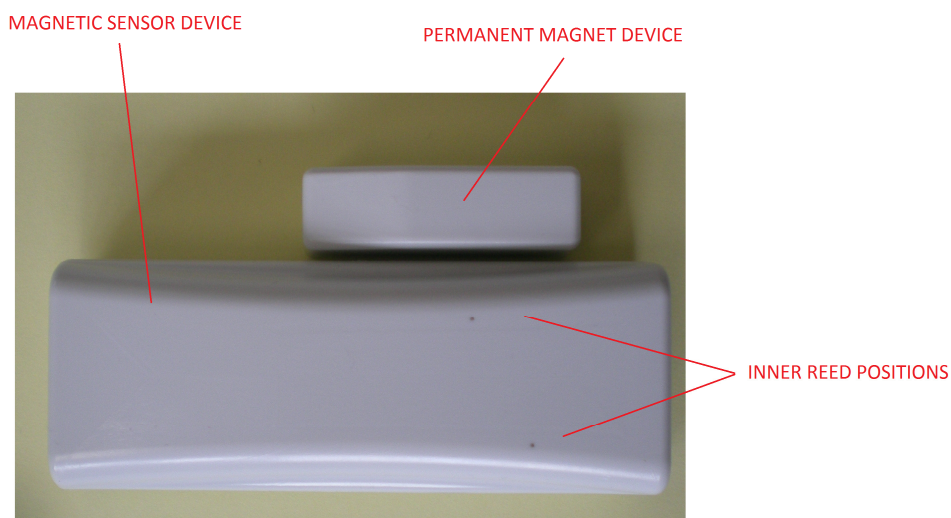
**Figure 1 MAG sensor external view**
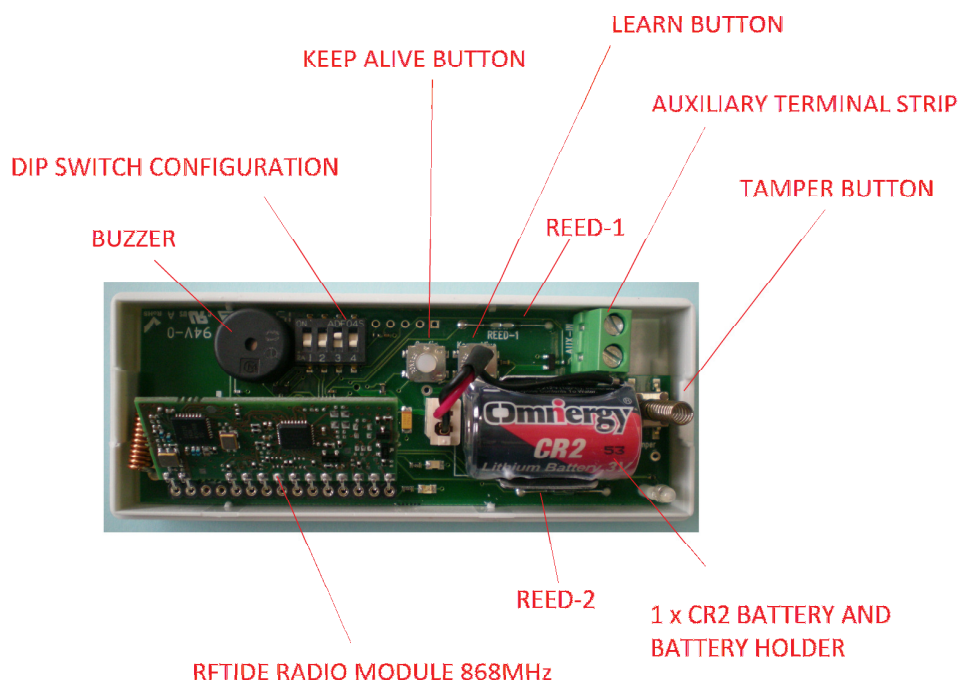
Figure 2 MAG sensor internal view with description

FIRST CONFIGURATION

Referring to Figure 2, these first steps must be followed:

a. Remove the upper cover of the case.

b. As per first configuration, set the dipswitch as follow:
   1. OFF
   2. OFF
   3. ON
   4. OFF

c. Connect the CR2 battery as per Figure 2.

d. Follow the "Learning Procedure" part explained in the chapter *DEVICE SETTINGS* at page 8.

e. For advanced setup refer to Table 1 Dip-switch Configuration at page 9 and to *Advanced Configuration* at page 11 on *DEVICE SETTINGS* chapter.

MOUNTING
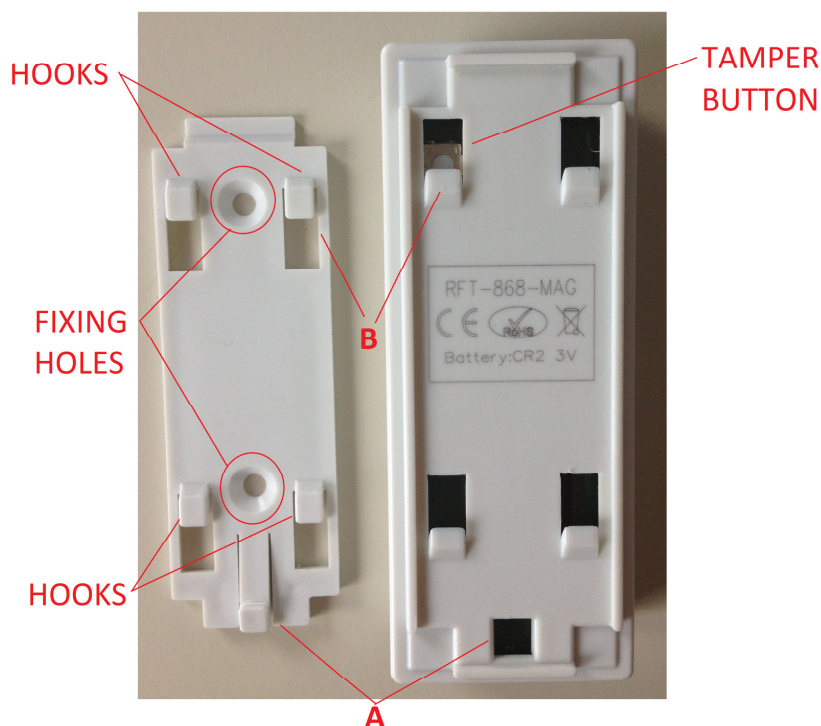
**Figure 3 Bottom side of the RFT-868-MAG and mounting plate**

It's possible to mount the magnetic sensor with its specific support plate as can be seen in Figure 3. During the installation of the module, pay attention to the tamper button (anti-tear) sited in the back of the device: once the mounting plate is settled on the wall/window/door, hook the device on it by sliding on the support, if it's correctly done the tamper button will be kept push. In Figure 3 is the position B. Moreover, the joint between the plate and the device is guaranteed by the hole in position A which allow a stable and accurate lock. As already seen in Figure 1, there're two different reed positions, make sure the magnetic device is close to one of those.

I.   *Mounting Recommandations*

In order to have a correct installation and to avoid false alarms some basic rules must be followed:

- Place the device on a stable surface and not subject to high vibrations (except for the normal use of the door or window).
- Be sure that the mounting plate is correctly fixed with the 2 screws in the fixing holes and the hooks are correctly fixed to the device. If it's not, it's possible to have false tampering alarms.
- Keep the magnetic device close much as possible to the reed switch.

II.   *Installation with auxiliary input*
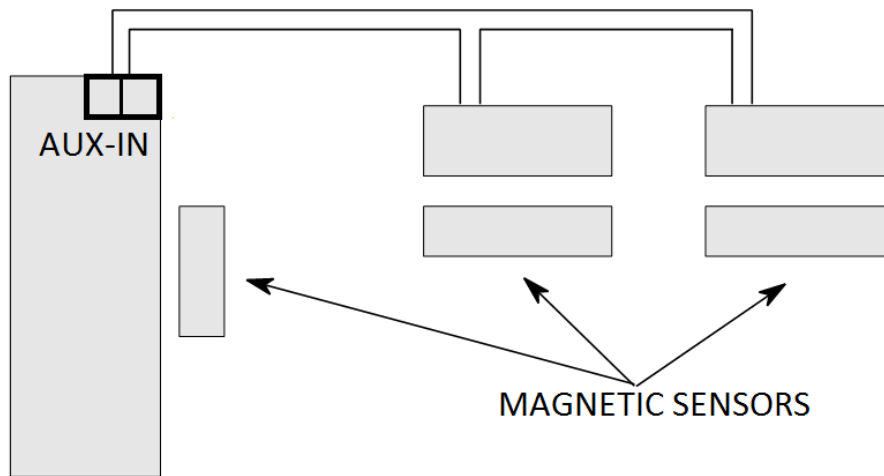
Figure 4 Typical installation and use of the AUX-IN terminal strip

The RFT-868-MAG has a dry input contact AUX-IN to be used as extension to other sensors. In this way the security system composed by the magnetic and the auxiliary sensors can be monitored from the Control Unit.

In Figure 4 an example of installation, another typical installation could be a magnetic sensor in the window and the auxiliary used by the rolling shutter sensor.

The magnetic sensor detects open contact in the terminal strip, it's possible to deactivate the aux-in function using a configuration message from the control unit.

DEVICE SETTINGS

I.   *Learning Procedure*

In order to let the device communicate with the Control Unit of the existing RFTide network the following steps must be done:

1. Keep pushing the Learn button (Figure 2) for about 3 seconds, till a red led turns on.
2. Till 15 seconds, the Control Unit has to send a PROGR_MESSAGE signal to the device. That message must contain the node address which will be assigned to the sensor and the Network ID.
3. If the message is received correctly, the red led must be blinking for a while, then it turns off.

II. *Keep Alive*

Referring to Figure 2, the Keep Alive button permit the device to send instantly a message as follow:

- Command: SEND_PACKET   0x00 0x00
- Destination: Control Unit address   0x[Control Unit ID]
- Payload Byte 0:   PIR Device   0x01
- Payload Byte 1:   Keep Alive message   0x01
- Payload Byte 2÷7. Not used   0x00..0x00

III. *Alarm Status*

In case of alarm, the device sent a message as follow:

- Command: SEND_PACKET   0x00 0x00
- Destination: Control Unit address   0x[Control Unit ID]
- Payload Byte 0:   0x02 (= MAG Device)   0x02
- Payload Byte 1:   0x03 (Alarm message)   0x03
- Payload Byte 2:   Alarm Code   0x[see Table 2]
- Payload Byte 3:   Battery Status   0x[see Table 3]
- Payload Byte 4-5: Not used   0x00 0x00
- Payload Byte 6-7: Alarm Number   0x[Incremental value]

As for every SEND_PACKET message, the RFTide module re-send the message in case that the ANSWER_MESSAGE from the Control Unit it's not received. The sensor will make 2 retry maximum and then goes off after 1 second.

IV. *Configuration Tables*

Dip-switch Configuration		ON	OFF
Dip1	Radio Mode	Continuous radio TX for 1 minute	Normal Status
Dip2	Supervisor	Active	Not Active
Dip3	Select reed side	REED-1 ON REED-2 OFF (see Figure 2)	REED-1 OFF REED-2 ON (see Figure 2)
Dip4	Set magnet	Active	Not Active

Table 1 Dip-switch Configuration

➢ If there're some doubts about the radio coverage of the module, it is possible to put the device in continuous transmission mode for 1 minute with the dip-switch 1 (**Radio Mode**), after that time it will turn back to normal status. To restore the radio mode it's necessary to turn off and then on again.

- To set the supervision of the device it's necessary to turn on the dip-switch 2 (***Supervision***). In this way the radio module will transmit a supervision message every 60 minutes.

- Depending on the type of the support where the device is mounted, it could be necessary select the reed switch with the dip-switch 3 (***Select reed side***).

- During the installation of the device it could be handy a led sensor which allow to understand when the magnetic contact trigger the reed switch. To do so use the dip-switch 4 (***Set magnet***), it turns on a led when the magnet closes the switch and off when it opens. No radio transmission is activated during the process. After 5 minutes the sensor will return in normal mode. To restore the calibration it's necessary to turn off and then on again.

MAG Alarm Code (Byte 2) [1 = Active; 0 = Not Active]	
Bit 0	Reed
Bit 1	Tamper
Bit 2	Anti - Tear (Tamper back button)
Bit 3	Auxiliary
Bit 4	Not used
Bit 5	Not used
Bit 6	Monitoring
Bit 7	Radio Test Mode

Table 2 MAG Alarm Code

Battery Status (Byte 3)	
00000001	Low Level Battery (<2.15V)
00000000	Normal Level Battery(>2.15V)

Table 3 Battery Status

V. <u>*Advanced Configuration*</u>

The RFT-868-MAG has a configuration signal which allows to configure the device remotely.

   a. Referring to Figure 2, push the "Keep Alive" button.

   b. The Control Unit receive a "*Configuration Request*" message. The MAG radio module will stay on for ten seconds, awaiting a response.

- Command: SEND_PACKET   0x00 0x00
- Destination: Control Unit address   0x[Control Unit ID]
- Payload Byte 0:   MAG Device   0x02
- Payload Byte 1:   Conf. request message   0x01
- Payload Byte 2÷7:   Not used   0x00 … 0x00

   c. The Control Unit send a "*Configuration Command*" message.

- Command: SEND_PACKET   0x00 0x00
- Destination: MAG Sensor address   0x[MAG ID]
- Payload Byte 0:   0x02   0x02
- Payload Byte 1:   0x02   0x02
- Payload Byte 2:   Config Data   0x[see Table 4]
- Payload Byte 3÷7:   not used   0x00

The *Config Data* field is composed as follow:

MAG Config Data (Byte 2) [1 = Active; 0 = Not Active]	
Bit 0	Buzzer
Bit 1	Alarm Led
Bit 2	Supervision
Bit 3	AUX-IN
Bit 4	Not used
Bit 5	Not used
Bit 6	Not used
Bit 7	Not used

Table 4 MAG Configuration Data

MAINTENANCE

In order to replace the battery, remove the front plate and place the CR2 battery as per Figure 2. In case of loosing of acid from the battery, remove it and clean the contacts.
Here follows some cases which could be resolved easily:

- ✓ **Buzzer goes on when the battery is inserted in the plug:**
  That's the indicator of the low voltage alarm. The battery need to be replaced and if the radio module is already configured in the RFTide network, the Control Unit will receive a low battery message.

- ✓ **The Control Unit doesn't receive any message from the MAG:**
  There could be a dual problem, to avoid radio issues it's necessary to repeat the learning procedure as described in the *Learning Procedure* section at page 8. Or the configuration of the dip-switch is wrong, see point b of the chapter *FIRST CONFIGURATION* at page 6.

- ✓ **The device can't detect reed alarms:**
  Be sure to have configured the right active reed and do some checks if the magnet is positioned at a correct distance (see Table 1 Dip-switch Configuration).