OUR SALES NETWORK IN EUROPE

AUSTRIA - Carlo Gavazzi GmbH
Ketzergasse 374, A-1230 Wien
Tel: +43 1 888 4112
Fax: +43 1 889 10 53
office@carlogavazzi.at

BELGIUM - Carlo Gavazzi NV/SA
Schaarbeeklei 213/3, B-1800
Vilvoorde
Tel: +32 2 257 4120
Fax: +32 2 257 41 25
sales@carlogavazzi.be

DENMARK - Carlo Gavazzi Handel A/S
Over Hadstenvej 40, DK-8370
Hadsten
Tel: +45 89 60 6100
Fax: +45 86 98 15 30
handel@gavazzi.dk

FINLAND - Carlo Gavazzi OY AB
Petaksentie 2-4, FI-00661 Helsinki
Tel: +358 9 756 2000
Fax: +358 9 756 20010
myynti@carlogavazzi.fi

FRANCE - Carlo Gavazzi Sarl
Zac de Paris Nord II, 69, rue de
la Belle Etoile, F-95956 Roissy
CDG Cedex
Tel: +33 1 49 38 98 60
Fax: +33 1 48 63 27 43
french.team@carlogavazzi.fr

GERMANY - Carlo Gavazzi GmbH
Pfnorstr. 10-14
D-64293 Darmstadt
Tel: +49 6151 81000
Fax: +49 6151 81 00 40
info@gavazzi.de

GREAT BRITAIN - Carlo Gavazzi UK ltd
7 Springlakes Industrial Estate,
Deadbrook Lane, Hants GU12
4UH, GB-Aldershot
Tel: +44 1 252 339600
Fax: +44 1 252 326 799
sales@carlogavazzi.co.uk

ITALY - Carlo Gavazzi SpA
Via Milano 13, I-20020 Lainate
Tel: +39 02 931 761
Fax: +39 02 931 763 01
info@gavazziacbu.it

NETHERLANDS - Carlo Gavazzi BV
Wijkermeerweg 23,
NL-1948 NT Beverwijk
Tel: +31 251 22 9345
Fax: +31 251 22 60 55
info@carlogavazzi.nl

NORWAY - Carlo Gavazzi AS
Melkeveien 13, N-3919 Porsgrunn
Tel: +47 35 93 0800
Fax: +47 35 93 08 01
gavazzi@carlogavazzi.no

PORTUGAL - Carlo Gavazzi Lda
Rua dos Jerónimos 38-B,
P-1400-212 Lisboa
Tel: +351 21 361 7060
Fax: +351 21 362 13 73
carlogavazzi@carlogavazzi.pt

SPAIN - Carlo Gavazzi SA
Avda. Iparraguirre, 80-82,
E-48940 Leioa (Bizkaia)
Tel: +34 94 480 4037
Fax: +34 94 480 10 61
gavazzi@gavazzi.es

SWEDEN - Carlo Gavazzi AB
 Va Kyrkogatan 1,
S-652 24 Karlstad
Tel: +46 54 85 1125
Fax: +46 54 85 11 77
info@carlogavazzi.se

SWITZERLAND - Carlo Gavazzi AG
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Sumpfstrasse 32,
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Tel: +41 41 747 4535
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CANADA - Carlo Gavazzi Inc.
2660 Meadowvale Boulevard,
CDN-Mississauga Ontario L5N 6M6,
Tel: +1 905 542 0979
Fax: +1 905 542 22 48
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Calle La Montaña no. 28, Fracc. Los Pastores
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Tel: +65 67 466 990
Fax: +65 67 461 980

MALAYSIA - Carlo Gavazzi Automation (M) SDN. BHD.
D12-06-G, Block D12,
Pusat Perdagangan Dana 1,
Jalan PJU 1A/46, 47301 Petaling
Jaya, Selangor, Malaysia.
Tel: +60 3 7842 7299
Fax: +60 3 7842 7399

CHINA - Carlo Gavazzi Automation (China) Co. Ltd.
Rm. 2308 - 2310, 23/F.,
News Building, Block 1,
1002 Shennan Zhong Road,
Shenzhen, China
Tel: +86 755 83699500
Fax: +86 755 83699300

HONG KONG - Carlo Gavazzi Automation Hong Kong Ltd.
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HEADQUARTERS

Carlo Gavazzi Automation SpA
Via Milano, 13 - I-20020
Lainate (MI) - **ITALY**
Tel: +39 02 931 761
info@gavazzi-automation.com

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IRS
Long Range Motion Radar Sensor

Quick Start Guide

Sense

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Long Range Motion Radar Sensor

IRS Series

IRS01

IRS Long range sensor is a digital unidirectional motion sensor for trouble-free opening of all types of industrial automatic doors. It can be adapted to every application without further accessories and can be controlled by an infrared remote controller. Mounting height up to 7m (23ft) to detect vehicle or person motion towards or away from the sensor. Like most of other microwave detectors equipped with planar flat antenna, the sensor works on echo doppler signal for detecting movements.

⚠ Safety Notes

Read Instructions!
Before working with this unit, read these instructions carefully and completely. Make sure that you have understood all the information!

Disconnect sensor from supply network
Before any installation, maintenance or modification work: Disconnect your sensor from the supply network. Ensure that cannot be re-connected inadvertently!

Before start of operation ensure appropriate installation
Warning! Improper installation / operation impair safety and result in operational difficulties or complete failure of the unit.
The unit must be installed and put into service appropriately by qualified personnel. Compliance with the relevant regulations must be ensured.
With stranded wires: all strands must be secured in the terminal blocks (potential danger of short circuit).

In operation: No modifications!
As long as the unit is in operation: do not modify the installation! The same applies also to the secondary side.
- The unit must not be opened except appropriately trained personnel!
- Do not introduce any object into the unit!
- Keep away from fire and water!
- The unit is a motion sensor, and thus still requires some type of presence sensing device for most applications (ie. Safety beams, overhead infrared curtain, etc.).
- The housing of the sensor shall be concealed within a NEMA-4 type-rated enclosures and is extremely reliable in abusive environments, but not necessarily vehicular traffic.

FCC warnings
Changes or modifications made to this equipment not expressly approved by CARLO GAVAZZI may void the FCC authorization to operate this equipment.

IMPORTANT NOTE
IRS is a motion detector, and thus still requires some type of presence sensing device for most applications (ie. Safety beams, overhead infrared curtain, etc.).

Box Content

- Motion Radar Sensor
- Connecting cable
- Screws and anchor fixing set
- Instruction manual

Ordering Key — IRS 01
- Type
- Detection mode
- Options

Accessory — IRS 00 RC
- Type
- IR remote

General Data

Sensing field orientation	by housing orientation
Detection angle	±45° vertical and lateral
Detecting area	see the "maximum field extension" pictures
Detection mode	
Unidirectional	to detect motions towards **or** away from sensor
Bidirectional	to detect motions towards **and** away from sensor
Motion detecting speed	0.05 - 3.0m/s (0.164 - 6.56fps) along sensor axis
Frequency emitted	(K-Band) 24.125GHz

Environmental Data

Temperature range	-20°C to +60°C (-4°F to +140°F)
Humidity	from 0% to 90%RH
Immunity	R&TTE 1999/5/EC EMC 2004/108/EEC
Mounting height	2.5m to 7m (8.20ft to 22.96ft)
Protection degree	IP65, NEMA-4

Electrical data

Radiated power	< 16dBm EIRP
Rated supply voltage	12 – 24VAC ±10% 12 – 32VDC Powered by Class 2 or LVE transformer
Main frequency	50 to 60HZ
Power consumption	< 1.2W
Output Relays	2 x SPDT
Rated Voltage	30VAC/DC
Max switching current	1A (resistive load)
Max switching power	30W (resistive load)
Hold time	0.5 – 6s (adjustable)

Mechanical data

Housing Material	Aluminium with plastic junction box
Dimensions WxHxD	137 x 188 x 91.5mm (5.39 x 7.40 x 3.6inch.)
Weight	300g (10.58oz)
Cable length	5m (16.4ft)
Colour	Black

Approvals

CE 0682 FC c UL us

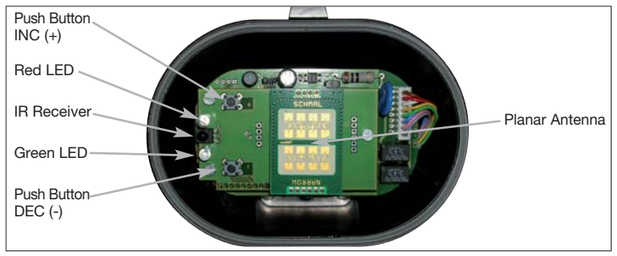
Trade Name: **Carlo Gavazzi Logistics S.p.A.**
via Milano 13, I-20020 Lainate (MI)

Model No: IRS01

FCC ID: U7PIRS01
IC: 7118A-IRS01

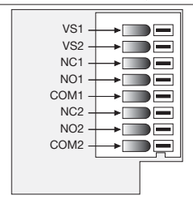
This device complies with Part 15 of the FCC Rules and with RSS-210 of Industry Canada. Operation is subject to the following two conditions. (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Inside View



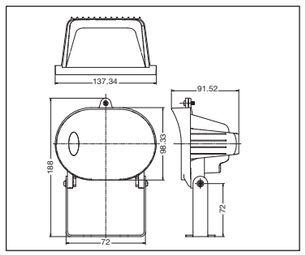
Electrical Connection

The unit should be powered by Class 2 or LVE transformer. Do not switch on the power until all primary and secondary wiring are completed. The contacts of relays should be connected to Class 2 circuit.
Opening the junction box of the housing an 8 pole snap connector will be accessible. Connect the wires as below indicated.

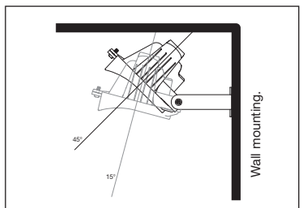


Code	Description
VS1	First supply terminal
VS2	Second supply terminal
NC1	Relay n°1 - Normally close contact
NO1	Relay n°1 - Normally open contact
COM1	Relay n°1 - Common
NC2	Relay n°2 - Normally close contact
NO2	Relay n°2 - Normally open contact
COM2	Relay n°2 - Common

Dimension (mm)

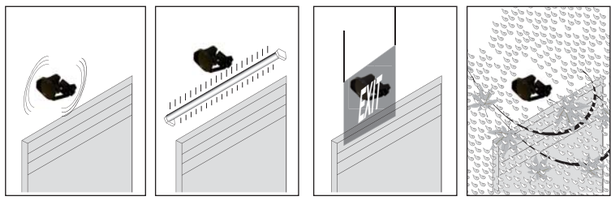


Mounting Instructions



To install the radar is necessary only a screwdriver and drill.

Installation Tips



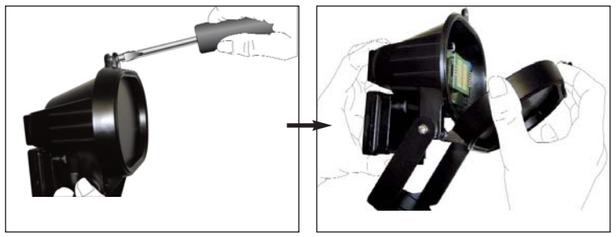
The sensor shall be firmly fixed to avoid any false activation by shocks or vibrations. It should not be mounted to high vibration surfaces such as a door canopy that houses the operating mechanism.

Not install the radar close to flourescent lamps.

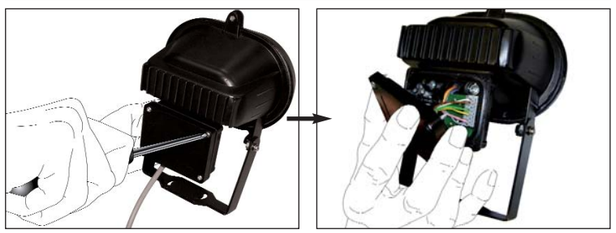
Sensor should not be placed near metal halide lights or placed behind any kind of protection layer or plate.

The housing of the sensor shall be concealed within a NEMA-4 type-rated enclosures and is extremely reliable in harsh environments.

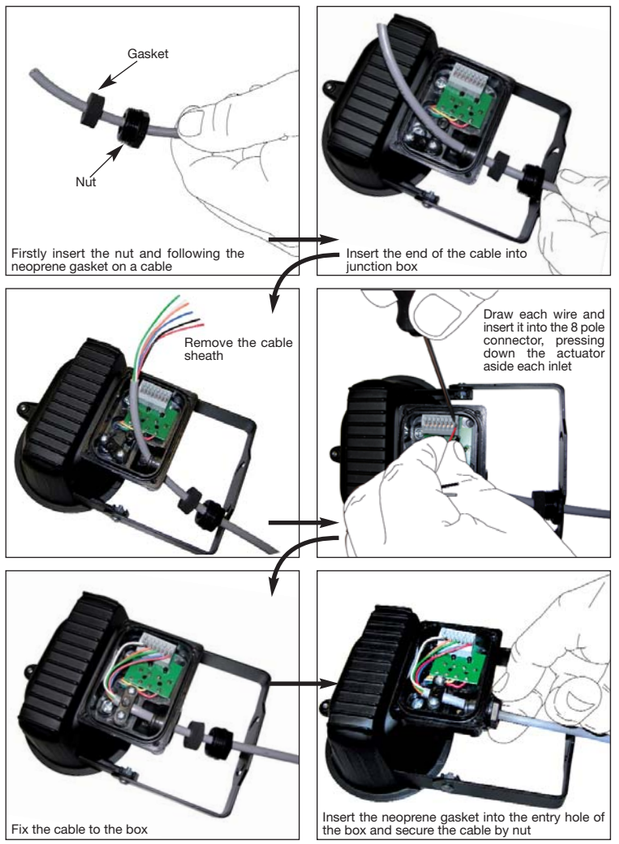
Sensor Cover Removing



Junction Box Cover Removing



Wiring



Adjustment and Setting

Manual adjustment	· orientation of sensing field (mechanically) · multiple functions (by push buttons on board inside).
Remote control adjustments	· Sensitivity · Hold time · Mounting height · Detection mode · Immunity · Relay configuration
Sensitivity	· 5 levels. It allows increment or decrement of detection field.
R1 and R2 Relay hold time	· 5 levels (0.5 to 6s).
Unidirectional mode	· Forward or backward.
Immunity detection	· Normal mode · Immunity · "Quasi-presence" · Lateral Traffic suppression
R1 and R2 Relay status	· Active, Passive, can be set independently by remote controller; · Switching in automatic mode (normal detection) the last status of relays will be considered as steady state condition.
Security code	· 4-digit PIN access code to lock or unlock the keyboard of controller.

Switching ON and factory settings

1. After the supply voltage has been connected, the RED LED will start flashing quickly for 3 seconds.
The unit is set up in factory at the following default values:

A) Sensitivity:	level 1 (SENS+1)
B) Mounting height:	2.5 to 3.5 m (F1)
C) Relay hold time:	0.5 sec (HT+1)
D) Operating mode	V or P
E) Detection Recognition	Movements towards the detector (FW)
F) Immunity, Quasi-presence, and Lateral Traffic Suppression:	OFF
G) R1 and R2 Relay Status:	OFF in rest condition
H) PIN security:	0000 - lock keyboard disabled on remote controller

2. Set mounting height (F1…F4) if different from factory setting
The detector will not function correctly if the wrong mounting height is set

3. Set field size (SEN+1…5) and if necessary using inclination angle, 15-45°.

4. Set the optional volume of Relay Hold time (HT +1...5) if different from factory setting HT+1 (0.5")

5. Set the other parameters as the specific application requires.

Explanation

V/P = Vehicle / Person with differentiation
Using this function, it is possible to select whether the two relays should be switched separately in response to person (R2) or vehicles (R1).

VorP = Vehicle or person with direction segregation
Using this function, it is possible to select whether the relays should be switched regarding only the direction indifferently of people or vehicles.

VR = Vehicle rejection
The R2 relay switches in response only to person.

PR = Person rejection
The R1 relay switches in response only to vehicle. It can be happen a spurious switching in response of person along the border of detection area.

Attention
The discrimination between a persons and the different vehicles depends mainly on the mounting height and the unit inclination angle. Use also the other two functions like IMMUNITY, LTS, to obtain the required rejection level.

QP = Quasi-presence detection
The slightest (quasi-static) movements are detected as soon as the industrial door has been open. The sensitivity during the opening time of the door is increased by one level. The industrial door is only closed if no more movement over the increased sensitivity is monitored.

F / B = Forward / Backward detection
Forward: detection of objects moving towards the sensor.
Backward: detection of objects moving away from the sensor.

BiD = uni-directional / bi-directional movement detection
Respect to initial factory setting direction detection cannot be changed in the VorP operating mode (Vehicle or person detection with direction segregation) where it remains unidirectional.

LTS = lateral traffic suppression
Lateral traffic suppression prevents an industrial door from being inadvertently opened by objects that are only moving or walking past it but do not want to pass through. It is effective at level 4 and 5 of sensitivity as large detection area is needed. To be effective it should be also adopted an inclination angle of the sensor of 30°-45°.
With this function the reaction time of the sensor is improved to 0,5".

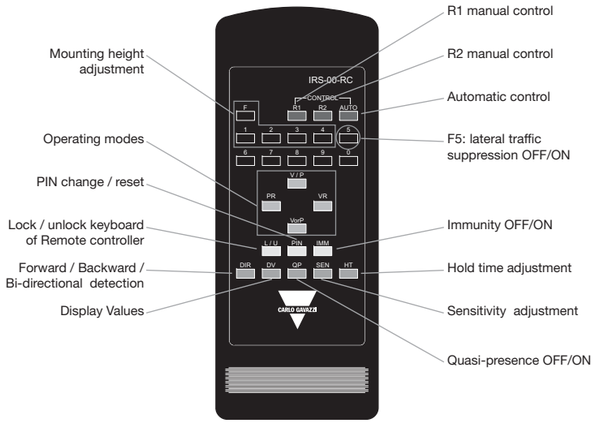
IMM = immunity
Immunity function. This function is used to avoid false activation of the sensor due to environmental interferences (vibrations, rains, etc). Be careful that the immunity function increases the response time of the sensor.

R1, R2 = relay #
During initial setting or maintenance of door system the two relays R1 and R2 can be separately activated by remote controller using these buttons in a toggle way. When this is done the sensor stops to detect the target and it can restart again by pressing the AUTO button. These R1 and R2 buttons should also be used for setting the "Relay Configuration at the Detection". After this setting the button AUTO should be pushed to restore the normal operating condition of the sensor. Example: by pressing R1 button the relay #1 has been set to OFF; by R2 button relay #2 has been set to ON. After having pressed AUTO button the rest condition of relay #1 will be OFF and that of relay #2 ON.

AUTO = automatic door opening
Normal operating condition of the sensor.

DV = display values
Pressing this button followed by the button of the function to be checked it is possible to display its current value. It is applicable to only these functions: SENSITIVITY, HOLD TIME, DIRECTION RECOGNITION and MOUNTING HEIGHT. Example: pressing in sequence DV+SENS buttons the RED LED will display the value of 6 where the sensitivity has been set at this value. Repeat this operation to check the value of other parameters, if required.

Description of Infrared remote controller



Note: For optimum results point the remote control at the sensor before pressing its buttons.

Note: before using the remote controller
- open the battery compartment at the back of the remote control;
- insert two AAA batteries supplied with the remote control;
- close the batteries compartment.

Remote controller enable/disable

Current status of remote controller	Function to be activated	Button to be typed on the remote controller	Signalling by RED LED on the sensor	Status Modification
Keyboard unlocked	Display of Keyboard status	L/U	1 flash	None
Keyboard locked			2 flashes	
Keyboard unlocked	Disabling	L/U	1 flash	None
		4 digits of current PIN code	2 flashes	Keyboard locked
Keyboard locked	Enabling	L/U	2 flashes	None
		4 digits of current PIN code	1 flash	Keyboard unlocked
Keyboard unlocked	PIN change	PIN	1 flash	Ready to accept 4 digits
		4 digits of current PIN code	None	Waiting confirmation
		PIN	1 flash	Confirmation done
		4 digits of current PIN code	None	New PIN code

IR remote controller setting procedure

The table below lists all the functions which can be adjusted with remote controller as well as how to adjust them.

KEY	FUNCTION	LEVELS	RANGE	DESCRIPTION	FACTORY SETTING	LED SIGNAL
F1…F4*	Mounting height	1 2 3 4	2.5-3.5 3.5-4.5 4.5-5.5 5.5-7	Distance of the fixing point on the wall from ground	1	RED LED flashes many times as the selected level. Example: typing F3 keys 3 flashes of the RED LED will be noted: the height is set at the level 3.
SEN+ 1…5**	Field size	1 2 3 4 5	See pictures	1-2: small 3-4: medium 5: large	3	Same as above
HT+ 1…5**	Relay hold time	1 2 3 4 5	0.5" 1" 2" 4" 6"	Extension of the relay activation time	1	Same as above
DIR	Direction recognition	-	FW or BKW or BiD	FW: unidirectional approaching BKW: unidirectional departing BiD: bi-directional /Unidirectional detection	FW	RED LED flashes one time in response to FW detection, two times for BKW detection and three times for BiDirectional.
DV	Display Values	-	DV+HT DV+SEN DV+DIR DV+AUT	DV+HT: display the value of HOLD TIME DV+SEN: display the value of SENSITIVITY DV+DIR: display the value of DIRECTION DV+AUT: display the value of MOUNTING HEIGHT	-	RED LED flashes many times as the value of selected function. The maximum number of flashes are: 5 for HOLD TIME and SENSITIVITY, 3 for DIRECTION and 4 for MOUNTING HEIGHT
V/P PR VR VorP	Operating modes (or relay assignment)	-	-	V/P: differentiation between people and vehicles PR: people suppression VR: vehicle suppression VorP: people or vehicles with direction segregation	V or P	RED LED flashes - 1 time in response to V/P - 2 times for PR, - 3 times for VR, - 4 times for VorP
F5*	LTS	-	OFF/ON	Lateral traffic suppression (see explanations) "Toggle" type function.	OFF	RED LED flashes one time in response to OFF selection and two times for ON
QP	Quasi-presence	-	OFF/ON	Quasi-presence detection (see explanations) "Toggle" type function.	OFF	RED LED flashes one time in response to OFF selection and two times for ON
IMM	Immunity	-	OFF/ON	Immunity (see explanations). "Toggle" type function.	OFF	RED LED flashes one time in response to OFF selection and two times for ON
R1 R2 AUTO	Industrial door control	-	-	R1: manual control of relay #1 by remote controller "Toggle" type function. R2: manual control of relay #2 by remote controller "Toggle" type function. AUTO: restoring of normal detection condition	AUTO	The corresponding LED (see the table "Relay vs Functions" and "Relay configuration at NO DETECTION") will be switched ON (and OFF)
L/U	Keyboard lock/unlock	-	Lock/Unlock	Locking/Unlocking keyboard of controller. "Toggle" function type.	Unlock	RED LED flashes one time in response to UNLOCK selection and two times for LOCK
PIN	PIN modifying or resetting	-	Mod/Reset	Modify or reset the 4 digit PIN to lock/unlock the keyboard of remote controller. "Toggle" function type.	0000	RED LED flashes one time in response to the first activation and two times at the end of procedure

* F button pressed contemporary with 1..5 button.
** Function button pressed for 1" followed by button level (1…5) after a pause of 1"

Signalling by LED

The RED and GREEN LED flash in the following conditions:
- When power is turned ON, the RED LED flashes for 3 seconds.
- During a object detection the GREEN or RED LED lights ON (depending by operating mode setting).
- During programming procedure by remote controller the RED LED flashes many times as the function being modified (see following table). A blind time of 5 seconds will be inserted during the signalling.
- During manual programming procedure the RED and GREEN LED flash a number of time corresponding to the step of the procedure (see description of the procedure).

Relay vs Function

RELAY #	IR REMOTE CONTROLLER BUTTON	FUNCTION	LED	DIRECTION	CONNECTION PIN
1	R1	Vehicles	GREEN	Forward (also Backward & Bidirection in PR operating mode)	COM - PIN5
					NO - PIN4
					NC - PIN3
2	R2	Persons	RED	Backward (also Forward & Bidirection in VR operating mode)	COM - PIN8
					NO - PIN7
					NC - PIN6

Relay configuration at NO DETECTION

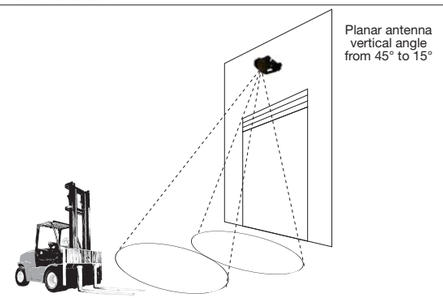
	LED OFF	LED ON
R1 / Green LED	NO COM NC	NO COM NC
R2 / Red LED	NO COM NC	NO COM NC

Sensing field adjustment according to Sensitivity setting and mounting Height

The sensing field area size (lobo) depends on the sensitivity parameter setting and the radar mounting height.

Sensing Field adjustment

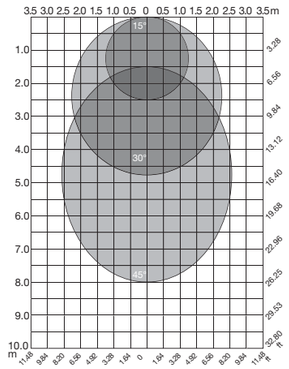
Mechanical sensor orientation



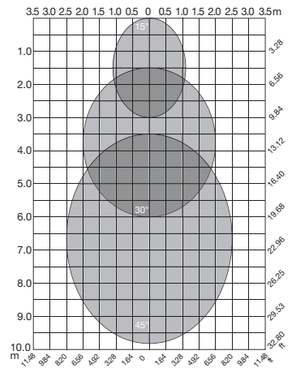
Adjust the vertical position to obtain the vertical sensing field close or far from the door.

Maximum field extension (with level 5 as sensitivity)

Mounting height: 4.5m with 3 different inclination angles.



Mounting height: 7m with 3 different inclination angles.

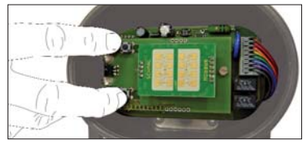


Manual programming

The sensor can be manually programmed using two push-buttons accessible inside the housing after having removed the front closure. Pay attention do not touch the antenna with a fingers.

Configuration keys

Press Keys PB1 and PB2 at the same time for at least 1" to gain access to manual programming, then release.
The RED and GREEN LED will light ON together for 1" for indicating the starting of procedure at first level. It follows the flashing of RED LED to signal the level (one in this case) and the flashing of GREEN LED to signal the programmed value. Then the flashing of LEDs will follow with the same sequence until 1 min. and 1/2 will be elapsed.



The table beside shows the sequence of programmable functions and the corresponding numbers of selectable values.

LEVEL	FUNCTION	N° OF SELECTABLE VALUES	VALUES
1	SENSITIVITY	5	1 (low)...5 (high)
2	HOLD TIME	5	1 (0.5")...5 (6")
3	MOUNTING HEIGHT	4	1 (2.5-3.5m)... 4 (5.5-7m)
4	OPERATING MODE	4	V/P, PR, VR, VorP
5	DIRECTION	3	OFF / ON
6	IMMMUNITY	2	OFF / ON
7	QUASI-PRESENCE	2	OFF / ON
8	LATERAL TRAFFIC SUPPRESSION	2	OFF / ON

Do nothing at a specified level
The RED LED will light ON for 1" many times as corresponding level followed by shorter flashing of GREEN LED many times as it is the value previously programmed inside. Then the flashing of RED and GREEN LED will follow with the same sequence in revolving way until 1 min and ½ will be elapsed.

Changing the Function
To pass from one level (function) to the following one, press again both the buttons for 1". The changing will be signalled by RED and GREEN ON for 1". Then The RED LED will flash correspondingly many times as level reached and GREEN LED will flash correspondingly to the memorized value. Once the last level (level 8) has been reached, attempting to switch to higher level the program jumps back to the first one again.

Changing the value
To pass to higher value (or to switch to ON condition) press for 1" PB2 button indicated as '+'. To switch to a lower value (or to switch to OFF condition), press for 1" PB1 button indicated as '−'. The GREEN LED will flash a number of pulses correspondingly to the stored value previously programmed.

Ending the programming mode
The manual programming procedure will automatically terminated when 1 min. and 1/2 from last activation of any button will be elapsed.

Trouble Shooting

DEFECT	PROBABLE CAUSE	RECOVERY ACTION
The door will not open and any LED do not light up	The sensor power is OFF	Check the electrical wiring connections
		Check the power supply
The door opens and closes frequently for no apparent reason	The sensor detects the door moving	Change the inclination angle of the sensor or reduce sensitivity
	Vibrations picked up by the sensor when the door is moving	Verify the robust fixing of sensor
		Reduce the sensitivity
		Switch the sensor to UNIdirectional mode
False tripping of door opening	Interference source disturbs the detection field	Be sure the fluorescent tubes do not affect the detection lobe
		Activate the IMMUNITY function
Delayed detection or non-detection of persons	Detection area too small or/and incorrect fixing height selected	Verify the detection area size
		Verify the fixing height set
		Check setting for wider area
Person/Vehicle incorrect identification	Incorrect fixing height selected	Set the correct fixing height
		Check setting for wider area
The sensor does not respond to the remote controller	Weak batteries	Change battery insertion and voltage
	PIN code has been changed	To restore the factory value of PIN code switch OFF the supply. Within 45" after power ON, push PIN button followed by 0 (zero) on the keyboard of remote controller to reset PIN code.

Warranty

Carlo Gavazzi guarantees radar device to be free of manufacturing defects for 2 Years from purchasing date. The guarantee intervenes when the device presents a material defect. The faulty device can be returned back to our factory and will be repaired free of charge. If the defect is due to an exceeding of the permissible technical data, wrong wiring, not permissible changes in equipment by the user or a faulty operation no guarantee is carried out.