EE240

Wireless Sensor Network for Humidity, Temperature and CO_2

The EE240 wireless sensor network is based on the IEEE 802.15.4 radio standard for energy-efficient communication and is ideal for both building automation and industrial process control. The use of the Zigbee protocol facilitates star and tree topologies. The network is self-configuring and self-healing, properties that increase the scalability and reliability of data transmission. It stands out by state of the art E+E sensor technology, high data transmission security and easy maintenance.

An EE240 network consists of an EE242 base station, up to 50 transmitters / routers and up to 500 wireless transmitters with up to 2000 measured values: relative humidity (RH), dew point temperature (Td), temperature (T) and carbon dioxide (CO_2).

EE242 Base Station

EE242 Base Station

The EE242 base station controls the entire network. It receives information from all the wireless transmitters and routers and supplies the measured data via Ethernet / Modbus TCP, Ethernet / JSON and RS485 / Modbus RTU. Four measurands can be assigned to the voltage or current analogue outputs. The measured data as well as status information is available also on the optional display.

EE244 Transmitter / Router

EE244 Modular Transmitter / Router

The EE244 transmitters and routers feature an IP65 / NEMA 4X enclosure and an optional pluggable display. The antenna can be connected either directly into the EE244 enclosure or located remote with an optional 2 m (6.6 ft) cable. With an optional adapter, the devices can be mounted onto DIN rails.

Depending on its version, the EE244 transmitter accommodates up to 3 sensing probes for RH, T and CO_2 and can be powered by an external power supply adapter or/and by batteries. The EE244 router accommodates up to 2 sensing probes and requires external power supply.

Sensing Probes for EE244

Sensing Probes for EE244

The probes (EE871 for CO_2, EE07 for RH / T or T only) feature M12 connectors and are interchangeable. They can be plugged directly into the EE244 enclosure or located remotely using a cable of up to 10 m (33 ft) length.

EE245 Room Transmitter

EE245 Modular Room Transmitter

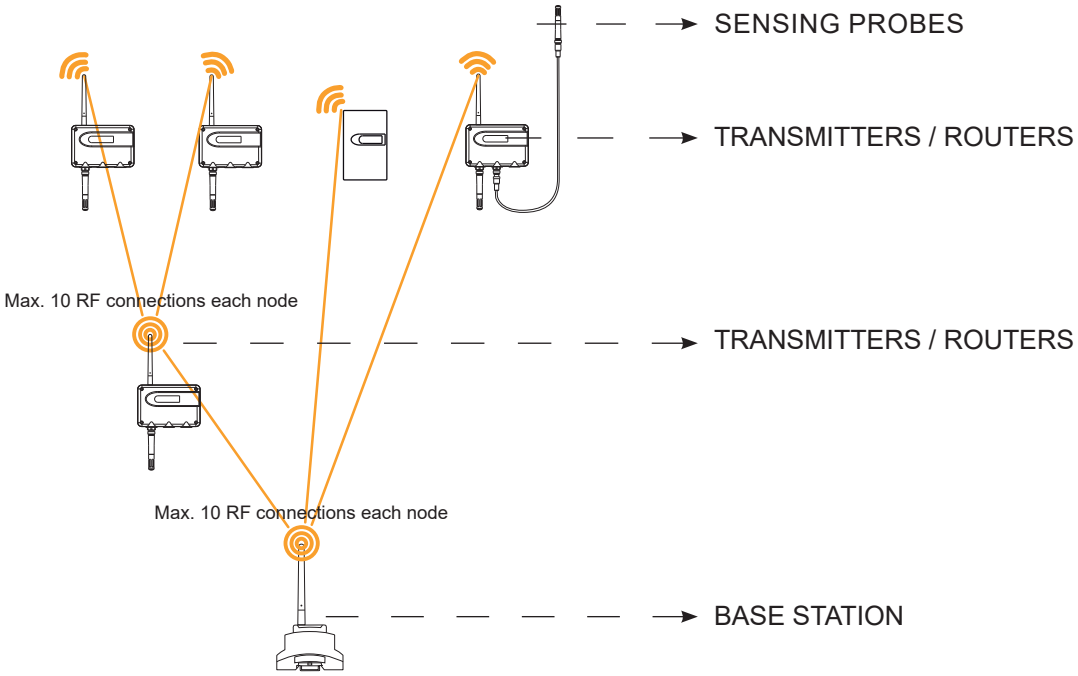
The EE245 is designed for indoor use and measures any combination of CO_2, RH and T. It features an elegant enclosure, optional display and can be powered with batteries or with an external power supply adapter.

The snap-on enclosure with entire electronics located in the front cover simplifies installation and maintenance. The back cover, which contains just the screw terminals, can be mounted and wired without the front cover, thus avoiding the exposure of the electronics to construction site pollution.

Features

» Operates worldwide on license free 2.4 GHz frequency band
» Typical transmission range of 60 m (197 ft) inside buildings and 1 000 m (3 300 ft) in the open field
» Stable network and reliable data transmission
» AES-128 encryption provides highest data security
» Webserver in the base station facilitates wireless network setup as well as remote access, diagnosis and maintenance via web browser
» Reference probes for check of EE244 and for loop calibration available
» Interchangeable RH / T and CO_2 sensing probes for EE244 can be plugged directly or installed remotely up to 10 m (33 ft)
» Pluggable, interchangeable CO_2 and RH sensing modules for EE245
» CO_2 measurement employs dual wavelength non-dispersive infrared (NDIR) technology
» Proprietary E+E coating protects the RH sensing elements against dust, dirt and corrosive deposits

Example of EE240 Network



RF coverage: up to 60 m within buildings / up to 1 000 m free field (without obstacles)

Technical Data

EE242 Base Station

Digital interface / protocol	Ethernet / Modbus TCP or JSON RS485 / Modbus RTU / ASCII
Analogue outputs	0 - 5 V -0 < I_L < 0.5 mA 0 - 10 V -0 < I_L < 1 mA 0 - 20 mA / 4 - 20 mA R_L < 500 Ω
Number of analogue outputs	4
Accuracy of analogue outputs	±5 mV resp. ±10 µA
Temperature dependence of analogue outputs, max.	0.1 $\frac{mV}{°C}$ resp. 1 $\frac{\mu A}{°C}$
Resolution of analogue outputs	0.7 mV resp. 1.5 µA
Working and storage temperature range	-30...+50 °C (-22...122°F) -20...+50 °C (-4...122°F) with display
Power supply class III	24 V AC/DC ±20%, USA & Canada: class 2 supply required
Electrical connection	Screw terminals max. 2.5 mm²
Current consumption, typ. max.	I_L = 150 mA at 24V DC; I_L = 180 mA at 24V DC
Enclosure material	Polycarbonate (PC)
Protection rating enclosure	IP20

EE244 Transmitter and Router

Max. number of measurands	6 (battery powered) 4 (external supply)
Max. number of sensing probes	3 (battery powered) 2 (external supply)
Working and storage temperature range	-40...+50 °C (-40...122 °F) -20...+50 °C (-4...122 °F) with display
Working temperature range of probes	Refer to data sheet of respective probe
Battery supply with EE244-AF6x	4x1.5 V AA[1] (not in the scope of supply)
External supply with EE244-AFxE9x[2] class III	8 - 28 V DC, USA & Canada: class 2 supply required
Current consumption with external supply, typ. max.	I_L = 20 mA at 24 V DC I_L = 35 mA at 24 V DC
Enclosure material	Polycarbonate (PC)
Protection rating enclosure	IP65 / NEMA 4X

EE245 Room Transmitter

Accuracy		
	T:	±0.3 °C (at 20 °C) / ±0.4 °C (20...55 °C)
at 23 °C (73 °F)	RH:	±3 % (30...70 %) / ±5 % (70...90 %)
at 25 °C (77 °F) and 1013 mbar	CO_2:	2000 ppm (< ±50 ppm + 2 % of m.v.) 5000 ppm (< ±50 ppm + 3 % of m.v.) m.v. = measured value
Antenna		Internal
Working and storage conditions		-5...+55 °C (23...131 °F) / 0...90 %RH (non-condensing)
Battery supply		4x1.5 V AA[2] (not in the scope of supply)
External power supply class III		8 - 28 V DC / 12 V AC (±20%), USA & Canada: class 2 supply required
Electrical connection		Screw terminals 1.5 mm²
Enclosure material		Polycarbonate (PC)
Protection rating		IP30

General

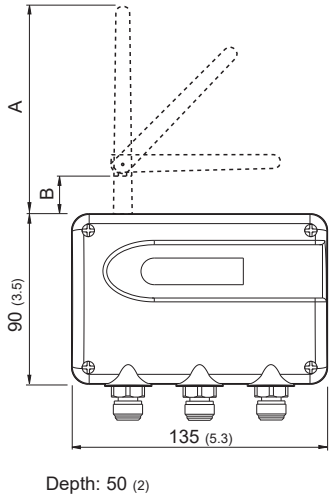
Transmission frequency	2.4 GHz
Transmission standard	IEEE 802.15.4
Transmission power	8 dBm
Transmission range	Up to 60 m (197 ft) indoors, up to 1000 m (3300 ft) in open field
Approval	ETSI / FCC Part 15.247 / IC
Electromagnetic compatibility	EN 61326-1 Industry FCC Part 15 Class A EN 61326-2-3 Industry ICES-003 Class A CE

1) Battery lifetime > 1 year with a measuring data transmission every 5 min. (for T / RH)
2) Choice between batteries and external power supply via jumper on the electronics board for EE244-AF6E9x possible

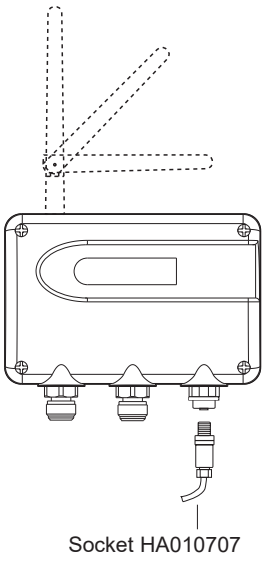
Dimensions

Values in mm (inch)

EE244-AF6NP3:

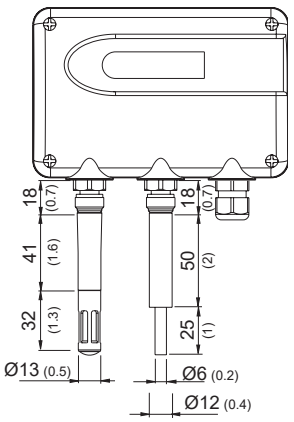


EE244-AFxE9NP2:

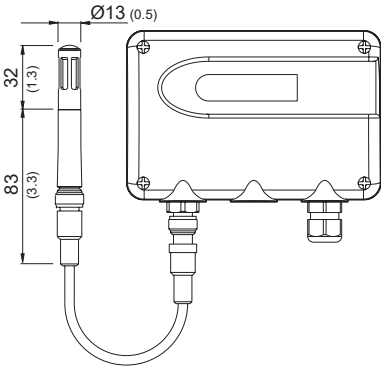


Antenna	A	B
2.4 GHz	172 (6.8)	27 (1.1)

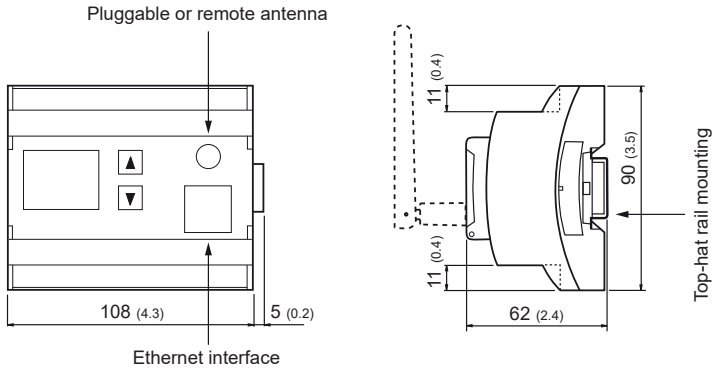
EE244 with plugged probes



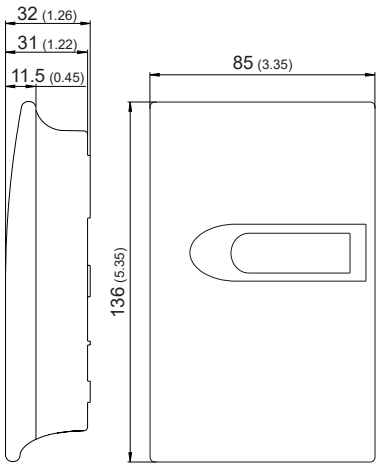
EE244 with remote probe



EE242



EE245



Sensing Probes for EE244

Refer to the respective data sheet for details

EE07 Humidity and Temperature Probe with Digital Output: www.epluse.com/ee240

EE871 CO_2 Sensing Probe for the EE240 Wireless Sensor Network: www.epluse.com/ee240

Ordering Guide

Base Station			EE242-
HW Config.	Output	0 - 5 V	A2
		0 - 10 V	A3
		0 - 20 mA	A5
		4 - 20 mA	A6
	Display	Without display	no code
		With display with backlight	D2
SW Configuration	Output 1	Relative humidity RH [%]	no code
		Other measurand (xx see measurand code below)	MAxx
	Scaling 1 low	0	no code
		Value	SAL*Value*
	Scaling 1 high	100	no code
		Value	SAH*Value*
	Output 2	Temperature T [°C]	no code
		Temperature T [°F]	MB2
		Other measurand (xx see measurand code below)	MBxx
	Scaling 2 low	Value	SBL*Value*
	Scaling 2 high	Value	SBH*Value*
	Output 3	Dew point Temperature Td [°C]	no code
		Dew point Temperature Td [°F]	MC53
		Other measurand (xx see measurand code below)	MCxx
	Scaling 3 low	Value	SCL*Value*
	Scaling 3 high	Value	SCH*Value*
	Output 4	CO_2	no code
		Other measurand (xx see measurand code below)	MDxx
	Scaling 4 low	Value	SDL*Value*
	Scaling 4 high	Value	SDH*Value*

Measurand Code for Output 1 to Output 4

Measurand code		MAxx / MBxx / MCxx / MDxx
Temperature T	[°C]	1
	[°F]	2
Relative humidity RH	[%]	10
Dew point Temperature Td	[°C]	52
	[°F]	53
CO_2	[ppm]	30

Please note: no mix of SI/US units allowed

Transmitter / Router			EE244-		
HW Configuration	Function	Transmitter	AF6		AF7
		Router			
	Electrical connection	Without (battery powered)	no code		
		M12 plug for supply		E9[1)]	E9
	Number of probes	0			NP0
		1	NP1	NP1	NP1
		2	NP2	NP2	NP2
		3	NP3		
	Display	Without display	no code		
		With display	D1		
SW	Unit	Metric SI	no code		
		Non-metric US/GB	U2		

1) EE244-AF6E9 additionally supports battery supply changeover via jumper, see manual
External power supply recommended for CO2 measurement (not included in the scope of supply).

Room Transmitter			EE245-	
HW Configuration	Model	RH + T	M1	
		T	M3	
		CO_2 + T		M11
		RH + T + CO_2		M12
	CO_2 Range	0...2000 ppm		HV1
		0...5000 ppm		HV2
	Display	Without display	no code	
		With display	D1	
SW	Unit	Metric SI	no code	
		Non metric US/GB	U2	

Accessories

- Cable for remote sensing probe

2 m (7 ft)	HA010801
5 m (16 ft)	HA010802
10 m (33 ft)	HA010803

Base Station:

- Antenna cable 2 m (6.6 ft)	HA010330
- Crossover cable (PC to base station)	HA010333
- External power supply unit	V03

Transmitters:

		EE244	EE245
- Antenna cable 2 m (6.6 ft)	HA010330	(✓)	
- Bracket for rail installation	HA010203	(✓)	
- Reference probes	HA010403	(✓)	
- M12x1 cable connector, 4 pole socket for self assembly	HA010707	(✓)	
- External power supply unit	V03	(✓)	(✓)

Order Examples

Position 1 - Base station:
EE242-A3D2SBL0SBH50SCL-20SCH50SDL0SDH2000

Output:	0 - 10 V
Display:	With display with backlight
Output 1:	Relative humidity
Scaling 1 low:	0 %RH
high:	100 %RH
Output 2:	Temperature [°C]
Scaling 2 low:	0 °C
high:	50 °C
Output 3:	Dew point Temperature [°C]
Scaling 3 low:	-20 °C
high:	50 °C
Output 4:	CO_2 [ppm]
Scaling 4 low:	0
high:	2000 ppm

Position 2 - Transmitter / Router:
EE244-AF6E9NP2D1U2

Function:	Transmitter
Electrical Connection:	M12 plug for supply
Number of probes:	2
Display:	With display
Unit:	Non-metric US/GB [°F]

Position 3 - Sensing probes:
EE07-M1F2, EE07-M3HS2

Position 4 - Cable for remote sensing probes:
HA010801, HA010802

Position 1 - Base Station:
EE242-A6SBL-40SBH60SCL0SCH50SDL0SDH5000

Output	4 - 20 mA
Display	Without display
Output 1:	Relative humidity [%RH]
Scaling 1 low:	0 %RH
high:	100 %RH
Output 2:	Temperature [°C]
Scaling 2 low:	-40 °C
high:	60 °C
Output 3:	Dew point Temperature [°C]
Scaling 3 low:	0 °C
high:	50 °C
Output 4:	CO_2 [ppm]
Scaling 4 low:	0
high:	5000 ppm

Position 2 - Transmitter / Router:
EE245-M12HV2D1

Model:	RH + T + CO_2
CO_2:	0...5000 ppm
Display:	With display
Unit:	Metric SI [°C]