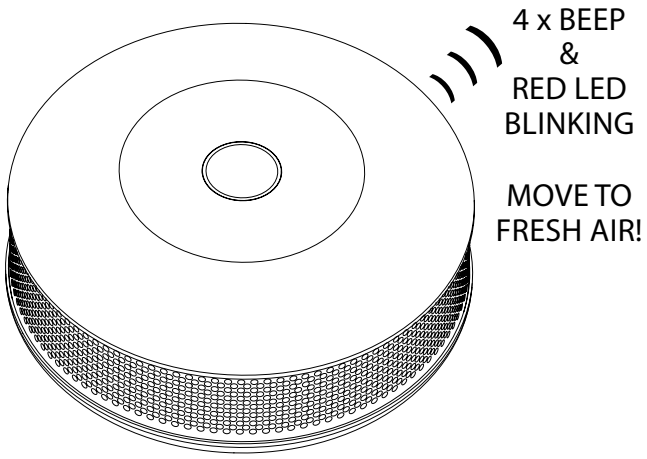
OPERATING
MANUAL

EN



FIBARO CO SENSOR

FGCD-001

CONTENTS

v1.1

Important safety information

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, Fibar Group S.A. will not be held responsible for any loss or damage resulting from not following the instructions of operating manual.

General carbon monoxide information

Carbon monoxide (CO) is a colourless, odourless, and tasteless poison gas that can be fatal when inhaled. It is produced when liquid, solid, or gas fuel is burned.

Symptoms of carbon monoxide poisoning

The early symptoms of carbon monoxide poisoning can be confused with flu-like symptoms: headache, dizziness and nausea. Breathing carbon monoxide causes these symptoms even in healthy people. It can also cause sleepiness, vision problems (including blurred vision), ringing in the ears, aching arms and legs, irregular breathing, fatigue and confusion. At very high levels, it causes loss of consciousness and death.

Some external factors, eg. exposure to high concentration of basic (non-acidic) gases, silicone vapors, hydrogen sulfide or sulfuric acid gas, organic vapors, contact with water, dust and oil mist, or dew condensation **may affect** the reliability of the device operation.

This device **may not** protect from long-term exposure to low levels of carbon monoxide which can also lead to neurological symptoms.

The device **is not** a substitute for appropriate ventilation and exhaust systems.

General information about the FIBARO System

FIBARO is a wireless smart home automation system, based on the Z-Wave protocol. All of available devices can be controlled through a computer (PC or Mac), smartphone or tablet. Z-Wave devices (non-battery powered) are not only receivers, but can also repeat the signal, increasing the Z-Wave network's range. It gives advantage over traditional wireless systems that require direct link between transmitter and receiver, as a result the construction of the building could affect network's range negatively.

Every FIBARO network has its unique identification number (home ID). Multiple independent networks can exist in the building without interfering. Transmission security of FIBARO System is comparable to wired systems.

Z-Wave technology is the leading solution in smart home automation. There is a wide range of Z-Wave devices that are mutually compatible, independently of manufacturer. It gives the system the ability to evolve and expand over time. For more information visit: www.fibaro.com.

#1: Description and features

FIBARO CO Sensor is an ultra-light, compact, battery-powered carbon monoxide detector, designed to be placed on a wall.

Its high sensitivity allows to detect the presence of the carbon monoxide (CO) gas at the early stage in order to prevent carbon monoxide poisoning.

Alarm is signalled with a built-in siren, blinking LED indicator and by sending commands to Z-Wave network devices.

Additionally, the device is equipped with a temperature sensor.

Main features of FIBARO CO Sensor:

- compatible with any Z-Wave or Z-Wave+ Controller
- supports protected mode (Z-Wave network security mode) with AES-128 encryption
- wall-mounted
- battery-powered
- completely wireless
- alarm signalled with a built-in siren and LED diode
- built-in temperature sensor

FIBARO CO Sensor is a fully compatible Z-Wave PLUS device.

NOTE

This device may be used with all devices certified with the Z-Wave Plus certificate and should be compatible with such devices produced by other manufacturers.

NOTE

FIBARO CO Sensor is a Security Enabled Z-Wave Plus product and a Security Enabled Z-Wave Controller must be used in order to fully utilize the product.

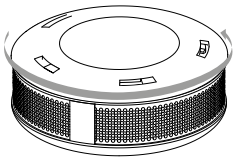
#2: Basic activation

NOTE

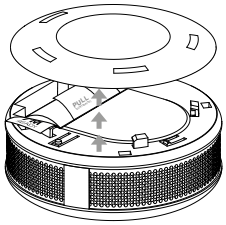
Recommended height of installation is dependant on the purpose of the room and height at which head typically is.

NOTE

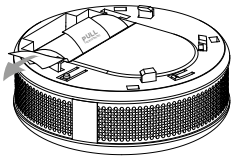
FIBARO CO Sensor may operate as a stand-alone carbon monoxide detector or may be used in cooperation with Z-Wave Controller (eg. FIBARO Home Center) as a part of smart home system.



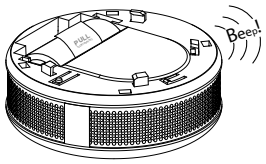
1. Turn the cover counter-clockwise.



2. Take off the cover.



3. Remove the paper strip protecting the battery.



4. Proper powering up will be confirmed with a short beep.

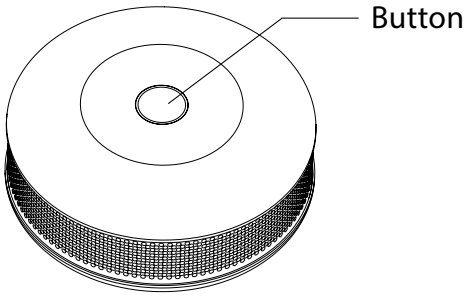
5. Add the device (as described in "Adding/removing the device") if you want to use it in the Z-Wave network.

#3: Adding/removing the device

Adding (Inclusion) - Z-Wave device learning mode, allowing to add the device to existing Z-Wave network.

To add the device:

1. Place the device within direct range of the Z-Wave controller.
2. Set the main Z-Wave controller in (security/non-security) adding mode (see the controller's manual).
3. Quickly, triple click the button located on the casing.



4. Wait for the device to be added into the system.
5. Successful adding will be confirmed by the Z-Wave controller's message.

Removing (Exclusion) - Z-Wave device learning mode, allowing to remove the device from existing Z-Wave network.

To remove the device:

1. Place the device within direct range of the Z-Wave controller.
2. Set the main Z-Wave controller in remove mode (see the controller's manual).
3. Quickly, triple click the button located on the casing.
4. Wait for the removing process to end.
5. Successful removing will be confirmed by the Z-Wave controller's message.

NOTE

Adding in security mode must be performed up to 2 meters from the controller.

NOTE

When powered, the device will indicate Z-Wave status with colour of LED:

- **Green** - the device is already added to the Z-Wave network.
- **Red** - the device is not added to any Z-Wave network.

NOTE

In case the device is not added, please reset the device and repeat the adding procedure.

NOTE

When changing the Sensor's location, it's recommended to wake up the device and reconfigure the Z-Wave network by clicking the button.

NOTE

Removing the device from the Z-Wave network restores all the default parameters of the device.

#4: Physical installation

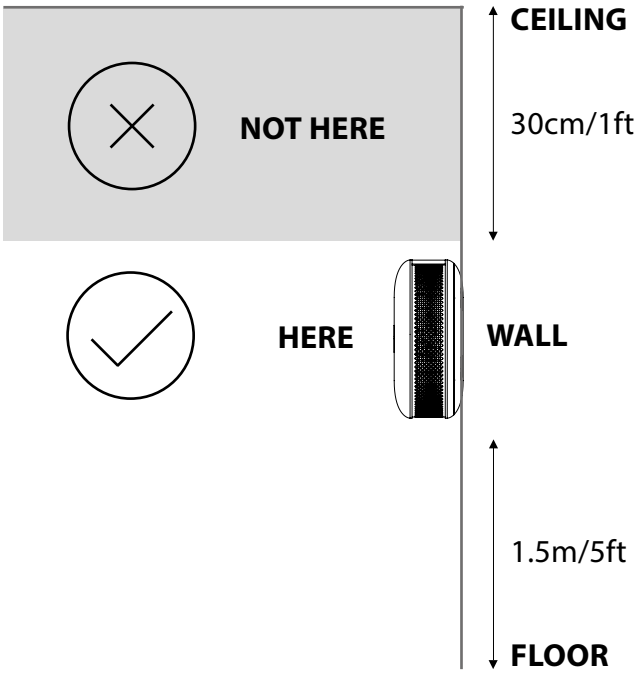
READ BEFORE INSTALLATION AND HEED ALL THE WARNINGS!

- The device **should** be installed below the ceiling level.
- The device **should** be installed on the wall, at least 30 cm (1 ft) away from the corners.
- The device **should not** be installed: in a bathroom, next to heat sources, within range of kids, obstructed from possible carbon monoxide sources, in direct sunlight.
- The device **should** be installed by a qualified installator.
- Do **not** paint the device.
- The device **should** be cleaned with a slightly damp cloth or moistened tissue.

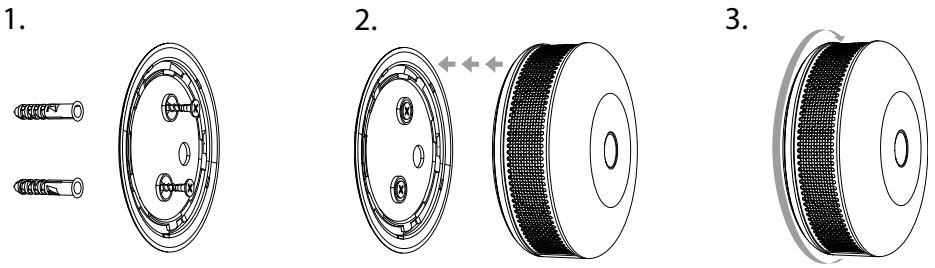
NOTE

Recommended height of installation is dependant on the purpose of the room and height at which head typically is.

Place of installation:



Installation on the wall:



1. Mount the cover on a wall.
2. Attach the device to its cover.
3. Turn the device clockwise to close it.

#5: Operating the device

Menu allows to perform Z-Wave network actions. In order to use the menu:

1. Press and hold the button for 3 seconds
2. You should hear a short signal while the LED diode blinks white.
3. Release the button.
4. Wait for the device to indicate desired menu position with a colour:
   - **White** - confirm the start of the firmware update process
   - **Green** - send the current state of CO Alarm
   - **Magenta** - Z-Wave network's range test
   - **Yellow** - the device reset
5. Press the B-Button to confirm selection.

Waking up the device:

The CO Sensor needs to be woken up to receive information about the new configuration from the Z-Wave controller, like parameters and associations. To wake up the sensor manually click the button located on the casing.

Self-test:

1. Press and hold the button.
2. The LED indicator will glow white and you will hear a short beep.
3. Release the button when you hear the first alarm sequence.
4. Move away from the device to protect your hearing.

If the self-test procedure does not result in emitting sound and red light signal, replace the device.

Resetting the device to factory defaults:

Reset procedure allows to restore the device back to its factory settings, which means all information about the Z-Wave controller and user configuration will be deleted.

1. Press and hold the button.
2. Release the button when LED indicator glows white.
3. Click the button when LED indicator glows yellow.
4. After few seconds the device will be reset (confirmed by red LED indicator).

CAUTION

The alarm is very loud! Only the first alarm sequence is quieter.

NOTE

Resetting the device is not the recommended way of removing the device from the Z-Wave network. Use the reset procedure only if the primary controller is missing or inoperable. Certain device removal can be achieved by the procedure of removing described in "Adding/removing the device" on page 5.

#6: Visual indications & acoustic signals

Indications and signals:

The CO Sensor is equipped with a LED diode and a buzzer, signalling menu position and status of the device.

Device status indications:

What you hear	What you see	What it means	What to do
4 x BEEP every 5s	**4 x RED BLINK every 5s**	**Detected presence of carbon monoxide which can kill you!**	**1. Open the windows 2. Move to fresh air! 3. Contact emergency services**
1 x BEEP	1 x YELLOW BLINK every 30s	Low battery level	Replace the battery
1 x BEEP every 30s	–	Sensor error (does not detect carbon monoxide)	Reset the device, replace if no effect
2 x BEEP	2 x CYAN BLINK every 30s	End of lifespan	Reset the device, replace if no effect
3 x BEEP every 30s	1 x BLUE BLINK every 30s	Heat alarm	Be cautious of fire
1 x BEEP	1 x WHITE BLINK	Tamper alarm	Check the housing
–	1 x GREEN BLINK after button press	Device powered	–
1 x BEEP	1 x GREEN BLINK after powering	Added to Z-Wave	–
1 x BEEP	1 x RED BLINK after powering	Not added to Z-Wave	–
1 x BEEP	1 x MAGENTA BLINK every 10min	Out of range	Check the Z-Wave range
–	CYAN BLINKING	Firmware update	Wait for completion

NOTE

Replace the device before date on the front or if sensor error is detected.

#7: Battery

FIBARO CO Sensor can be powered with CR123A (included) battery. Estimated battery life with device on default settings is 3 years (tested with Panasonic Industrial Lithium).

Checking battery level:

FIBARO CO Sensor automatically warns about low battery with one yellow blink and a short beep, when battery level is low.

Replacing the battery:

1. Remove the device from the cover by turning it counter-clockwise.
2. Pull the paper strip to take out the battery.
3. Press and hold the button for at least one second.
4. Insert a new CR123A battery observing the polarities shown inside.
5. Attach the device to its cover by turning it clockwise and perform the test (as described in #5: Operating the device).

CAUTION

Using batteries other than specified may result in explosion. Dispose of properly, observing environmental protection rules.

CAUTION

Use only type of battery specified in this manual and keep proper polarity!

#8: Associations

NOTE

Association ensures direct transfer of control commands between devices, is performed without participation of the main controller and requires associated device to be in the direct range.

NOTE

2nd and 4th association groups use BASIC CC, but the device does not repond to GET commands.

Association (linking devices) - direct control of other devices within the Z-Wave system network e.g. Dimmer, Relay Switch, Roller Shutter or scene (may be controlled only through a Z-Wave controller).

The device provides the association of six groups:

1st association group – "Lifeline" reports the device status and allows for assigning single device only (main controller by default).

2nd association group – "CO Alarm" is assigned to the device status - devices in this group will be switched on/off when CO Alarm status changes.

3rd association group – "CO Alarm" is assigned to the device status - devices in this group will receive notification when CO Alarm status changes. Useful for devices that can trigger alarms.

4th association group – "CO Level" is assigned to measured CO level - devices in this group will be switched on/off after exceeding the level of CO concentration specified in parameter 14.

5th association group – "Tamper Alarm" is assigned to the tamper - sends tamper alarm and cancellation frames to the associated devices.

6th association group – "CO Alarm BC" is assigned to the device status - devices in this group will be switched on/off when CO Alarm status changes. Provides backward compatibility with controllers not supporting Z-Wave+ protocol.

7th association group – "Tamper Alarm BC" is assigned to the tamper - sends tamper alarm and alarm cancellation frames to the associated devices. Provides backward compatibility with controllers not supporting Z-Wave+ protocol.

The CO Sensor in 2nd to 7th group allows to control 5 regular or multichannel devices per an association group. "LifeLine" group is reserved solely for the controller and hence only 1 node can be assigned.

It is not recommended to associate more than 10 devices in general, as the response time to control commands depends on the number of associated devices. In extreme cases, system response may be delayed.

To add an association (using the Home Center controller):

1. Go to the device options by clicking the icon:
2. Select the „Advanced" tab.
3. Click the "Setting Association" button.
4. Specify to which group and what devices are to be associated.
5. Save the changes.
6. Press the button to wake up the device.

Notification report:

The device uses Notification Command Class to report different events to 1st association group (Lifeline).

Notification Type	Triggering Event
CO Alarm	1. Carbon monoxide detected, unknown location 2. Carbon monoxide test 3. Replacement required
Heat Alarm	Overheat detected, unknown location
Home Security	Tampering, product covering removed
Power Management	Replace battery soon
System	System hardware failure

#9: Advanced parameters

NOTE

Entering invalid value of parameter will result in response with Application Rejected frame and not setting the value.

The CO Sensor allows to customize its operation to user's needs. The settings are available in the FIBARO interface as simple options that may be chosen by selecting the appropriate box.

In order to configure the CO Sensor (using the Home Center controller):

1. Go to the device options by clicking the icon:
2. Select the „Advanced" tab.
3. Modify values of chosen parameters.
4. Save the changes.
5. Press the button to wake up the device.

Wake up interval

Available settings: **0** or **3600-43200** (in seconds, 1h - 12h)

Default setting: **21 600** (every 6 hours)

The CO Sensor will wake up at each defined time interval and always try to connect with the main controller. After successful communication attempt, the device will update configuration parameters, associations, settings and then will go into Z-Wave communication standby.

After failed communication attempt (eg. no Z-Wave range) the device will go into Z-Wave communication standby and retry to establish connection with the main controller after the next time interval.

Setting wake up interval to 0 disables sending Wake Up notification to the controller automatically. Wake up may be still performed manually using the button.

Longer time interval means less frequent communication and thus a longer battery life.

2. Z-Wave notifications

This parameter allows to set the actions which result in sending notifications to the Z-Wave network controller.

Available settings:	**0** - both actions disabled **1** - tampering (opened casing) **2** - exceeding the temperature **3** - both actions enabled		
Default setting:	**0**	Parameter size:	**1** [byte]

3. LED diode indications

This parameter allows to set the actions which result in LED diode indications. This parameter does not apply to the most important actions, such as CO Alarm, Malfunction Alarm and Low Battery Alarm.

Available settings:	**0** - all actions disabled **1** - tampering (opened casing) **2** - exceeding the temperature **4** - lack of Z-Wave range		
Default setting:	**0**	Parameter size:	**1** [byte]

NOTE

Parameter 3 values may be combined, e.g. 1+2+4=7 means that all actions will be active.

4. Acoustic signals

This parameter allows to set the actions which result in acoustic signals. This parameter does not apply to the most important actions, such as CO Alarm, Malfunction Alarm and Low Battery Alarm.

Available settings:	**0** - all actions disabled **1** - tampering (opened casing) **2** - exceeding the temperature **4** - lack of Z-Wave range		
Default setting:	**0**	Parameter size:	**1** [byte]

NOTE

Parameter 4 values may be combined, e.g. 1+2+4=7 means that all actions will be active.

7. Associations in Z-Wave network security mode

Parameter defines how commands are sent in specified association groups: as secure or non-secure. Parameter is active only in Z-Wave network security mode. It does not apply to 1st "Lifeline" association group.

Available settings:	**1** - 2nd group sent as secure **2** - 3rd group sent as secure **4** - 4th group sent as secure **8** - 5th group sent as secure **16** - 6th group sent as secure **32** - 7th group sent as secure		
Default setting:	**63**	Parameter size:	**1** [byte]

NOTE

Parameter 7 values may be combined, e.g. 1+2=3 means that 2nd & 3rd group are sent as secure.

10. Commands sent to 2nd association group (CO Alarm)

This parameter defines commands sent to devices associated in 2nd association group (CO Alarm). Values of specified commands may be set in parameters 11 and 12.

Available settings:	**1** - BASIC ON **2** - BASIC OFF **3** - BASIC ON & BASIC OFF		
Default setting:	**3** (ON & OFF)	Parameter size:	**1** [byte]

11. Value of BASIC ON command sent to 2nd association group

This parameter defines the value of BASIC ON command sent to devices in 2nd association group after the CO Alarm activation.

Available settings:	**0-99** or **255**		
Default setting:	**255** (turn on)	Parameter size:	**2** [bytes]

NOTE

Setting parameters 11-12 to appropriate value will result in:

0 - turning associated devices off

1-99 - forcing level of associated devices

255 - setting associated devices to the last remembered state or turning them on

12. Value of BASIC OFF command sent to 2nd association group

This parameter defines the value of BASIC OFF command sent to devices in 2nd association group after the CO Alarm cancellation.

Available settings:	**0-99** or **255**		
Default setting:	**0** (turn off)	Parameter size:	**2** [bytes]

13. Commands sent to 4th association group (CO Level)

This parameter defines commands sent to devices associated in 4th association group (CO Level). Values of specified commands may be set in parameters 16 and 19.

Available settings:	**1** - BASIC ON **2** - BASIC OFF **3** - BASIC ON & BASIC OFF		
Default setting:	**3** (ON & OFF)	Parameter size:	**1** [byte]

NOTE

Parameter 14 value must be at least 5 ppm higher than parameter 17 value.

14. CO level required for sending BASIC ON command to 4th association group

This parameter defines the minimum level of CO concentration which exceeding will result in starting the timer set in parameter 15.

Available settings:	**25-400** - CO concentration level in ppm		
Default setting:	**40** (40 ppm)	Parameter size:	**2** [bytes]

15. Time required for sending BASIC ON command to 4th association group

This parameter defines the time during which the level of CO concentration should remain above the value set in parameter 14 to send the BASIC ON command to 4th association group.

Available settings:	**0** - immediate sending of BASIC ON command **1-2880** (30s - 24h, in 30s steps)		
Default setting:	**0**	Parameter size:	**2** [bytes]

NOTE

Setting parameter 16 to appropriate value will result in:

0 - turning associated devices off

1-99 - forcing level of associated devices

255 - setting associated devices to the last remembered state or turning them on.

16. Value of BASIC ON command sent to 4th association group

This parameter defines the value of BASIC ON command sent to devices in 4th association group after exceeding the CO level set in parameter 14 through the time set in parameter 15.

Available settings:	**0-99** or **255**		
Default setting:	**255** (turn on)	Parameter size:	**2** [bytes]

NOTE

Parameter 17 value must be at least 5 ppm lower than parameter 14 value.

17. CO Level required for sending BASIC OFF command to 4th association group

This parameter defines the level of CO concentration below which falling will result in sending the BASIC OFF command to 4th association group.

Available settings:	**10-400** - CO concentration level in ppm		
Default setting:	**25** (25 ppm)	Parameter size:	**2** [bytes]

19. Value of BASIC OFF command sent to 4th association group

This parameter defines the value of BASIC OFF command sent to devices in 4th association group after falling below the CO level set in parameter 17.

Available settings:	**0-99** or **255**		
Default setting:	**0** (turn off)	Parameter size:	**2** [bytes]

20. Temperature reporting time interval

Time interval (in seconds) between consecutive reports of temperature (done by built-in temperature sensor). Short time interval means more frequent communication, which results in shortened battery life.

Available settings:	**0** - no periodical reports **10-1440** (5min - 12h, in 30s steps)		
Default setting:	**0**	Parameter size:	**2** [bytes]

21. Temperature reporting hysteresis

This parameter defines a minimum change in temperature resulting in a report being sent to the main Z-Wave controller.

Available settings:	**1-20** (0.5°C - 10°C, each 0.5°C)		
Default setting:	**2 (**1°C)	Parameter size:	**1** [byte]

22. Threshold of exceeding the temperature

This parameter defines the temperature level, which exceeding will result in sending actions set in parameters 2, 3 and 4.

Available settings:	**1-85** (1°C - 85°C, each 1°C)		
Default setting:	**55** (55°C)	Parameter size:	**1** [byte]

23. CO meter activation

This parameter activates reporting the value of CO concentration level to the main Z-Wave controller.

Available settings:	**0** - disabled **1** - enabled		
Default setting:	**1** (enabled)	Parameter size:	**1** [byte]

25. CO level reporting hysteresis

This parameter defines a minimum change in CO concentration level which results in sending a new value to the main Z-Wave controller.

Available settings:	**2-6** (10 ppm - 30 ppm, each 5 ppm)		
Default setting:	**2** (10 ppm)	Parameter size:	**1** [byte]

26. Threshold of CO meter activation

This parameter defines the CO concentration level, which exceeding will result in sending a new value to the main Z-Wave controller, according to parameter 25 settings. Adjusting the value allows to get the accurate data in case of danger and helps to save the battery in normal conditions.

Available settings:	**10-255** (ppm)		
Default setting:	**30** (30 ppm)	Parameter size:	**2** [bytes]

NOTE

Setting parameter 19 to appropriate value will result in:

0 - turning associated devices off

1-99 - forcing level of associated devices

255 - setting associated devices to the last remembered state or turning them on.

NOTE

Values received by the controller may be used for graphs of CO concentration level.

NOTE

Parameter 25 is closely related to parameter 26.

#10: Specifications

CAUTION

Using batteries other than specified may result in explosion. Dispose of properly, observing environmental protection rules.

NOTE

Replace the device before date on the front or if sensor error is detected.

NOTE

Radio frequency of individual device must be same as your Z-Wave controller. Check information on the box or consult your dealer if you are not sure.

Power supply:	CR123A 3.0V battery (included)
Battery life:	3 years on default settings (tested with Panasonic Industrial Lithium)
Lifespan under typical conditions:	8 years
CO concentration measurement range:	0 - 450 ppm
Measuring accuracy:	±10ppm / ±5%
Alarm response times on default settings:	50ppm 60-90min 100ppm 10-40min 300ppm <1.5min
Alarm siren sound level:	85 dBA at 3 meters (10 feet)
Operating temperature:	0 - 50°C
Operating humidity:	10-95%RH without condensation
EU directives compliance:	R&TTE 1999/5/EC RoHS 2011/65/EU EN 60950-1
Radio protocol:	Z-Wave (500 series chip)
Radio frequency:	868.4, 868.42 or 869.8 MHz EU; 908.4, 908.42 or 916.0 MHz US; 921.4, 921.42 or 919.8 MHz ANZ; 869.0 or 869.02 MHz RU;
Range:	up to 50m outdoors up to 40m indoors (depending on terrain and building structure)
Dimensions (d x h):	65 x 28 mm

#11: Regulations

This device complies with Part 15 of the FCC Rules

Operation is subject to the following two conditions:
1. This device may not cause harmful interference
2. This device must accept any interference received, including interference that may cause undesired operation. This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Industry Canada (IC) Compliance Notice

This device complies with Industry Canada license-exempt RSSs. Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Cet appareil est conforme aux normes d'exemption de licence RSS d'Industry Canada. Son fonctionnement est soumis aux deux conditions suivantes : (1) cet appareil ne doit pas causer d'interférence et (2) cet appareil doit accepter toute interférence, notamment les interférences qui peuvent affecter son fonctionnement.

Legal Notices

All information, including, but not limited to, information regarding the features, functionality, and/or other product specification are subject to change without notice. Fibaro reserves all rights to revise or update its products, software, or documentation without any obligation to notify any individual or entity.
FIBARO and Fibar Group logo are trademarks of Fibar Group S.A. All other brands and product names referred to herein are trademarks of their respective holders.

Note

Changes and modifications not expressly approved by the manufacturer or registrant of this equipment can void your authority to operate this equipment under Federal Communications Commission's rules.

DGT Warning Statement

Article 12

Without permission, any company, firm or user shall not alter the frequency, increase the power, or change the characteristics and functions of the original design of the certified lower power frequency electric machinery.

Article 14

The application of low power frequency electric machineries shall not affect the navigation safety nor interfere a legal communication, if an interference is found, the service will be suspended until improvement is made and the interference no longer exists.

第十二條
經型式認證合格之低功率射頻電機，非經許可，公司、商號或使用者均不得擅自變更頻率、加大功率或變更原設計之特性及功能。
第十四條

低功率射頻電機之使用不得影響飛航安全及干擾合法通信；經發現有干擾現象時，應立即停用，並改善至無干擾時方得繼續使用。
前項合法通信，指依電信法規定作業之無線電通信。
低功率射頻電機須忍受合法通信或工業、科學及醫療用電波輻射性電機設備之干擾。

Information according REACH

The included Panasonic CR123A battery contains 1,2-Dimethoxyethane substance. Normal use of the device does not expose the user to a given substance.

Declaration of conformity

Hereby, Fibar Group S.A. declares that FIBARO CO Sensor is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC.