

APPLICATIONS

- Warehousing
 - Asset monitoring & tracking
 - Consignment management
 - Rack impact detection
 - Forklift tracking
 - Pick notification
- Transport & Supply Chains
 - Container & IBC tracking
 - Asset monitoring & tracking
 - Cold chain monitoring
- Manufacturing
 - Machine monitoring
 - Predictive maintenance
 - Spare parts management
 - Environmental monitoring
- Building automation
 - HVAC
 - Environmental monitoring
- Infrastructure
 - Integrity monitoring
 - Control & automation

Features

- Wireless sensor device supporting a wide range of applications
- Multiple on-board sensors: ambient temperature, relative humidity, air pressure, acceleration, tilt, fall detection, vibration, gyroscope, magnetic (proximity), light, sound
- Configurable sensor parameters
- Seamless interace to RedBoard™ cloud dashboard.
- Can connect directly to you own data backend and dashboard. Programmer-friendly data encoding for easy cloud-ingestion
- Smartphone app for configuration and diagnostics using NFC interface
- Remote API to control and monitor wireless sensor sevicees remotely
- Low-power mesh network protocol (Wirepas)
- Connects to any Wirepas-capable gateway
- Over-the-Air-Programmable (OTAP)
- Long-life (up to 10 years) industrial-grade rechargeable battery
- Indoor Positioning capable



Description



The RL3 family of wireless sensor devices can be used in a wide variety of applications. Each RL3 variant (see next page) packs a number of sensors that are aimed towards certain applications. On request custom variants can be made to meet specific application needs or to reduce cost. The sensing parameters (e.g. sampling rate) can be changed to suit the application needs.



Sensor data is serialized over language/platform neutral Protocol Buffers for easy ingestion by the customer's platform of choice. OTAP (Over-the-Air-Programming) enables wireless and remote reprogramming of the device firmware.



The wireless sensor device contains a long-life industrial-grade and replaceable LiSOC12 battery pack (2400mAh) for up to 10 years of battery life.



The RL3 has the Wirepas Mesh Network communication protocol built in: Every device is a wireless router and can act as a repeater for other devices. As a result very large physical networks with 1000's of devices can be built as long as every device can connect to a device which is closer to the gateway. At the same time every device remains low power and can work uninterruptedly for years on a small battery.



The accompanying smartphone app connects through the built-in NFC 'tap'-interface, allowing configuration and diagnostics of a device. The same functions are available from the gateway using the Remote Functions API.



All devices have built-in capability for indoor location tracking. A device can be configured either as a *fixed position device* – to assist in tracking the location through the positioning engine – or as an *asset tag*, whose location is tracked.

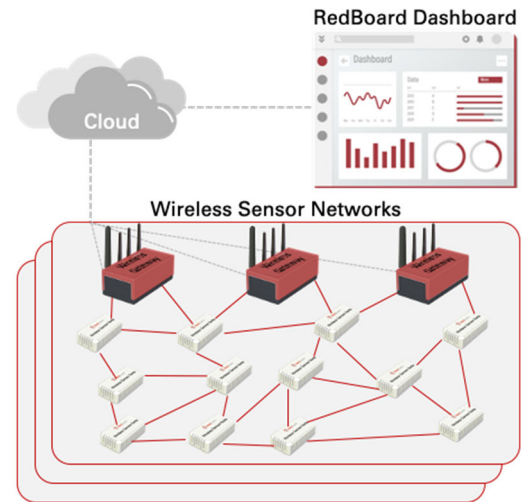
Network

The RL3 devices send the sensor data to one or more gateways on site or in the building. The gateways in turn forward the data to the cloud via a cellular (4G/LTE) connection, WIFI or Ethernet.

A single gateway supports over 1000 devices. Multiple gateways per site optimizes message latency and device battery life time.

RL3 wireless sensor devices needn't have a direct link to the gateway but can hop their messages across other devices.

The configurable and expandable RedBoard dashboard platform visualizes the cloud data.



Product Variants

Variants	A Full	C Comfort	D HVAC	E Temper- ature	G Asset monitoring
Sensors					
Temperature	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Relative humidity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Air pressure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Light intensity	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>
Sound level	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>
Acceleration 3-axis	<input type="checkbox"/>				<input type="checkbox"/>
Gyroscope 3-axis	<input type="checkbox"/>				<input type="checkbox"/>
Magnetic	<input type="checkbox"/>				<input type="checkbox"/>
Other features					
NFC 'tap' interface			<input type="checkbox"/>		
RGB LED for network status and application use			<input type="checkbox"/>		
Wirepas communication protocol			<input type="checkbox"/>		
Battery	LiSOC12- 2400mAh – Up to 10 years life-time – replaceable				
Dimensions	80 x 40 x 20mm 3.2 x 1.6 x 0.8"				
Ingress Protection	IP20 (IP65 available on demand)				

Ordering information

FP.B.RL.03.____ Example – Comfort sensors with 2400mAh battery: FP.B.RL.03.C
 ↑ Sensor variant

Operating parameters and tolerances

General

Operating temperature range	-25°C and +85°C (versions with light sensor) -40°C and +85°C (all other versions)
Battery (nominal)	2400mAh, 3.6V at 25°C
Data update rate	10 seconds to 10 days
Configuration	Remotely through remote functions or through Android App (not all configuration options are available from the App)

Temperature sensor

Operating range	-40°C and +85°C
Accuracy tolerance	±1.0°C between 0..65°C ±1.25°C between -20..0°C ±1.5°C between -40..-20°C
Measurement procedure	single measurement at update rate interval

Humidity sensor

Operating range	0..100%RH between 0°C and 60°C 0..68%RH at -40°C 0..87%RH at +85°C
Accuracy tolerance	±3 %RH between 20%..80 %RH and at 25°C
Long term stability	0.5 %RH/year between 10%..90 %RH and at 25°C
Measurement procedure	single measurement at update rate interval

Air Pressure sensor

Operating range	300..1100 hPa between 0°C and 65°C
Accuracy tolerance	±1.7 hPa
Measurement procedure	single measurement at update rate interval

Light level sensor

Operating range	0..20,000 Lux
Accuracy tolerance	Depends on sensor orientation. Needs to be calibrated case-by-case for tolerance-sensitive applications.
Measurement procedure	single measurement at update rate interval

Sound level sensor

Operating range	30..75 dB
Accuracy tolerance	Depends on sensor orientation. Needs to be calibrated case-by-
Measurement procedure	average of burst measurements, configurable 1 per s to 1 per min

Accelerometer

Operating range	$\pm 2/\pm 4/\pm 8/\pm 16$ g for all 3 axes (configurable)
Accuracy tolerance	$\pm 3\%$ of full scale operating range
Measurement procedure	12Hz measurement, reporting min, avg, and max at update rate interval

Gyroscope

Operating range	$\pm 125/\pm 250/\pm 500/\pm 1000/\pm 2000$ dps for all 3 axes (configurable)
Accuracy tolerance	$\pm 3\%$ of full scale operating range
Measurement procedure	12Hz measurement, reporting min, avg, and max at update rate interval

Magnetic sensor

Operating range	20 mT and 200 mT (configurable)	Note: 1 Gauss = 0.1 mT
Measurement procedure	single measurement of magnetic field at update rate interval, or, switch-mode (message sent when magnet presented), or, count-mode (pulse counting,...)	

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