

# GC 335

Active infrared safety sensor



**Instruction sheet**



# Konformitätserklärung

## Declaration of Conformity

## Déclaration de conformité

Hersteller: GEZE GmbH  
Manufacturer: Reinhold-Vöster-Str. 21 - 29  
Fabricant: D-71229 Leonberg

Produktbezeichnung: GEZE-Aktiv-Infrarot Sicherheitssensor

Product identifier: TYP: GC 335

Désignation du produit:

### **Erklärung (Declaration, Déclaration):**

Der GEZE-Sicherheitssensor entspricht bei bestimmungsgemäßer Verwendung den grundlegenden Anforderungen der nachfolgend genannten Richtlinien.

The GEZE-active infrared safety sensor is, by the directed application, in accordance with the essential requirements of the following directives.

Le détecteur de sécurisation infrarouge actif de GEZE correspondent en cas d'utilisation appropriée aux exigences de la directives suivante.

- Maschinenrichtlinie (Machines Directive, Directive relative aux machines) 2006/42/EG  
Benannte Stelle (Notified Body): TÜV NORD CERT GmbH & Co. KG, Kennnummer 0044,  
Langemarckstraße 20, 45141 Essen  
EG-Baumusterprüfbescheinigung (EC Type Certificate) Nr. 44 205 13095702  
Bevollmächtigt zur Zusammenstellung der technischen Unterlagen: GEZE GmbH, Anschrift s.o.
- EMV-Richtlinie (EMV Directive, Directive CEM) 2004/108/EWG

**Folgende europäische Normen sind angewandt** (the following European standards have been applied, les normes européennes suivantes sont appliquées):

- EN 61000-6-2:2005
- EN 61000-6-3:2007/A1:2011
- EN 12978:2003+A1:2009
- EN ISO 13849-1:2008
- EN 16005:2012

### **Folgende nationale Normen sind angewandt**

(the following national standards have been applied. Sont appliquées les normes nationaux)

- DIN 18650-1:2010
- DIN 18650-2:2010

### **Dokumentation und Betriebsanleitung**

(Documentation and Operating Instructions, Documentation et instructions de service):

Die Konformitätserklärung und die Betriebsanleitung sind dem Produkt beigelegt.

Produkt- und Konformitätsdokumentation sind bei GEZE GmbH archiviert.

The declaration of conformity and operating instructions are included with the product.

The product and conformity documentations have been archived at GEZE GmbH.

La déclaration de conformité et les instructions de service sont jointes au produit.

Les documents relatifs au produit et à son conformité sont archivés chez GEZE GmbH.

Dokumentationsverantwortlicher war: Peter Igl / TBP5, Tel: +49(0)7152/203-0

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Responsable de la documentation: Peter Igl / TBP5, Tél: +49(0)7152/203-0

### **Bedienungsanleitung** (User instructions, Mode d'emploi):

Die Bedienungsanleitung in den europäischen Amtssprachen liegt vor und ist in der Betriebsanleitung abgelegt.

The user instructions are available in the European official languages have been deposited in the operating instruction.

Le mode d'emploi est disponible dans les langues officielles européennes et est joint aux instructions de service.




Hermann Alber  
Geschäftsführer


Leonberg, den 02. September 2013

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This manual is for V.01 device version

## General information

	<p><i>This symbol points out German standard DIN 18650 / EN 16005 to the user.</i></p> <p><i>All points described there are required to fulfill German standard DIN 18650 / EN 16005.</i></p>
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	<p><i>This symbol points out important notes to the user.</i></p>
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**1 Design of the device**

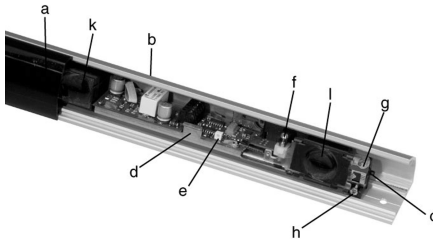


Figure 1.1 Internal design of the device

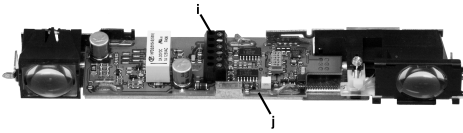


Figure 1.2 Design of the master module

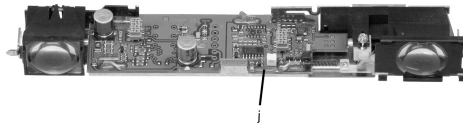


Figure 1.3 Design of the slave module

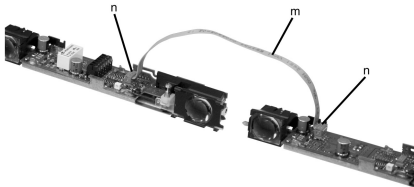


Figure 1.4 Connection of two modules

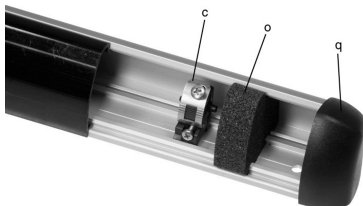


Figure 1.5 Installation of the module holder and of the profile seal

- a** Removable housing cover
- b** Aluminum section
- c** Module holder
- d** Handle to set the angle of inclination (chassis lever)
- e** Function display for detection
- f** Screw for mechanical setting of the detection range
- g** Screw to secure the angle of inclination
- h** Headless screw to secure the module holder
- i** Terminal block for supply voltage, output and test input
- j** Configuration bridge
- k** Infrared transmitter
- l** Infrared receiver
- m** Flat cable
- n** Module connector
- o** Profile seal
- q** End caps

## 2 Description of Function

The GC 335 is an active infrared triangulation scanner.  
The GC 335 has been designed for detection traveling on the door leaf.



*The intended use of GC 335 is to secure automatic swinging door in keeping with German standard DIN 18650 / EN 16005. If used as intended, the sensor shall influence the door movement through the safe door control only and not by direct intervention as only the entirety of safe door control and sensor constitute a protective device of Category 2 EN 954/1.*



*The modification of the construction/ arrangement of the installation without consultation with the manufacturer could lead to dangerous situations.*

### 2.1 Principle of Operation

Any objects entering the protected area will be detected by the infrared beams and will cause the relay outputs to be switched off.

The beam spot produced by the infrared beam on the ground is approx. 1,1 cm x 8,3 cm in size (at a mounting height of approx. 2 m).

The angle of the two lens systems can be modified by an adjustment mechanism. A detection range (detection height of objects) of up to a maximum of 2.50 m can be set. The sensing range of the device is set to maximum at the factory. The device has been fitted with an optical adjusting tool.

The sensor reacts to objects in the detection range largely independently of the surface color and structure. Reflecting and very dark objects are detected as well.

Several sensors can be operated in a master and slave combination in order to be able to adapt the area protected to the prevailing conditions.

By means of a six-pole screw terminal the master module is connected to the door control. The slave modules are connected to and supplied by the master module by means of flat cables. The master module and the slave modules are located in an aluminum profile together.

## 3 Installation and initial Operation

### 3.1 Installation Check List

#### 3.1.1 Installation of Aluminum Section

1. Push the module holder (c) into the aluminum profile (b) and position the module holder at the points where the modules will be mounted later.
2. Drill the fastening holes in the middle between the module holders (in Fig. 3.1 grayed surface). Make sure that no chips remain in the aluminum section. Seal the borehole when fastening in such a way that no dripping water can penetrate. Mechanical information which may facilitate the positioning of screws:

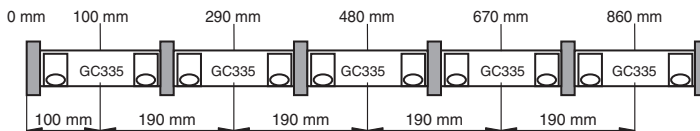


Figure 3.1 Mounting the aluminum section

3. Only use screws with a flat head to fasten the aluminum section, and mount the aluminum section (b) at the intended mounting height (maximum 2.50 m).

### 3.1.2 Installation of the Module

1. Set the transmitters of the modules identically at all modules to be used (cf. Figure 3.3). -> For this purpose, push the transmitter adjustment always in direction of the flat conductor cable (the flat conductor cable side is opposite the closing edge).
2. Connect all required flat conductor cables to the modules prior to the installation of the modules.
3. Please make sure that the master module is always located on the hinge plate side.
4. Connect the terminal screw (i) of the master module to the transition cable of the door control.
5. Place the modules between the module holders (c). Subsequently use the screw M2.5 (h) to screw down to the module holder (cf. Figure 1.1).
6. Use nippers to cut the configuration bridge (j) out of the PCB of the last module (last slave module or individual master module) (cf. Chapter 5).
7. Set the angle of inclination and the detection range in keeping with Chapter 3.2.
8. Place the housing orifice (a).
9. Subsequently screw down the end caps.
10. Finally, check the detection range for each beam.



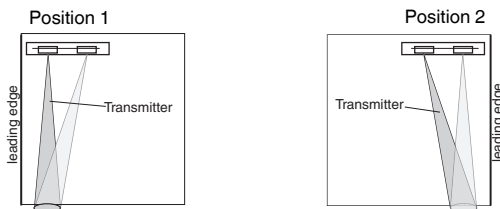
*The transition cable to the door control can be passed through the end cap by means of a cable bushing.*



*If you use the accessories "GC 335 ErgänzungsKit IP54", please fix a double-faced scotch tape between the profile and the mounting surface. This avoids the intrusion of water through the drills of the sensor profile.*

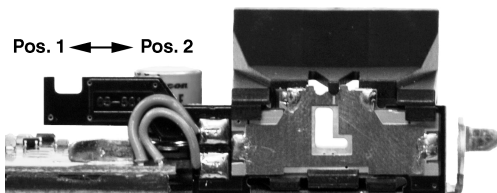
### 3.2 Setting the monitoring Beam - closing Edge

Set the transmitting or receiving beam upright in order to secure the closing edge as best as possible.



*Figure 3.2 Explanation of the monitoring beam setting at the closing edge*

Use two lock position to set a monitoring edge flush on the left or right side of the transmitter (cf. Figure 3.3.).



*Figure 3.3 Setting the monitoring beam to the closing edge*

In the factory default setting, all transmitter modules are preset to position 1 and the sensing range to maximum. Position 1 means that the transmitter is straight and the closing edge is on the left (cf. Figure 3.2 left).

Make sure that the transmitters are all set identical in case of several slave modules (identical lock position of the transmitter) ! The master module has to have the same transmitter setting as well.

### 3.3 Optical Setting of the Sensor

You can swivel the detection field away from the door or towards the door by setting the angle of inclination. The angle of inclination can be varied continuously from 0° to +25°.

Use the handle on the chassis metal to set the angle of inclination.

For the adjustment of the angle of inclination use the M3 screw (g) at the top of the module holder.

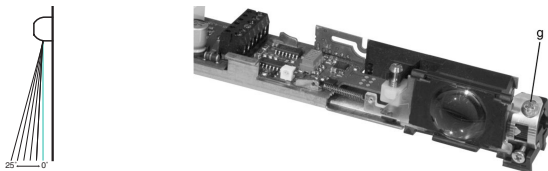


Figure 3.4 Setting the angle of inclination

Use the detection range screw (f) to adjust the detection range.

By turning the detection range screw (f) with a screwdriver and the displacement of the receiver lens caused, the detection range can be set.

An optical adjustment tool (LED green / red (p)) facilitates the exact adjustment of the detection range over the ground.

**If the sensor is not used for protection in keeping with German standard DIN 18650 / EN 16005, a higher adjustment (no more than 80 cm) is possible.**



Figure 3.5 Adjustment of the detection range

LED display:

LED red: Lens has been detected.

LED green: Free protected area and the sensor sees the ground.



*If used as a means of protection in keeping with German standard DIN 18650 / EN 16005, the angle of inclination and the detection range have to be adjusted as follows:*

Use the optional calibration tool (test card and square) for adjustment.

#### Detection range adjustment of the Sensor:

1. Use the chassis lever to set the module to the first marking line on the module holder (cf. Illustration 6.3), and use the M3 screw to fasten (g).
2. Turn the detection range screw (f) counterclockwise until the overturn protection is activated (slight "clicking" noise). Now the maximum detection range has been set.
3. Now use the test card and place it on the test specimen in such a way that it lays 12,5 cm above the ground.
4. Turn the detection range screw clockwise until the LED display just switches from red to green (if necessary turn back to red and then clockwise to just into green). The detection range adjustment is thus completed.

### Angle of Inclination of the Sensor:

5. Lay the test card on the ground with the marking parallel to the door.
6. Rest the test specimen to the marking on the side of the door (cf. Figure 3.6).
7. The sensor points down vertically.
8. Use the chassis lever to swivel the sensor forward until it detects the test specimen raised by 20 cm (LED = red).
9. Swivel the sensor further to the front until it just sees the ground again (LED switches from red to green).
10. Now use the M3 screw (g) to attach the module to the module holder. The angle of inclination has now been set.  
This setting is now completed.

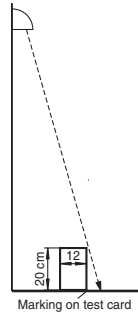


Figure 3.6 Positioning the test specimen

### Checking the Detection range adjustment

11. Use the test card to check the detection range adjustment once again.

**EN** For the operation as a safety sensor in keeping with German standard DIN 18650 / EN 16005, the detection range has to be set to approx. 12,5 cm  $\pm$  1 cm over the ground.



The following sensor characteristics do not conform to the safety regulations outlined in the EC declaration of conformity:

- The distance between the modules and the main locking edge is greater than 10 cm.
- Gaps are left between the modules.
- The right/left adjustment position of the modules is not aligned with the main locking edge.
- The modules are set to a sensing height greater than 20 cm above ground level.

## 4 Detection Field

Depending on the requirement and the door width, a master module can be supplemented with up to seven slave modules.

We recommend to adjust the straight transmitting / receiving beam of the corresponding sensor module no further than 10 cm away from the closing edge.

Figure 4.1 renders information on the installation for different door leaf widths.

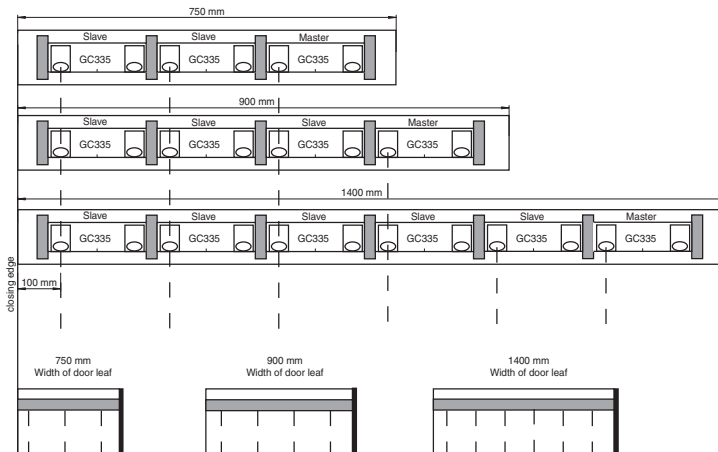


Figure 4.1 Detection field

The wider the door leaf is, the more slave modules are required.



## 5 Master / Slave Operation

### 5.1 Difference between Master and Slave Module

It is possible to fit up to seven additional slave modules, apart from one master module.

The differences between the master module and the slave module are as follows:

**Master module:** with relay; 6-pole connector; one red socket

**Slave module:** no relay; no 6-pole connector; two red sockets

### 5.2 Installing Master / Slave Module

Make sure that the chassis neatly locks into the module holder during the installation of the master module and the slave module.

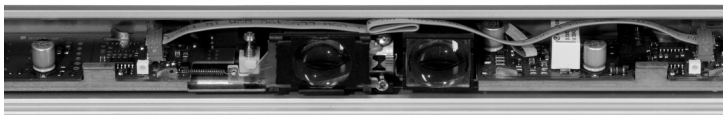


Figure 5.1 Master / slave module

The chassis plate has to lock into the module holder as follows:

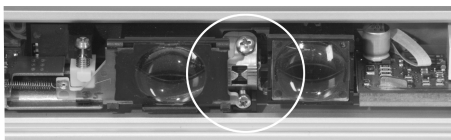


Figure 5.2 Installing master / slave module

- Please make sure that the arbor of the module holder locks into the borehole of the chassis safely. The chassis clip has to be visible in the middle of the module holder (Figure 5.2 Circle).
- Connect the master module only by means of the 6-pole terminal (i) to the door control.
- Connect the master module with the 24 cm flat cables provided for the purpose.

### 5.3 Removing the Configuration Bridge

Disconnect the configuration bridge (j) at the last slave module or on the last slave module's PCB or on the master module's PCB.

Disconnect the bridge when the sensor is not powered.

Before carrying out this step, touch the chassis lever.

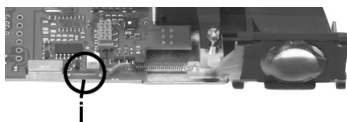


Figure 5.3 Configuration bridge

## 6 Fault analysis

Error	Cause	Remedy
The sensor does not initialize or react.	Supply voltage is not correct.	Check the voltage supply.
The door opens and closes cyclically.	<ul style="list-style-type: none"> <li>• The sensor is disturbed by the movement of the door.</li> <li>• The door leafs are detected by the sensor.</li> <li>• The door movement causes vibrations.</li> </ul>	<ul style="list-style-type: none"> <li>• Change the adjustment angle.</li> <li>• Check the attachment of the sensor.</li> </ul>
The door opens and closes sporadically.	<ul style="list-style-type: none"> <li>• There are objects in the detection field which move in the air current.</li> </ul>	<ul style="list-style-type: none"> <li>• Remove the objects.</li> </ul>
Test unit is not recognized.	<ul style="list-style-type: none"> <li>• The detection range has been wrongly set.</li> <li>• The angle of inclination has been wrongly set.</li> </ul>	<ul style="list-style-type: none"> <li>• Check the detection range and the test card.</li> <li>• Readjust the angle of inclination (cf. Chapter 3.3).</li> </ul>

Table 6.1 Fault analysis

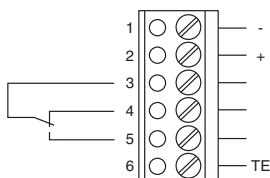
## 7 Technical data / connection diagram

<b>General data</b>	
Detection range min.	0 ... 1,500 mm
Detection range max.	0 ... 2,500 mm
Light transmitter	IREL
Black/white difference (6 % / 90 %)	< 2 % at a detection range of 2,000 mm
Marking	CE, TUV
Number of beams	Number of sensor modules GC 335 mounted
Mode of operation	Background evaluation
Diameter of the light spot	1,1 cm x 8,3 cm at a detection range of 2 m for each module
<b>Displays/operating elements</b>	
Function display	LED red / green (cf. chapter titled Functional displays)
Operating components	Detection range adjustment
<b>Electrical data</b>	
Operating voltage	24 VDC $\pm$ 20 %
No-load current $I_0$	Master: <75 mA Slave: <65 mA
<b>Input</b>	
Test input	-3 V ... +5 VDC or open: Test off +11 V...+24 V DC $\pm$ 20 % Test on
<b>Output</b>	
Switching type	Relay released when objects are inside the detection range.
Signal output	Relay, 1 changeover unit
Switching voltage	5 V ... 30 VAC / VDC
Switching current	0.001mA ... 0.3 A
Response time	70 ms
Maximum length of the connecting cables	30 m
Connection diameter	0.3 mm ... 1.3 mm (AWG26-16) Cu single/multicore
<b>Optical data</b>	
Light wave length	875 nm $\pm$ 15 nm
Classification according to EN 62471	free group
Minimum degree of reflection of the floor	6 %
Minimum degree of reflection of the objects to be recognized	0 %
Mutual interference (cross-talk)	No
Resolution	CA Reference body DIN 18650-1 / EN 16005 applicable in all positions
<b>Functional safety related parameters</b>	
Safety Integrity Level (SIL)	SIL 1
Category	Cat. 2
Performance level (PL)	PL c
BWS-Typ	Typ 2
<b>Ambient conditions</b>	
Ambient temperature	-10° Celsius ... 50° Celsius (263 K ... 323 K)
Humidity at 20° Celsius	< 90 %
Humidity at 60° Celsius	< 50 %
<b>Mechanical data</b>	
Housing length L	min. 310 mm
Mounting height	max. 2,500 mm
Protection type	IP52
Connection	Screw terminal

<b>Material</b>	
Housing	Aluminum / ABS
Light exit	PMMA

Table 7.1 Technical data

## 7.1 Assignment of the Connections



Pin	Assignment
1	GND (0 V)
2	UB +24 VDC $\pm$ 20 %
3	Relay - center contact
4	Relay breakcontact
5	Relay make contact
6	Test input

### Explanation:

#### Relay:

- Relay is inactive during detection
- Relay is active in free detection field

#### Test input:

- Test input is inactive at:  $U_{low} = -3 \text{ V} \dots +5 \text{ VDC}$
- Test input is active at:  $U_{high} = +11 \text{ V} \dots +24 \text{ V DC} \pm 20 \%$

## 8 Components of GC 335

Part Numbers	Description
128074	GC 335, MASTERMODUL
128065	GC 335, SLAVEMODUL
120190	Prüfkörper GC 335

Table 8.1 Components of GC 335

## 9 Disposal, Repair, Maintenance

### 9.1 Disposal

Dispose of the useless device in keeping with the applicable national legal regulations. For example, take the sensor to a pertinent collection point for electronic waste.

### 9.2 Repair

Defective device may be repaired by the manufacturer only.

### 9.3 Servicing

Observe the applicable national regulations for servicing.

The sensor is maintenance-free by and large.

Nonetheless, check the technical safety of the sensor system in regular intervals, watching out for damage of the housing in particular.

If it has to be assumed that a safe operation is no longer possible, the sensor system has to be shut down and secured against unintentional operation.

Check the sensor for soiling occasionally. In order to clean the sensor, use a dry or moist soft cloth to wipe across the sensor in regular intervals. This action will ensure an optimal function.

The housing is made of plastic. For this reason avoid contact with acetone and detergents containing solvents.

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