

User Guide 1-Wire Multisensor Pro flush mounted

- Professional Temperature- and Humidity-sensor for home, schools, commercial buildings and businesses
- Precise Temperature- and Humidity-sensor
Temperature +/- 0,3°C
Humidity +/-3% relative humidity
- Universal in-wall mounting suitable for many switch-manufacturers
- Easy assembly in 55mm flush mount boxes
- Panels (central plates) available in pure white matt and high gloss
- Easy voltage supply (5VDC)

- Application:
- Heating control (control of individual rooms)
- Ventilation system control



Note: Article is also available with no central disc

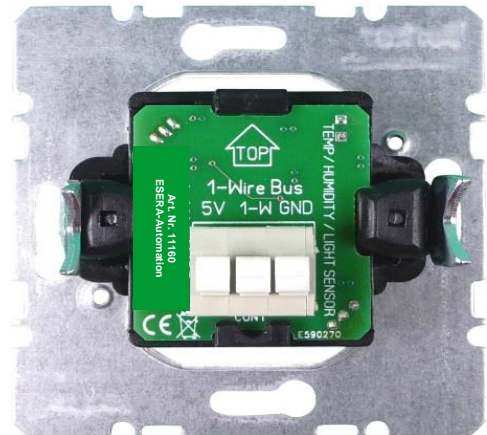
1 Introduction

Before you start assembling the 1-Wire Multisensor Pro and before you take the device into operation, please read this assembly and operating instruction carefully to the end, especially the section referring to the safety notes.

With the ESERA 1-Wire Multisensor Pro you have acquired a professional and highly accurate multi-sensor. Due to the new technology of the ESERA 1-Wire Pro sensors, the accuracy of humidity measurements is on average 200 - 300% higher compared to most standard sensors on the market. Due to the use of highly integrated sensors with 12-bit resolution, the 1-Wire Multisensor delivers very accurate values for temperature and relative humidity. In addition, the evaluation of the delivered measured values is enormously simplified.

The 1-Wire Multisensor Pro enables easy climate monitoring of all rooms and buildings.

The 1-Wire Multisensor Pro is installed in an almost invisibly flush-mounted housing in standard 50mm / 55mm format. Due to the standard 50mm / 55mm center disc size, this multisensor fits into all current switch series of most manufacturers e.g. Berker, Jung, Merten, Busch-Jaeger and many others. The Multisensor Pro is available with no center disk as well as with central disk in pure white matt and white high gloss.



Due to the wide ventilation openings, the 1-Wire Multisensor Pro detects climatic conditions in rooms and buildings very exactly and quickly. For all types of radiator and heating control, an accurate temperature sensor, as installed in this Multisensor, is an important component.

In combination with 1-Wire ESERA switching modules / binary outputs, a very effective and energy-saving heating control (individual room control) is possible.

The 1-Wire Multisensor Pro is intended for use in normal living spaces. For outdoor use and in damp rooms, such as saunas or steam baths, a matching sensor is available on the ESERA website.

Calibration of the sensors is not necessary. The 1-Wire Multisensor Pro can be put into operation immediately without any waiting time.

The electrical connection to the 1-Wire bus system of the 1-Wire Multisensor Pro is carried out with screwless push-in terminals and can be operated in standard mode, 3 cables for ground, data and 5V.

Each 1-Wire Multisensor Pro has an individual serial number.

2 Why to measure air humidity?

The room air always contains moisture in the form of water vapor. For a comfortable living climate, the relative humidity is crucial. During the heating period, 35 % to 45 % relative humidity is considered as optimal. Values of more than 45 % to 55 % may lead to mold formation in the case of a poor quality of the outside walls. For health reasons values of 20 % and under should be avoided as any possible.

The absolute humidity indicates how many grams of water vapor are dissolved in one cubic meter of air.

The warmer the air, the more water it can absorb. The relative humidity states with what percentage the room air is enriched with humidity. Fully air-saturated air is when the relative humidity is 100 %. In addition, the air can not absorb any more moisture. If more moisture is added, the water vapor condenses - it leads to the formation of droplets. In nature, this phenomenon leads to fog-formation, in heated rooms the water vapor of the room air settles down on cold surfaces. This leads to a risk of mold growth here.

3 Software / Control

The module is being read out per 1-Wire commands for the DS18B20 and DS2438 modules. The sensor is supported by many computer programs such as, Loxone, WAGO SPS (via OWOS), OWFS, FHEM (Linux), IP Symcon or microcontroller applications.

4 Technical data

Function:	Multisensor for temperature and rel. humidity and air quality, monitoring of operating voltage
Temperature sensor:	Precise digital temperature sensor with 12 Bit measurement resolution
Range of measuring temp.:	-40°C to +60°C (sensor element: -40°C to +85°C)
Accuracy temperature:	0,3° in the range of -10°C - 60°C (more accurate than the DS18B20 sensor)
Resolution:	12 Bit, 0,06°C/Bit depending on selected resolution
Humidity sensor:	Capacitive digital humidity sensor with high accuracy
Range of measuring hum.:	0-100% rel. humidity
Accuracy humidity:	+/-3 % in the range of 10-85% rel. humidity
Data output:	0-10V equates 0-100% rel. humidity, 0,1V = 1% rF
Interface:	3 - wire connection (data, ground and 5V, parasitic operation not supported)
Connection:	Push-In clamps (screwless clamps) solid 0.2 to 2.5qmm or finely stranded 0.2 to 1.5qmm for connection we recommend slotted screwdriver of the size 2,5x75
1-Wire interface	Basis DS2438
Operating voltage:	5 V= (+10% / -20%)
Current consumption:	approx. 2 mA

5 Ambient conditions

Protection system:	IP00
Protection class:	III
Temperature, operation:	-25°C to 70°C, (limitation by carrier system, sensor -40°C to +125°C)
Humidity:	10 - 90% (non condensing)
Outer dimensions:	71 x 71 x 32mm (LxWxH)

6 Conformity

EN 50090-2-2
 EN 61000-4-2, ESD
 EN 61000-4-3, HF
 EN 61000-4-4, Burst
 EN 61000-4-5, Surge
 EN 61000-6-1, Interference immunity
 EN 61000-6-3, Interference radiation
 RoHS

7 Software / Control

The 1-Wire Multisensor Pro is being read out per 1-Wire commands for the DS2438 modules. The sensor is supported by many systems such as ESERA Station, Loxone, IP-Symcon, OWFS, FHEM (Linux) or microcontroller applications.

For ESERA 1-Wire Multisensors of the Pro series no elaborate formulas are necessary.

A sensor controller within the Multisensor takes over the preprocessing of all measured values and thereby enormously simplifies the integration into 1-wire systems. The measured values are no longer dependent on the operating voltage of the 1-Wire Multisensor.

The values measured by the sensor are assigned to the standard DS2438 module values as follows:
 VDD = operating voltage (5V), TEMP = temperature, VAD = humidity, Xsense = no data output, fixed at 0.

Calculations

Temperature

Standard output according to DS2438 module

Operating voltage

Standard output according to DS2438 module

Humidity

To obtain the rel. humidity in percent, multiply the output value (Vas) by a factor of 10. 0.1V corresponds to 1% relative humidity.

8 Data output 1-Wire Controller / 1-Wire Gateway

For the 1-Wire Multisensor Pro, the following measured values are calculated and output by the 1-Wire Controller / 1-Wire Gateway. The dew-point calculation is a function of the 1-Wire Controller / 1-wire gateway. This can be found in the Config-Tool or in the download area of the 1-Wire Controller and 1-Wire Gateway.

Data output:

1_EVT 12:27:40	
1_OWD1_1 2008	=> controller no._module no._data record temperature (°C) example: 20,08 °C
1_OWD1_2 511	=> controller no._module no._data record voltage VCC (V)
1_OWD1_3 470	=> controller no._module no._data record humidity (rF) example 47,0%
1_OWD1_4 1200	=> controller no._module no._data record dew-point (°C) example: 12,00 °C

Further information for options and commands can be found in the latest available documentation for 1-Wire Controller / 1-Wire Gateway.

9 Integration in IP-Symcon / ESERA-Station

On our website, we provide ESERA IP-Symcon software modules for reading in the 1-Wire Multisensors in IP-Symcon ready via 1-Wire controller / 1-Wire gateway. Therefore no scripts are necessary. Details can be found on the ESERA website at „Kompatible Steuerungen/Zentralen/IP-Symcon-Integration“

<https://www.esera.de/kompatible-steuerungen-zentralen/ip-symcon-integration/>

For the conventional connection via 1-Wire bus coupler, the sensor values must be calculated according to the specified formulas.

10 Integration in Loxone

At our webshop we provide a sample project on how to import the 1-Wire Multisensor by 1-Wire Controller 1/1-Wire Gateway. Further details can be found here: <https://www.esera.de/kompatible-steuerungen-zentralen/loxone-integration/demo-1-wire-controller-1-loxone-integration/>

11 Integration in FHEM

For integration into the open source automation software FHEM, we provide a software module to import in the 1-Wire Multisensor by 1-wire controller / 1-wire gateway. Therefore, no scripts are necessary.

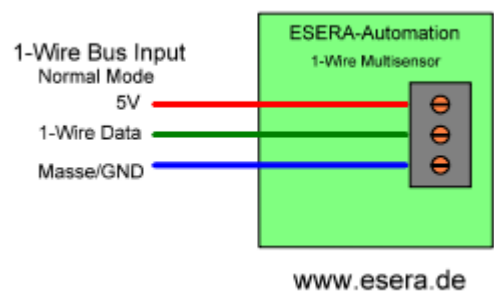
Further details can be found here: <https://www.esera.de/kompatible-steuerungen-zentralen/fhem-integration/>.

12 Measurement accuracy

The sensor elements inside the 1-Wire Multisensor Pro are calibrated. Please note that the measuring accuracy may possibly decrease towards the measuring range limits as well as at very high/low operating temperatures.

13 Pin assignment

The 1-Wire Multisensor is connected by screwless clamps. The pin assignment of the clamps is marked on the circuit board. The terminals are designed for single-wire cables with 0.2 to 2.5qmm or fine stranded cable 0.2 to 1.5qmm cross-section. It is important to pay attention to the correct polarity when connecting. The Multisensor has to be supplied with three cables (ground, 1-Wire Data and 5V). Parasitic mode is not supported.



Note: Basics and tips for 1-Wire Bus systems can be found here: <https://www.esera.de/1-wire-grundlagen/>

14 Assembly

The installation site must be protected from direct moisture, e.g dripping water and drafts. The device may only be used in dry indoor areas and in protected outdoor areas.

During assembly, a draft-free location is to be selected. The device is intended for installation as a stationary device within a living space. The 1-Wire multi-sensor can be mounted on flush-mounted boxes thanks to clever housing openings.

15 1-Wire Network cabling

For short connection distances no special requirements are needed on the cable used. With unshielded cables, e.g. telephone cable J-Y(St)Y telephone line 4x2x0,8, 1-wire networks in star or tree cabling of about 30 – 80 m in total can be constructed. For installation we recommend the use of CAT 5-7 network cable. For cable assignment you will find a recommendation in the download area of this product in our webshop.

In smart homes, commercial buildings and industrial environments, shielded cables, e.g. CAT5 or CAT6 cables must be used. This achieves a very high system stability. One more advantage of cabling with CAT cable is that a linear bus topology can be achieved despite star-shaped cable routing in buildings. This is only possible with the 8-core cable construction of a CAT cable. We recommend a linear topology. When using CAT7 cables, the maximum possible cable length of the entire 1-Wire network is reduced due to the stronger shielding and the resulting higher cable capacity. With star or tree cabling by using CAT cables a total length of about 50-100m in total can be calculated, which corresponds to 1-2 floors in a residential building.

Basically, the wiring should avoid unnecessary cable connections, branching or cable extensions. Each joint or clamp connection reduces the maximum available network size.

The special feature of the wiring of the Multisensors with 1-Wire bus technology is that all sensors are operated by a three-core cable. Both, the supply and the data communication take place by the bus line.

16 Operating conditions

The Multisensor is designed for measuring temperature and humidity of indoor air and gases, such as living spaces, offices, workshops or public facilities. The measured values given under technical data are limit data for the entire 1-Wire Multisensor and must not be undershot or exceeded, otherwise the sensor may be damaged.

17 Disposal note

Do not dispose of the device within the household waste! According to the directive concerning old electrical and electronic appliances, electronic devices must be disposed of via the collecting points for old electronic appliances!



18 Safety instructions

When using products that come into contact with electrical voltage, the valid VDE regulations must be observed, especially VDE 0100, VDE 0550/0551, VDE 0700, VDE 0711 and VDE 0860

- All final or wiring work must be carried out with the power turned off.
- Before opening the device, always unplug or make sure that the unit is disconnected from the mains.
- Components, modules or devices may only be put into service if they are mounted in a contact proof housing. During installation they must not have power applied.
- Tools may only be used on devices, components or assemblies when it is certain that the devices are disconnected from the power supply and electrical charges stored in the components inside the device have been discharged.
- Live cables or wires to which the device or an assembly is connected, must always be tested for insulation faults or breaks.
- If an error is detected in the supply line, the device must be immediately taken out of operation until the faulty cable has been replaced.
- When using components or modules it is absolutely necessary to comply with the requirements set out in the accompanying description specifications for electrical quantities.
- If the available description is not clear to the non-commercial end-user what the applicable electrical characteristics for a part or assembly are, how to connect an external circuit, which external components or additional devices can be connected or which values these external components may have, a qualified electrician must be consulted.
- It must be examined generally before the commissioning of a device, whether this device or module is basically suitable for the application in which it is to be used.
- In case of doubt, consultation with experts or the manufacturer of the components used is absolutely necessary.
- For operational and connection errors outside of our control, we assume no liability of any kind for any resulting damage.
- Kits should be returned without their housing when not functional with an exact error description and the accompanying instructions. Without an error description it is not possible to repair. For time-consuming assembly or disassembly of cases charges will be invoiced.
- During installation and handling of components which later have mains potential on their parts, the relevant VDE regulations must be observed.
- Devices that are to be operated at a voltage greater than 35 VDC / 12mA, may only be connected by a qualified electrician and put into operation.
- Commissioning may only be realized if the circuit is built into a contact proof housing.
- If measurements with an open housing are unavoidable, for safety reasons an isolating transformer must be installed upstream or a suitable power supply can be used.
- After installing the required tests according to DGUV / regulation 3 (German statutory accident insurance, https://en.wikipedia.org/wiki/German_Statutory_Accident_Insurance) must be carried out.

19 Warranty

ESERA GmbH guarantees that the goods sold at the time of transfer of risk to be free from material and workmanship defects and have the contractually assured characteristics. The statutory warranty period of two years begins from date of invoice. The warranty does not extend to the normal operational wear and normal wear and tear. Customer claims for damages, for example, for non-performance, fault in contracting, breach of secondary contractual obligations, consequential damages, damages resulting from unauthorized usage and other legal grounds are excluded. Excepting to this, ESERA GmbH accepts liability for the absence of a guaranteed quality resulting from intent or gross negligence. Claims made under the Product Liability Act are not affected.

If defects occur for which the ESERA GmbH is responsible, and in the case of replacement goods, the replacement is faulty, the buyer has the right to have the original purchase price refunded or a reduction of the purchase price.

ESERA GmbH accepts liability neither for the constant and uninterrupted availability of the ESERA GmbH or for technical or electronic errors in the online offer.

We are constantly developing our products further and reserve the right to make changes and improvements to any of the products described in this documentation without prior notice. Should you require documents or information on older versions, please contact us by e-mail at info@esera.de.

20 Trademarks

All mentioned designations, logos, names and trademarks (including those which are not explicitly marked) are trademarks, registered trademarks or other copyright or trademarks or titles or legally protected designations of their respective owners and are hereby expressly recognized as such by us. The mention of these designations, logos, names and trademarks is made for identification purposes only and does not represent a claim of any kind on the part of ESERA GmbH on these designations, logos, names and trademarks. Moreover, from their appearance on ESERA GmbH webpages it cannot be concluded that designations, logos, names and trademarks are free of commercial property rights. **ESERA and Auto-E-Connect are registered trademarks of ESERA GmbH.**

21 Contact

ESERA GmbH
Adelindastrasse 20
87600 Kaufbeuren
GERMANY
Tel.: +49 8341 999 80-0
Fax: +49 8341 999 80-10
www.esera.de
info@esera.de
WEEE-Number: DE30249510