4IOT-SEN-01

Sensor for IOT application

Datasheet

General description

4IOT-SEN-01 is a device developed by 4IOTECH s.r.o. especially for an industrial environment. Thanks to the high sampling frequency of the analog input and the powerful internal processor for processing the measured data, it is suitable for monitoring and evaluating the fast processes. It is possible to connect commonly used industrial sensors with voltage or current output and send the measured data wirelessly to the superior system. The IQRF[1] wireless technology, powered by 868 MHz with IQMESH and DPA, is used for data transfer. Thanks to the 1-Wire[2] bus support, DS18B20 temperature sensors can be connected to the device.

Benefits and features

- Analog input with sampling rate of 20 kHz
- Option to connect any sensor with voltage or current output
- Galvanic isolated digital input
- Galvanic isolated digital output
- 1-Wire[2] support
- Own power supply for 1-Wire device, short-circuit protection
- Wireless communication at 868/916 MHz
- Support for IQMESH[1] networks
- Support for IQRF DPA[1]
- MCU with own FW
- Reverse polarity and overvoltage protection
- Industrial design
- DIN rail mounting

Applications

- IoT applications
- Wireless monitoring and data collection
- Temperature measurement
- Vibration monitoring
- 24V power supply diagnostics for industrial applications

Note 1: Patented by IQRF company (https://www.iqrf.org)
Note 2: 1-Wire is a registered trademark of Maxim Integrated Products (https://www.maximintegrated.com)

DC Electrical characteristics

(-40 to +85°C; Vcc = 24VDC)

Parameter	Symbol	Notes	Min	Typ	Max	Units
Supply voltage	Vcc		8	24	30	V
Active current	Icc			7,5	10	mA
Peak current	Ipp	t < 2ms			2,7	A
Operating temperature	t		-40		85	°C
Degree of coverage	IP			20		

Analog input – range 0 - 24VDC

(-40 to +85°C; Vcc = 24VDC)

Parameter	Symbol	Notes	Min	Typ	Max	Units
Measure range	Vadc-res		0		32,4	V
Absolute measure range	Vadc-max		0		50	V
Accuracy					±1	%
Resolution				10 bit		
Input impedance	R			5		kΩ
Sampling rate	fv			20		kHz

Analog input – range 0 - 10VDC

(-40 to +85°C; Vcc = 24VDC)

Parameter	Symbol	Notes	Min	Typ	Max	Units
Measure range	Vadc-res		0		11,9	V
Absolute measure range	Vadc-max		0		17,5	V
Accuracy					±1	%
Resolution				10 bit		
Input impedance	R			2		kΩ
Sampling rate	fv			20		kHz

Analog input – range 0 - 20mA

(-40 to +85°C; Vcc = 24VDC)

Parameter	Symbol	Notes	Min	Typ	Max	Units
Measure range	Iadc		0		28	mA
Absolute measure range	Iadc-max		0		30	mA
Accuracy					±1	%
Resolution				10 bit		
Sampling rate	fv			20		kHz

Digital input

(-40 to +85°C; Vcc = 24VDC)

Parameter	Symbol	Notes	Min	Typ	Max	Units
Input voltage log. „1“	VDI1	To DI_GND	3	24	30	V
Input voltage log. „0“	VDI0	To DI_GND	0		2	V
Supply current	IDI	To DI_GND		10	20	mA

Digital output

(-40 to +85°C; Vcc = 24VDC)

Parameter	Symbol	Notes	Min	Typ	Max	Units
Supply voltage	Vcc-DO	To DO_GND	0	24	30	V
Output voltage	V-DO	To DO_GND	Vcc-DO – 0,8			V
Absolute current	IDO	To DO_GND			800	mA

1-Wire device

(-40 to +85°C; Vcc = 24VDC)

Parameter	Symbol	Notes	Min	Typ	Max	Units
Supply voltage	Vcc-1W		-0,85%	5	+0,85%	V
Supply current	Icc-1W				250	mA
1-Wire interface	V-1W		0	5	5,5	V

Wireless communication

Parameter	Value	Units
RF band	868 or 916	MHz
RF channels	68	
RF data modulation	GFSK	
RF data transmission bit rate	19,8	Kb/s
RF output power	8	mW
Antenna	External, SMA connector	

Note: The RF parameters taken from TR-76D datasheet. For more information see https://www.iqrf.org

Pin description

Pin	Name	Description
1, 6	Vcc	Supply voltage
2, 3, 5, 9	GND	Ground
4	AI	Analog input
7	DI	Digital input
8	DI_GND	Ground of digital input
10	Vcc-DO	Supply voltage of digital output
11	DO	Digital output
12	DO_GND	Ground of digital output

WARNING

The device has an integrated overvoltage protection. To avoid damage to the device due to a higher voltage than Vcc, it is necessary to add a fuse element in the form of a fuse with a rated current of 200 mA and a fast characteristic. Recommended fuse: SCHURTER 0034.1509 (200mA, fast).

Failure to observe this warning may result in equipment being destroyed and other damage may occur!

Overview

Analog input- AI

The analogue input on the 4IOT-SEN-01 allows for fast input signal sampling and subsequent processing and evaluation in the form of the maximum, middle, minimum and current values of the input signal. The device can be configured to measure 24 VDC, 10 VDC or 0-20 mA current loop, as detailed in the "Ordering Codes" chapter.

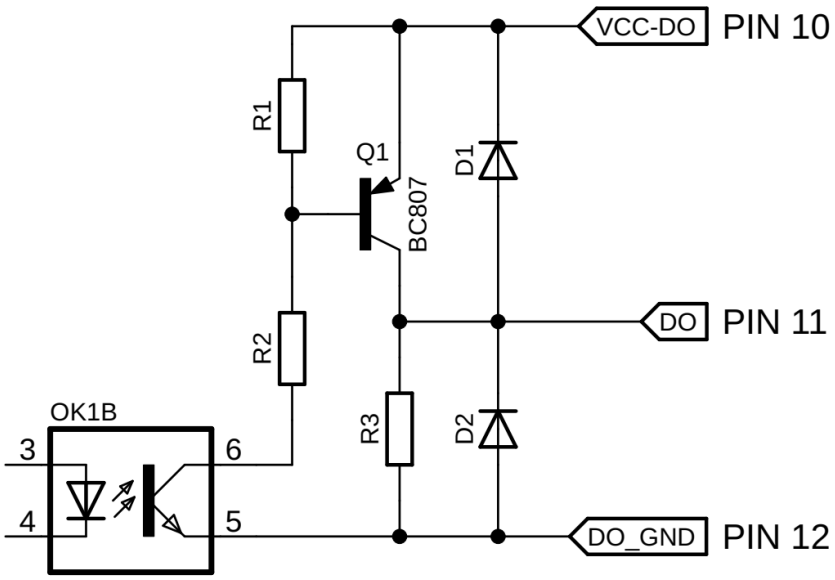
Thanks to these features, the device is suitable for collecting data from commonly available sensors with a voltage output of 0-10 VDC or a 0-20 mA current output. The 24 VDC measuring range is particularly suitable for monitoring the supply voltage in an industrial environment.

Digital input - DI

The digital input is galvanic isolated from other I / O and power supply.

Digital output– DO

The digital output is galvanic isolated from other I / O and power supply. This is a standard connection with an open collector PNP transistor. Digital output has integrated protection diodes that prevent destruction of the output transistor when switching inductive loads, eg relay



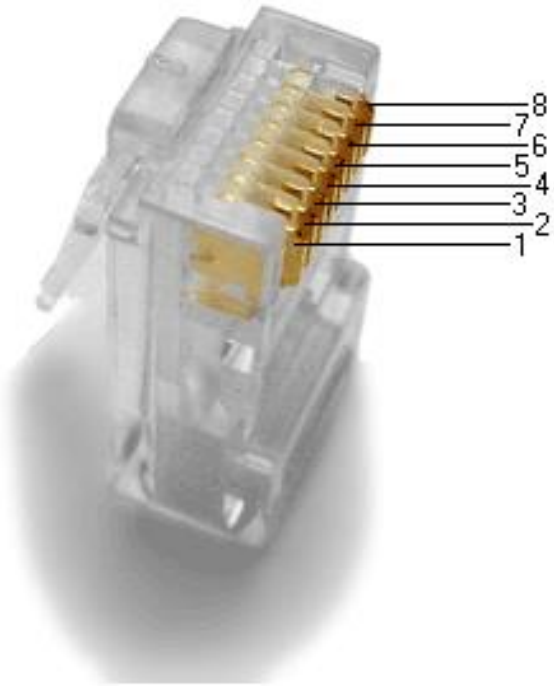
Digital output schematic

1-Wire bus

4IOT-SEN-01 includes an extension socket in the form of an RJ-45 connector for connecting a device communicating with the 1-Wire bus. The power supply to the bus is solved by its own voltage source with short-circuit protection. If a short circuit occurs on the 1-Wire device's power supply, the unit will immediately respond by turning off the power supply and will indicate an error by flashing the red LED

RJ45 connection

The RJ45 socket is used to connect an external 1-Wire device.



Pin	Symbol	Description
1, 2	NC	Not connect
3, 8	GND	Ground
4, 5	Vcc-1W	Supply voltage
6, 7	1-Wire DQ	1-Wire interface pin

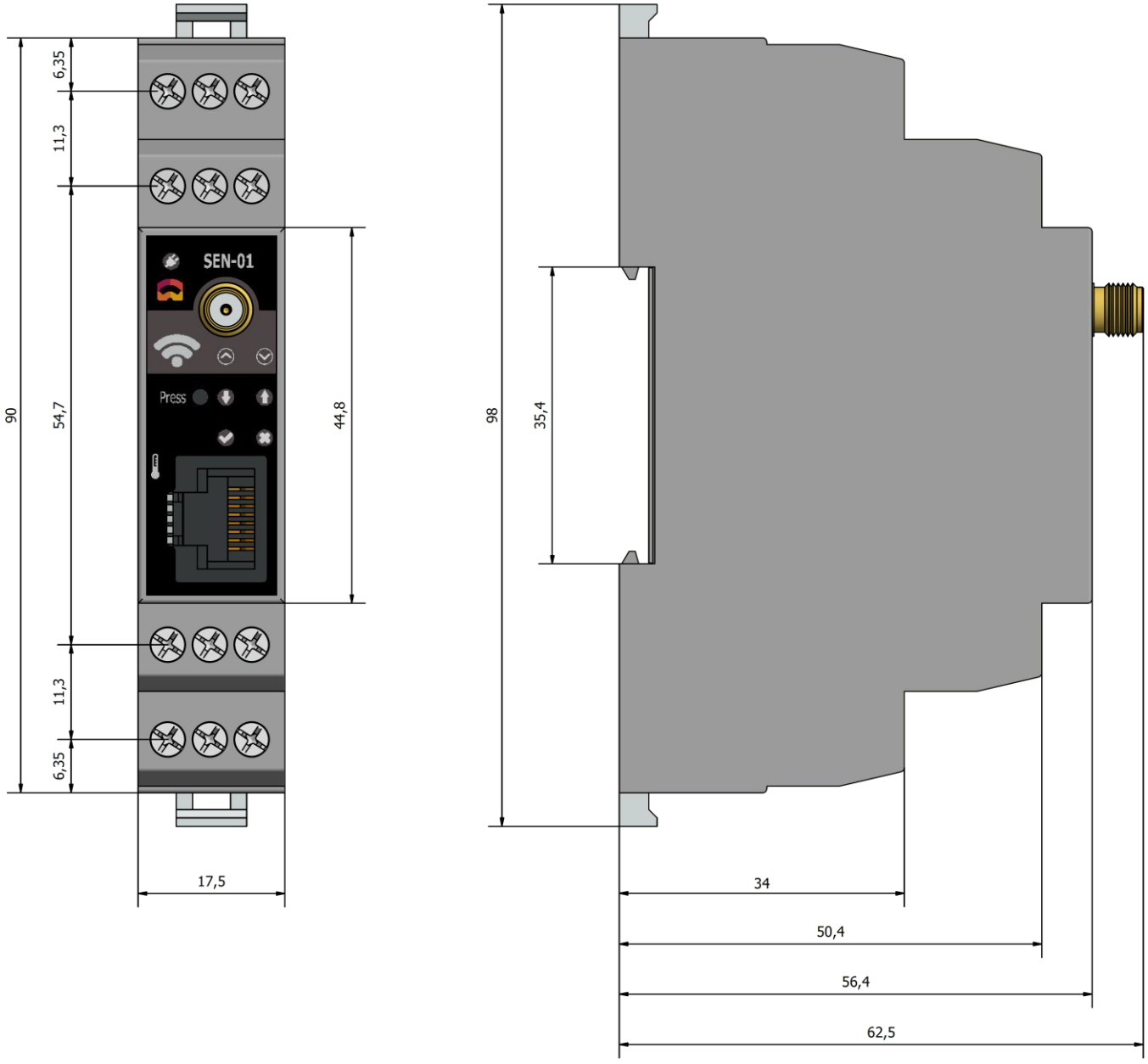
Device label

Symbol	Description
	Indication of the connected voltage supply
	Wireless communication indicator - sending a packet
	Wireless communication indicator - receiving a packet
	Digital input
	Digital output
	System LED - Features may vary depending on the FW version, more information in the FW recorded documentation
	System LED - Features may vary depending on the FW version, more information in the FW recorded documentation
Press	System Button - Features may vary depending on the FW version, more information in the FW recorded documentation
	1-Wire connector RJ45

Wireless communication

Wireless communication is provided by the IQRF module TR-76D. The IQRF DPA communication protocol is supported. For more information, please visit the manufacturer's website https://www.iqrf.org and the documentation of the current FW.

Dimension



Ordering codes

Typ	Analog input setting
4IOT-SEN-01-24VDC	For measure range 0-24VDC
4IOT-SEN-01-10VDC	For measure range 0-10VDC
4IOT-SEN-01-20MA	For current loop measure 0-20mA

Document revision

Version	Date	Description	Compatibility	
			HW	Rev. of DPS
1.01	9.9.2018	First release	v1.02	02

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General information

Warning

Installation and setup of the device may only be carried out by a qualified person with a valid decree 50/1978 Sb. In the event of a device malfunction, please send it to the reseller address, and do not attempt to service yourself in any way. Opening the cover or any modification of the device is not permitted, there is a risk of electric shock or fire. By unauthorized modifications to the device, the user violated these operating instructions, thus bearing full blame for any damages

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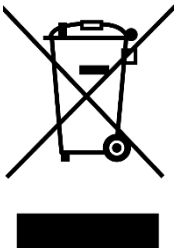
Environmental protection



The device is subject to the WEEE Directive 2002/96 / EC. The symbol indicates that the product must be disposed of separately and should be handed over to the appropriate collection point. Do not dispose of it together with other waste.

CE