DATA SHEET

REDRAVEN™

LoRaWAN Wireless Monitoring System

NODE ER WIRELESS SENSOR

The Node ER sensor is part of Flowserve's low-power, wide-area network (LoRaWAN) system designed for near real-time asset health monitoring of industrial equipment via Flowserve's complete end-to-end, internet of things (IoT) solution. Node ER is a wireless battery-powered sensor capable of transmitting large volumes of equipment performance data securely over long distances. It can collect a range of sensor parameters such as three-axis vibrations, temperature and pressure data, encrypt that data, and transmit it up to 1.6 km (1 mile). With just a small quantity of Node ER and gateway devices, you easily can cover large areas or facilities.

Node ER sensors can be installed directly on pumps and other assets throughout a plant, including hazard-rated areas (Class I Div 1/ATEX Zone 0).

Its wireless, long-range capabilities, coupled with a robust modulation scheme and optimized communication protocol, make it ideal for large refineries or other facilities that want a reliable and cost-effective IoT condition monitoring solution. With Node ER as a workhorse in Flowserve's complete IoT solution, plants do not have to experience excessive disruptions as a result of complex installations — as experienced with wired sensors — making Flowserve's LoRaWAN system the perfect choice when deploying across hundreds of assets.

The Node ER is a key component of Flowserve's end-to-end complete IoT solution, which also includes:

LoRaWAN Gateway and Network Server: Collects data from Node ER sensors and transmits it to the cloud through secure and encrypted data transmission. One gateway can receive data from numerous Node ERs, thereby keeping costs low. LoRaWAN gateway and network topology inherently provides redundancy, thereby helping guarantee sensor data will always be available.

Insight Portal: This Flowserve user interface (UI) portal consolidates equipment performance data in an easy-to-interpret remote dashboard. With its simple and clear visuals, customers immediately can identify which assets are experiencing problems and act quickly to prevent failures and disruptions.

Flowserve Monitoring Center: A state-of-the-art facility with a dedicated monitoring team to analyze customers' asset performance and provide reports, recommendations and solutions. By taking advantages of LoRaWAN's bidirectional communication, the Flowserve Monitoring Center can interact with Node ER sensors remotely and dynamically obtain more frequent or deeper information when needed.

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Product variants

Model	Description
Node ER – V/T	Combined three-axis vibration and temperature sensor
Node ER – P/T	Combined pressure and temperature sensor
Node ER – 4-20	Single two-wire, 4-20 mA input
Node ER – DD	Two dry-contact discrete inputs

Physical characteristics

Parameter	Specifications
Dimensions	Refer to drawings
Weight	625 to 850 g (22 to 30 oz)
Housing Material	Glass-filled nylon cover with 316 stainless steel base
Mounting Options (V/T model)	Roto-lock (adapters available)
Process Connection (P/T, 4-20, DD models)	½ in MNPT

Certifications

Parameter	Specifications
Ex Certification	NA/ATEX/IECEx Zone 0, Zone 20 Class I/Div 1 Class II/Div 1 Class III/Div 1 Ex ia IIC IIIC (intrinsically safe for gases and dust) -40°C < Ta < 85°C (-40°F < Ta < 185°F)
Regional Compliance	CE mark, NRTL
Ingress Protection	IP66/67
Telecommunication Compliance	FCC, CE mark

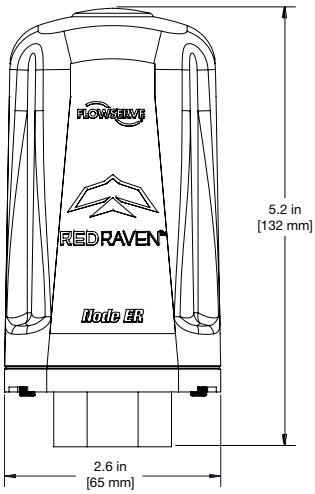
Wireless specifications

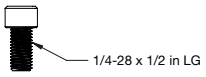
Parameter	Specifications
Communication Protocol	LoRaWAN, Class A
LoRaWAN Region	US915, EU868, AS923
Antenna	Built-in omnidirectional antenna

Battery

Parameter	Specifications
Chemistry	Lithium Thionyl Chloride (primary cells)
Max. Rated Voltage	3.6 V
Max. Rated Capacity	4.8 Ah (two-cell battery pack)
Lifetime	4 years[1]

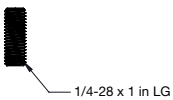
V/T Model



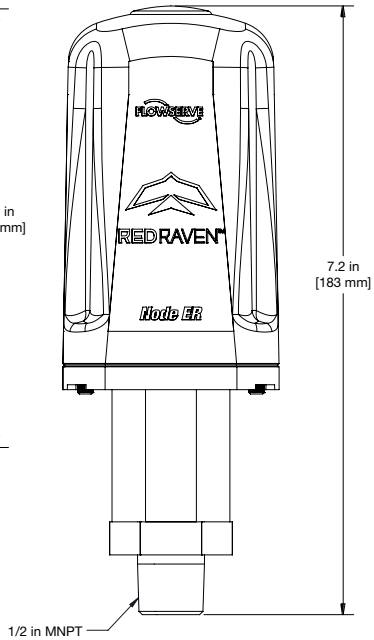


Roto-Lock
(through hole mount)

Roto-Lock
(stud/epoxy mount)



P/T, 4-20, DD Models



[1] Estimated battery life in following conditions: Velocity overall RMS data transmission every 30 minutes and FFT data transmission once per day.
Ambient temperature: 23°C ± 2°C (73°F [± 4°F])
The estimated battery duration is for reference only and it does not represent a guaranteed value.

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Measurements

Parameter		Description
Vibration	Measurement	Velocity (overall RMS) Velocity (0 to peak RMS) Acceleration (0 to peak)
	FFT	**Max Peaks Detection** Amplitude and frequency of 8 highest peaks Settable for velocity and/or acceleration **One-third Octave Spectrum** Settable for velocity and/or acceleration
	Axes	X, Y and Z
	Range	± 4.6 *g*
	Frequency Range	Vertical Axes: 10 Hz to 1 kHz Horizontal Axes: 10 to 500 Hz
	Resolution	Acceleration: 1 mm/s^2 Velocity: 0.1 mm/s Spectral Frequency: 1 Hz
	Velocity Accuracy	± 5% FSO @ 60 and 100 Hz (qualified to ISO16063)
Temperature	Range	-20°C to 85°C (-4°F to 185°F)
	Accuracy	IEC 751 Class B
	Resolution	0.1°C (0.2°F)
Pressure	Range(s)	-1 to 2.4 barg (-14.7 to 35 psig) 0 to 34.5 barg (0 to 500 psig) 0 to 68.9 barg (0 to 1,000 psig)
	Accuracy	± 5% FSO
	Resolution	0.1 bar (1.5 psi)
4-20 mA	Resolution	0.1 mA
Dual Discrete	Hysteresis	Hysteresis protection
Status and Diagnostics	Connectivity	LEDs for wireless activity
	Battery Status	Battery voltage reported periodically
	Sensor Information	Queried remotely via Flowserve Insight Portal
	Transmission Rate	Remotely settable (standard: 30 minutes; minimum: 1 minute; maximum: 24 hours)

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SEDS000168-01 (EN/AQ) January 2021

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