SENSOR FEATHERWING

USER MANUAL

2501000201291

VERSION 1.0

NOVEMBER 20, 2020
## Revision history

<table>
<thead>
<tr>
<th>Manual version</th>
<th>HW version</th>
<th>Notes</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0</td>
<td>2.0</td>
<td>Initial version</td>
<td>November 2020</td>
</tr>
</tbody>
</table>
## Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CISPR</td>
<td>Comité International Spécial des Perturbations Radioélectriques</td>
<td>International Special Committee on Radio Interference</td>
</tr>
<tr>
<td>EV</td>
<td>Evaluation</td>
<td></td>
</tr>
<tr>
<td>ESD</td>
<td>Electro Static Discharge</td>
<td></td>
</tr>
<tr>
<td>EMC</td>
<td>Electro Magnetic Compatibility</td>
<td></td>
</tr>
<tr>
<td>GND</td>
<td>Ground</td>
<td></td>
</tr>
<tr>
<td>HIGH</td>
<td>High signal level</td>
<td></td>
</tr>
<tr>
<td>IDE</td>
<td>Integrated development environment</td>
<td></td>
</tr>
<tr>
<td>IEC</td>
<td>International Electrotechnical Commission</td>
<td></td>
</tr>
<tr>
<td>JST</td>
<td>Japan Solderless Terminal</td>
<td></td>
</tr>
<tr>
<td>JTAG</td>
<td>Joint Test Action Group</td>
<td></td>
</tr>
<tr>
<td>LED</td>
<td>Light Emitting Diode</td>
<td></td>
</tr>
<tr>
<td>LGA</td>
<td>Land Grid Array</td>
<td></td>
</tr>
<tr>
<td>Li-Po</td>
<td>Lithium-Polymer</td>
<td></td>
</tr>
<tr>
<td>LOW</td>
<td>Low signal level</td>
<td></td>
</tr>
<tr>
<td>MEMS</td>
<td>Micro-Electro Mechanical Systems</td>
<td></td>
</tr>
<tr>
<td>PC</td>
<td>Personal Computer</td>
<td></td>
</tr>
<tr>
<td>PCB</td>
<td>Printed Circuit Board</td>
<td></td>
</tr>
<tr>
<td>SCL</td>
<td>Serial clock</td>
<td></td>
</tr>
<tr>
<td>SDA</td>
<td>Serial data</td>
<td></td>
</tr>
<tr>
<td>SDK</td>
<td>Software Development Kit</td>
<td></td>
</tr>
<tr>
<td>SPI</td>
<td>Serial Peripheral Interface</td>
<td></td>
</tr>
<tr>
<td>VCC</td>
<td>Supply voltage</td>
<td></td>
</tr>
<tr>
<td>VDD</td>
<td>Voltage Drain Drain</td>
<td></td>
</tr>
</tbody>
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1 General description

1.1 Introduction

The Würth Elektronik eiSos Sensor FeatherWing is a sensor development board fully compatible to the popular Adafruit Feather line of development boards. It consists of the following four sensors,

- WSEN-PADS - Absolute pressure sensor (2511020213301)
- WSEN-ITDS - 3-axis acceleration sensor (2533020201601)
- WSEN-TIDS - Temperature sensor (2521020222501)
- WSEN-HIDS - Humidity sensor (2523020210001)

All four sensors are connected over the shared I²C bus and hence can be connected to any of the Feather microcontroller boards. The Arduino (C/C++) drivers and examples (see chapter 4) made available makes it easy to build a prototype to kick-start the application development.

The Sensor FeatherWing also has the 4-pin JST QWIIC® connector on-board. This enables easy connection to the QWIIC® ecosystem of development boards. Additionally, a 6 pin connector enables extension of the FeatherWing with a host of evaluation boards from Würth Elektronik eiSos.
1.2 Block diagram

![Block diagram of Sensor FeatherWing](image)

Figure 2: Block diagram - Sensor FeatherWing

1.3 Contents

<table>
<thead>
<tr>
<th>Description</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>WE Sensor FeatherWing</td>
<td>1</td>
</tr>
<tr>
<td>QWIIC® connector</td>
<td>1</td>
</tr>
<tr>
<td>2×3 WE-sensor connector (right angled)</td>
<td>1</td>
</tr>
<tr>
<td>Packaging: ESD safe bag</td>
<td>2</td>
</tr>
</tbody>
</table>

Table 1: Contents 2501000201291
2 Functional description

The Sensor FeatherWing was designed with rapid prototyping in mind. Being fully compatible with the Adafruit ecosystem, this FeatherWing allows the user the flexibility to choose the preferred host microcontroller. The inherent modularity of the ecosystem allows the FeatherWing to be easily integrated into any project. The next sections provide a brief introduction to Adafruit’s Feather ecosystem and details on the sensors present on the FeatherWing. Feel free to check our youtube channel: www.youtube.com/user/WuerthElektronik/videos for video tutorials, hands-ons and webinars relating to our products.

2.1 Adafruit Feather

The Adafruit Feather ecosystem consists of two types of boards apart from a host of accessories:

- **Feather**: Adafruit Feathers are a complete line of development boards from Adafruit that are standalone and stackable. They can be powered either over the on-board micro-USB plugs or using a Li-Po battery. Feathers are portable, flexible and light as their namesake.

- **FeatherWings**: FeatherWings are stackable boards that when used along with a Feather add a certain functionality to the system.

The Feather system with more than 50+ Wings, several different types of accessories and arduino/circuit python based code support provides a perfect ecosystem for rapid prototyping. Please refer to adafruit.com/feather for more details on the Adafruit Feather ecosystem.

2.2 Sensor FeatherWing

The Sensor FeatherWing consists of four sensors. This section provides details regarding the key features of these sensors.

2.2.1 WSEN-PADS (2511020213301)

The WSEN-PADS is a MEMS based piezo-resistive absolute pressure sensor with an integrated ASIC and an embedded temperature sensor. The fully molded holed LGA package and low current consumption makes this sensor suitable for a range of applications including weather stations, barometers, altimeters and indoor navigation.

**Key features**

- Absolute pressure range : 26 to 126 kPa
- Output data rate : 1 to 200 Hz
- Pressure data resolution : 24-bits
- Current consumption : 4 $\mu$A
• Programmable pressure threshold and data-ready interrupt

Further details about this sensor can be found under we-online.de/katalog/en/WSEN-PADS

2.2.2 WSEN-ITDS (2533020201601)

The WSEN-ITDS sensor is a 14-bit digital ultra-low-power and high-performance three-axis accelerometer with a digital output interface. Capability of detecting events like free fall, tap recognition, wake up, stationary/motion, activity/inactivity and 6D orientation make the sensor suitable for applications like vibration monitoring, tilt measurement, impact detection and many more.

Key features

• Selectable full scale: ±2g, ±4g, ±8g, ±16g,
• Bandwidth: 400 Hz
• Output data rate: Up to 1600 Hz
• Noise density: 90 μg / Hz
• Operating modes: High-performance, Low-power, Normal
• Current consumption: 16 μA (Low-power mode)

Further details about this sensor can be found under we-online.de/katalog/en/WSEN-ITDS

2.2.3 WSEN-TIDS (2521020222501)

The WSEN-TIDS is a high precision silicon-based digital temperature sensor IC with an integrated ASIC and a digital I²C interface. A compact UDFN package and fast thermal response make this sensor ideal for a range of applications like environmental monitoring, HVAC, PCB thermal monitoring, industrial control and many more.

Key features

• Temperature range: -40 to 125 °C
• Output data rate: 25 to 200 Hz
• Temperature data resolution: 16-bits
• Current consumption: 1.75 μA
• Programmable temperature threshold interrupt

Further details about this sensor can be found under we-online.de/katalog/en/WSEN-TIDS
2.2.4 WSEN-HIDS (2523020210001)

The WSEN-HIDS is a 16-bit ultra-low power and high-performance humidity sensor with a digital interface. The pre-calibrated sensor in a compact LGA package is suitable for a variety of applications including HVAC systems, white goods, building automation and air conditioning.

Key features

- Humidity range: 0 to 100 % rH
- Humidity noise: 0.35 % rH RMS
- Output data rate: 1 Hz, 7 Hz and 12.5 Hz
- Current consumption: 8.9 μA
- Integrated temperature sensor

Further details about this sensor can be found under we-online.de/katalog/en/WSEN-HIDS
3 Hardware description

This section contains a detailed description of the hardware features of the Sensor FeatherWing. The design files for this hardware can be downloaded from [github.com/WE-eiSmart/FeatherWings-Hardware](https://github.com/WE-eiSmart/FeatherWings-Hardware).

3.1 Jumpers

Figure 3: Jumpers and their default state

3.1.1 JP1

This jumper has to be mounted and set when the CON4 is used to connect to a sensor using the SPI interface.

<table>
<thead>
<tr>
<th>JP1</th>
<th>Function</th>
<th>Jumper set (default)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,2</td>
<td>SPI_CE(CON4) to GPIOA5</td>
<td>No (Not mounted)</td>
</tr>
</tbody>
</table>

Table 2: Jumper JP1

3.1.2 JP2

The standard I\(^2\)C interface requires the SCL and SDA lines to be pulled up with resistors. These jumpers can be removed in cases where the pull-ups already exist on the I\(^2\)C bus.
### 3.2 Connectors and pin headers

#### Table 3: Jumper JP2

<table>
<thead>
<tr>
<th>JP2</th>
<th>Function</th>
<th>Jumper set (default)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,2</td>
<td>Connect $\text{I}^2\text{C}$ SCL line to a 4.7 k$\Omega$ Pull up resistor</td>
<td>Yes</td>
</tr>
<tr>
<td>3,4</td>
<td>Connect $\text{I}^2\text{C}$ SDA line to a 4.7 k$\Omega$ Pull up resistor</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Figure 4: Connectors on the top

Figure 5: Connectors at the bottom
<table>
<thead>
<tr>
<th>Connector</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>CON1</td>
<td>Pin header for interrupt lines of the sensors</td>
</tr>
<tr>
<td>CON2</td>
<td>QWIIC® connector</td>
</tr>
<tr>
<td>CON3</td>
<td>QWIIC® connector</td>
</tr>
<tr>
<td>CON4</td>
<td>2×3 connector for WE sensor EV-boards for SPI</td>
</tr>
<tr>
<td>CON5</td>
<td>2×3 connector for WE sensor EV-boards for I²C</td>
</tr>
<tr>
<td>Feather connector</td>
<td>Standard 16 and 12-pin headers for the Feather ecosystem</td>
</tr>
</tbody>
</table>

Table 4: Connector overview

### 3.2.1 CON1

Connector CON1 is a 1×5 2.54 mm pin header and provides all the interrupt lines that can be optionally connected to the host. This connector is not mounted.

<table>
<thead>
<tr>
<th>Pin</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Interrupt of the WSEN-HIDS sensor</td>
</tr>
<tr>
<td>2</td>
<td>Interrupt 1 of the WSEN-ITDS sensor</td>
</tr>
<tr>
<td>3</td>
<td>Interrupt 0 of the WSEN-ITDS sensor</td>
</tr>
<tr>
<td>4</td>
<td>Interrupt of the WSEN-PADS sensor</td>
</tr>
<tr>
<td>5</td>
<td>Interrupt of the WSEN-TIDS sensor</td>
</tr>
</tbody>
</table>

### 3.2.2 CON2 and CON3

CON2 (mounted) and CON3 (not mounted) are 4-pin JST connectors that allow interfacing with SparkFun’s QWIIC® development board ecosystem. CON3 is not mounted and needs to be soldered on in order to be daisy chain-able. The QWIIC® ecosystem offers a wide range of development boards and accessories for quick prototyping. Please check spark-fun.com/qwiic for details on the QWIIC® ecosystem.

<table>
<thead>
<tr>
<th>Pin</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>I²C SCL</td>
</tr>
<tr>
<td>2</td>
<td>I²C SDA</td>
</tr>
<tr>
<td>3</td>
<td>VCC</td>
</tr>
<tr>
<td>4</td>
<td>GND</td>
</tr>
</tbody>
</table>

### 3.2.3 CON4

The connector 4 (not mounted) is a 2×2 2.54 mm pitch plug that is compatible with the EV-boards of sensors from Würth Elektronik eiSos using the SPI interface.
3.2.4 CON5

The connector 5 is a 2×3 2.54 mm pitch plug that is compatible with the EV-boards of sensors from Würth Elektronik eiSos using the I²C interface.

<table>
<thead>
<tr>
<th>Pin</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>GND</td>
</tr>
<tr>
<td>2</td>
<td>SPI_SCK (Clock)</td>
</tr>
<tr>
<td>3</td>
<td>SPI_MOSI (Master Out Slave In)</td>
</tr>
<tr>
<td>4</td>
<td>SPI_CE (Chip Enable)</td>
</tr>
<tr>
<td>5</td>
<td>SPI_MISO (Master In Slave Out)</td>
</tr>
<tr>
<td>6</td>
<td>VCC</td>
</tr>
</tbody>
</table>

3.2.5 Feather connector

This is the standard set of connectors that is used across the Feather ecosystem. The table below describes the functions of each of the 28 pins as applicable to this FeatherWing.
<table>
<thead>
<tr>
<th>Pin Number</th>
<th>Pin Name</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>RST</td>
<td>Not connected</td>
</tr>
<tr>
<td>2</td>
<td>3V3</td>
<td>3.3V power supply</td>
</tr>
<tr>
<td>3</td>
<td>AREF</td>
<td>Not connected</td>
</tr>
<tr>
<td>4</td>
<td>GND</td>
<td>Ground</td>
</tr>
<tr>
<td>5</td>
<td>A0</td>
<td>Not connected</td>
</tr>
<tr>
<td>6</td>
<td>A1</td>
<td>Not connected</td>
</tr>
<tr>
<td>7</td>
<td>A2</td>
<td>Not connected</td>
</tr>
<tr>
<td>8</td>
<td>A3</td>
<td>Not connected</td>
</tr>
<tr>
<td>9</td>
<td>A4</td>
<td>Not connected</td>
</tr>
<tr>
<td>10</td>
<td>A5</td>
<td>(Optional) SPI_CE via JP1</td>
</tr>
<tr>
<td>11</td>
<td>SCK</td>
<td>SPI clock</td>
</tr>
<tr>
<td>12</td>
<td>MOSI</td>
<td>SPI MOSI</td>
</tr>
<tr>
<td>13</td>
<td>MISO</td>
<td>SPI MISO</td>
</tr>
<tr>
<td>14</td>
<td>U0RX</td>
<td>Not connected</td>
</tr>
<tr>
<td>15</td>
<td>U0TX</td>
<td>Not connected</td>
</tr>
<tr>
<td>16</td>
<td>NC</td>
<td>Not connected</td>
</tr>
<tr>
<td>17</td>
<td>SDA</td>
<td>I²C SDA</td>
</tr>
<tr>
<td>18</td>
<td>SCL</td>
<td>I²C SCL</td>
</tr>
<tr>
<td>19</td>
<td>5</td>
<td>Not connected</td>
</tr>
<tr>
<td>20</td>
<td>6</td>
<td>Not connected</td>
</tr>
<tr>
<td>21</td>
<td>9</td>
<td>Not connected</td>
</tr>
<tr>
<td>22</td>
<td>U1TX</td>
<td>Not connected</td>
</tr>
<tr>
<td>23</td>
<td>U1RX</td>
<td>Not connected</td>
</tr>
<tr>
<td>24</td>
<td>12</td>
<td>Not connected</td>
</tr>
<tr>
<td>25</td>
<td>13</td>
<td>Not connected</td>
</tr>
<tr>
<td>26</td>
<td>5V</td>
<td>Not connected</td>
</tr>
<tr>
<td>27</td>
<td>EN</td>
<td>Not connected</td>
</tr>
<tr>
<td>28</td>
<td>VBAT</td>
<td>Not connected</td>
</tr>
</tbody>
</table>
3.3 Schematics

Figure 6: Schematics
3.4 Layout

Figure 7: Assembly diagrams
Figure 8: Top, bottom and internal layers
4 Software description

Würth Elektronik eiSos provides a software development kit (SDK) with examples to support all the WE FeatherWings. Here are the salient features of the WE FeatherWing SDK.

- The SDK is open-source and well documented.
- It uses popular open-source tool chain including an IDE.
- The examples are written in Arduino-styled C/C++ for quick prototyping.
- The core components of the SDK are written in pure C to enable easy porting to any microcontroller platform.
- Development platform independent (Windows, Linux or MAC).
- Modular structure of the software stack makes it easy to integrate into any project.

The SDK can be accessed on Github at github.com/WE-eiSmart/FeatherWings.

4.1 Software architecture

The WE FeatherWing SDK is built up in a modular way using a set of open-source tools to enable complete flexibility for the user.

The figure 9 shows the architecture of the WE FeatherWing SDK.

- **PlatformIO**: is a cross-platform, cross-architecture, multiple framework professional tool for embedded software development. It provides the tool chain necessary for the software development including building, debugging, code-upload and many more. PlatformIO works well on all the modern operating systems and supports a host of development boards including the Feathers from Adafruit. Further details about PlatformIO can be found under platformio.org.

- **Platform interface**: This layer provides abstraction to the peripheral drivers for the platform being used. Currently, this SDK implements an abstraction to the Arduino peripheral drivers for the Feather M0 express platform.

- **WE SDK**: This is a layer of platform-independent pure C drivers for sensors and wireless connectivity modules from Würth Elektronik eiSos. These drivers implement all the necessary functions to utilize full feature set of the sensors and wireless connectivity modules. More details on the SDK and downloads under, we-online.com/wcs-software.

- **Board files**: This layer provides abstraction at a board level and provides functions to configure and control individual FeatherWings from WE.

- **User application**: The SDK currently implements a quick start example for each of the FeatherWings.
4.2 Installing the tools

4.2.1 IDE

Although, platformIO provides a versatile command line interface for development, the SDK provides quick start projects for the Visual Studio Code. This popular IDE makes for better code organization as well as code editing. Visual Studio Code is available on all modern operating systems. Support for extensions, built-in Git and a versatile code editor make it a well rounded tool for embedded software development. Please refer to code.visualstudio.com for more details on Visual Studio Code.

4.2.2 Installation steps

- Install Visual Studio Code on the platform of your choice following the instructions under code.visualstudio.com/docs
- Follow the instructions under platformio.org/install/ide?install=vscode to install Plat-
4.3 Hardware Setup

The quick start examples in the SDK are written to be run on Adafruit's Feather M0 express. The hardware setup is as simple as stacking up the FeatherWing on top of the M0 Feather and powering up the board.

4.4 Running the quick start example

- Clone or download the WE FeatherWing SDK from Github. 
  github.com/WE-eiSmart/FeatherWings
- Open the workspace of interest with the filename <FeatherWing>.code-workspace in Visual Studio code.
- Build and upload the code from the PlatformIO tab as shown in the Figure 10
- After successful upload, click on Monitor to view the debug logs in the serial terminal (See Figure 10).
Figure 10: Running the quick start example
5 Regulatory compliance information

Pursuant to Article 1 (2.) of the EU directive 2014/53/EU, Article 1 (2.) the directive does not apply to equipment listed in Annex I (4.): custom-built evaluation kits destined for professionals to be used solely at research and development facilities for such purposes.

Nevertheless this evaluation board has been tested to satisfy general EMC requirements. Following standards have been applied:

- IEC 61000-4-3
- IEC 61000-4-4
- IEC 61000-4-6
- CISPR 16-2-1
- CISPR 16-2-3

5.1 Exemption clause

Relevant regulation requirements are subject to change. Würth Elektronik eiSos does not guarantee the accuracy of the before mentioned information. Directives, technical standards, procedural descriptions and the like may be interpreted differently by the national authorities. Equally, the national laws and restrictions may vary with the country. In case of doubt or uncertainty, we recommend that you consult with the authorities or official certification organizations of the relevant countries. Würth Elektronik eiSos is exempt from any responsibilities or liabilities related to regulatory compliance.

Notwithstanding the above, Würth Elektronik eiSos makes no representations and warranties of any kind related to their accuracy, correctness, completeness and/or usability for customer applications. No responsibility is assumed for inaccuracies or incompleteness.
6 Important notes

The following conditions apply to all goods within the wireless connectivity product range of Würth Elektronik eiSos GmbH & Co. KG:

6.1 General customer responsibility

Some goods within the product range of Würth Elektronik eiSos GmbH & Co. KG contain statements regarding general suitability for certain application areas. These statements about suitability are based on our knowledge and experience of typical requirements concerning the areas, serve as general guidance and cannot be estimated as binding statements about the suitability for a customer application. The responsibility for the applicability and use in a particular customer design is always solely within the authority of the customer. Due to this fact, it is up to the customer to evaluate, where appropriate to investigate and to decide whether the device with the specific product characteristics described in the product specification is valid and suitable for the respective customer application or not. Accordingly, the customer is cautioned to verify that the documentation is current before placing orders.

6.2 Customer responsibility related to specific, in particular safety-relevant applications

It has to be clearly pointed out that the possibility of a malfunction of electronic components or failure before the end of the usual lifetime cannot be completely eliminated in the current state of the art, even if the products are operated within the range of the specifications. The same statement is valid for all software sourcecode and firmware parts contained in or used with or for products in the wireless connectivity and sensor product range of Würth Elektronik eiSos GmbH & Co. KG. In certain customer applications requiring a high level of safety and especially in customer applications in which the malfunction or failure of an electronic component could endanger human life or health, it must be ensured by most advanced technological aid of suitable design of the customer application that no injury or damage is caused to third parties in the event of malfunction or failure of an electronic component.

6.3 Best care and attention

Any product-specific data sheets, manuals, application notes, PCN’s, warnings and cautions must be strictly observed in the most recent versions and matching to the products firmware revisions. This documents can be downloaded from the product specific sections on the wireless connectivity homepage.

6.4 Customer support for product specifications

Some products within the product range may contain substances, which are subject to restrictions in certain jurisdictions in order to serve specific technical requirements. Necessary information is available on request. In this case, the field sales engineer or the internal sales person in charge should be contacted who will be happy to support in this matter.
6.5 Product improvements

Due to constant product improvement, product specifications may change from time to time. As a standard reporting procedure of the Product Change Notification (PCN) according to the JEDEC-Standard, we inform about major changes. In case of further queries regarding the PCN, the field sales engineer, the internal sales person or the technical support team in charge should be contacted. The basic responsibility of the customer as per section 6.1 and 6.2 remains unaffected. All wireless connectivity module driver software “wireless connectivity SDK” and its source codes as well as all PC software tools are not subject to the Product Change Notification information process.

6.6 Product life cycle

Due to technical progress and economical evaluation we also reserve the right to discontinue production and delivery of products. As a standard reporting procedure of the Product Termination Notification (PTN) according to the JEDEC-Standard we will inform at an early stage about inevitable product discontinuance. According to this, we cannot ensure that all products within our product range will always be available. Therefore, it needs to be verified with the field sales engineer or the internal sales person in charge about the current product availability expectancy before or when the product for application design-in disposal is considered. The approach named above does not apply in the case of individual agreements deviating from the foregoing for customer-specific products.

6.7 Property rights

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6.8 General terms and conditions

Unless otherwise agreed in individual contracts, all orders are subject to the current version of the “General Terms and Conditions of Würth Elektronik eiSos Group”, last version available at www.we-online.com.
7 Legal notice

7.1 Exclusion of liability

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8 License terms

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8.2 Usage and obligations

The responsibility for the applicability and use of the Würth Elektronik eiSos wireless connectivity product with the incorporated Firmware in a particular customer design is always solely within the authority of the customer. Due to this fact, it is up to you to evaluate and investigate, where appropriate, and to decide whether the device with the specific product characteristics described in the product specification is valid and suitable for your respective application or not.

You are responsible for using the Würth Elektronik eiSos wireless connectivity product with the incorporated Firmware in compliance with all applicable product liability and product safety laws. You acknowledge to minimize the risk of loss and harm to individuals and bear the risk for failure leading to personal injury or death due to your usage of the product.

Würth Elektronik eiSos' products with the incorporated Firmware are not authorized for use in safety-critical applications, or where a failure of the product is reasonably expected to cause severe personal injury or death. Moreover, Würth Elektronik eiSos' products with the incorporated Firmware are neither designed nor intended for use in areas such as military, aerospace, aviation, nuclear control, submarine, transportation (automotive control, train control, ship control), transportation signal, disaster prevention, medical, public information network etc. You shall inform Würth Elektronik eiSos about the intent of such usage before
design-in stage. In certain customer applications requiring a very high level of safety and in which the malfunction or failure of an electronic component could endanger human life or health, you must ensure to have all necessary expertise in the safety and regulatory ramifications of your applications. You acknowledge and agree that you are solely responsible for all legal, regulatory and safety-related requirements concerning your products and any use of Würth Elektronik eiSos’ products with the incorporated Firmware in such safety-critical applications, notwithstanding any applications-related information or support that may be provided by Würth Elektronik eiSos. YOU SHALL INDEMNIFY WÜRTH ELEKTRONIK EISOS AGAINST ANY DAMAGES ARISING OUT OF THE USE OF WÜRTH ELEKTRONIK EISOS’ PRODUCTS WITH THE INCORPORATED Firmware IN SUCH SAFETY-CRITICAL APPLICATIONS.

8.3 Ownership

The incorporated Firmware created by Würth Elektronik eiSos is and will remain the exclusive property of Würth Elektronik eiSos.

8.4 Firmware update(s)

You have the opportunity to request the current and actual Firmware for a bought wireless connectivity Product within the time of warranty. However, Würth Elektronik eiSos has no obligation to update a modules firmware in their production facilities, but can offer this as a service on request. The upload of firmware updates falls within your responsibility, e.g. via ACC or another software for firmware updates. Firmware updates will not be communicated automatically. It is within your responsibility to check the current version of a firmware in the latest version of the product manual on our website. The revision table in the product manual provides all necessary information about firmware updates. There is no right to be provided with binary files, so called "Firmware images", those could be flashed through JTAG, SWD, Spi-Bi-Wire, SPI or similar interfaces.

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