Wireless Air-Duct Temperature Sensor

ENAD

Application

Battery -and wireless air-duct sensor for temperature control in connection with the receiving interfaces MSRC-x and higher-graded control systems.

Detection of measuring values via the higher-graded control system. Transmission to receiver by means of radio telegrams according to EnOcean standard. With integrated temperature sensor and solar energy storage for maintenance-free operation.

Types Available

ENAD 62	Air-duct temperature sensor (L=62mm)
ENAD 135	Air-duct temperature sensor (L=135mm)
ENAD 192	Air-duct temperature sensor (L=192mm)
ENAD 240	Air-duct temperature sensor (L=240mm)
ENAD 320	Air-duct temperature sensor (L=320mm)
ENAD 465	Air-duct temperature sensor (L=465mm)

Norms and Standards

FCC ID: S3N-SR65XX IC: 7953A-SR65XX
This device complies with Part 15 of the FCC Rules.
Operation is subject to the following two conditions:
(1) this device may not cause harmful interference, and
(2) this device must accept any interference received, including interference that may cause undesired operation.

This device complies with Industry Canada RSS-210 Issue 7.

This device complies with the Japanese radio law. It carries the following marking on the back side (MIC marking):

Warning: Changes or modifications made to this equipment not expressly approved by Entuit may void the user's authority to operate this equipment.

Security Advice

The installation and assembly of electrical equipment may only be performed by a skilled electrician.

The modules must not be used in any relation with equipment that supports, directly or indirectly, hu-man health or life or with applications that can result in danger for people, animals or real value.

Selection of Mounting Place for Solar Energy Storage for a correct and sufficient ambient brightnesscertain basic conditions must be met when selecting the mounting place.

By means of the energy-optimized EnOcean radio technology used in our "EasySens" wireless sensors, supplying themselves with electric energy by a 2 cm2 solar cell, the devices can work without batteries. Thanks to the cessation of changeable batteries the sensors are almost maintenance- free and environmentally sound.

If necessary, the solar-powered energy storage must be recharged after a longer storage of the wireless sensors in darkness, e.g. during installation. In principle, however, this is made automatically during the first operating hours in daylight. If the initial charging should not be sufficient in the first operating hours, the sensor is reaching its full operating state after 3 to 4 days at the latest. The sensor is sending properly in darkness (in the night) after this period of time at the very latest.

Entuit, Inc.
1930 Baseline Road - Grand Island, NY 14072 - phone (716) 775.9572 - www.EntuitInc.com - sales@entuitinc.com

Wireless Air-Duct Temperature Sensor

ENAD

Technical Data

Technology:	EnOcean, STM	
Transmitting frequency:	315,0 MHz	
Antenna:	Type: Helix, Gain: -3dBi	
Transmitting range:	Approx. 30m in buildings, approx. 300m upon free propagation	
Temperature detection:	Range:	10°C...+90°C
	Resolution:	0,31 K
	Absolute accuracy:	typ. +/-0,8K
Measuring value detection:	Every 100 seconds	
Sending interval:	Every 100 seconds with changes >1,6K Every 1000 seconds with changes <1,6K	
Energy generator:	Solar cell, internal goldcap, maintenance-free For type "BAT": battery 3,6V Type LS14250, operation time with battery operation approx. 5 to 10 years (depending on the intentional component aging and the self- discharging of the battery used).	
Enclosure:	Bottom part: material PA6, colour white Top cover: material PC, colour crystal clear For type "BAT": Top cover: material PA6, colour white.	
Sensor bushing:	Stainless steel grade 1.4571, D=7mm	
Mounting lengths:	2.44" / 5.31" / 7.56" / 9.45" / 12.6" / 18.3"	
Protection:	IP65 according to EN60529	
Ambient temperature:	-25...+65°C	
Transport: Weight:	-25...+65°C/ max. 70%rH, non-condensed	
Weight:	140g	

What to do if the ambient brightness is not sufficient.

Depending on the application (dark rooms etc.) it is also possible to operate the device by a battery. Thus, the sensor is equipped by a corresponding battery holder. Battery to be used: Lithium battery 3,6V/1,1Ah Type LS14250 / 1/2AA, operating time approx. 5 to 10 years, depending on the intentional component aging and the self-discharge of the bat-tery used. In order to change over the sensor from solar to battery operation, just put the coin cell into the battery holder.

Transmitting Frequency

The sensors send event or time controlled telegrams to the receiver.

Measuring Principle and Production of Telegram

A: Event controlled

By actuating the learning button of the device, the internal microprocessor is woken up, the measuring value for temperature is detected and a telegram to the receiver is generated.

B: Time controlled

The internal microprocessor is woken up within a time interval of approx. 1,6 minutes (T_wake up) and the measuring value for temperature is detected. If the status of an input has changed since the last inquiry (temperature change > 2% (>1,6°C), a telegram is produced immediately. If the input value temperature remain unchanged compared with the previous telegrams, a telegram is automatically produced at the latest after expiration of the fixed sending time of approx. 16 minutes (T_send).

Information	Temperature Production
Temperature Value	Time Controlled

After a telegram is sent, regardless whether produced by status changes or after expiration of T-send, the times T_wake up and T_intervall are re- started.

Remark: A telegram includes all information (tem-perature value etc....)

Wireless Air-Duct Temperature Sensor

ENAD

Selection of Mounting Place for Solar Energy Storage (continuation)

When selecting the mounting place for the wireless sensors, the following should be considered:

The minimum illumination of 200lx should be guaranteed at the mounting place for aleast 3 to 4 hours everyday regardless whether there is artificial light or daylight.

The health and safety at work act requires a minimum illumination of 500lx for office workplaces.

The illumination should not exceed1000lx in the long term.

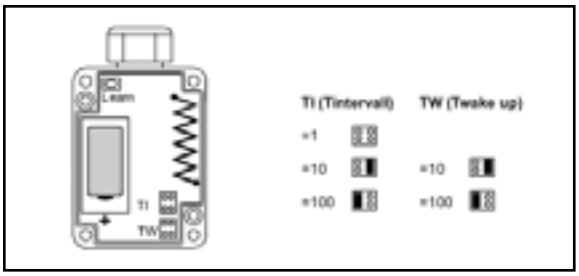
A recess that is not illuminated sufficiently in the course of the day should be avoided.

When using collimated artificial light the angle of incidence on the solar cell should be not too steep.

The sensors should preferably be mounted with the solar cell in window direction, whereas a direct sun radiation should be avoided. An occassionally direct sun radiation would lead to falsified measuring values with the temperature detection.

With regard to a future use of the room, the mounting place should be selected in that way, that a later shadowing by the user, e.g. by filing places or rolling container, is avoided..

Setting of Transmission Time



Manufacturer's Adjustment
T_wake up: 100, T_interval: 10
T_send = 100sec. wake up x 10 interval = 1000sec. = approx. 16 Min.

Remark: The sending frequency has a direct influence on the operation energy available in the energy storage. Thus, it also affects the discharge time of the energy storage during running operation.

Mounting Advice

The devices are supplied in an operational status. Probably, the internal solar energy storage must be recharged after a longer storage of the radio sensors in darkness. In principle, the recharging process is done automatically during the first operating hours in daylight. For this purpose, please refer to the remarks "solar energy storage".

Depending on the application, the cable temperature sensor is assembled to the air duct by means of a mounting flange respectively a clamp screw joint. Operation of the sensor with an immerision pocket: Use contact fluid for better heat transfer between sensor and measuring medium. When using our sensing elements in moist rooms or for purposes in refrigeration technique, we recommend our IP67 ver-sion "SI-Protection".

For an optimum location and receiving range, please see the "radio information" on the following pages.

Please note the general remarks in our"INFOBLATTTHK"

Wireless Air-Duct Temperature Sensor

ENAD

Description Radio Telegram

ORG	7 dec. Always (EnOcean module type “4BS”)
Data_byte1	Temperature 10...90°C, linear n=255...0
Data_byte0	Bit D3 Learn Button (0=Button pressed)
ID_Byte3	device identifier (Byte3)
ID_Byte2	device identifier (Byte2)
ID_Byte1	device identifier (Byte1)
ID_Byte0	device identifier (Byte0)

Installation

Learning-in of a telegram
with button actuation

Information on Wireless Sensors
Transmission Range

As the radio signals are electromagnetic waves, the signal is damped on its way from the sender to the receiver. That is to say, the electrical as well as the magnetic field strength is removed inversely proportional to the square of the distance between sender and receiver (E,H~1/r2).

Beside these natural transmission range limits, further interferences have to be considered: Metallic parts, e.g. reinforcements in walls, metallized foils of thermal insulations or metallized heat-absorbing glass, are reflecting electromagnetic waves. Thus, a so-called radio shadow is built up behind these parts.It is true that radio waves can penetrate walls, but thereby the damping attenuation is even more increased than by a propaga-tion in the free field.

For the practice, this means, that the building material used in a building is of paramount importance for the evaluation of the transmitting range. For an evaluation of the environment, some guide values are listed:

Radio path range/-penetration:
Visual contacts: Typ. 30m range in passages, corridors, up to 100m in halls

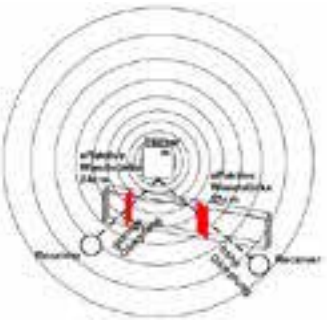
Rigypsum walls/wood:
Typ. 30m range through max. 5 walls

Brick wall/Gas concrete:
Typ. 20m range through max. 3 walls

Reinforced concrete/-ceilings:
Typ. 10m range through max. 1 ceiling

Supply blocks and lift shafts should be seen as a compartmentalisation.

In addition, the angle with which signal sent arrives at the wall is of great importance. Depending on the angle, the effectivewall strength and thus the damping attenuation of the signal changes. If possible, the signals should run vertically through the walling. Walling recesses should be avoided.



Other Interference Sources

Devices, that also operate with high-frequency signals, e.g. computer, auido-/video systems, electronical tansfomers and ballasts etc. are also considered as an interference source.

The minimum distance to such devices should amount to 0,5m.

Wireless Air-Duct Temperature Sensor

ENAD

Find the Device Positioning by means of the Field Strength Measuring Instrument EPM100C

EPM 100C is a mobile tool for measuring and indicating the received field strength (RSSI) of the EnOcean telegrams and disturbing radio activity at 315,0 MHz. It supports electrical installers during the planning phase and enables them to verify whether the installation of EnOcean transmitters and receivers is possible at the positions planned.

It can be used for the examination of interfered connections of devices, already installed in the building.

Proceeding for determination of mounting place for wireless sensor/ receiver:

- Person 1 operates the wireless sensor and produces a radio telegram by key actuation
- By means of the displayed values on the measuring instrument, person 2 examines the field strength received and determines the optimum installation place, thus.

High-Frequency Emission of Wireless Sensors

Since the development of cordless telephones and the use of wireless systems in residential buildings, the influence of radio waves on people's health living and working in the building have been discussed intensively. Due to missing measuring results and long-term studies, very often great feelings of uncertainly have been existing with the supporters as well as with the critics of wireless systems.

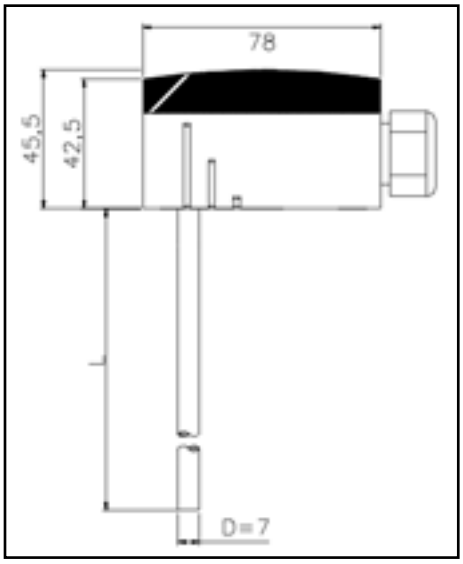
A measuring experts certificate of the institute for social ecological research and education (ECOLOG) has now confirmed, that the high-fequency emissions of wireless keys and sensors based on EnOcean technology are considerably lower than comparable conventional keys.

Thus, it is good to know, that conventional keys do also send electromagnetic fields, due to the contact spark. The emitted power flux density (W/m2) is 100 times higher than with wireless sensors, considered over the total frequency range. In addition, a potential exposition by low-frequency magnet fields, emitted via the wires, are reduced due to wireless keys. If the radio emission is compared to other high-frequency sources in a building, such as DECT-telephones and basis stations, these systems are 1500 times higher-graded than wireless keys.

Optional Accessories

(THMS)	Immersion pocket, mat. brass nickel-plated, safe up to 16bar
(THVA)	Immersion pocket, mat.stainless steel, safe up to 40bar
(MF7)	Mounting Flange
(LS14250)	Battery EasySens LS14250, 1,1Ah / 3,6V / 1/2AA

Dimensions



Entuit, Inc.
1930 Baseline Road - Grand Island, NY 14072 - phone (716) 247-5302 - www.EntuitInc.com - sales@entuitinc.com