Automatic Passenger Counting

IRMA – Infrared Motion Analyzer
5th generation

sCON-F-12-PoE
Data sheet
Document information

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Applicable product variants

<table>
<thead>
<tr>
<th>ALSTOM ref.</th>
<th>Iris refs.</th>
<th>Product name</th>
<th>Description</th>
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<tr>
<td>DTR0000459722</td>
<td>5002_24</td>
<td>DIST500.7-F07.OC030-01</td>
<td>IRMA MATRIX sensor, flush mount version, IP67, RER NG Variant</td>
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<td>DTR0000452070</td>
<td>5002_03</td>
<td>DIST500.7-F07.OC030</td>
<td>IRMA MATRIX sensor, flush mount version, RER NG variant</td>
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<td>DTR0000450226</td>
<td>5250_41</td>
<td>sCON-F-12-PoE</td>
<td>sCON sensor connector with M12 Ethernet PoE interface</td>
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<tr>
<td>-</td>
<td>-</td>
<td>DIST500.7-F07</td>
<td>Any IRMA MATRIX sensor of the flush mount version</td>
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</table>
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1 General

The sCON-F-12-PoE connector is a connector by iris-GmbH. The housing corresponds to the previous sCON-F-12 connectors, the attachment set is integrated. The connector is designed for installation in coves with a material thickness of 1 to 8 mm.

The connector connects the IRMA MATRIX sensor (flush mount version F) to the other systems in the vehicle. It has following interfaces:

- an Ethernet interface with Power over Ethernet via an M12 connector (D coding, 4 poles) at connector No. 3 is available (Fig. 1.),
- connectors 1 and 2 are not assigned and closed with a cap (Fig. 1.)

The M12 Ethernet cabling applied uses two core pairs. This results in the PoE operating mode A (phantom powering) which uses the same cores for data transmission and voltage supply.

The electronic system for the provision of the operating voltage for the IRMA MATRIX sensor and the output of the Ethernet signals is located between the sCON contact surfaces and the M12 connector.

In combination with the IRMA MATRIX sensor this yields a "Powered Device" (PD), type 1, class 0 (average power 13 W max.) in accordance with IEEE 802.3-2015, section 33.

Meaning of the variables

F  sCON with flat housing
12  M12 connector for flat housing
PoE  Power over Ethernet
sCON  sensor CONnector
2 Layout

Base body (connector) with contact pads for MATRIX sensor

Ethernet (ETH)
M12 connector (f)
4 poles, D coded

Figure 1: Connection diagram of the connector
3 Pin assignment

3.1 Built-in connector (f)

The metal housing serves as a shield connection of the connecting cables.

<table>
<thead>
<tr>
<th>M12 female connector</th>
<th>Connection to</th>
<th>Signal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethernet (ETH)</td>
<td>Pin 1</td>
<td>TD+/VD+</td>
</tr>
<tr>
<td>4 poles, D coded</td>
<td>Pin 2</td>
<td>RD+/VD-</td>
</tr>
<tr>
<td></td>
<td>Pin 3</td>
<td>TD-/VD+</td>
</tr>
<tr>
<td></td>
<td>Pin 4</td>
<td>RD-/VD-</td>
</tr>
</tbody>
</table>

Table 1: Pin assignment of Ethernet/PoE interface (built-in female connector)

Due to the compulsory power rectifiers at the input to the PD, the polarity of the supply voltage is not relevant for operation.

4 Connecting cable

The sCON-F-12-PoE can be integrated with any existing M12 cabling, provided a PoE switch with phantom powering (mode A as specified in IEEE 802.3-2015) is installed.

A patch cable with M12 male connector is connected to the M12 Ethernet female connector to link it to a PoE switch. The switch must support type 1, class 0 PSE (Power Sourcing Equipment).

- K-M12CAT5-hh-X M12 patch cable for Ethernet

All connecting cables must be manufactured with a 360° shield connection in order to meet the requirements of the applicable standards on EMC radiation.

In particular for increased cable lengths, cables with a cross section of more than 0.34 mm²/AWG22 must be installed.
5 Compliance with standards

Ethernet:

IEEE 802.3-2015: The device is a "Powered Device" (PD), type 1, class 0

EMC interference emission:

Field emission according to EN 50121-3-2
Data line interference voltage according to EN 50121-3-2

EMC immunity to interference:

HF irradiation according to EN 50121-3-2
Data line HF voltage according to EN 50121-3-2
Fast transient/burst according to EN 50121-3-2

Mechanical and dynamic strength:

The following specifications are presently checked and are to be considered as temporary information!

Vibration, broad band noise according to IEC 61373
Shock, semi-sinusoidal according to IEC 61373
Vibration, broad band noise according to IEC 60721-3-5
Vibration, sinusoidal according to IEC 60721-3-5
Shock, semi-sinusoidal according to IEC 60721-3-5

Insulation test:

Dielectric strength and insulation resistance in connection with the IRMA MATRIX sensor were successfully tested according to EN 50155.

RoHS compliance:

The circuit board is manufactured in accordance with the RoHS directives, the laminate corresponds to UL94-V0 and EN 45545-2. The assembly is lacquer coated.
6 Technical data/properties

<table>
<thead>
<tr>
<th>Property</th>
<th>min.</th>
<th>typ.</th>
<th>max.</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mating cycles</td>
<td>100</td>
<td>75</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Ethernet</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- sCON</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient temperature</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Storage Function</td>
<td>-40</td>
<td></td>
<td>+85</td>
<td>°C</td>
</tr>
<tr>
<td>Function</td>
<td>-25</td>
<td></td>
<td>+70</td>
<td></td>
</tr>
<tr>
<td>Protection class</td>
<td>IP54</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nominal voltage (PoE)</td>
<td>48</td>
<td></td>
<td></td>
<td>V</td>
</tr>
<tr>
<td>Insulation resistance</td>
<td>1000</td>
<td></td>
<td></td>
<td>VDC</td>
</tr>
<tr>
<td>Power consumption with</td>
<td></td>
<td>9</td>
<td>15¹</td>
<td>W</td>
</tr>
<tr>
<td>IRMA MATRIX sensor</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2: Technical parameters

7 Nameplate

![Nameplate Image]

1 Type designation
2 Item No.
3 Exterior: Information on the orientation of the sCON-F12
   This side is to face towards the vehicle exterior.
4 Interior: Information on the orientation of the sCON-F12
   This side is to face towards the vehicle interior.
5 iris internal information

¹ The IRMA MATRIX logs on to the switch as a Class0 device. It is recommended not to limit the Class0 performance at the PoE port. The maximum values also include the losses, which drop on the line and can be up to 2W.

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8 Dimensions

Requirement for installation space considering the minimum bending radius

Figure 4: Dimensions with cable bending radius

1 M12 connector
2 Bearing surface to the sensor
3 DIV-119, article number for the leaf spring
9 Attachment

The sCON-F-12-PoE is designed for installation in coves with a material thickness of 1 to 8 mm.

The sCON-F-12-PoE comprises the mounting set for the IRMA MATRIX sensor. The sCon is mounted to the IRMA MATRIX sensor using two screws, the system is clamped to the cove (panel) using the two leaf springs. The screws must be tightened repeatedly and alternatingly.

⚠️ After dismounting the sCON it is not permissible to mount it into a cove (panel) of reduced thickness without having replaced the leaf springs. In such a case, the spring pressure may not be sufficient to ensure reliable attachment.
10 Connection combinations

10.1 Power supply

The sCON-F-12-PoE connectors are supplied via the Ethernet M12 socket. The PoE supply voltage (48V) superimposes the Ethernet signals using phantom power (alternative A according to IEEE 802.3-2015).

The maximum power requirement of the IRMA MATRIX sensor is 9W. In order to meet this power requirement, the sCON-F-12-PoE is designed as PD (Powered Devices), Type 1, Class 0, which according to IEEE 802.3-2015 permits an average power consumption of max. 15W. The DC/DC converter of the sCON has an efficiency of approx. 80%, which means a maximum power consumption of 12W in counting mode.

The connection to the IRMA MATRIX sensor is made via the contact surfaces of the printed circuit board.

10.2 Ethernet cabling

The sCON-F-12-PoE has an M12 socket for communication via Ethernet. With this installation variant, all sCONS are connected to a PoE switch. The power supply is realized with the cables mentioned in chapter 4.
Figure 6: Schematic for Ethernet and PoE installation with 4 sensors