Automatic passenger counting

IRMA 6
Installation manual

IRMA6-SENSOR-HD-00-POE-IO-00
IRMA6-SENSOR-HD-00-POE-00

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**Model**

Sensor:
IRMA 6

Sensor variant:
for PoE (Power-over-Ethernet)

**Function:**
Automatic passenger counting system with 80,000 px ToF (Time-of-Flight)-technology for vehicle and railway application, consisting of sensor unit and interface unit. Generates real-time counting data for further processing via Ethernet to on-board computer. Mounted above doors.

**Used symbols**

- Please note
- See annex
- Information
- Instruction

- See document on our website
- Please note down
- Download

**Disclaimer**

The information contained in this document is based on product data resulting from the development and approval phases as well as the production of initial samples. These specifications do not claim to be error-free and will need to be updated or corrected. Such modifications may be made by iris-GmbH without notice. Characteristic or typical values given are based on our experience and are approximate values to be expected; they are by no means guaranteed by iris-GmbH.

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Fig. 1: IRMA 6 interface unit and sensor unit
1. IRMA 6 overview

- The mounting height must not exceed 2.40 m (3 m in preparation).
- The door-to-IRMA 6 distance must not exceed 20 cm if the installation height is less than 2 m.
- The inclination angle of IRMA 6 must not exceed 5°.

For the relation between maximal distance (door – sensor), counting width and the door height see Table 1, p. 5.

Table 1: Dimensions depending on door height

<table>
<thead>
<tr>
<th>Door height</th>
<th>Covered door width</th>
<th>Distance max</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.90 m</td>
<td>1.40 m</td>
<td>20 cm</td>
</tr>
<tr>
<td>2.00 m</td>
<td>1.50 m</td>
<td>20 cm</td>
</tr>
<tr>
<td>2.10 m</td>
<td>1.60 m</td>
<td>35 cm</td>
</tr>
<tr>
<td>2.20 m</td>
<td>1.70 m</td>
<td>40 cm</td>
</tr>
</tbody>
</table>
IRMA 6 components

1  Mounting screws
2  n.c.
3  M12 Ethernet connector
4  Leaf spring
5  Internal connector
6  Mounting hook
7  Sensor unit
8  Door panel
9  n.c.
10 M12 door contact connector (on demand) (f)
11 Interface unit

IRMA 6 comes with normal M12 connectors or with angled M12 connectors to save space.
**Needed Tools**

- **Drilling machine**
  - with twist drill (10 mm)
- **Jig saw**
- **Hex Key**
  - size 4 mm

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**Most relevant steps at a glance**

1. Prepare needed tools and drilling templates, IRMA 6 sensors as well as cables for doors to be equipped.

2. Install IRMA 6 into vehicle doors panels and connect IRMA 6 via Ethernet to data transmission, to power supply and (optionally) to door contacts.

3. Configure IRMA 6 via web interface, while using RJ 45 service cable and ETH interface.

4. Perform a commissioning test on your pc or on-board computer.

**Essential directives for installation**

- In all considerations with regard to installation positions and orientation, it is assumed that the observer is inside the vehicle.

- The sensor-to-door distance **must not exceed 20 cm** if the installation height is less than 2 m, see Table 1, p. 5.

- Install IRMA 6 on a horizontal surface. The maximum permissible deviation from the horizontal plane is ±5°.

- IRMA 6 must be installed by staff that follows the pertinent regulations and the installation manual.
2 Mounting

1. Choose position in door panel

Travel direction

2. Drill 4 holes and saw out template for IRMA 6

Drill 4 holes with drilling machine and saw out the template with jig saw in the door panel according to measures in attached drilling templates, see Drilling templates, p. 26.

3. Put sensor unit in

Put the IRMA 6 sensor unit via the mounting hook into the drilled hole in the door panel.

4. Fit sensor unit into interface unit

Fit in in the internal connector and the attaching form of the sensor unit into the interface unit which is above the door panel.
5 Tighten screws with hex key

Tighten both screws max. 3 Nm with a hex key (4 mm) on the interface unit.

For easy and correct connection to the cables: Align the M12 connector so that the stop lug is centered toward the top of the labels!

6 Connect IRMA 6 (optionally with angled M12 connectors)

Connect IRMA 6 via (angled) M12 connectors to the Ethernet network, to voltage supply and optionally to the door contacts.

Angled M12 connectors, slewable (180°), optionally available.
Connecting IRMA 6

7 Connect IRMA 6 to power supply

Power-over-Ethernet: connect IRMA 6 from component to the on-board power supply via the M12 system Ethernet cable K-M12CAT5-XX-xm that connects the IRMA 6 with the switch. See Fig. 5, p. 13 for time relay for 30 min overrun power.

8 Connect IRMA 6 with Ethernet

Connect IRMA 6 from component with the switch via the M12 system Ethernet cable K-M12CAT5-XX-xm. Via Ethernet the connection to the OBU and to the service PC is made.

Only possible with service PCs having an Ethernet interface.
9 Connect IRMA 6 to PC

Connect IRMA 6 with the PC via switch from component with the M12 system Ethernet cable **K-M12CAT5-XX-xm** and the outgoing adapter cable **KQ-M12CAT5-RJ45-01-xm** for service purposes (update, configuration).

*Only* possible with service PCs having an Ethernet interface.

10 Connect IRMA 6 to door contact (on demand)

Connect the wire strands of the cable from component either directly to the door control unit or establish a circuit with the wire strands via a limit switch (external power supply from vehicle required).

See cabling diagram for wiring overview of IRMA 6 in the vehicle, see Fig. 4, p. 12.
Fig. 4: Installation of IRMA 6 (Ethernet version) as door contact variant

1  IRMA 6 POE variant (rear view on interface unit)
2  n.c.
3  M12 system cable, Ethernet K-M12CAT5-XX-xm (PoE)
4  Fuse 5 A, quick-acting
5  Switch-M12-5Port-eCon
6  Power supply of switch, K-Switch-Power (= K2),
   length 3 m or SAC-4P-5.0-28R/FS SCO RAIL (= K3)
7  Adapter cable for PC connection for service
   purposes KQ-M12CAT5-RJ45-01-xm
8  Wires for setting door contacts (and opt. Door Clear)
   A Distribution of the vehicle-provided power supply to each
      door for the connection of IRMA 6 and switch. The distribution
      of the vehicle-provided power supply to each door is not part of
      the standard scope of delivery of iris-GmbH!
   5  PC connection for service purposes
      D1 to Dn: Doors with 1 IRMA 6
   B Connection to on-board computer/on-board
      unit (On-Board Computer/Unit)
3.1 Ensuring power supply

1. Fuse 5 A, quick-acting
2. Timing relay, (dropout/OFF delay) for 30 min minimum
3. N.C.
4. IRMA 6

Fig. 5: Power supply of the IRMA 6 sensor with fuse and time relay for 30 min overrun power
3.2 Connector types

- Ethernet interface
- D-coded (f)
- 5 poles

Fig. 6: Pin assignment – Rear view on interface unit with connectors (Cf. Fig. 2)
4 Configuring IRMA 6

1 Provide a DHCP server in the LAN. Open DNS. Connect IRMA 6 via the RJ45 service cable with your pc. Enter the device number in the browser bar. Start configuring IRMA 6. Change the language via “English”.

2 On the left side you find the navigation:
   - for configuring IRMA 6
   - updating IRMA 6
   - checking logged error messages
   - visualizing counting data of IRMA 6

3 Click on CONFIGURATION to get to the points INSTALLATION and ETHERNET

4 At the point INSTALLATION you set:
   - door/function area
   - sabotage detection
   - status LEDs
   - installation parameter
In the section “Door /Function Area” you set the:
- “Function Area Address”
- with the “FA” according to real door / fa number in vehicle
- “Door Address” with the setting value which is, as a rule, identical to the “Function Area Address” (FA) in an Ethernet installation; and
- “Door Close Delay” with the value of the time determined between the door closing signal sent by the on-board computer and the actual mechanical closing of the door.

In the section “Status LEDs” you set “OFF”, as this is the default LED setting of the sensor.

In the section “Installation Parameter” you set the parameters for the placement of IRMA 6 according to the measures in the vehicle. Measure the values for each installation parameter in the vehicle and enter them. (See graphics below for each installation parameter in vehicle).
### 8 Mounting Height

**Side view**

Mounting height indicates the mounting height of the sensor in mm. Drop a perpendicular from the sensor centre to the floor and mark the foot of the perpendicular on the floor with an adhesive marker. The distance from the sensor to the adhesive marker is the mounting height. Measure the distance and enter the value measured.

### 9 Door to Sensor Distance

Door to sensor distance is the horizontal distance from the sensor to the (closed!) door. This parameter marks the boundary between the inside and the outside of the vehicle in order to differentiate between boarding the vehicle and alighting from it. If the installation distance exceeds 20 cm, absolutely contact iris-GmbH. Measure the distance and enter the value measured.
10 Vehicle edge offset

Vehicle edge offset is the difference in level between the adhesive marker and the vehicle edge with the door open. The vehicle edge may be below or above the adhesive marker. Measure the difference in height between the vehicle edge and the adhesive marking and:

- Set the measured value as positive (> 0 mm), if the vehicle edge is below the adhesive marker.
- Set the measured value as negative (< 0 mm), if the vehicle edge is above the adhesive marker.

11 Rotation angle X

Rotation angle X is the inclination angle of the sensors visual axis (=x axis) when the vehicle is stationary on a level plane. Sensors directed towards the inside have a positive angle. This angle must not be > 5°; otherwise the counting accuracy is reduced. Measure the sensor’s angle of rotation (e.g. using a suitable smartphone app) and enter the value measured.
Left/right wall distance is the left-hand/right-hand sensor monitoring area up to the left/right lateral boundary in the vehicle interior.

Left/right door clearance (passage width) is the horizontal distance between the sensor and the left/right opened door parallel to the vehicle edge. Enter 0 mm if there is no opened door in the sensor viewing range.

Set 0 mm if there is no obstacle between the adhesive marker and the left/right lateral boundary when the door is open.
**14 Left / right door opening angle**

Left / right door opening angle is the maximum door opening angle with the door opened, between the vehicle edge and the left / right door opened towards the outside. This parameter is relevant for outward opening doors, and is irrelevant for opening angles exceeding 90°. If the left / right door open towards the outside, measure the opening angle and enter the value measured. Retain the value of 0° if the doors do not open towards the outside.

**i** Opening angle (left, right) – outward swinging doors like here are mainly to be found in the USA and Central and South America.

**15**

In the section “Sabotage Detection” you check the field “Enable Sabotage Detection” to enable the sabotage detection. Set the value 5 in the field “Sabotage Aggregation” in order to suppress unwanted and intermittent activations of the sabotage detection.
Click APPLY to set the data from all sections of CONFIGURATION.

Wait until the green bar confirms that the configuration is applied.

Click on ETHERNET to get to the IP configuration of IRMA 6.

In the section “IP Configuration” you can, if needed, set:

- address configuration
- IP address
- net mask
- gateway
Click on LOG to see recorded error states.

See the field “Log Level”, “Support Level” and “Number of Log Entries” for logged error messages.

Click on VISUALISATION to visualize counting data.
See boarding and alighting persons in real-time. Via “Image Type” you can switch viewing type between “Depth” and “Intensity” error messages.

Click OK, if IRMA 6 needs to be restarted because of error messages recorded in the log.
## 5 IRMA 6 components

Table 2: Overview of IRMA 6 components - interface and sensor unit with cables

<table>
<thead>
<tr>
<th>Description</th>
<th>Explanation</th>
<th>Sketch / item description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>IRMA 6 sensor unit</strong></td>
<td>Connection possible with: interface unit of IRMA 6</td>
<td><strong>IRMA 6 sensor unit</strong></td>
</tr>
<tr>
<td><strong>IRMA 6 interface unit with:</strong></td>
<td>Connector for IRMA 6 sensors, interfaces:</td>
<td><strong>IRMA 6 interface unit</strong></td>
</tr>
<tr>
<td>n.c.</td>
<td>2 n.c.</td>
<td>3 9 10</td>
</tr>
<tr>
<td>1 Ethernet interface</td>
<td>3 ETH: M12 connector (f), ETH type: for connection to the switch</td>
<td><strong>IRMA 6 interface unit</strong></td>
</tr>
<tr>
<td>n.c.</td>
<td>9 n.c.</td>
<td><strong>IRMA 6 interface unit</strong></td>
</tr>
<tr>
<td>1 door contact interface (on demand)</td>
<td>10 Door contact and / or door clear optional, (f)</td>
<td><strong>IRMA 6 interface unit</strong></td>
</tr>
<tr>
<td>M12 power cable for IRMA 6</td>
<td><strong>K-M12POW-B-oE-04-2m</strong> M12 cable for power supply of IRMA 6, 1x M12 connector (f), CAN type / two wires and shield for connection to the vehicle-provided power supply, component (not available for PoE).</td>
<td><strong>K-M12POW-B-oE-04-2m</strong></td>
</tr>
<tr>
<td>M12 system cable, Ethernet type</td>
<td><strong>K-M12CAT5-XX-xm</strong> Ethernet cable for connection of IRMA 6 to the M12 switch, 2 x M12 connector (m), ETH type, component.</td>
<td><strong>K-M12CAT5-XX-xm</strong></td>
</tr>
<tr>
<td>M12 door contact cable (on demand)</td>
<td>Cable for connection of IRMA 6 to the door contacts with the two wires, 1 x M12 connector (m), component.</td>
<td>n. n.</td>
</tr>
</tbody>
</table>
6 Check of the installation

1. Have all IRMA 6 been installed and are they properly attached?
2. Is their mounting position correct?
3. Have all IRMA 6 connecting cables been attached to the interface unit?
4. Is the IRMA 6 power supply connected?
5. Is the switch power supply connected?
6. Is the switch connected to the onboard computer?
7. Do the infrared LEDs of IRMA 6 light up when the door is open? Please check separately for each door!
8. Are the infrared LEDs of the IRMA 6 out when the door is closed? Please check on each door individually!
9. Then the installation is checked using the web interface IRMA 6 configuration.
7 Drilling templates

There are 2 kinds of templates in (mm):

• for retrofitting with hand tools
• for original equipment manufacturers (CNC machining)
For retrofitting with hand tools

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Drilling template IRMA 6, Frontend

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Scale A4-Format

Unit

mm (inch)

Description

For size tolerances
DIN ISO 2768 mK
edge of workspace
DIN ISO 13715

Drawing-No.

BB_GEN6-FE-F

Index

00
Drilling template for BB_GEN6-FE-F_00

Scale: 1:1

Printer setting: set option "Actual size"
Drilling template for BB_GEN6-FE-F_00

Scale: 1:1

Printer setting: set option "Actual size"
Drilling template IRMA 6, Frontend

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for original equipment manufacturers (CNC machining)
for original equipment manufacturers (CNC machining)

Drilling template IRMA 6, Frontend

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