

## Project Documentation | JBOX - Junction Box

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Junction Box for UMRR Traffic Management Sensor

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# 1 Data Sheet

The Smartmicro **Junction Box** offers a universal and easy to use field installable way of connecting and surge protecting a UMRR-0A or UMRR-0C or UMRR-0F radar to the home run cable.

## 1.1 Features

- Provides an **easy-to-use** universal electrical interface through a terminal block.
- **Field installable:** A simple screwdriver is sufficient to install the Junction Box.
- **Surge Protection:** The Junction Box features protection for power, CAN and RS485 communication wires.
- **Robust:** The Junction Box is watertight and almost unbreakable.
- Gen. 01 and Gen. 02 Junction boxes feature
  - Captive screws
  - Signal names printed on PCB
  - Jumpers to determine RS485 full or half duplex operation<sup>1</sup>
- Versions for **all UMRR-0A and UMRR-0F and UMRR-11 models** available.
- Versions for **UMRR-0C** require HOUSING-070707 or compatible.
- Integrates into smartmicro's BRACKETs.

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<sup>1</sup> UMRR hardware has to offer both options, check UMRR datasheet.

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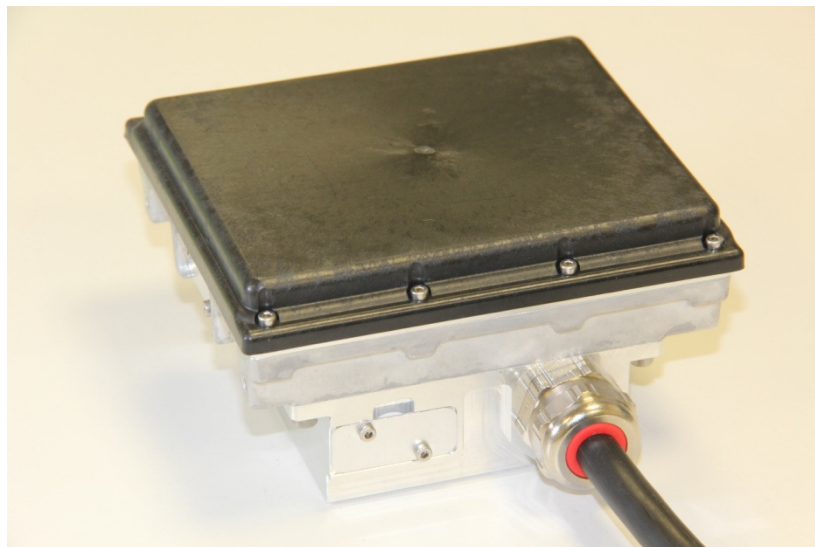
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## 2 Junction Box for UMRR-0A sensors



**Figure 1: Junction Box JBOX-000000 with attached Lapp cable**



**Figure 2: Junction Box JBOX-000000 with attached Sensor**

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## 2.1 Specifications

<b>Model No.</b>	<b>JBOX-000000 / JBOX-000100</b>
<b>Mechanical</b>	
Weight	183 g, excluding cable.
Height	79.8 mm excluding cable outlet ca. 116 mm including cable outlet
Width	84 mm
Depth	29 mm
<b>Supported Cables</b>	
Supported cable diameter	9 mm – 13 mm (smaller diameter available on request)
Supported conductor cross section range	0.13 mm <sup>2</sup> – 2.5 mm <sup>2</sup>
Recommended cable	Lapp cable UNITRONIC BUS IBS Yv COMBI type 2170217 or MEDI no. 9DB280431
<b>Surge Protection</b>	
Surge protection of power lines	Compliant to IEC 61000-4-2 (ESD) and IEC 61000-4-4 (fast transients)
Surge protection of data lines	Compliant to IEC 61000-4-2 (ESD) and IEC 61000-4-4 (fast transients)

**Table 1: JBox Gen. 00 specifications**

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## 2.2 Pinout

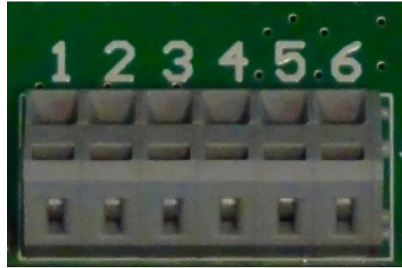


Figure 3: Terminal block with "pin" numbers

Pin No.	Function	Wire Color (Lapp type 2170217)	Wire Color (MEDI type #9DB280431)
1	CAN H	green	green
2	CAN L	yellow	yellow
3	Sensor RS485 TX/RX High	gray	gray
4	Sensor RS485 TX/RX Low	pink	pink
5	Sensor_VCC	red	red
6	Sensor_GND	blue	blue

Table 2: pinout of terminal block connector

## 2.3 Variants

See **Table 3** for a list of Junction Box variants and the sensor types they support.

Junction Box variant	Supported UMRR-0A
<b>JBOX-000000</b>	Type 29 Type 31
<b>JBOX-000100</b>	Type 30 Type 32 (with Housing-070602)

Table 3: Junction Box Gen 00 variants

## 2.4 Recommended Cable

Lapp cable UNITRONIC BUS IBS Yv COMBI type 2170217.

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### 3 SIMPLE Junction Box for UMRR-0C, UMRR-0F and UMRR-11 sensors

The Junction Box Gen. 02 features a terminal block for RS485 and Power lines. The terminal block has only 6 terminals allowing greater wire gauge than the FULL Junction Box.

If other data lines are required, use the FULL Junction Box Gen. 01.



Figure 4: Junction Box JBOX- 02xxxx

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### 3.1 Specifications

<b>Model No.</b>	<b>JBOX-02xxxx</b>
<b>Mechanical</b>	
Weight	180 g, excluding cable.
Height	79.8 mm excluding cable outlet ca. 116 mm including cable outlet
Width	84 mm
Depth	29 mm
<b>Supported Cables</b>	
Supported cable diameter	9 mm – 13 mm (smaller diameter available on request)
Supported conductor cross section range	0.13 mm <sup>2</sup> – 2.5 mm <sup>2</sup>
Recommended cable	MEDI #KU110C12J002
<b>Surge Protection</b>	
Surge protection of power lines	Compliant to IEC 61000-4-2 (ESD) and IEC 61000-4-4 (fast transients)
Surge protection of data lines	Compliant to IEC 61000-4-2 (ESD) and IEC 61000-4-4 (fast transients)

**Table 4: JBox Gen. 02 specifications**

### 3.2 Jumpers J1 and J2

J1 and J2 are bridges between pins 1 and 3 / pins 2 and 4 of the terminal block. Those bridges must be **open for full duplex RS485** operation, and must be **closed for half-duplex RS485**.



**Figure 5: J3 and J4 determine RS485 full/half duplex operation**

Please note J1 and J2 are open or closed depending on order code. Check **Table 6**.

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### 3.3 Pinout



Figure 6: Terminal block with "pin" numbers

Pin No.	Function	Wire Color (MEDI type #KU110C12J001)
1	Sensor RS485 TX H <sup>2</sup>	white
2	Sensor RS485 TX L <sup>3</sup>	brown
3	Sensor RS485 RX H	gray
4	Sensor RS485 RX L	pink
5	VCC	red
6	GND	blue

Table 5: pinout of terminal block connector

### 3.4 Variants

See **Table 6** for a list of Junction Box variants and the sensor types they support.

Junction Box variant	Supported UMRR-0C	Supported UMRR-0F	Supported UMRR-11
<b>JBOX-020000</b>	none	Type 29 Type 31	none
<b>JBOX-020100</b>	none	Type 30	none
<b>JBOX-020400</b>	none		Type 44 Type 45
<b>JBOX-020500</b>	Type 39 Type 40 Type 42 Type 43		none

Table 6: Junction Box Gen 02 variants

<sup>2</sup> In half-duplex mode the pins 1 and 3 has to be hard-wired connected, use J1 and J2

<sup>3</sup> In half-duplex mode the pins 2 and 4 has to be hard-wired connected, use J1 and J2

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## 4 FULL Junction Box for UMRR-0C, UMRR-0F and UMRR-11 sensors

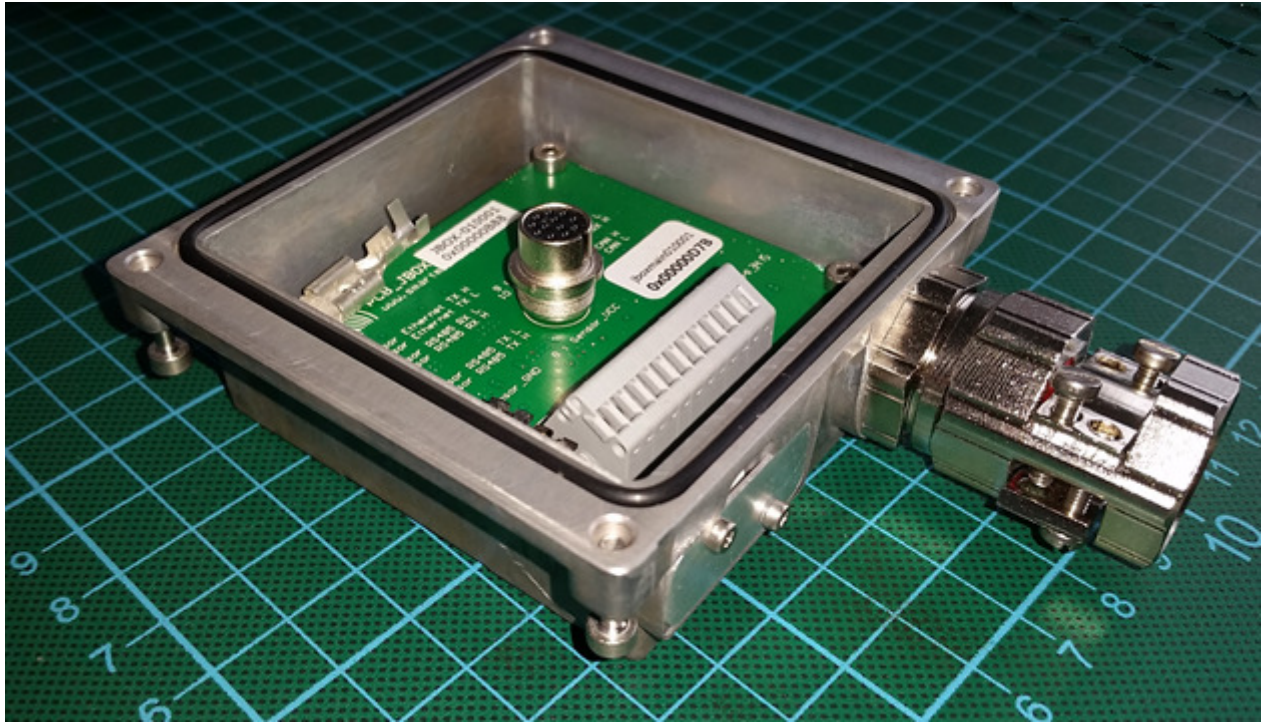


Figure 7: Junction Box JBOX-010001 inner view



Figure 8: Junction Box JBOX-010001 outer view

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## 4.1 Specifications

<b>Model No.</b>	<b>JBOX-010001 / JBOX-010101 / JBOX-010501</b>
<b>Mechanical</b>	
Weight	180 g, excluding cable.
Height	79.8 mm excluding cable outlet ca. 116 mm including cable outlet
Width	84 mm
Depth	29 mm
<b>Supported Cables</b>	
Supported cable diameter	9 mm – 13 mm (smaller diameter available on request)
Supported conductor cross section range	0.08 mm <sup>2</sup> – 0.5 mm <sup>2</sup>
Recommended cable	MEDI #KU110C12J002
<b>Surge Protection</b>	
Surge protection of power lines	Compliant to IEC 61000-4-2 (ESD) and IEC 61000-4-4 (fast transients)
Surge protection of data lines	Compliant to IEC 61000-4-2 (ESD) and IEC 61000-4-4 (fast transients)

Table 7: JBox Gen. 01 specifications

## 4.2 Jumpers J3 and J4

J3 and J4 are bridges between pins 3 and 5 / pins 4 and 6 of the terminal block. Those bridges must be **open for full duplex RS485** operation, and must be **closed for half-duplex RS485**.

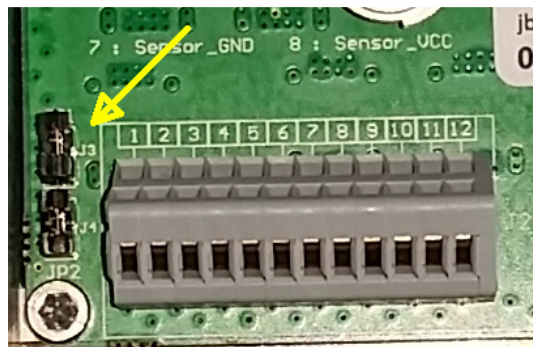


Figure 9: J3 and J4 determine RS485 full/half duplex operation

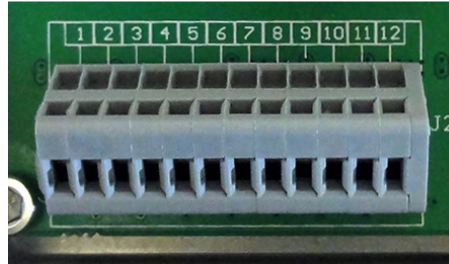
Please note J3 and J4 are open or closed depending on order code. Check **Table 10**.

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### 4.3 Pinout



**Figure 10: Terminal block with "pin" numbers**

Pin No.	Function	Wire Color (MEDI type #KU110C12J001)
1	Sensor Ethernet TX H	gray / red
2	Sensor Ethernet TX L	red / blue
3	Sensor RS485 TX/RX L	pink
4	Sensor RS485 TX/RX H	gray
5	connect to pin 3 <sup>4</sup>	brown
6	connect to pin 4 <sup>5</sup>	white
7	Sensor_GND	blue
8	Sensor_VCC	red
9	Sensor Ethernet RX L	black
10	Sensor Ethernet RX H	purple
11	CAN H	green
12	CAN L	yellow

**Table 8: pinout of terminal block connector (half-duplex/2-wire RS485, UMRR-0F products)**

Pin No.	Function	Wire Color (MEDI type #KU110C12J001)
1	Sensor Ethernet TX H	gray / red
2	Sensor Ethernet TX L	red / blue
3	Sensor RS485 RX L	pink
4	Sensor RS485 RX H	gray
5	Sensor RS485 TX L	brown
6	Sensor RS485 TX H	white
7	Sensor_GND	blue
8	Sensor_VCC	red
9	Sensor Ethernet RX L	black
10	Sensor Ethernet RX H	purple
11	CAN H	green
12	CAN L	yellow

**Table 9: pinout of terminal block connector (full-duplex/4-wire RS485, UMRR-0C and UMRR-11 products)**

<sup>4</sup> In half-duplex mode the pins 3 and 5 has to be hard-wired connected, use J3 and J4

<sup>5</sup> In half-duplex mode the pins 4 and 6 has to be hard-wired connected, use J3 and J4

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#### 4.4 Variants

See **Table 10** for a list of Junction Box variants and the sensor types they support.

<b>Junction Box variant</b>	<b>Supported UMRR-0C</b>	<b>Supported UMRR-0F</b>	<b>Supported UMRR-11</b>
<b>JBOX-010001</b>	none	Type 29 Type 31	none
<b>JBOX-010101</b>	none	Type 30	none
<b>JBOX-010401</b>	none		Type 44 Type 45
<b>JBOX-010501</b>	Type 39 Type 40 Type 42 Type 43		none

**Table 10: Junction Box Gen 01 variants**

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## 5 General Information

### 5.1 JBOX Grounding Requirements

Neither the housing of the UMRR sensor nor the JBOX is electrically floated but connected to the negative supply voltage instead. To assure correct operation of the sensor, please refer to the grounding requirements described in [UMRR\\_Traffic\\_Sensor\\_Grounding\\_Requirements.pdf](#).

### 5.2 Fixation

The JBOX will be attached to the UMRR sensor using the threaded holes on the back of the sensor. Please consider this in case that you design your own bracket or integrate the sensor in another housing. The threaded holes **on the sides** of the sensor are intended for the fixation of the sensor instead.

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