EE240 Series

**Wireless Sensor for
Humidity / Temperature / CO$_2$**

State of the art sensor technology, highest reliability of data transmission and the ease of system installation are the outstanding features of the wireless sensor series EE240. Indifferent whether a point-to-point connection or a complex network is required, the series EE240 offers the ideal solution.

Wireless Transmitter EE245

The elegant housing combines the measurement of temperature, humidity and CO$_2$. An optional display is available to provide local indication. As a standard, batteries provide for the power supply. For more power demanding applications the device can be powered through an external adapter.

Wireless Transmitter EE244

The industrial housing can be equipped with up to three sensing probes to contact the interchangeable probes. An optional display is available to provide local indication. As a standard, batteries provide for the power supply. For more power demanding applications the device can be powered through an external adapter.

Interchangeable Sensing probes

A modular structure and easy extendable assortment of sensing probes allow the usage in many applications. For many years, the proven sensor technology of E+E for the measurement values of humidity, temperature, and CO$_2$ guarantee precise measurements and the highest longtime stability.

The standard interface and the stored calibration data of the sensing probe allow for any choice or combination of the available sensing probes offered. An adaptation or expansion of the number of sensing probes afterwards or an exchange for service purposes can be achieved in seconds – a must-have for uninterrupted data acquisition. For high temperature applications or installations in small spaces, the sensing probe can be connected with a sensor cable of up to 10 m (33 ft) in length.

Base Station EE241 and EE242

Do you have to traverse a street? The inexpensive point-to-point connection can be accomplished very easily with the **EE241**.
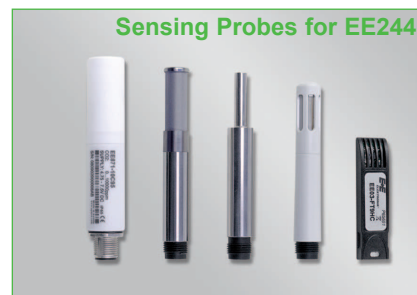
The configuration at the factory of the up to four transmitted measurement values is done in accordance with your specifications, meaning that the values are available as analogue outputs (0 – 5 / 10 V or 4 - 20 mA) immediately after installation.

For more complex networks (up to 500 transmitters or up to 2000 measurement values) is the user-configurable **EE242** available.

Independent of the topology of the network the integrated Webserver and the Ethernet interface warrants highest flexibility in the configuration of the network with a computer. A simple integration of the measurement system in the customer's network and the easy remote access and diagnostic of the measurement data are additional helpful features. The output values can be transferred as an analogue signal, as well as in digital form (via Ethernet). For a bus integration, Modbus will be supported. The actual measurement values and some operational information can be indicated on an optional display.

Router Series EE244-R

The radio range is greatly depending on local circumstances. With the router series EE244-R obstacles can be bypassed or the transmission distance expanded.

EE245 Transmitter

EE244 Transmitter

Sensing Probes for EE244

EE241   Base Station   EE242

Router EE244-R

Typical Applications

Pharmaceutical Industry
Warehouses
Control Rooms
Cooling Chambers
Museums
HVAC Systems
Food Industry

Features

Interchangeable Sensing Probes
Remote Probes up to 10 m (33 ft)
Battery Operating Life up to 1 Years
Webserver
Ethernet
Long Rangeability

Highest Transmission Reliability

The data transmission is based on the IEEE 802.15.4 protocol with a transmission frequency of 2.4 GHz, which can be used all over the world without any additional cost. A special identification address, checksums, handshakes, and bidirectional communication provide the highest transmission reliability. Typical radio ranges are 100 m (330 ft) for indoor applications and 1000 m (3300 ft) in the open field. Greater radio ranges are easy obtainable with routers. The self-configuring, scalable, and self-healing mesh network, even when a connection fails, is another component contributing to the improvement of the transmission reliability and security. The highest possible data security level is accomplished with a preset encryption key according to AES-128.
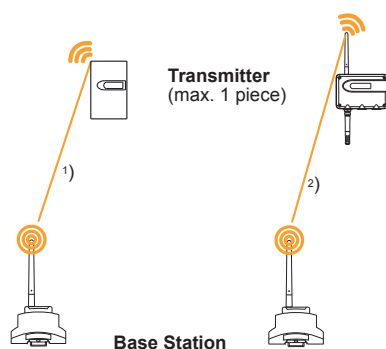
Digital bus connection

For bus integration, Modbus is supported. Communication is implemented via Ethernet or RS485 interface. Bus connection is only supported by the base station EE242.

Installation / Remote Access / Maintenance via Webserver

The integrated Webserver allows platform-independent installation, remote access and easy maintenance with any commercially available browser (Internet Explorer, Firefox, OPERA...) on a computer without additional software.
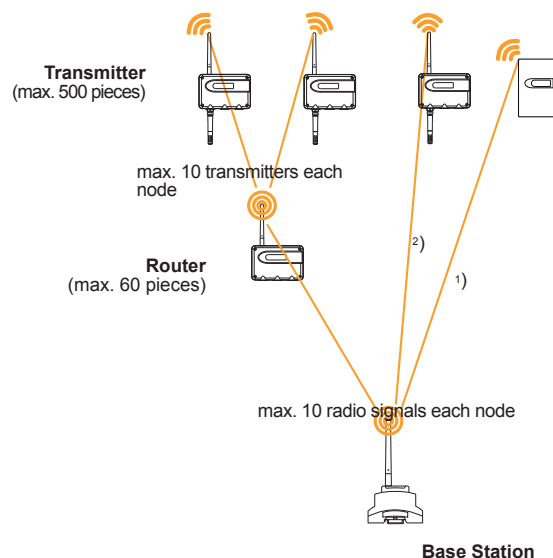
Wireless Networks

EE241 (point-to-point connection)   **EE242 (wireless network)**

Transmitter
(max. 1 piece)

Base Station

Transmitter
(max. 500 pieces)

max. 10 transmitters each node

Router
(max. 60 pieces)

max. 10 radio signals each node

Base Station

1) Radio ranges:
- up to 60m (197 ft) indoors

2) Radio ranges:
- up to 100m (330 ft) indoors
- up to 1000m (3300 ft) in open field

Comparison	EE241	EE242
Transmitter:		
max. number of transmitters EE244 / EE245	1	500
Router:		
maximum number of routers EE244-R	60	60
Base Station:		
configuration of analogue outputs	acc. to order code	✓ via Webserver
user-configurable after delivery	--	✓ via Webserver
digital interface	--	✓ Ethernet, Modbus

EE240

Technical data Transmitter EE244 & EE245

General

Transmission frequency	2.4 GHz
Transmission system	IEEE 802.15.4
Transmission power	10mW
Radio range	up to 100m (330 ft) indoors, up to 1000m (3300 ft) in open field
Approval	ETSI / FCC Part 15.247 / IC
Electromagnetic compatibility	EN61326-1 Industry FCC Part 15 Class B
	EN61326-2-3 Industry ICES-003 Class B CE

EE244 (Transmitter, Router)

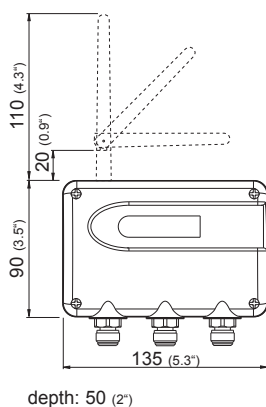|	
Supply transmitter (EE244-A)	battery 4x1.5V AA (not in the scope of supply)
Battery lifetime	> 1 year with a measuring data transmission every 5 min. (for T / %RH)
External supply transmitter (EE244-B)	8...28V DC SELV, typ. I_L = 20mA at 24V; max. I_L = 35mA at 24V DC
External supply router (EE244-R)	8...28V DC SELV, typ. I_L = 20mA at 24V; max. I_L = 35mA at 24V DC
Housing material	polycarbonate (PC)
Protection class housing	IP65
Temperature ranges	working temperature range of probe: refer to respective data sheet of sensing probe
	working temperature range: -40...+50°C (-40...122°F)
	(with display: -20...+50°C / -4...122°F)
	storage temperature range: -40...+50°C (-40...122°F)
	(with display: -20...+50°C / -4...122°F)
Max. number of sensing probes	3 (2*)
Max. number of measuring signals	6 (4*) (T / RH / CO_2**)

EE245 (Transmitter)

Power Supply	battery 4x1.5V AA (not in the scope of supply)
Battery lifetime	> 1 year with a measuring data transmission every 5 min. (for T / %RH)
Radio Range	up to 60m (197 ft) indoors
Antenna	internal
External supply transmitter (EE245)	DC 8-28V SELV / AC 12V (±20%)
Housing material	polycarbonate (PC)
Protection class housing	IP30
Temperature ranges	working temperature range: 0...90%RH (non-condensing) / -5...+55°C (23...131°F)
	storage temperature range: 0...90%RH (non-condensing) / -5...+55°C (23...131°F)
Max. numbers of measuring values	3 (T / RH / CO_2**)
Accuracy	T: ± 0,3 °C (at 20 °C) / ± 0,4 °C (20...55 °C)
	Rh: ± 3 % (30...70 %) / ± 5 % (70...90 %)
	CO_2: 2000ppm (± 50ppm +2 % of m.v.)
	5000ppm (± 50ppm +3 % of m.v.)
Connection	screw terminal 1,5mm²

*) with external power supply

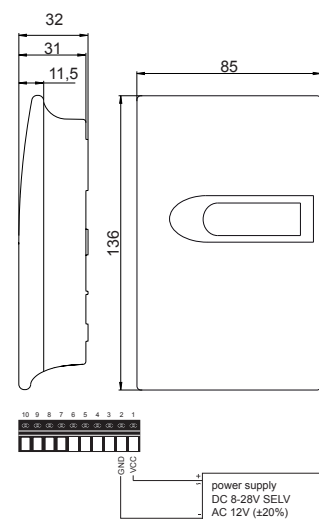**) For CO_2 an external power supply is recommended.

Dimensions in mm

EE244-Ax3:   **EE244-Bx2:**   **EE245**

depth: 50 (2")

socket / ELKA 4012 PG7[1]

1) included in the scope of supply

power supply
DC 8-28V SELV
AC 12V (±20%)
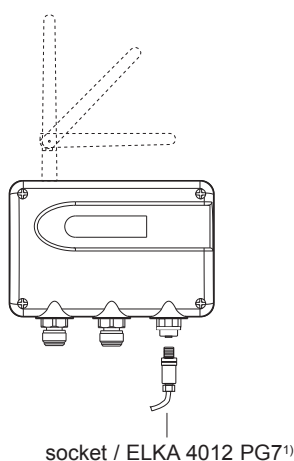
Technical data Base Station EE241 & EE242

EE241/EE242 (Base Station)

Supply voltage SELV		24V AC/DC ±20%
digital interface		• Ethernet • Modbus (RTU / ASCII / TCP)
Current consumption	EE241	typ. I_L = 70mA at 24V DC; max. I_L = 100mA at 24V DC
	EE242	typ. I_L = 150mA at 24V DC; max. I_L = 180mA at 24V DC
Analogue outputs		0-5V $\quad\quad\quad\quad\quad$ -0.5mA < I_L < 0.5mA
		0-10V $\quad\quad\quad\quad$ -1mA < I_L < 1mA
		0-20mA / 4-20mA $\quad$ R_L < 500 Ohm
Number of analogue outputs		4
Accuracy of analogue outputs		±5mV resp. ±10µA
Temperature dependence of analogue outputs		max. 0.1 $\frac{mV}{°C}$ resp. 1 $\frac{µA}{°C}$
Resolution of analogue outputs		0.7mV resp. 1.50µA
Electrical connection		screw terminals max. 2.5mm^2
Housing material		polycarbonate (PC)
Protection class housing		IP20
Temperature ranges		working temperature range: -30...+50°C (-22...122°F) (with display: -20...+50°C / -4...122°F) storage temperature range: -30...+50°C (-22...122°F) (with display: -20...+50°C / -4...122°F)

Dimensions in mm - connection Diagram EE241 / EE242

pluggable or remote antenna
(antenna cable refer to Accessories)
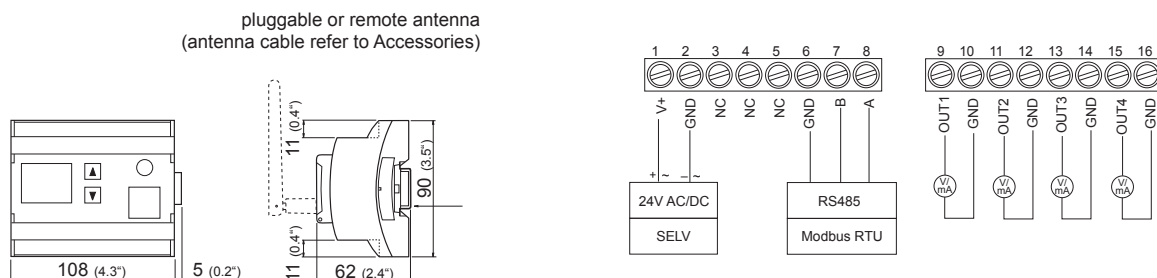
Overview of EE244 Sensing Probes

Application	Picture	Measuring Range	Accuracy	Order Code
Humidity/Temperature Probes				
RH/T probe for standard applications		0...100% RH -40...80°C (-40...176°F)	±2% RH (0...90% RH) ±3% RH (90...100% RH) ±0.1°C (±0.18°F) at 20°C (68°F)	EE07-PFT1
RH/T probe for clean room applications, food and pharmaceutical industry		0...100% RH -40...80°C (-40...176°F)	±2% RH (0...90% RH) ±3% RH (90...100% RH) ±0.1°C (±0.18°F) at 20°C (68°F)	EE07-MFT9
RH/T module for installation in small spaces or unobtrusive mounting		0...95% RH -40...85°C (-40...185°F)	±3% RH (10...100% RH) at 21°C (69.8°F) ±0.3°C (±0.54°F) at 20°C (68°F)	EE03-FT9
Temperature Probes				
T probe for standard applications		-40...80°C (-40...176°F)	±0.1°C (±0.18°F) at 20°C (68°F)	EE07-PT1
T probe for clean room applications, food and pharmaceutical industry		-40...80°C (-40...176°F)	±0.1°C (±0.18°F) at 20°C (68°F)	EE07-MT
CO$_2$ Probes				
CO$_2$ probe for standard applications		0...2000ppm 0...5000ppm 0...10000ppm	±(50ppm+2% of m.v.) ±(50ppm+3% of m.v.) ±(100ppm+5% of m.v.)	EE871

Ordering Guide

BASE STATION - „point-to-point connection" (EE241) and „wireless network" (EE242)

						EE241-	EE242-
Hardware Configuration							
Frequency	2,4GHz (10mW)					A	A
Output signal	0-5V					2	2
	0-10V					3	3
	0-20mA					5	5
	4-20mA					6	6
Display	with					D	D
	without					-	-
Software Configuration							
Physical parameters of outputs	relative humidity	RH	[%]	(A)	output 1	A	A / B / C / R
	temperature	T	[°C]	(B)	output 2	B	A / B / C / R
	dew point temperature	Td	[°C]	(C)	output 3	C	A / B / C / R
	CO_2	CO_2	[ppm]	(R)	output 4	R	A / B / C / R
Unit	metric / SI					-	-
	non metric / US					E01	E01
T-Scaling (in °C or °F)	-40...60 (T02)	0...50 (T04)			output T	Select Txx code	Select Txx code
Td-Scaling (in °C or °F)	-20...50 (T48)	furhter scalings on request			output Td	Select Tdxx code	Select Tdxx code
CO_2-Scaling (in ppm)	0...2.000 (C20)	0...10.000 (C22)				Select Cxx code	Select Cxx code
	0...5.000 (C21)						

TRANSMITTER EE245

		EE245-
Type	RH + T + CO_2	FTC
	RH + T	FTx
	CO_2 +T	xTC
	T	xTx
CO_2 (only for TC and FTC)	0...2000ppm	2
	0...5000ppm	5
	without CO_2 measurement	x
Frequency	2,4GHz (10mW)	A
Display	with	D
	without	x
Software Configuration		
Unit	°C	-
	°F	E01

TRANSMITTER / ROUTER EE244

		EE244-	EE244-
Type	transmitter	A	
	transmitter for external supply[1]	B	
	router		R
Frequency	2,4GHz (10mW)	A	A
Number of sensing probes	1	1	
	2	2	
	3 (not possible with type B - transmitter with external supply)	3	
Display	with	D	
	without	-	

1) External power supply units not included in the scope of supply

SENSING PROBES FOR EE244

Humidity / Temperature	probe RH/T (polycarbonat)	EE07-PFT1
	probe RH/T (metal)	EE07-MFT9
	module RH/T	EE03-FT9
Temperature	probe T (polycarbonat)	EE07-PT1
	probe T (metal)	EE07-MT
CO_2	probe CO_2	EE871

Accessories / Replacement Parts

Base Station:
- Antenna cable 2m (7ft)   (HA010330)
- Crossover cable (PC to base station)   (HA010333)
- External power supply unit   (V03)

Transmitter:		EE244	EE245
- Probe cable for EE07 - 2m (7ft) / 5m (16ft) / 10m (33ft)	(HA0108xx)	(✓)	
- Connection cable for EE03, 2m (7ft)	(HA010328)	(✓)	
- Connection cable for EE03, 5m (16ft)	(HA010329)	(✓)	
- Antenna cable 2m (7ft)	(HA010330)	(✓)	
- Bracket for rail installation	(HA010203)	(✓)	
- Reference probes	(HA010403)	(✓)	
- Duct mounting kit for EE07	(HA010209)	(✓)	
- External power supply unit	(V03)	(✓)	(✓)

Oder Example

1)   Position 1 - Base Station:
EE242-A3D/ABCR-T04-Td48-C20

Frequency:	2,4GHz
Output signal:	0-10V
Display:	yes
Outputs:	RH, T, Td, CO_2
Unit:	SI
Scaling:	T: 0...50; Td: -20...50

Position 2 - Transmitter / Router:
EE244-BA1D

Type:	Industral transmitter with external supply
Frequency:	2,4GHz
Probe:	1
Display:	yes

Position 3 - Sensing Probes:
EE07-PFT1, EE07-MT

2)   Position 1 - Base Station:
EE242-A3D/ABCR-T04-Td48-C20

Frequency:	2,4GHz
Output signal:	0-10V
Display:	yes
Outputs:	RH, T, Td, CO_2
Unit:	SI
Scaling:	T: 0...50; Td: -20...50

Position 2 - Transmitter:
EE245-FTC5Ax

Type:	Room transmitter for relative Humidity, Temperature and CO_2
CO_2:	0...5000ppm
Frequency:	2,4GHz
Display:	without