Art. No. 11150

User Guide

1-Wire Multisensor Pro for
Temperature and Air Humidity

- professional temperature and humidity sensor for private, schools,
  public buildings and companies
- precise temperature and humidity sensor with 12Bit resolution
- universal on-wall mounting
- stylish and high quality sensor housing
- easy voltage supply (5VDC)

Application:
- Heating control (control of individual rooms)
- Control sensor for ventilation system
- Monitoring of living areas for risks of mould

Note
Before you start assembling the device and put the product into operation, read this operating manual carefully to the end, especially the section on safety instructions. .

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1   Product description

With the ESERA 1-Wire Multisensor Pro you have acquired a professional and highly accurate Multisensor.
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 a stylish wall-mounted housing and fits perfectly in modern living and business areas.
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.

Note

Basics and tips for the 1-Wire Bus system can be found in the ESERA Online Shop at
https://www.esera.de/1-wire-grundlagen/
or please refer to our eBook in the store under Training/Documentation

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2   Auto-E-Connect® Support

With the launch of the ECO Controller, the ESERA Auto-E-Connect® 1-Wire Plug and Play system for the 1-Wire Bus is now introduced and supported.
This now enables fully automatic configurations of 1-Wire devices (sensors and actuators) on the 1-Wire Bus. It is optimized for commercial and industrial applications and enables significant added value beyond sensor and chip data.

The Auto-E-Connect function is built up in three levels. Currently there are
Level I, Level II and Level III available.
Please refer to the technical data to find out which Auto-E-Connect functionality is supported by this sensor.
With Auto-E-Connect Level III, fully automatic configurations of the 1-Wire devices on the
1-Wire bus are possible. It is optimized for industrial and IoT applications and enables significant added value beyond sensor and chip data.
With the Auto-E-Connect function, ESERA devices are detected fully automatically, suitable libraries are started and ready-formatted data is output.
The Auto-E-Connect functionality will be available for the ECO Controller and ESERA-Station 200 Pro from 2021.

Auto-E-Connect Level I
OWD Detect: Detection of new sensors and actuators and automatic start of adapted libraries.

Auto-E-Connect Level II
Visualize product data: Readout and visualization of Auto-E-Connect and manufacturer data of sensors and actuators, such as article number, date of manufacture, firmware and hardware version.

Auto-E-Connect Level III
Extended Plug and Play system for 1-Wire Bus
o   **Pre Configuration**: The OWD number for the next installation can be written to the 1-Wire **d**evice.

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o **Automatic Positioning**: The device logs on to any ECO Controller with Auto-E-Connect III with the new request OWD number. This automatic login works up to the maximum possible OWD number of the ECO controller

o **Sensorfinder Function**: The ECO Controller can activate a status LED within the ESERA 1-Wire Pro sensors. The status LED flashes or lights up permanently for a certain time. This makes the detection of a device in a 1-Wire network much easier. A faster detection saves a lot of time and therefore money when searching for a 1-Wire device.

o **Classes Assignment**: ESERA 1-Wire devices are assigned to OWD classes with the same properties. This assignment enables fully automatic visualization and data evaluation in control systems. A class list is available from ESERA**.**

For further information about the ESERA Auto-E-Connect System please refer to the ESERA website and the ESERA Config Tool 3.

Auto-E-Connect is registered as a German and European Patent by ESERA GmbH.

3 Technical data

Function	Multisensor or temperature and rel.humidity Monitoring of the operating voltage
Temperature sensor	high-precision digital temperature sensor with 12-bit measured value resolution
Measuring range temperature	-40°C to +85°C (Sensor element: -40°C to +85°C)
Accuracy temperature	0,2° in the range 5 to 60°C (better than DS18B20 Sensor)
Resolution	12 bit, 0.06°C/bit depending on selected resolution
Humidity sensor	capacitive digital humidity sensor with high accuracy
Measuring range humidity	0-100% rel. humidity
Accuracy humidity	2% in the range of 20-80% at 25°C
Data output	0-10V corresponds to 0-100% relative humidity, 0.1V = 1% rH
Interface	3 - wire connection (data, ground and 5V, parasitic operation not supported)
Connection	screw terminal for cable solid 0.2 to 2.5qmm or fine stranded 0,2 to 1,5qmm for connection we recommend slotted screwdriver size 2,5x75
1-Wire interface	based on DS2438
Operating voltage	5 V= (+10%/-20%)
Current consumption	approx. 2mA
Auto-E-Connect	level I,II, from 2022 level I-III

4 Ambient conditions

Protection system	IP20
Protection class	III
Temperature, operation	-25°C to 80°C, (limitation by carrier system, sensor -40°C to +125°C)
Humidity	10 - 90% (non condensing)
Dimensions (outside)	71 x 71 x 32mm (LxWxH)

5 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

6 Software / Control
The 1-Wire Multisensor Pro is read out via 1-Wire command for DS2438 modules. The sensor is supported by many controllers like ESERA-Station, Loxone, IP-Symcon, OWFS, FHEM, (Linux) or Micro Controller applications.

For ESERA 1-Wire Multisensors of the Pro series no complex formulas are necessary anymore.
A sensor controller within the Multisensor takes over the preprocessing of all measured values and thus simplifies the integration into 1-Wire systems enormously. Also, the measured values are no longer dependent on the operating voltage of the 1-Wire Multisensor.

The sensor measured values are assigned to the standard DS2438 device values as follows:
VDD = operating voltage (5V), 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.

7 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.

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

8 Integration in IP-Symcon / ESERA-Station
Through our website we provide ESERA IP-Symcon software-modules to import the 1-Wire Multisensor in IP-Symcon via 1-Wire Controller / 1-Wire Gateway. Therefore, no scripts are necessary.
Details can be found on the ESERA website at : https://www.esera.de/kompatible-steuerungen-zentralen/ip-symcon-integration/.

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

9 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/

10　Integration in FHEM

For the integration into the open source automation software FHEM we provide a software module for reading in the 1-Wire Multisensor via 1-Wire Controller / 1-Wire Gateway. This means that evaluation scripts are no longer necessary.

Details can be found on the ESERA website under "Compatible controllers - control units / FHEM integration"
https://www.esera.de/kompatible-steuerungen-zentralen/fhem-integration/

11　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.

12　Connection

The 1-Wire Multisensor Pro is connected by screw terminals.
The connection terminal is intended for solid cables with 0.2 to 2.5qmm or fine wire cables with 0.2 to 1.5qmm cross-section.
For the connection we recommend slotted screwdriver size 2,5x75.
The pin assignment is printed on the circuit board.
The correct polarity must be observed during connection.
The Multi-sensor must be connected with three cables (ground, 1-Wire Data and 5V). Parasitic mode is not supported.
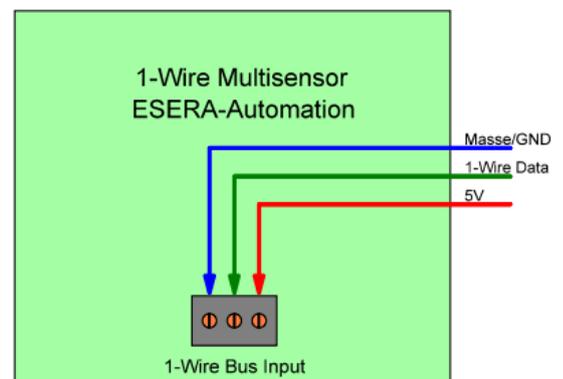
Note

The module may only be operated at the voltages and under the ambient conditions intended for it. The operating position of the device is arbitrary.
The modules may only be commissioned by a qualified electrician.

For further information on the operating conditions, see the following instructions under "Operating conditions".

13　Assembly

The mounting location must be protected from direct sunlight, moisture (e.g. dripping water) and drafts. The device may only be used in dry indoor rooms and in protected outdoor areas. During installation, make sure that the ventilation openings are located at the top and bottom. Also note the imprint of the direction of the air flow on the connection side of the unit

A draught-free location must be selected for installation. The unit is intended for installation inside a living room as a stationary unit. The 1-Wire Multisensor can be ideally mounted on a flush-mounted box through clever housing cut-outs.

14　1-Wire Network Cabling

The special feature of the 1-Wire system is the "BUS technology". All devices (sensors and actuators) are operated in parallel on a three-wire line, which is used for both power supply and data communication. The 1-Wire bus system joins the list of other successful bus systems such as CAN or Modbus RTU. All of the installation principles recommended for these are also applicable and appropriate to 1-Wire.

The maximum size of a 1-Wire Network is determined by various factors. These are mainly:

- Total cable length and cable type
- Number of 1-Wire devices
- Type of cable installation (topology)
- Number and design of cable connectors (unnecessary connection transitions should be avoided)

All factors in total are summarised and referred to as 1-Wire Bus load. Each increase of a factor increases the total 1-Wire Bus load for the 1-Wire controller and thus reduces the maximum network size.

According to our many years of experience and a lot of feedback from customers, the following conservative recommendation can be made:
- Maximum cable length 50 -120m
- Number of 1-Wire devices no more than 20 -22 pieces
- As linear a topology as possible without T-junctions

The topology in particular plays a major role. If possible, linear topology should be used. The linear topology can be compared like pearls on a pearl necklace. The data line should be laid from one device to the next without T-joints.

Furthermore, the type of cable used can also be mentioned here. We recommend for the cabling CAT5 or CAT6 network cable. It is also possible to use J-Y(St)Y telephone cables and KNX cables. Longer cable runs are possible with CAT5 versus CAT7 cables.

With twisted pair cables, a longer connection length can be achieved in an undisturbed environment, as the capacitive bus load is lower. A total length of 50 m and more can be easily achieved without additional measures. In disturbed, commercial and industrial environments, the cable should always be shielded in order to increase the "robustness" or interference sensitivity of the system

> **Note**
> The above statements about 1-Wire are hints and tips and do not describe any product property or represent any warranted product property of the product and the 1-Wire Controller.

15 Operating conditions

The Multisensor is designed for temperature and humidity measurements of air and gases indoors, 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.

16 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!

17 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.

18   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.

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20   Contact

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