

## WIRELESS MAGNETIC CONTACT

The magnetic contact wireless MAG HCS is a sensor able to detect opening or closing doors or windows and transmits via radio a alarm signal. It is composed of two distinct elements: a case containing the magnetic contact and electronic card normally placed on the frame of the fixture and a small permanent magnet to fit on the mobile element of the fixture. The working is based on the closing and opening of a sensor capable to operate within a 10-15mm radius from the permanent magnet.

MAG HCS is battery power by (CR2032) supplied and designed to ensure autonomy of 2-3 years, it is always internally

controlled by a meter charge that forwards via radio the battery life time and warns by a beeper and LED, the alarm of discharged battery.

It's available a double auxiliary block terminal independent from internal magnetic contact, where it's possible to connect a second sensor, eg further magnetic contact, sensor for rolling shutters or other type of sensor that uses a free NC contact. Internal electrical card manages this independent contact and the event of case opening and consequent sends a unique radio code.

Other functionalities are: the tamper, which is activated in the event of tampering of the enclosure, the tear can be activated by removing of the sensor installed, a software periodic supervision that communicates via radio the battery status, tamper, magnetic contact independent alarm condition.

The radio protocol is a rolling code type, and unique code programmed in AUREL for each sensor. A LED shows radio transmissions, alarms and test.

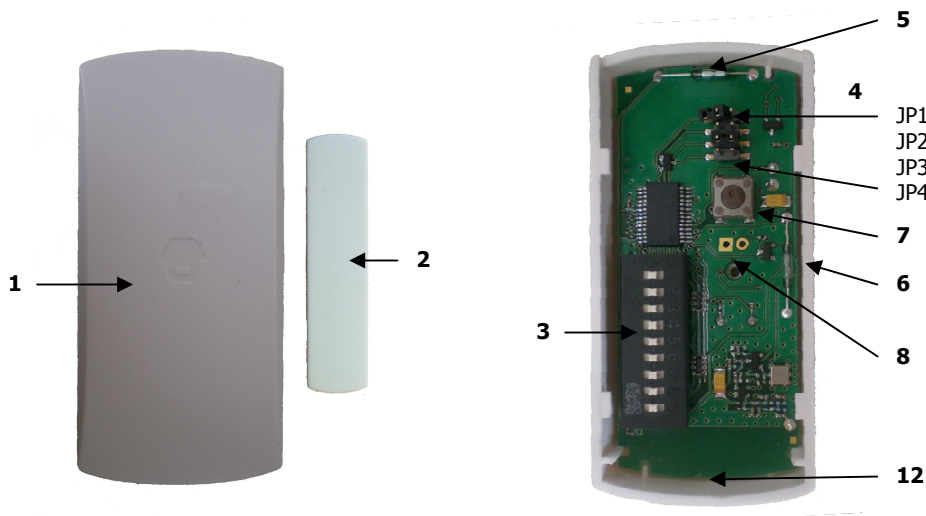


Fig.1 – Sensor and magnet

Fig. 2 – PCB sensor side

- 1) **Sensor**
- 2) **Permanent Magnet**
- 3) **Dip switch:** not assembled in HCS version
- 4) **Jumper 1-4:** Setting mode (see "Sensor Configuration).
- 5) **Reed:** select magnetic contact with open JP3
- 6) **Reed:** select magnetic contact with closed JP3
- 7) **Tamper:** tamper switch
- 8) **Aux In:** AUX INPUT
- 9) **Battery:** batteria mod. CR2032 tipo Litio
- 10) **Buzzer:** Low battery indicator
- 11) **LED:** light signals (see signaling)
- 12) **Antenna:** please do not modify it

\* HCS and Keeloq are brand Microchip

Le caratteristiche tecniche possono subire variazioni senza preavviso. La AUREL S.p.A non si assume la responsabilità di danni causati dall'uso improprio del dispositivo.

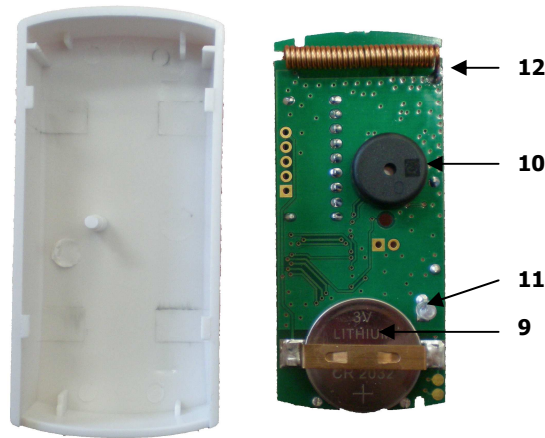


Fig. 3 – battery PCB side

## Sensor configuration

Jumpers allows to setup different operation mode and tests. Do not activate at the same time jumper JP1 and JP2, if you activate jumper JP1, be sure JP2 is not active! After 10 minutes from last jumper status change, sensor configuration mode is off, in order to reset this configuration, take off the battery and insert back after tamper button will press.

JP1	Radio Mode
JP2	Supervision
JP3	Magnetic contac selection
JP4	Magnet setting

Tab.1 – sensor config.

**RADIO MODE:** allows to verify the radio link between sensor and receiver. It's activate once JP1 is closed. Radio transmission works for 30 seconds, then switch on normal works.

**SUPERVISION FUNCTION:** It sends to the receiver side a signal to give a feedback of the status battery and the status of the magnetic, tamper , tear contacts. It's activated from the closing of JP2 contact, it's foreseen a transmission each 60 seconds independent from the alarm signal.

**CALIBRATION OF MAGNETIC SENSOR:** It's a function used during learning procedure of the sensor that helps the installer to place the permanent magnet near the magnetic contact. It is triggered by the closure of JP4 the LED switches on when the magnet closes the magnetic contact and switches off when the contact opens. No radio transmission is activated. After 5 minutes from the starting of the procedure, the sensor will come back to the normal function. To start again the function, disconnect and fit again JP4.

**MAGNETIC CONTACT SELECTION:** allows to select, if both are present, one magnetic contact REED depending from the assembly. Selection is made by JP3 if closed, active contact is the one fitted on the large PCB side, if open is the one fitted on the short PCB side.

JP3 closed	Reed active on large PCB side
JP3 open	Reed active on short PCB side

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**MAIN WORKING:** Normally is activated after the fitting of the battery or when "RADIO MODE" AND "CALIBRATION OF MAGNETIC SENSOR" functions are finished. The sensor sends the status code when there is a variation of the operation, eg opening or closing of any contact (see "SPECIFICATIONS OF THE RADIO CODE"). The led switches on for 100 ms to show the transmission. The time transmission is about 1 sec.

## Acoustic and luminous signal.

are present 1 buzzer and 1 red LED with the following functions:

**BUZZER:** Used to signal low battery and it's activated when the battery voltage drops below 2.35 volts with a duration time of 2-3 seconds.

**LED** is activated for each radio transmissions (alarm, supervisory radio test). If the case of low battery (below 2.35 V), it blinks quickly for 2 seconds every 5 minutes. The calibration function of the magnetic sensor remains on when the magnetic contact is closed.

## Technical features

	Min	Tipico	Max	Unità
Power supply (1)	2.1	3	3.3	V
Current consumption Tx		12	15	mA
Current consumption stand-by	4.0	5.0	6.5	uA
Low battery	2.1	2.25	2.35	Volt
Battery life		2 (1)	3	years
<b>Radio transmission</b>				
Standard frequency OOK modulation	433.82	433.92	434.02	MHz
Modulation		OOK		On-Off Keying
Effected Radiated Power (E.R.P)		0.5	1.0	mW
ERP second harmonic < 1GHz			-36	dBm
ERP third harmonic > 1GHz			-30	dBm
Electromagnetic immunity	10			V/m
<b>Codifica Keeloq</b>				
Serial code		28		bit
Hopping code		32		bit
Hopping combos		2 <sup>32</sup>		-
Working temperature	-10		+55	°C
Case Dimension	70,4 x 33,6 x 17,4			mm

(1) Tipo Litio 3V CR2032

## Radio code features

MAG 4MHCS implements the Microchip's Keeloq rolling code with Aurel manufacturer code, customizable on request. The parameters of the protocol Microchip Keeloq are not disclosed and are available on request. The radio transmitted codes related to different functions of MAG HCS are described below. Consider that the S0-S1-S2-S3 codes refer to the 4-bit encoding used by Keeloq (see the documentation about the Microchip Keeloq):

**MAGNETIC CONTACT:** represented by S3 bit and it has high logic level when the contact is opened or low logic level when the contact is closed.

**TEAR AND TAMPER CONTACT:** they use the same bit S2 and it goes high when one of the two contacts is open. S2 goes low when both are closed.

**AUXILIARY INPUT:** represented by S0 bit and it goes high when the contact is open and low when it's closed.

**RADIO MODE:** all bits (S0-S1-S2-S3) are at "zero" logic level and this function is used for test radio transmission or learning the radio code in the central unit.

**SUPERVISION:** represented by S1 bit it has high logic level once radio code Supervision is emitted

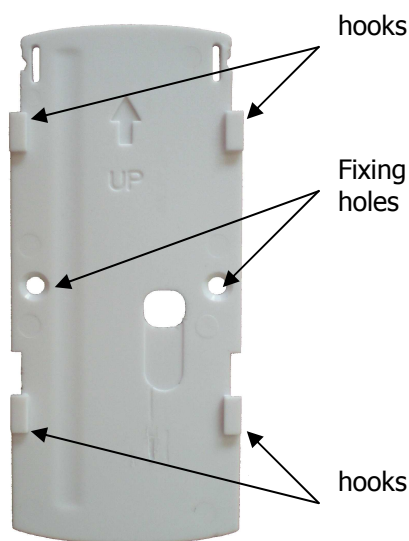


Fig.4 -Back frame

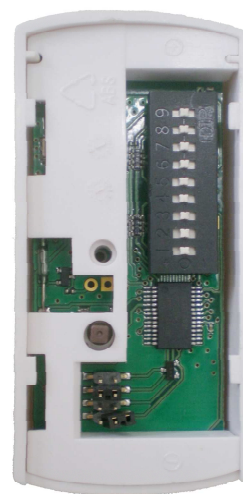


Fig.5 - Back sensor

## Installation:

- 1) Place the back frame (fig. 4) on the fixture making sure to turn the magnetic sensor to the moving part of the frame where the permanent magnet is placed. Then mark the holes printed on the bottom box (see fig. 3), 5-6 mm drill with drill and secure the bottom
- 2) Place the permanent magnet on the mobile part of the fixture trying to match the reference marks in the

case of the sensor and permanent magnet. If the magnet is sufficiently close to the magnetic contact, LED will switch on indicating the closure of the magnetic contact. However, the sensor will not be installed at a distance greater than 30mm from the permanent magnet.

**Learning procedure and radio test:**

Prepare the receiver side in the learning mode.

Activate the "radio mode" of the MAG 4MHCS by closing JP1 and JP2. The radio will operate for about 30 seconds.

Note: The installation of MAG HCS on metal frames can cause radio performance losses. In this case it is advisable to install the magnetic sensor away from screening components and connect an external magnetic contact to the auxiliary input

**Installation with connection to the auxiliary input.**

Il MAG HCS implement intermally a NO contact, usable from a another sensor The figure above shows a typical application of sensors connected in series to help protect a single device with multiple windows. The various contacts must be connected in series, the opening of one of them will cause the alarm. This scheme will not allow the state opening of each frame.

This contact can also be used with any other type of sensor that has a dry contact output NO / NC.

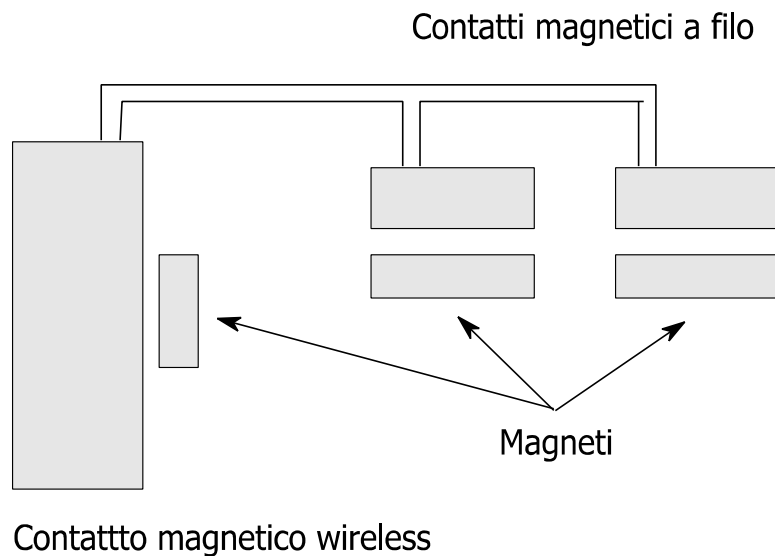


Fig.7 – Principio di utilizzo e collegamento del contatto ausiliario del sensore magnetico

**Battery substitution**

The substitution of the battery must be carried out when the sensor transmits the low battery alarm by radio signal or led or buzzer. However the battery is not completely discharged and will ensure a couple of weeks of working.

To substitute, procede as follow:

remove the top side of the case, replace the 3V mod. CR2032 litium battery being careful to the polarity, see picture number 8. To obtain a higher time life, five years life time batteries are advised. The accidental reversal of polarity of the batteries does not cause the breaking of the circuit and discharging them. In the case of loosing of substances , remove it taking care to not get in contact with them. Throw used batteries in respect of the normative. See the section 'Information for users'.

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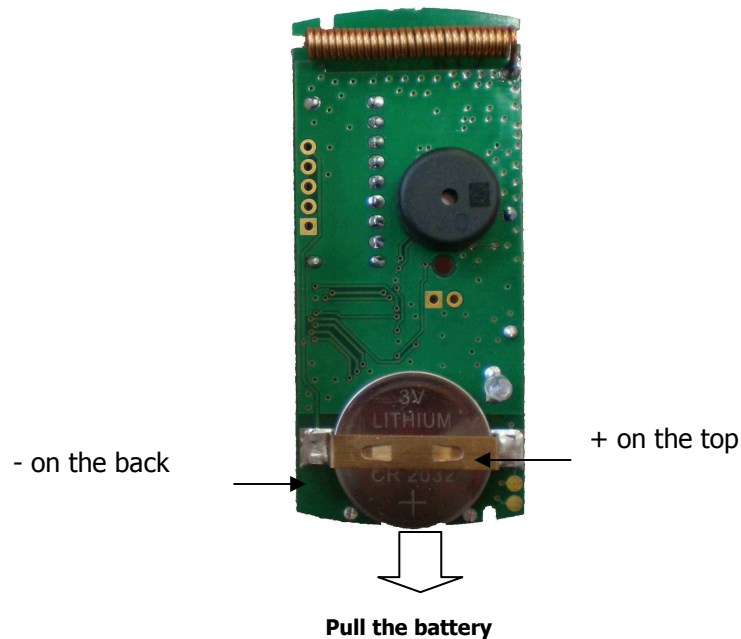


Fig. 8 – battery substitution

### INFORMATION FOR THE CUSTOMER

The product you purchased, must be separately throw and it can not be thrown as municipal waste, as required by Directive 2002/96/EC. Therefore, this system and all its components, subsystems and consumables materials that are part of the product, when you take the decision to discard them, must be thrown to collection centers for proper treatment of waste, according as provided by law. To know where these centers are located, you should ask at the municipal offices.

### CE DECLARATION OF CONFORMITY

The magnetic contact MAG 4MHCS is under the follow normative:

- ETSI EN 301 489-3 V1.4.1 – Electromagnetic compatibility
- ETSI EN 300 220-1 V2.3.1 – Radio features
- EN 60950 – Other features

### CE Reference

In the back of the plastic case that encloses the transmitter is present a label with the identification of the module as those reported here at the left side [product name, manufacturer, voltage supply and current supply].



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