

# ROSI

## Battery or continuously powered IoT Gateway System with SIM-card and mobile internet connection



These 6 components together form the IoT process chain belonging to the integrated ROBIOTIC concept. ROSI, our ROBIOTIC-Sensor-Interface, is the hardware for the first two components, “Sensor & Devices” and “Data Connectivity”. It is perfect suited for IoT applications and communicates with our proprietary cloud.

## Overview

The ROBIOTIC ROSI (ROBIOTIC-Sensor-Interface) is ideally suited for IoT applications.

With its stable and ruggedized case and IP65 protection class rating, it could be used as gateway for any kind of sensor in an industrial environment, such as fill level monitoring in vending machines (retrofit as well as newly designed), surveillance applications for flood protection, door contact detection in remote buildings, as a gateway from an internal bus system to the internet, or any other application.

As ROSI can be assembled with a variety of sensors or connections to different bus-systems, virtually any kind of information can be sent to a cloud service.

To define regular or event-triggered frequencies, ROSI is open for configurations either during production or even over-the-air while in the field. Even if no mobile internet is available, ROSI can receive and send SMS messages as a backup solution.

# Wireless

Thanks to many years of experience and our partnership with Deutsche Telekom, we offer a mobile net with maximum possible coverage. With our modular Chipset, we are able to change net bands from 2G to 5G by just changing the modem on the PCB. ROSI can also be configured via SMS, as firmware updates can be performed over-the-air via mobile internet connection.

With its internal antenna, ROSI is able to work even as a stand-alone unit (in 2G or 3G versions). Optionally ROSI offers a variety of uFL ports for external devices as well as GPS antennas.



Customizable  
ROBIOTIC  
RoSi-IoT-Box

## Operation

ROSI communicates to an Operator either by an external control element with two buttons (On/Off and Reset) and two LEDs (Voltage and Wireless status). Alternatively, these input elements are also available on the PCB inside the housing, if an external inputs should be prevented.

## Mechanical Characteristics

Dimensions w x l x h:  
122mm x 82mm x 55mm  
Protection Class: up to IP65

# Payload Structure and Security

ROSI communicates with our proprietary cloud with its several unique identifiers, including MSN (Serial Number of the Device), Device ID, the unique identifiers of the modem (IMEI) as well as the applied SIM-card (ICCID, IMSI and MSISDN). The HSPP2 message protocol is also unique and adds another layer of security to our system; further, by converting HSPP2 to MQTT, a protocol specifically standardized for IoT communications, we can also forward the information generated by the sensor to any cloud distributor of the customer's choice.

# Variants

Variant	Wireless	Processor, Memory	Sensor Systems*	Options
ROSI-x-x-xx-x-xx-x	Mobile: <ul style="list-style-type: none"> <li>• GPRS (2G)</li> <li>• UMTS (3G)</li> <li>• LTE (4G) (optional)</li> <li>• Prepared for NB-IoT (5G)</li> </ul>	32-bit ARM® Cortex®-M3, 32,7 MHz, 200 kB SRAM, 256 kB Flash	On Screw-jack: <ul style="list-style-type: none"> <li>• 2 x Analog Input</li> <li>• 3 x Digital In/Output</li> <li>• 1 x 5V Input</li> <li>• 1 x 3,3V Output</li> <li>• 1 x GND</li> </ul> On extension headers: <ul style="list-style-type: none"> <li>• 1 x I<sup>2</sup>C</li> <li>• 1 x SPI</li> <li>• 3 x UART</li> <li>• 18 x DI/DO</li> <li>• 3 x AI</li> <li>• 1 x AO</li> </ul>	up to: <ul style="list-style-type: none"> <li>• 164 GPIO</li> <li>• 2 x USB</li> <li>• 4 x UART</li> <li>• 2 x C_CAN</li> <li>• 2 x I<sup>2</sup>C</li> <li>• 2 x I<sup>2</sup>S</li> <li>• 1 x PWM-out</li> <li>• 3 x 10-bit ADC (400/s)</li> <li>• GPS</li> </ul>

\* Depending on Variant of ROSI some Channels might not be available in combination with others.

# Configuration of ROSI

Wireless (1)	GPS (2)	IP-Class (3)	Supply (4)	Connector (5)	Keyboard (6)
2 = 2G 3 = 3G 4 = 4G (= ext. Ant.) 5 = 5G (= ext. Ant.)	G = GPS 0 = none	00 = none 42 = IP42 65 = IP65	B = Battery E = ext. Supply	P3 = Standard-Inputs P9 = Extension Header	K = ext. Keyboard 0 = none

### Examples:

RoSI-x-x-xx-x-xx-x

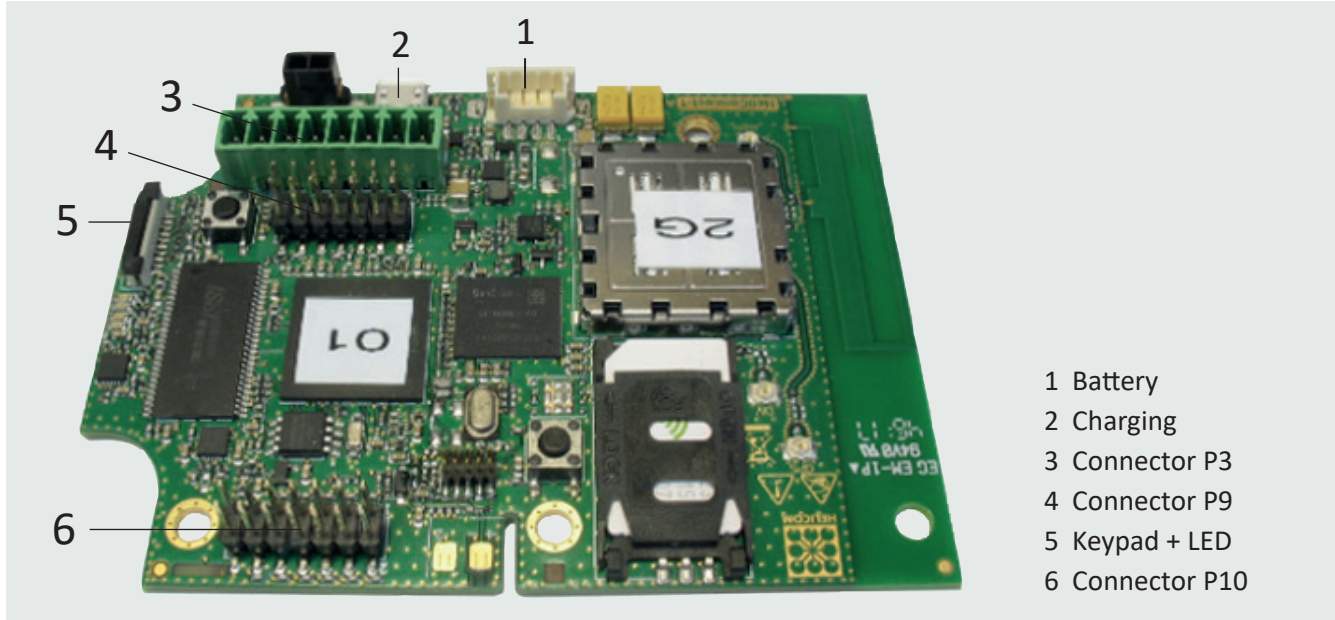
RoSI-3-G-42-E-P9-K = Wireless 3G + GPS + IP-Class IP42 + ext. Supply + Extension Header + Keyboard

RoSI-2-0-65-B-P3-0 = Wireless 2G + no GPS + IP-Class IP65 + Battery + Standard-Inputs + no Keyboard

- (1) In 4G and 5G Versions, external Antennas will be necessary.
- (2) GPS will reduce battery life, depending on use case.
- (3) IP-Class is depending on cable grommets.

- (4) For the use of a battery, we need to clarify which capacity is needed.
- (5) Extension Headers need customized configurations.
- (6) External keyboard might be customized.

# Electrical Characteristics



- 1 Battery
- 2 Charging
- 3 Connector P3
- 4 Connector P9
- 5 Keypad + LED
- 6 Connector P10

Symbol	Parameter	Condition	Min	Typ	Max	Unit
V <sub>Bat</sub>	Battery Voltage	4,2V LiPoly Battery	3.0	3.6	4.2	V
V <sub>cc</sub>	Supply Voltage	Constant Supply / Battery charging		5.0		V
I <sub>cc</sub>	Power Consumption (The power consumption strongly depends on CPU activity, as well as on active sensor systems, measurement and radio transmission intervals, etc. The values given are for reference only and can differ from practical application values.)	Active Mode	0.05		2.0 (peaks)	A
		Sleep Mode		1.6		μA
T	Temperature Range	Standard Batteries	-20		+70	°C
		Extended or industrial temperature range on request.				

## Usage of Battery

Optionally, ROSI can be assembled with a battery to have an Uninterruptible Power Supply (UPS) in cases that external power losses occur, or even for using ROSI as a stand-alone unit in inaccessible regions.

Battery-life depends on the use-case as GPS-locating, transfer rates and net availability heavily influence battery capacity.

Our technicians will be happy to help you with finding the right (rechargeable) battery for your application.

# Technical Data

## Pin assignment of the connectors

Connector P3			Connector P9			Connector P10		
Pin	Circuit Diagram Name		Pin	Circuit Diagram Name		Pin	Circuit Diagram Name	
1	<b>Battery Voltage</b>		1	3.3 Voltage		1	P41	DI, DO, AI, UART 3TXD
2	<b>AI_01</b>	AI	2	P24	DI, DO, I <sup>2</sup> C 1SCL	2	PF11	DI, DO, UART 0RXD
3	<b>AI_02</b>	AI	3	PE0	DI, DO	3	P42	DI, DO, UART 3RXD
4	<b>GND</b>		4	P23	DI, DO	4	PF10	DI, DO, UART 0TXD
5	<b>DI/DO_01</b>	DI, DO	5	PE1	I <sup>2</sup> C 1 SDA DI, DO	5	PB4	DI, DO
6	<b>DI/DO_02</b>	DI, DO	6	PE5	DI, DO, UART 1RTS	6	PF7	DI, DO, SPIMOSI
7	<b>DI/DO_03</b>	DI, DO	7	PE2	DI, DO	7	PB5	DI, DO
8	<b>3.3 Voltage</b>		8	PE7	DI, DO, UART 1CTS	8	PF6	DI, DO, SPIMISO
			9	ADC0_6	AI	9	PB3	DI, DO
			10	PE11	DI, DO, UART 1TXD	10	PF5	DI, DO, SPISSEL
			11	ADC0_3	AI	11	GND	
			12	PE12	DI, DO, UART 1RXD	12	PF4	SPISCK
			13	ADC0_0	AO	13	Battery Voltage	
			14	Power-Key		14	GND	

I<sup>2</sup>C, SPI and UART are available on extension headers P9 and P10. By using these inputs, other definitions of these ports will be unavailable. The definition of all ports will be given to RoSI inside a config-file which will be provided according to customer needs.