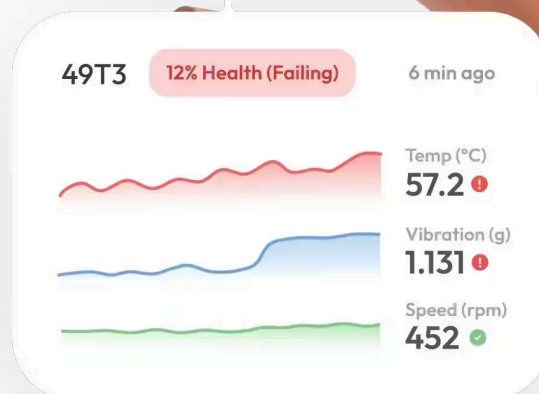




Technical overview

The Sensor Seal System

October 2026



OVERVIEW

Every roller, reporting from the bearing

A Sensor Seal takes the place of the standard seal at the end of a Lorbrand roller. Powered by the roller's own rotation, it measures bearing temperature, vibration and speed and reports them wirelessly, with no batteries or cabling.

A large underground mine runs 20,000 to 50,000 rollers, each containing two bearings that can fail.¹ Any one of them can seize and stop the conveyor, and collapsed idler bearings started 46 % of the 105 underground conveyor fires in the NSW coal mines inspectorate's 15-year review.² At Hazelwood mine in 2006, a fire traced to one failed idler bearing, which inspection rounds had missed, caused an estimated A\$30 million in damage.³

With a Sensor Seal in each roller, the dashboard shows which roller is failing and how its bearing is trending, so the crew can change it at the next planned stop. The unit cost is low enough for every roller on a conveyor to carry one, and the software is free for the life of the product.

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EVERY ROLLER

Monitored at the bearing

ZERO WIRES

Powered by the roller's rotation

ZERO BATTERIES

Lasts the life of the roller

ZERO FEES

Software free for life

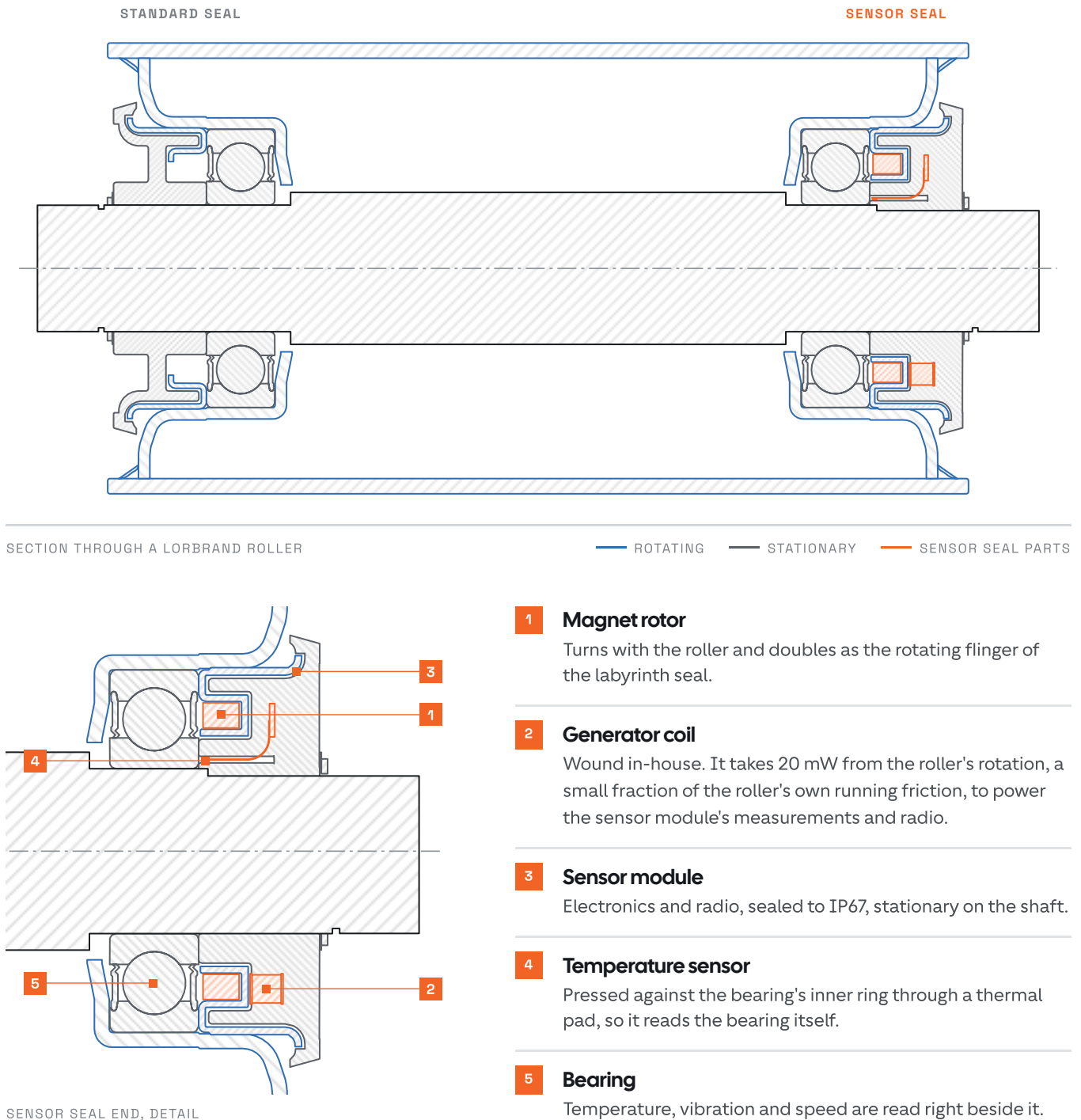
¹ Australasian Mine Safety Journal, [Conveyor roller fire prevention](#).

² NSW Coal Mines Inspectorate, Fires associated with underground conveyors (Notice A36, 1989), in MDG 30 Mechanical Compendium.

³ International Power Hazelwood, [October 2006 Mine Fire Investigation](#) (January 2007), and [The Morwell open-cut mine fire, 12–19 October 2006](#), report to the Country Fire Authority; Hazelwood Mine Fire Inquiry.

Powered by the roller it monitors

A generator built into the seal runs on the roller's rotation, so each Sensor Seal reports whenever the belt runs and lasts the life of the roller, with no battery to replace or cable to run.



STANDARD SEAL

The conventional end of the same roller: a metal flinger in place of the magnet rotor, and no electronics.

MEASURED

Bearing temperature at 0.1 °C resolution, vibration as overall RMS and kurtosis, and speed to $\pm 0.05\%$.

Specified with the roller

Sensor Seals are fitted in our factory to new Lorbrand rollers, in seven seal sizes for bearing bores from 25 to 60 mm. We develop the roller and the Sensor Seal together and optimise them as one.



■ ■ One Sensor Seal

Bearing heat and vibration travel along the shaft, so one Sensor Seal monitors both bearings of a short roller.

■ ■ ■ Two Sensor Seals

Longer rollers take one at each end. Two independent Sensor Seals also tell a failed sensor from a stalled or slipping roller, so a short roller can take a second for redundancy.

Rollout

A roller with Sensor Seals installs like any other, so crews can fit them in place of worn rollers during routine maintenance. Each S1 roller reports straight to the gateway; S2 Sensor Seals relay readings to each other and are best spaced under 20 m apart.

Seal sizes

Series	Deep groove	Spherical	OD (mm)	ID (mm)
25	6305	21305	62	25
30	6306	21306	72	30
35	6307	21307	80	35
40	6308	21308	90	40
45	6309	21309	100	45
50	6310	21310	110	50
60	6312	21312	130	60

Commissioning

A supported handheld records each roller's position on the conveyor at installation, by RFID on S1 and by NFC on S2, where a supported phone also works. Barcode or manual entry works on both.

NFC at the roller

On S2, an NFC tap identifies a roller after its labels have worn off, and reads its last measurement with the belt stopped.

Factory testing

Every roller fitted with Sensor Seals goes through a running friction and operational test before it leaves our Centurion factory.

Service life

A Sensor Seal lasts the life of the roller it is fitted to.

From selected rollers to whole conveyors

S1 and S2 take the same measurements and report through a Lorbrand gateway to the on-site server or the cloud. They differ in how each reading reaches the gateway.



S1 Selected rollers

IN SERVICE

Each Sensor Seal reports straight to the gateway over long-range radio, for targeted monitoring of critical rollers spread across a site.

NETWORK	Star: each Sensor Seal talks only to the gateway
RADIO	LoRa, sub-GHz ISM band
RANGE	Over 1 km line of sight
GATEWAY	Polls one Sensor Seal per second, up to 10 per second for targeted areas at shorter range
BEST FOR	Critical rollers spread across a site, long overland conveyors, low Sensor Seal density



S2 Every roller

IN FIELD TRIALS

Sensor Seals pass readings from roller to roller along the conveyor to the nearest gateway, so one gateway serves a whole conveyor. Further gateways along its length shorten the interval between readings.

NETWORK	Mesh, relayed along the conveyor on a self-healing path
RADIO	2.4 GHz ISM band, with a protocol designed by Lorbrand for conveyor structures
SPACING	Sensor Seals under 20 m apart for best results
GATEWAY	600 to 800 readings per second [†] ; over 50,000 Sensor Seals per gateway
BEST FOR	Fully fitted conveyors, underground conveyors, high Sensor Seal counts

Reporting interval

Each Sensor Seal reports once per gateway cycle: the interval is the number of Sensor Seals on the gateway divided by its reading rate, never shorter than 2 seconds. The interval you need sets how many Sensor Seals one gateway serves.

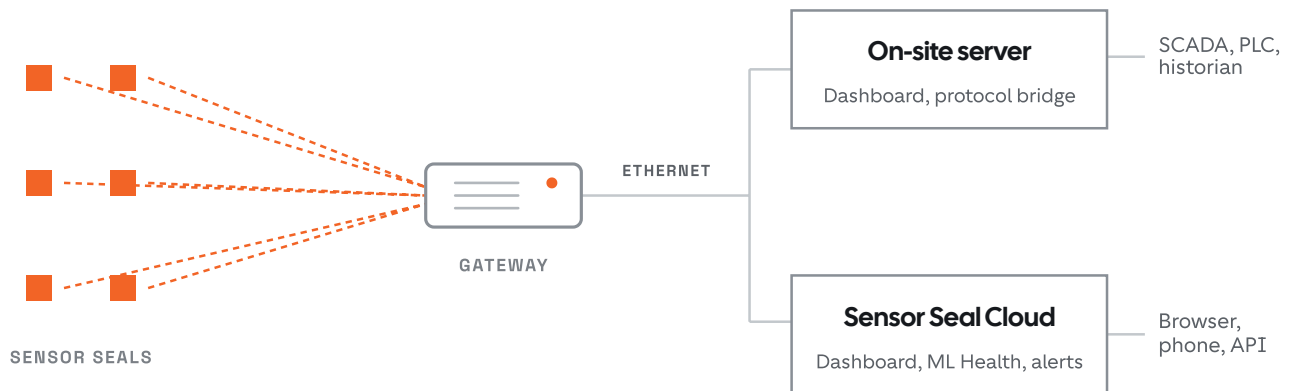
SENSOR SEALS PER GATEWAY	S1, FULL RANGE 1 PER SECOND	S1, TARGETED AREA 10 PER SECOND	S2 [†] 600 TO 800 PER SECOND
100	100 s	10 s	2 s
1 000	17 min	100 s	2 s
5 000	83 min	8 min	6 to 8 s
10 000	2.8 h	17 min	13 to 17 s
50 000	14 h	83 min	63 to 83 s

More gateways share the Sensor Seals between them: on 10,000 Sensor Seals with four S2 gateways, each Sensor Seal reports every 3 to 4 seconds. S2 relays add 0.5 to 4 seconds of latency along a multi-kilometre conveyor.[†]

[†] Simulated: network simulation running production firmware. S2 is in field trials.

From the roller to your control room

Sensor Seals report to gateways along the conveyor. Each gateway connects over Ethernet to the on-site server, to the protocol bridge for your control system, or to Sensor Seal Cloud.



GATEWAY

In service with S1

A low-power gateway that collects readings from the Sensor Seals and passes them on over Ethernet.

POWER	Passive PoE, 12 to 57 V DC, or DC screw terminals, 12 to 48 V
NETWORK	IEEE 802.3 Ethernet, to switches, routers, fibre-optic transceivers and wireless bridges
RADIO	Sub-GHz LoRa, for S1 Sensor Seals
POLLING	One Sensor Seal per second, up to 10 per second for targeted areas

NEXT-GENERATION GATEWAY

For S2 and on-site setup

The next-generation gateway runs the S2 mesh and takes over the work of the separate protocol bridge.

- ◆ 2.4 GHz radio for the S2 mesh, and Wi-Fi
- ◆ Gigabit Ethernet, and an SFP port for standard fibre-optic transceivers
- ◆ Touchscreen for configuration and monitoring on site
- ◆ Protocol bridge built in, with no separate bridge server
- ◆ 600 to 800 readings per second[†]

IN DEVELOPMENT

GATEWAY PLACEMENT, S1

Each gateway reaches Sensor Seals over 1 km away in line of sight, so place it where it has a clear view of the rollers it serves.

GATEWAY PLACEMENT, S2

One gateway serves a whole conveyor. On very long conveyors, further gateways spaced evenly along its length add throughput.

SECURITY

Every reading is encrypted from the Sensor Seal to the server.

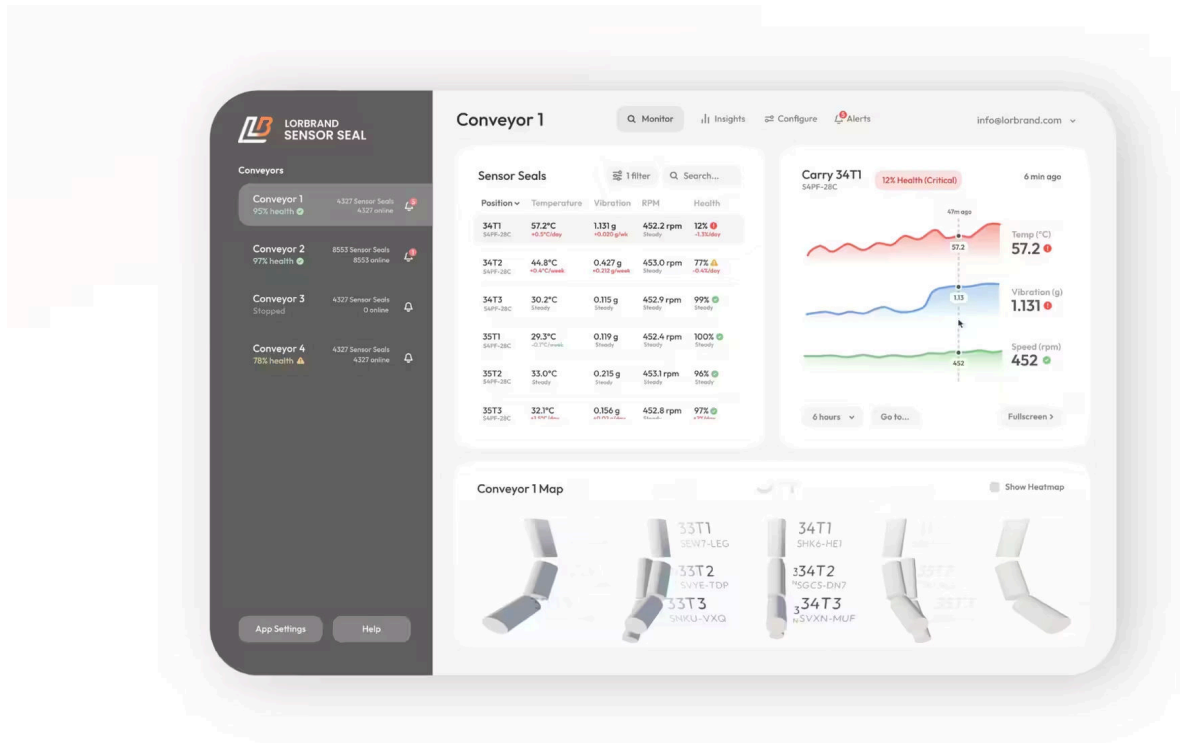
UPDATES

Over-the-air firmware updates reach every Sensor Seal on the network.

[†] Simulated: network simulation running production firmware. S2 is in field trials.

From an alarm to the exact roller

The dashboard rates the Health of every roller, shows each conveyor in 3D, roller by roller, and keeps the full temperature, vibration and speed history of every Sensor Seal.



01

Overview

Every monitored conveyor with its overall Health, so the conveyors that need attention stand out.

02

Conveyor

Every Sensor Seal on the conveyor with its position, such as CV-103, 18T3, and its latest readings, beside a 3D view of the conveyor.

03

Sensor Seal

The full temperature, vibration and speed history of one roller, for trend analysis.

HEALTH

0 to 100 % per Sensor Seal. A roller with two Sensor Seals shows the lower value.

ALERTS

Push notifications on site and in the cloud, and email and SMS alerts from Sensor Seal Cloud.

NO SUBSCRIPTION

Free for the life of the product, on site or in the cloud, however many rollers report.

On your network or in the cloud

Three ways to run the software, each free for the life of the product. Choose by where the data should live and what it should connect to.

01

Protocol bridge

A lightweight service on a local server that delivers every reading straight into your SCADA, PLC or historian.

INTERFACES

OPC UA, Modbus TCP, Siemens S7, EtherNet/IP and more

DATA

Stays on site

02

On-site server

The full dashboard on your own network, with a secure database and the protocol bridge included.

ALERTS

Push notifications

DATA

Every reading kept on site

03

Sensor Seal Cloud

Gateways connect securely to our servers, and the dashboard opens in any web browser or as an installed app.

ANALYSIS

Built-in machine-learning Health analysis of each bearing's trends

ALERTS

Email, SMS and push notifications

INTEGRATION

API for your own applications and business intelligence tools

DATA

Stays yours, with full export

In development

- ◆ Remaining-life estimates for each roller
- ◆ Maintenance planning from the Health of every roller
- ◆ A customisable analysis view for your own charts and reports

Data ownership

Every reading belongs to your operation. The on-site server keeps it on your network, and Sensor Seal Cloud gives you full export.

OPEN BY DESIGN

Any roller maker will be able to join your network

We are committed to opening the Sensor Seal network to other roller manufacturers. The programme is in development. Once it launches, certified rollers from any maker will report to the same gateways and dashboard.

- ◆ Free for roller manufacturers to join
- ◆ Your operation holds the network keys and decides which rollers join
- ◆ Published certification criteria, applied to our own rollers too
- ◆ Get data out through documented and open interfaces
- ◆ Installed rollers keep working as the protocol develops

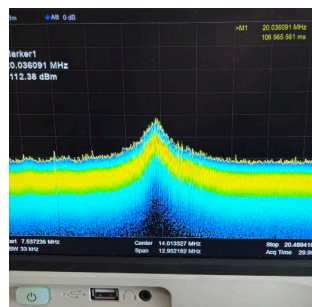
IN DEVELOPMENT

PRODUCTION

Designed and made in South Africa

Every Sensor Seal is designed by the Lorbrand team in South Africa, from the generator and the electronics to the firmware and the software that runs the network.

We wind the generator coils, solder the circuit boards, and assemble each Sensor Seal in our Centurion factory. Every roller fitted with Sensor Seals then goes through a running friction and operational test before it leaves.



Specifications

	Sensor Seal S1	Sensor Seal S2
STATUS	In service	In field trials
MEASUREMENTS	Bearing temperature, vibration and speed	
TEMPERATURE	0.1 °C resolution; ± 0.4 °C at 25 °C, ± 0.8 °C at 0 °C and 50 °C (worst case)	
VIBRATION	Overall RMS (g) and kurtosis	Overall RMS (g) and kurtosis; optional on-device ML models
SPEED	± 0.05 %, from 300 to 1,500 rpm*	
REPORTING	One Sensor Seal per second per gateway; up to 10 per second for targeted areas	As often as every 2 s; 600 to 800 readings per second per gateway†
POWER	20 mW, generated from the roller's rotation; no battery	
PROTECTION	IP67 sensor module; ambient up to 80 °C	
RADIO	LoRa, sub-GHz ISM band, star network	2.4 GHz ISM band, mesh designed by Lorbrand
RANGE	Over 1 km line of sight	Relayed along the conveyor; Sensor Seals under 20 m apart for best results
GATEWAY	PoE (12–57 V) or DC (12–48 V); Ethernet	Next-generation gateway with Gigabit Ethernet and SFP port; over 50,000 Sensor Seals, as the reporting interval required allows
HEALTH	0 to 100 % per Sensor Seal; a roller with two shows the lower	
COMMISSIONING	RFID (supported handheld), barcode or manual	NFC (supported phone or handheld), barcode or manual
SECURITY	Encrypted from Sensor Seal to server; over-the-air firmware updates	
SOFTWARE	On-site server or Sensor Seal Cloud, free for the life of the product	
INTEGRATION	OPC UA, Modbus TCP, Siemens S7, EtherNet/IP and more, through the protocol bridge; API with Sensor Seal Cloud	
SEAL SIZES	Seven, for bearing bores from 25 to 60 mm (6305 to 6312, 21305 to 21312)	
FITMENT	Factory-fitted to new Lorbrand rollers	

* Typical range. The lower limit depends on the model, the magnet configuration and the reporting interval.

† Simulated: network simulation running production firmware. S2 is in field trials.

ENGINEERED FOR THE APPLICATION

Specify Sensor Seal on your next rollers

Our engineers plan seal placement, gateways and integration with your team, from a pilot section to a full conveyor.

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DESIGNED AND MADE IN SOUTH AFRICA · SUPPLYING WORLDWIDE
SPECIFICATIONS ARE SUBJECT TO CHANGE. OCTOBER 2026.