59XXN SERIES
WIRELESS LORAWAN® HUMIDITY/ TEMPERATURE SENSOR

General Description

The TE Model 59XXN wireless sensor combines a high accuracy relative humidity and temperature sensor, a data logger and radio in one compact, battery-operated device. Designed for harsh environments, it is waterproof and ATEX / IECEx certified. The humidity sensor is enclosed in a weatherproof plastic housing.

The model 59XXN wireless humidity and temperature sensor uses the LoRaWAN® communication protocol, offering a simple, reliable, and secure means of expanding condition-based maintenance into plant areas where the cost to install wired systems is prohibitive, making data available to existing process control and information systems. What's more, it also offers a Bluetooth® Low Energy interface for easy configuration of built-in parameters during sensor installation.

Features

- Compact Design with humidity sensor enclosed in plastic housing for corrosion resistance.
- Humidity operating range from 0% to 100%RH
- Relative humidity accuracy: Typical ±5% RH (at 25°C and RH 55%)
- Integrated sensor temperature output accuracy ±0.8°C @25°C
- Up to 8 years battery life, depending on environmental conditions and data transmission intervals.
- Lithium Primary 3.6V / 2.1Ah battery supplied with the sensor.

Applications

- Corrosion under insulation (CUI)
- Moisture in oil
- Infrastructure
- Environmental
- Agriculture

Key Specifications

- Wireless Humidity & Temperature Sensor
- Designed for Condition Monitoring
- LoRaWAN® [868MHz (EU) / 915MHz (NA)] wireless communications with a Bluetooth® Low Energy interface to ease the embedded settings configuration at the sensor installation.
- Weatherproof (IP66/IP67)
- FCC /IC /CE /RED Certified
- Explosive Atmospheres ATEX/IECEx certified & HazLoc North America certification pending (See section 1.6 for more information)
- Programmable and Customer Configurable
- Wide operating temperature range from -30°C to 75°C
- Rugged construction can withstand 50g shock/ 5g vibration.

CLICK HERE ›
CONNECT WITH A SPECIALIST

1 PERFORMANCE SPECIFICATIONS

1.1 Operation specification:

Unless otherwise specified, all parameters are measured at 25°C @ 3.0V applied.

Parameter	Symbol	Min	Typ.	Max	Unit	Notes/Conditions
Humidity Sensor- Humidity						
Humidity measurement range		0		100	%RH	
Relative Humidity Accuracy(1)		-6	±5	+6	%RH	55%RH/25°C
Recovery time after Immersion			<1		h	45%RH/ 25°C
Humidity Sensor- Temperature						
Temperature measurement range	Tr	-30		+75	°C	
Temperature Accuracy			±0.8		°C	At 25°C

(1) Exposure to extreme relative humidity for extended periods may temporarily induce an offset on the RH measurement accuracy specification, which will recover over time.

1.2 Environmental specifications(2):

Parameter	Symbol	Min	Typ.	Max	Unit	Notes/Conditions
Operating temperature	T°	-30		+75	°C	
Ingress protection	IP	IP66/67				
EMI/RFI/ESD protection		IEC61000-4-2, ICE61000-4-6				
ESD		4			kV	Contact Discharge
Storage temperature		According to IEC 60721-3-1:2018 Class 1K22				Without battery/ 85 %RH Max
Vibration		5g 10Hz-150Hz				According to IEC60068-2-6-2007
Shock limit	g_{max}	50			g	According to IEC60068-2-27

(2) Maximum limits which the sensor will withstand without damage

1.3 Communication specification (BLE):

Parameter	Symbol	Min	Typ.	Max	Unit	Notes/Conditions
Wireless protocol		BLE 5.0				
Operating frequency BLE		2.4			GHz	
Receiver sensitivity		-129		-127	dBm	
Advertising interval			1		sec	Factory default configuration
Transmit power	Max	+4			dBm	

1.4 Communication specification (LoRa):

Parameter	Symbol	Min	Typ.	Max	Unit	Notes/Conditions
Wireless protocol		LoRaWAN® class A				
Operating frequency LoRaWAN®		868 (EMEA) or 915 (USA)			MHz	
Transmit power	Max	+8			dBm	

1.5 Physical:

Parameter	Symbol	Min	Typ.	Max	Unit	Notes/Conditions
Media compatibility		External exposed surfaces: PEEK PET GF EPDM O-ring				
Weight	Max		60±10		g	(With cap version, without battery)
Dimension			See section 5		mm	
Mounting		Wrench size: 1-7/16in or 36mm Max torque: 5Nm				Refer to the installation manual (Doc# 20029500-10)

1.6 Compliance/regulatory:

Compliance Type	Notes/Conditions	Status
Bluetooth® Signal Compliance	Worldwide application	Completed
LoRaWAN® Certification	North America 915 MHz Europe and middle east (EMEA) 868 MHz	Completed
FCC Certified	United States	Completed
ISED Certified	Canada	Completed
RED Compliance	Europe (EU)	Completed
RoHS Compliance		Completed
REACH Compliance		Completed
Explosive Atmospheres Certifications	ATEX, IECEx	Completed
	United States, Canada	Pending
CE Certification	Europe (EU)	Completed
CITC Certification	Saudi Arabia	Pending
NCC certification	Nigeria (Refer to the Order TCPN for NCC-certified references)	Pending

2 INTRINSIC SAFETY MODELS:

This equipment is certified for Intrinsic Safety when model code “EX” is selected during the ordering process. Please see ordering information in section 8 for details:

Intrinsic Safety approval is as follows:

TÜV 23 ATEX 9051 X

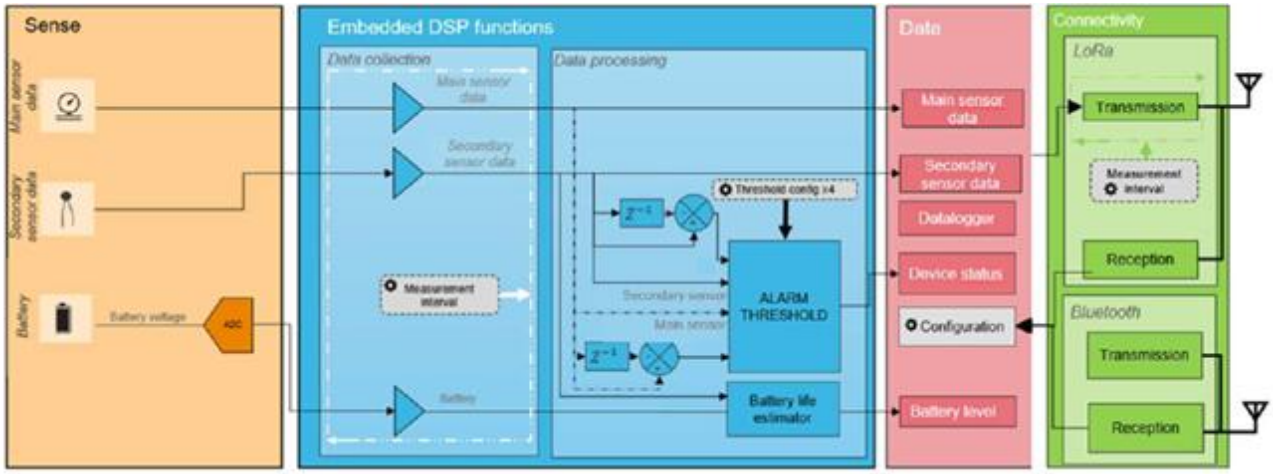
II 1 G, Ex ia IIC T4 Ga

3 GENERAL DESCRIPTION:

• Block diagram/schematic:

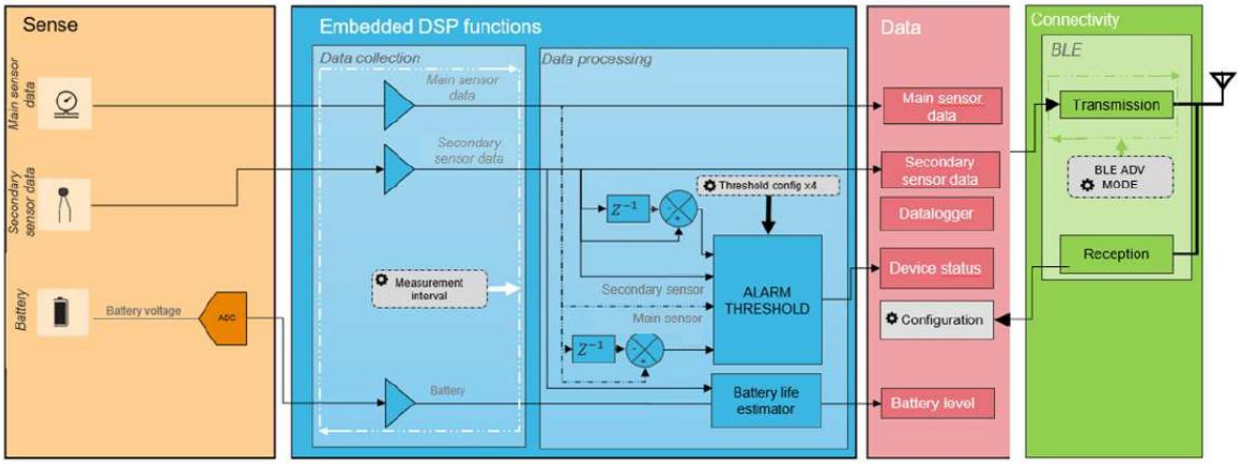
The sensor operates as a smart device. It offers sensor acquisition, data processing, analysis, and wireless communication capabilities.
Processing and analysis functions offer the end user flexibility and cover most applications.
The device computes humidity or internal temperature data in a smart way:

- Delta detection
- Humidity and Temperature data



BLE can be used for local configuration for 1 hour.

LoRaWAN® connectivity will be used to send sensor data periodically. Once configured and connected to a LoRaWAN® network, the downlink frame can then be used to configure the sensor.



4 BATTERY:

4.1 Saft LS17330:

The system should be exclusively powered with an LS17330 battery.

Parameters	Typical value
Manufacturer	SAFT
Reference	LS 17330
Technology	Primary lithium-thionyl chloride (Li-SOCl2)
Nominal voltage	3.6 V
Capacity at 20°C	2100 mA

4.2 Battery life:

The 59XXN Humidity and Temperature sensor is designed to use battery power in the most efficient ways possible. Battery quality, long term ambient temperature conditions, data collection and transmission intervals, and spreading factor will impact overall battery life.

- Battery Quality – Batteries for the sensor must be acquired from authorized distributors and sources. This ensures that batteries have been stored and transported in temperature conditions that do not exceed the manufacturer's recommended limits. End users must also store batteries within these temperature limits. If batteries are exposed to temperatures exceeding recommended limits, battery life will be affected.

- Ambient Temperature Conditions – Optimum battery life can be expected when the ambient temperature is near 25ºC. In most applications, the temperature will vary within the specified limits. These variations can shorten battery life.

- Data Collection and Transmission Intervals – The sensor consumes the most power when it is taking measurements, processing the data, and transmitting the information via radios. The user can select the intervals for these actions. Longer intervals will consume less battery power and result in longer battery life.

- Spreading Factor – This impacts communication performance of the LoRaWAN® radio. A larger spreading factor increases the time on air, increases receiver sensitivity, reduces data rate, all to improve communication range. Higher spreading factors will consume more battery energy shortening battery life.

- Under the most ideal conditions, a battery life of 8 years is expected. However, each application will have conditions that are something less than ideal.

4.3 Battery replacement:

The 59XXN's battery must be replaced if depleted.

N.B.: It is only allowed to replace the battery in non-hazardous areas.

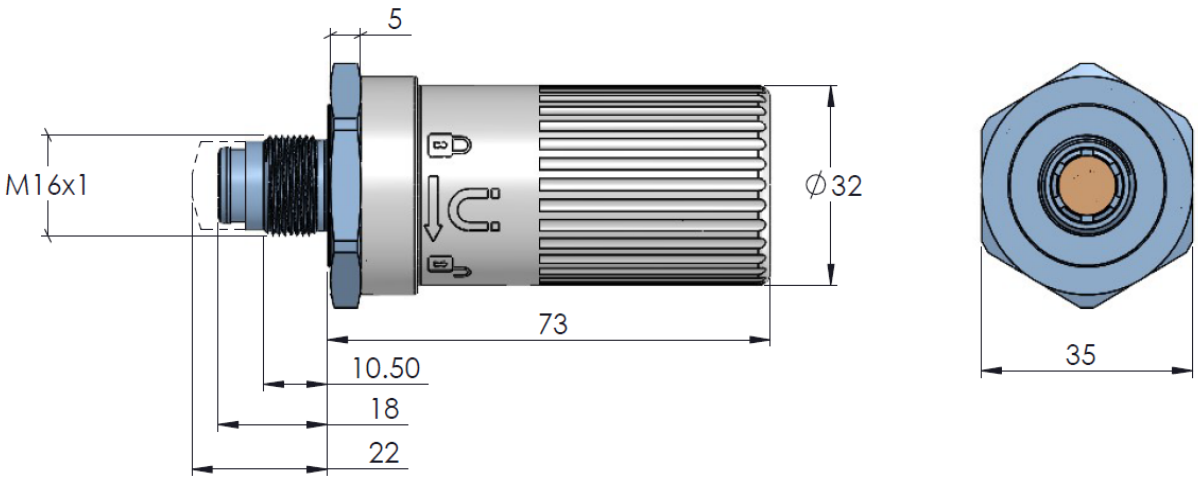
- Remove the plastic cover following the opening direction
- Use the orange ribbon to pull out the battery
- Put the orange ribbon back in the cavity before installing the new battery. Note that it MUST be replaced by the same battery reference 3.6 V SAFT battery LS17330.
- Put the spacer on the negative terminal and install the battery positive upward
- Pull the spacer out
- Install the plastic cover and tighten it following the locking direction. Refer to the Installation Manual or the Quick start guide for details of battery installation and replacement.

Once the battery replacement is completed, the battery life estimator in the firmware must be reset to a "full" battery status. The battery status can be reset using the TE SensorConnect App available from Apple App Store or Google Play Store.

!This action is mandatory otherwise the battery level will stay at 0%!

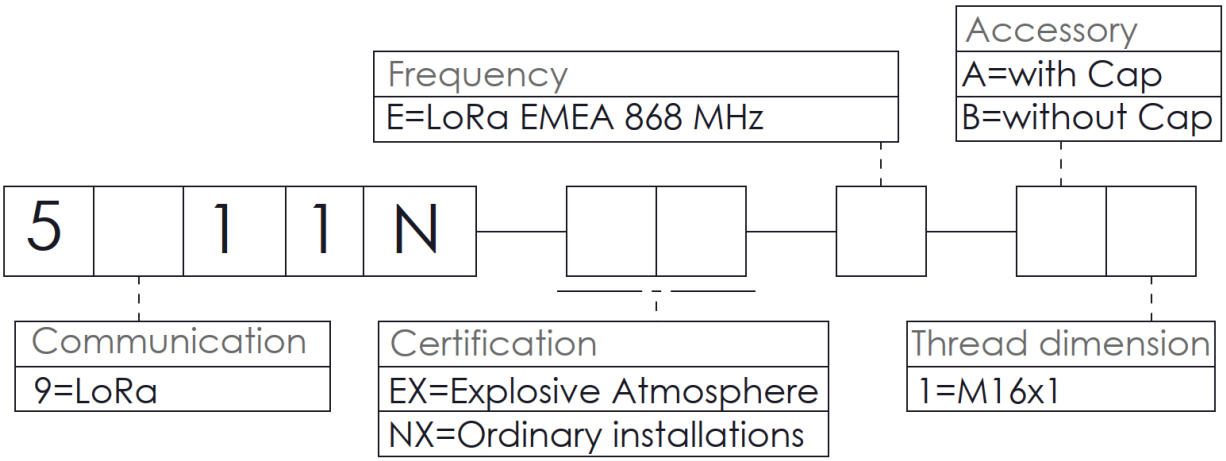
5 DIMENSIONS:

Dimensions units: Millimeter



6 ORDERING INFORMATION:

LoRa + BLE Sensor Model Number



7 PART NUMBERING KEY:

The 59XXN is packaged in kits that contain a battery and a battery insertion tool. Use the TCPN number when ordering to ensure that you receive the proper kit.

Order TCPN	Sensor Model Number	Sensor Description	Battery (Saft 17330)	Battery Insert Tool	MOQ
20027957-50*	**5911N-EX-E-A1**	5911N-EX LoRa 868Mhz M16 w/ battery & cap	•	•	10
20029245-50	**5911N-NX-E-A1**	5911N-NX LoRa 868Mhz M16 w/ battery & cap	•	•	10

(*) NCC certified sensor

Revision History

Revision Number	Revision Date	Description	Pages Changed
1	28/01/2025	Initial release	-

CLICK HERE ›
CONNECT WITH A SPECIALIST

NORTH AMERICA
Tel +1 800 522 6752

EUROPE
Tel +31 73 624 6999

ASIA
Tel +86 0400 820 6015

te.com/sensors

Published 01-2025