

## **Project Documentation | UMRR Traffic Management Sensor Data Sheet**

---

**Project Number:**

**SMS Project Number:**

**Project Title:**

Traffic Management Sensor

**Keyword(s):**

UMRR Traffic Management Sensor Data Sheet  
3D/HD

**Date:**

February 5, 2018

**Document:**

UMRR Traffic Sensor Type 40 Data Sheet.doc

**PROPRIETARY**

**The information contained in this document may be subject to change without notice.**

The information contained in this document shall remain the sole exclusive property of s.m.s smart microwave sensors GmbH.

# 1 Content

1	Content .....	2
2	Sensor Data Sheet .....	3
2.1	Sensor Photograph.....	4
2.2	Function Description.....	5
2.3	Application Characteristics .....	8
2.3.1	Intersection Management.....	8
2.3.2	Arterial Management.....	11
2.3.3	General Performance Data.....	14
2.3.4	Start-up time .....	15
2.3.5	On-board diagnostics (BIT).....	15
2.3.6	Sensor Network .....	15
2.3.7	Real Time Clock and Storage .....	15
2.3.8	Compliance.....	15
2.4	Sensor Description and Hardware ID.....	17
2.5	Sensor Dimensions.....	18
2.6	Connector.....	19
3	Important Legal Disclaimer Notice.....	20
4	Contact .....	21

**PROPRIETARY**

The information contained in this document may be subject to change without notice.

The information contained in this document shall remain the sole exclusive property of s.m.s smart microwave sensors GmbH.

## 2 Sensor Data Sheet

Smartmicro offers a family of traffic Radar sensors called UMRR – Universal Medium Range Radar. Within this family, three different Radar generations exist: UMRR-0A, UMRR-0F and UMRR-0C.

For each Radar generation, a number of different antennas are available - so the permanent fixed field of view and max. range can be selected by the customer.

This data sheet describes the UMRR-0C Type 40 **3D/HD** High Definition antenna model (all model specific values are highlighted).

Type 40 Antenna aims at very long range with wide horizontal angular coverage.

### PROPRIETARY

The information contained in this document may be subject to change without notice.

The information contained in this document shall remain the sole exclusive property of s.m.s smart microwave sensors GmbH.

## 2.1 Sensor Photograph

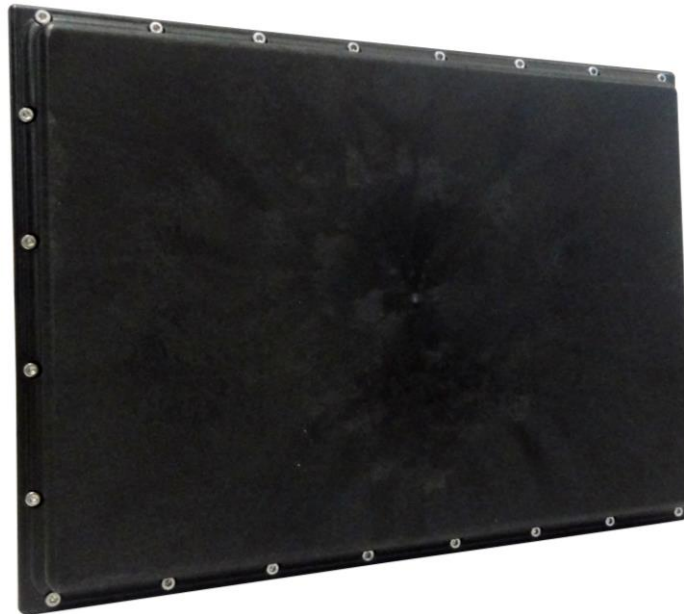


Figure 1: Traffic Sensor **Type 40** - front.



Figure 2: Traffic sensor **Type 40** - rear.

### PROPRIETARY

The information contained in this document may be subject to change without notice.

The information contained in this document shall remain the sole exclusive property of s.m.s smart microwave sensors GmbH.

## 2.2 Function Description

The sensor is a robust low cost **3D/HD** 24GHz Radar for traffic management applications.

It works in adverse conditions, almost unaffected by weather, and independent of sunlight, in a wide temperature interval.

The customer can select from a number of antenna and housing models which determine the permanent fixed field of view and range. **Type 40 Antenna aims at very long range with wide horizontal angular coverage.**

One individual sensor measures range, radial speed, angle, reflectivity and other parameters of multiple stationary and moving reflectors (**targets**) simultaneously. The following detection principle is integrated:

### **3D/HD:**

#### **Doppler based radial motion detection (> 0.1m/s), including:**

- a) Direct Doppler measurement
- b) Direct Range measurement
- c) Direct Angle measurement

Reflectors having a radial speed component of typ. abs. >0.1m/s are detected.

Having multi target capability, the sensor may detect many reflectors at a time (up to 256) being within the field of view. Depending on the selected communication interface, the number of reported targets may be limited to 128. Targets are sorted by range and if more than 128 are detected, short range targets are reported first.

Additionally filter algorithms are implemented for the tracking of all detected reflectors over time, those tracking algorithms are integrated in the sensor. **Multiple objects (max. 256)** are tracked simultaneously. Depending on the selected communication interface, the number of reported objects may be limited to 126. Objects are sorted by range and if more than 126 are tracked, short range objects are reported first.

The result of the tracking is an **object** list with the following parameters:

- x position
- y position
- x component of the velocity
- y component of the velocity
- other...

#### **PROPRIETARY**

**The information contained in this document may be subject to change without notice.**

The information contained in this document shall remain the sole exclusive property of s.m.s smart microwave sensors GmbH.

Hence the sensor reports such a list of all tracked objects inside its field of view in every measurement cycle of typ. 79ms length.

The field of view typically covers up to six lanes.

**The sensor is capable of detecting stationary objects.**

### **Object Separation Performance**

Measuring object co-ordinates of multiple objects simultaneously in **3D**, i.e. range speed and angle, or x, y and speed vector, is state of the art.

However, what counts even more is the object separation capability where many vehicles are closely spaced, i.e. in multi-lane scenarios with dense traffic, like traffic jams, stop-and-go traffic and busy intersections

**The sensor provides excellent target/object separation capabilities (HD).**

Individual reflectors are separated in the detection algorithms by:

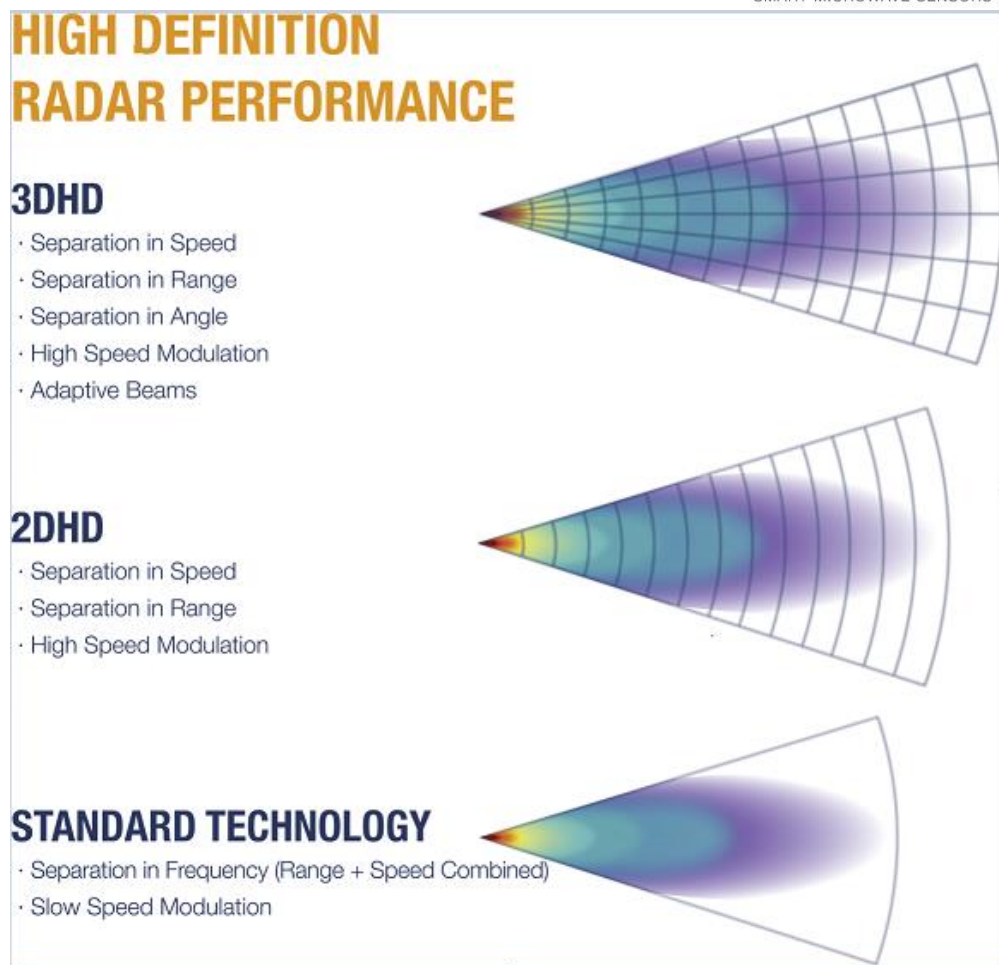
- a) having a different radial speed value (difference > 0.25m/s) **OR**
- b) having a different range value by 2...6m (depending on selected bandwidth).  
having a different range value by 7...20ft (depending on selected bandwidth)

Tracking algorithms and data base further support the separation of objects.

#### **PROPRIETARY**

**The information contained in this document may be subject to change without notice.**

The information contained in this document shall remain the sole exclusive property of s.m.s smart microwave sensors GmbH.



**Figure 3: Object Separation Capability.**

UMRR-0C features a technology which was never available before for traffic Radar sensors: **3D/UHD**. For each reflector, there is a true measurement of range, Doppler and angle.

UMRR-0C can now accomplish range gate specific and even angular gate specific detection of moving and even stationary vehicles. In each of these gates a separate Doppler detection is possible, including stationary detectors. Figure 3 explains the principle.

**PROPRIETARY**

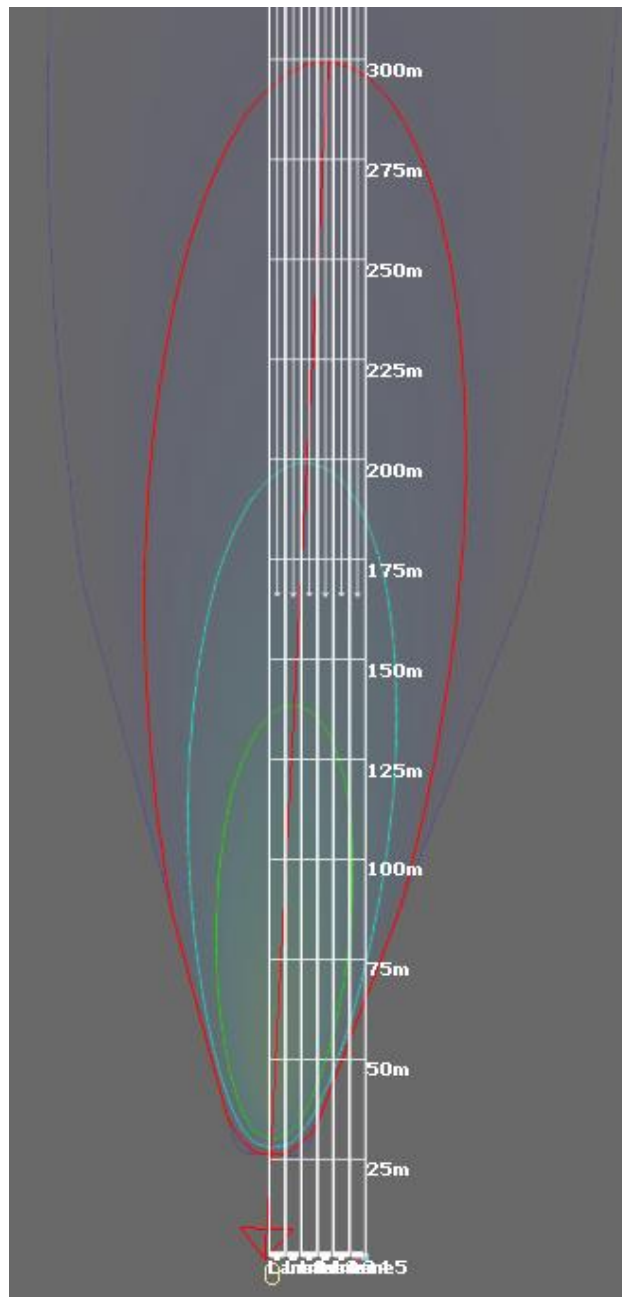
The information contained in this document may be subject to change without notice.

The information contained in this document shall remain the sole exclusive property of s.m.s smart microwave sensors GmbH.

## 2.3 Application Characteristics

### 2.3.1 Intersection Management

At intersections, the sensor is typically used for combined stop bar and advance detection.



**Figure 4: Stop Bar Detection only and Stop Bar + Advance Detection Type 40**

The sensor is usually mounted at the corner of an intersection on a vertical pole. Other mounting positions (gantry, mast arm, luminaire) may be possible. The **standard configuration** for type 40 sensor for intersection applications is shown in the picture of Figure 4 and its parameters are given in Table 1.

#### PROPRIETARY

The information contained in this document may be subject to change without notice.

The information contained in this document shall remain the sole exclusive property of s.m.s smart microwave sensors GmbH.



**Table 1: Standard Configuration for Combined Stop Bar and Advance Detection Type 40**

Parameter	Value
Traffic Direction	Typ. Approaching
Mounting Height	Typ. 6m (1...10m) <sup>I</sup> Typ. 20ft (3...33ft) <sup>I</sup>
Sensor Azimuth angle	Typ. -3° (-15 ...+15 deg.) <sup>II</sup>
Sensor Elevation angle	Typ. -1° (-9...0 deg.) <sup>II, III</sup>
Stop Bar Distance	Typ. 45m (20m ... 70m) <sup>IV</sup> Typ. 148ft (66 ... 230ft) <sup>IV</sup>
Advance Detection Distance	Typ. 180m (50m ... 440m) <sup>IV</sup> Typ. 591ft (164 ... 1444ft) <sup>IV</sup>

<sup>I</sup> May affect max. detection range. The best performance is typically achieved for mounting heights between 2-8m. Occlusion needs to be considered.

<sup>II</sup> Smaller absolute angles allow longer detection range along a road.

<sup>III</sup> Application specific. Gantry mount: steeper e. angle possible, with limitations of maximum range. Negative elevation angle means sensor pointing towards road.

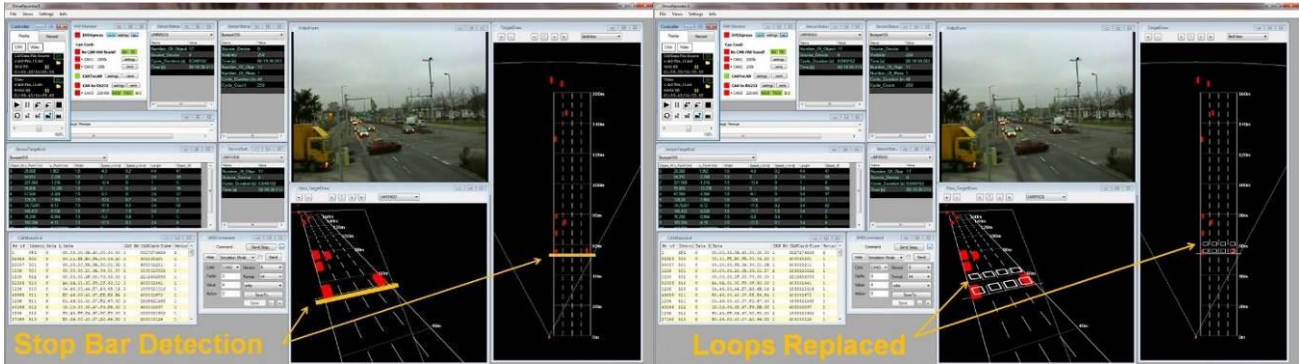
<sup>IV</sup> Typical value for stop bar applications; may be different for other applications.

**PROPRIETARY**

The information contained in this document may be subject to change without notice.

The information contained in this document shall remain the sole exclusive property of s.m.s smart microwave sensors GmbH.

The sensor is typically used standalone. Multiple sensors may however be used at an intersection. While usually four approaches need to be covered, up to four sensors can usually be mounted at or around an intersection using separate configurable frequency channels, avoiding mutual interference.



<p><b>UMRR-0C Type 40 Stop + Advance</b></p>	<ul style="list-style-type: none"> <li>• <b>Stop bar detection</b></li> <li>• <b>Advance detection</b> (exploiting the long range)</li> <li>• <b>Loop replacement</b> (non-intrusive detection)</li> <li>• <b>Queue length</b> measurement</li> <li>• <b>Custom trigger</b> conditions (e.g. location, vehicle speed, classification)</li> <li>• <b>ETA</b> measurement</li> <li>• <b>Speed</b> measurement</li> <li>• <b>Range</b> up to 340m</li> <li>• <b>Range</b> up to 1115ft</li> </ul>
<p><b>UMRR-0C Type 40 Advance+</b></p>	<ul style="list-style-type: none"> <li>• <b>Advance detection</b> (exploiting the long range)</li> <li>• <b>Loop replacement</b> (non-intrusive detection)</li> <li>• <b>Queue length</b> measurement</li> <li>• <b>Custom trigger</b> conditions (e.g. location, vehicle speed, classification)</li> <li>• <b>ETA</b> measurement</li> <li>• <b>Speed</b> measurement</li> <li>• <b>Range</b> up to 450m</li> <li>• <b>Range</b> up to 1476ft</li> </ul>

**PROPRIETARY**

The information contained in this document may be subject to change without notice.

The information contained in this document shall remain the sole exclusive property of s.m.s smart microwave sensors GmbH.

### 2.3.2 Arterial Management

On highways and country roads, the sensor is typically used to count and classify traffic. Usually three classes are selected and reported in configurable counting /statistics intervals.

The sensor delivers the following data:

- Volume
- Occupancy
- Average Speed
- Vehicle Presence
- 85 percentile speed
- Headway
- Gap
- Wrong Way Detection Trigger

The data can be retrieved in Push or Record Mode

- a) in low data volume as aggregated statistics output
- b) as per vehicle record (PVR)

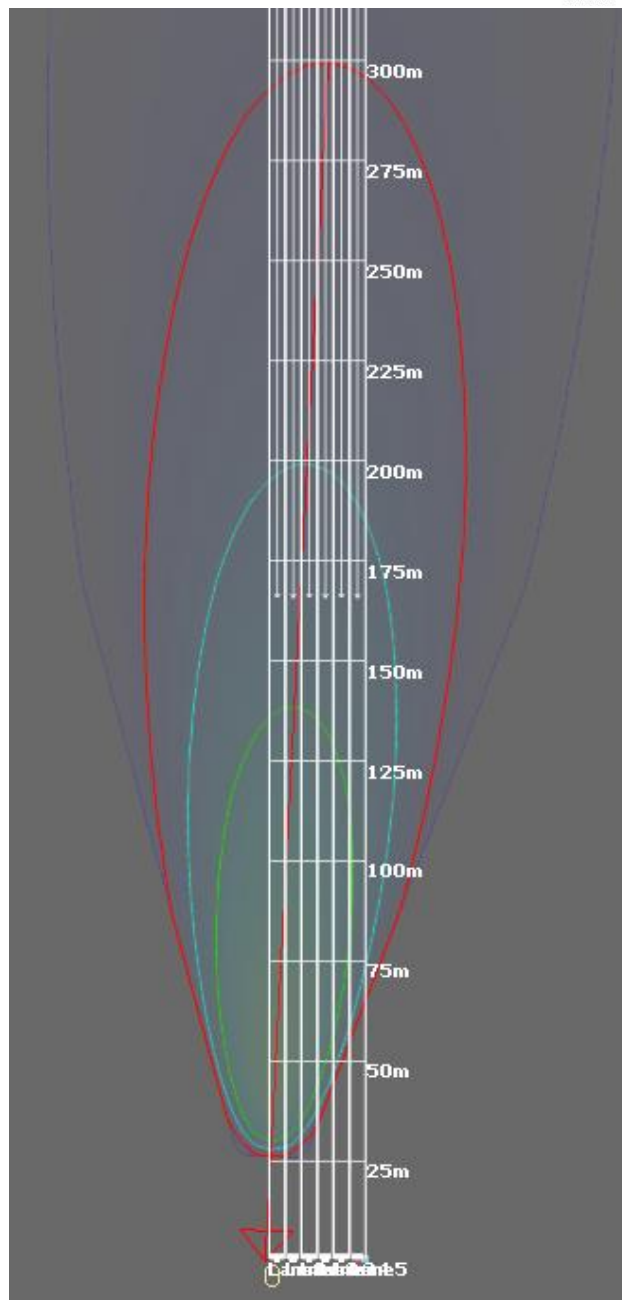
The data can be recorded in internal FLASH memory (option) and can be retrieved later. The capacity allows storage for >1 month of traffic data logging, depending on the recorder configuration:

- Example 1: 4 lanes highway monitored, Statistic Report only – 43.000h capacity  
3 classes, 5minute Statistics Report Interval
- Example 2: 4 lanes highway monitored, Statistic Report + PVR – 810h capacity  
5 classes, 5minute Statistics Report Interval, 17% of the time fully occupied

**PROPRIETARY**

**The information contained in this document may be subject to change without notice.**

The information contained in this document shall remain the sole exclusive property of s.m.s smart microwave sensors GmbH.



**Figure 5: Standard Configuration Type 40**

Because of the forward looking principle, the sensor provides the significant higher speed accuracy / general speed based information, compared to other traffic counting equipment.

The sensor is usually mounted at the roadside on a vertical pole. No setback is required. Other mounting positions (gantry, mast arm, luminaire) may be possible. The **standard configuration** for Type 40 sensor for counting applications is shown in Figure 5 and its parameters are given in the table below.

**PROPRIETARY**

**The information contained in this document may be subject to change without notice.**

The information contained in this document shall remain the sole exclusive property of s.m.s smart microwave sensors GmbH.

**Table 2: Standard Configuration for Counting and Statistics Type 40**

Parameter	Value
Traffic Direction	Typ. Approaching & Receding
Mounting Height	Typ. 6m (4...10m) <sup>I</sup> Typ. 20ft (13...33ft) <sup>I</sup>
Sensor Azimuth angle	Typ. -3° (-15 ...+15 deg.) <sup>II</sup>
Sensor Elevation angle	Typ. -1° (-9...0 deg.) <sup>II, III</sup>
Counting Line Distance (Approaching)	Typ. 70m (40 ... 100m) <sup>IV</sup> Typ. 230ft (131 ... 328ft) <sup>IV</sup>
Counting Line Distance (Receding)	Typ. 120m (70 ... 180m) <sup>IV</sup> Typ. 394ft (230 ... 591ft) <sup>IV</sup>
Setback	Typ. 1m (0... 10m) Typ. 3ft (0 ... 33ft)
Counting Accuracy	Typ. > 95% <sup>V</sup>
Classification Accuracy	Typ. > 80% <sup>V</sup>
Classes	Usually 3 classes are used of the following: Pedestrian, Bicycle, Motorbike, Passenger Car, Truck

<sup>I</sup> May affect max. detection range. Occlusion needs to be considered.

<sup>II</sup> Smaller absolute angles allow longer detection range along a road.

<sup>III</sup> Application specific. Gantry mount: steeper el. angle possible, with limitations of maximum range. Negative elevation angle means sensor pointing towards road.

<sup>IV</sup> Typical value for counting applications; may be different for other applications.

<sup>V</sup> Typical value when properly installed at suitable location. The counting and classification accuracy typically depends on the following main (and other) factors: mounting height, traffic density

The sensor is typically used standalone. Multiple sensors may however be used in close vicinity using separate configurable frequency channels, avoiding mutual interference.

### Sensor Variants and Features

<b>UMRR-0C Type 40 Forward+</b>	<ul style="list-style-type: none"> <li>• <b>Counting and Classification</b></li> <li>• <b>Wrong Way Detection</b> (vehicle moving opposite to the defined direction of traffic)</li> <li>• <b>Incident Detection</b> supported</li> <li>• <b>Speed</b> measurement</li> </ul>
---------------------------------	---

#### PROPRIETARY

The information contained in this document may be subject to change without notice.

The information contained in this document shall remain the sole exclusive property of s.m.s smart microwave sensors GmbH.

### 2.3.3 General Performance Data

Parameter	Value	Unit
<b>Sensor Performance</b>		
Max. Range on Passenger Car	350 <sup>I</sup> (@20dBm) / 230 <sup>I</sup> (@12.7dBm) 1148 <sup>I</sup> (@20dBm) / 755 <sup>I</sup> (@12.7dBm)	m ft
Max. Range on Truck	450 <sup>I</sup> (@20dBm) / 350 <sup>I</sup> (@12.7dBm) 1476 <sup>I</sup> (@20dBm) / 1148 <sup>I</sup> (@12.7dBm)	m ft
Instrumented Range	450 1476	m ft
Minimum Range	1.5 4	m ft
Range accuracy	Typ. < ±2.5% or < ±0.25m (bigger of) Typ. < ±2.5% or < ±0.80ft (bigger of)	%, m ft
Radial Speed Interval	-88.8 ...+88.8 -320...+320	m/s km/h
Minimum abs. Radial Speed	0.1 0.36	m/s km/h
Speed accuracy	Typ.< ±0.28m or ±1% (bigger of) <sup>II</sup> Typ.< ±1km/h or ±1% (bigger of) <sup>II</sup>	m/s km/h
Angle Interval (total field of view)	-6 ...+6 (El.); -18 ...+18 (Az.) <sup>III</sup>	degree
Update time	82	ms
<b>Environmental</b>		
Ambient Temperature	-40 ... +74	degree C
Shock	100	g <sub>rms</sub>
Vibration	14	g <sub>rms</sub>
IP	67 <sup>IV</sup>	
Pressure / Transport altitude	0...10.000 0...32800	m ft
<b>Mechanical</b>		
Weight	1290 45.50	g oz
Dimensions	See 2.5	
<b>Model No.</b>	<b>0Cxxxx-28xxxx</b>	
DSP Board – Antenna Identification	0Cxxxx-28xxxx	
Housing Identification	0707xx	
<b>General</b>		
Power Supply	13 ... 32 <sup>V</sup> 12 <sup>VI</sup>	V DC W
Frequency Band	24.0...24.25	GHz
Bandwidth	< 250	MHz
Max. Transmit Power (EIRP)	<20 (<12.7 in certain regions)	dBm
Interfaces	CAN V2.0b (passive) <sup>VII</sup>	

**PROPRIETARY**

The information contained in this document may be subject to change without notice.

The information contained in this document shall remain the sole exclusive property of s.m.s smart microwave sensors GmbH.

	RS485 full duplex <sup>VIII</sup> 10/100 Ethernet	
Connector	12 Pin plug Hirose LF10WBRB-12PD	CAN, Power, RS485, Eth.

<sup>I</sup> Typical values; may vary to higher or lower values depending on clutter environment. All values given for bore sight. Please note that the Radar system – like any other sensor system – although being well optimized and providing excellent performance, will not achieve a 100% detection probability and will not achieve a false alarm rate equal to zero.

<sup>II</sup> Measured on object having const. radial speed, at bore sight.

<sup>III</sup> Total field of view is angle interval where reflectors can be detected; 3dB field of view is narrower.

<sup>IV</sup> IP 67 only when connector or cap attached.

<sup>V</sup> measured at connector; min. voltage slew rate 500V/s or max. voltage rise time 15ms; supply source impedance 0.5Ohms.

<sup>VI</sup> Power consumption at 20°C. Increased consumption at higher temperatures: < 24W at +74°C

<sup>VII</sup> It is recommended to use an external surge protection for power, CAN, RS485, Ethernet and other interface ports.

#### 2.3.4 Start-up time

After power up or reset, the sensor readings are within specified performance within <30 seconds.

#### 2.3.5 On-board diagnostics (BIT)

The UMRR sensor cyclically reports a status message providing the following information (Continuous BIT)

- Sensor run time
- Sensor cycle time
- Sensor mode
- Other status bits

Initiated BIT is available. Sensor will send BIT results when it receives a command to do so.

#### 2.3.6 Sensor Network

The sensor is typically used standalone.

#### 2.3.7 Real Time Clock and Storage

The sensor has a real time clock and flash based non volatile memory for long term traffic statistic data on board.

#### 2.3.8 Compliance

EU RED directive,  
ETSI EN 300-440,

#### PROPRIETARY

**The information contained in this document may be subject to change without notice.**

The information contained in this document shall remain the sole exclusive property of s.m.s smart microwave sensors GmbH.

FCC part 15,  
RSS-310,  
RSS-210,  
SRRC,  
KCC,  
NCC  
CE  
ROHS

**Note:**

Parts of the UMRR-0C device may be hot. To ensure protection against accidental contact and fire protection, operate this device only with observe safety instructions according EN 60 950-1, corresponding UL Standard or national safety regulation.

**PROPRIETARY**

**The information contained in this document may be subject to change without notice.**

The information contained in this document shall remain the sole exclusive property of s.m.s smart microwave sensors GmbH.



## 2.4 Sensor Description and Hardware ID

Every UMRR sensor housing is tagged with a type sticker containing the product description and the serial number. It also contains a mark which side of the sensor is top.

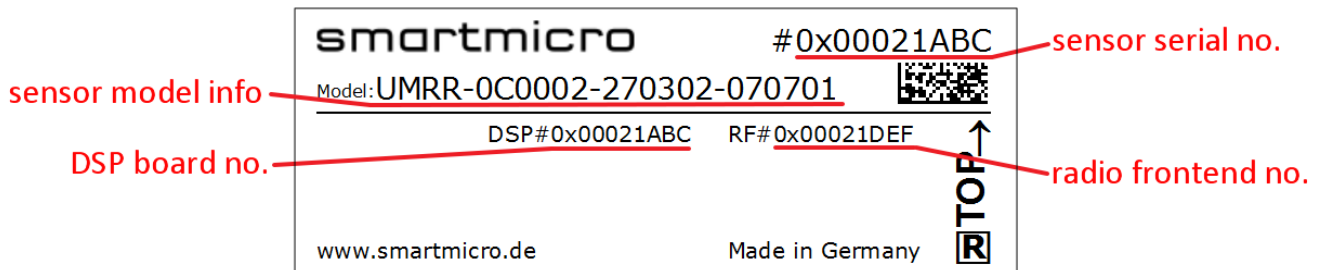


Figure 6: Type sticker example

The individual sensors are referred to as **UMRR-xyyyzz-aabbcc-ddeeff**

- xx** (DSP Board Generation xx)
- yy** (DSP Board Derivative/Version yy)
- zz** (DSP Board Revision zz)
  
- aa** (RF Board (Antenna) aa)
- bb** (RF Board Derivative/Version bb)
- cc** (RF Board Revision cc)
  
- dd** (Housing type dd)
- ee** (Housing Version ee)
- ff** (Housing Revision ff)

UMRR means Universal Medium Range Radar platform developed by Smartmicro.

The number in the top right corner is the unique serial number of the sensor. In addition to that the used DSP board and the RF board got their own unique serial numbers.

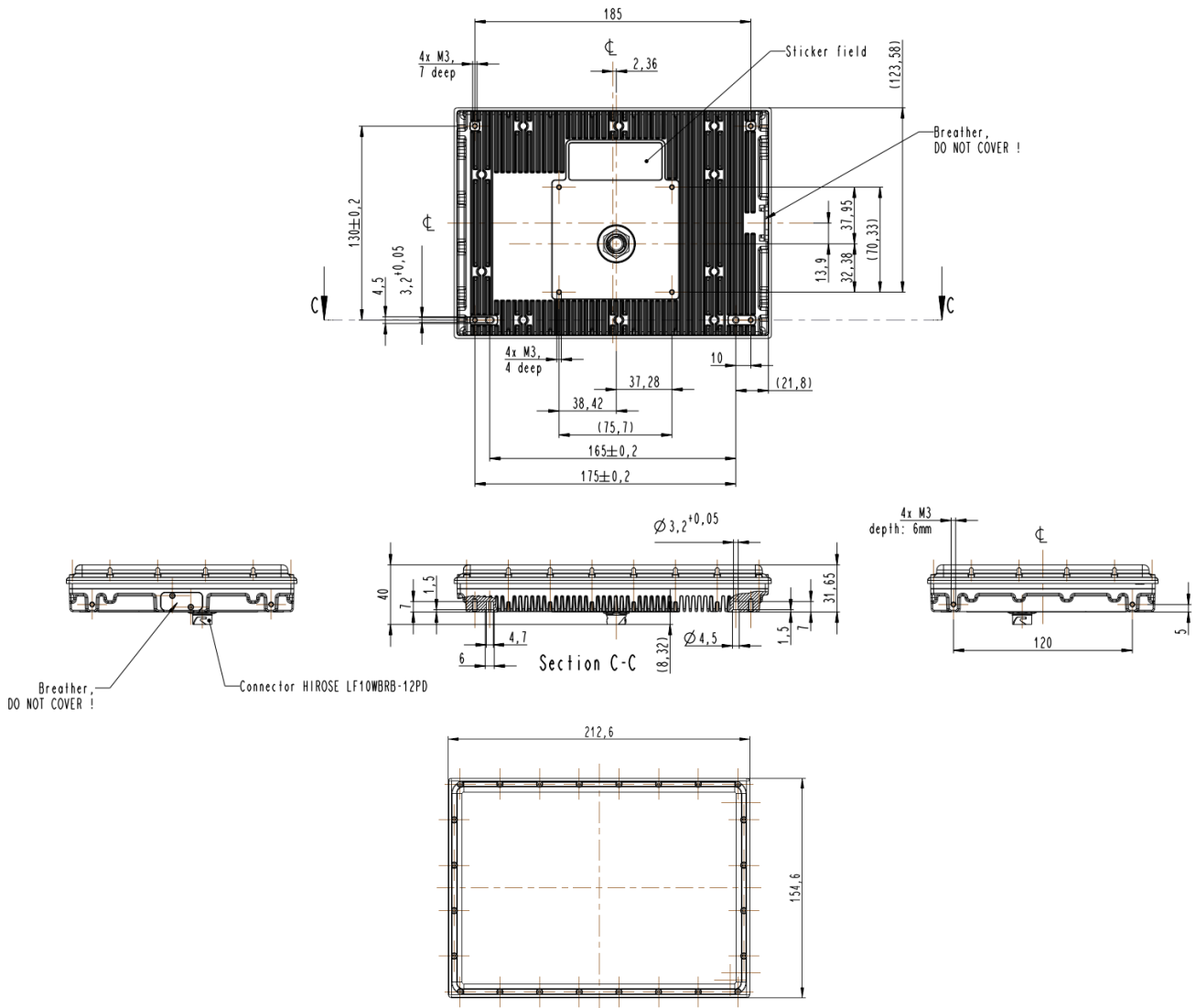
### PROPRIETARY

The information contained in this document may be subject to change without notice.

The information contained in this document shall remain the sole exclusive property of s.m.s smart microwave sensors GmbH.

## 2.5 Sensor Dimensions

All values given in mm.



**Figure 7: Sensor Dimensions.**

### PROPRIETARY

The information contained in this document may be subject to change without notice.

The information contained in this document shall remain the sole exclusive property of s.m.s smart microwave sensors GmbH.

## 2.6 Connector

The used sensor connector is a 12-pin male (plug) circular bayonet type connector (water proof IP67, series LF10WBRB-12PD, manufacturer Hirose, Japan). A female counterpart (socket), e.g. LF10WBP-12S, has to be used to connect to the sensor. The pin numbering of the socket is shown in Figure 8 the pin description is given in Table 3.

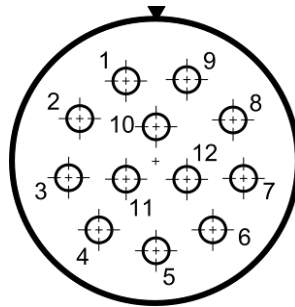


Figure 8: View on solder cup side of socket (rear view of female counterpart to be connected to sensor)

Table 3: Sensor connector pin out model UMRR-0Cxxxx

Pin No.	Function	Wire Color (MEDI type #KU110C12J002)
<b>1</b>	Sensor Ethernet TX H	gray / red
<b>2</b>	Sensor Ethernet TX L	red / blue
<b>3</b>	Sensor RS485 RX L	pink
<b>4</b>	Sensor RS485 RX H	gray
<b>5</b>	Sensor RS485 TX L	brown
<b>6</b>	Sensor RS485 TX H	white
<b>7</b>	Sensor_GND	blue
<b>8</b>	Sensor_Vcc	red
<b>9</b>	Sensor Ethernet RX L	black
<b>10</b>	Sensor Ethernet RX H	purple
<b>11</b>	CAN H	green
<b>12</b>	CAN L	yellow

Please note that in the standard configuration the sensor has no 120 Ohms resistor on board (CAN bus termination between CAN L and CAN H). The resistors are nevertheless required at either end of a CAN / RS485 bus and is in most cases integrated in the cable delivered along with the sensor (if cable is manufactured by Smartmicro).

For the RS485 data interface there is a 120 Ohms resistor on board of the sensor.

A number of cable sets for initial operation and test purposes are offered by Smartmicro, to deliver a fast set-up of a sensor system. Among those preconfigured ready-to-run cables as well as cable stumps (pig tail cables or various lengths) which carry the connector on one side and open wires on the other.

### PROPRIETARY

The information contained in this document may be subject to change without notice.

The information contained in this document shall remain the sole exclusive property of s.m.s smart microwave sensors GmbH.

### 3 Important Legal Disclaimer Notice

All Product, Product specifications and data in this Product / project documentation or data sheet are subject to change without notice to improve reliability, function, design or otherwise.

Not all Products and/or Product features may be available in all countries and regions. For legal reasons, features may be deleted from Products or Smartmicro may refuse to offer Products.

The statements, technical information and recommendations contained herein are believed to be accurate as of the date hereof. Smartmicro disclaims any and all liability for any errors, inaccuracies or incompleteness contained in this datasheet or in any other disclosure relating to the Product.

To the extent permitted by applicable law, Smartmicro disclaims (i) any and all liability arising out of the application or use of the Product or the data contained herein, (ii) any and all liability of damages exceeding direct damages, including - without limitation - indirect, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of suitability of the Product for a particular purpose.

Statements regarding the suitability of Products for certain types of applications are based on Smartmicro' knowledge of typical requirements that are often placed on Smartmicro' Products in generic/general applications. Such statements are, however, not binding statements about the suitability of Products for a particular/specific application. It is the customer/user's own responsibility to validate that the Product with the specifications described herein is suitable for use in its particular/specific application. Parameters and performance of the Products may due to particular/specific applications and due to particular/specific surroundings deviate from the statements made herein. Therefore, it is important that customer/user has thoroughly tested the Products and has understood the performance and the limitations of the Products before installing the Products for the final applications or before commercialization. Although Products are well optimized to be used for the intended applications stated herein, it must also be understood by the customer/user that the detection probability may not be 100 % and the false alarm rate may not be zero.

The information provided herein, relates only to the specific Product designated and may not be applicable when such Product is used in combination with other materials or in any process not defined herein. All operating parameters, including typical parameters, must be validated for each customer application by the customer/user's technical experts. Customers using or selling Smartmicro products not expressly indicated for use in such applications do so at their own risk.

This Product specification or data sheet does not expand or otherwise modify Smartmicro terms and conditions of purchase, including but not limited to the warranty expressed therein. Except as expressly indicated in writing by Smartmicro, the Products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Product could result in personal injury or death.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Smartmicro Product names and markings noted herein may be trademarks of their respective owners.

Please note that the application of the Product may be subject to standards or other regulations that may vary from country to country. Smartmicro does not guarantee that the use of Products in the applications described herein will comply with such regulations in any country. It is the customer/user's responsibility to ensure that the use and incorporation of Products complies with the regulatory requirements of their markets.

If any provision of this Disclaimer is, or is found to be, void or unenforceable under applicable law, that will not affect the validity or enforceability of the other provisions of this Disclaimer.

#### **PROPRIETARY**

**The information contained in this document may be subject to change without notice.**

The information contained in this document shall remain the sole exclusive property of s.m.s smart microwave sensors GmbH.

## 4 Contact

### Address:

smart microwave sensors GmbH  
In den Waashainen 1  
38108 Braunschweig  
Germany

### Phone / Fax numbers:

Phone: +49-531-39023-0  
Fax: +49-531-39023-599

### Web / Email address:

Web: [www.smartmicro.de](http://www.smartmicro.de)  
Email: [info@smartmicro.de](mailto:info@smartmicro.de)

### PROPRIETARY

The information contained in this document may be subject to change without notice.

The information contained in this document shall remain the sole exclusive property of s.m.s smart microwave sensors GmbH.