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Communication Node Datasheet

General description

The Communication Node measures many different geotechnical probes thanks to the availability of analog interfaces: 4-20 mA, mV/V, 5V, 12V, Vibrating Wire, Pt100-Pt1000, NTC, Potentiometer.

Part of the Move Solutions sensor family, it integrates seamlessly with the MyMove IoT Platform.
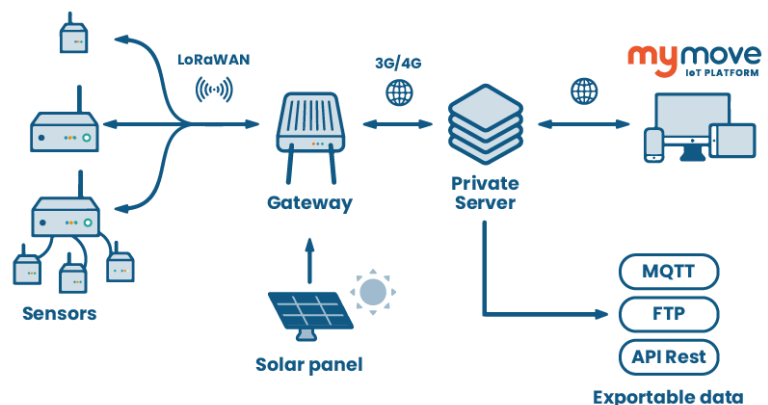
KEY FEATURES

- For indoor and outdoor operation
- Long battery life
- Wireless LoRaWAN connection
- Fully remote configuration and management
- Quick, flexible, and easy installation
- Short installation time
- Measures many different geotechnical probes
- Programmed data acquisition with customizable cadence
- Trigger-based data acquisition with integrated accelerometer
- Data management and processing through the MyMove IoT Platform

Its wireless design ensures quick and easy installation, significantly reducing time and costs.
The sensor is optimized for a very long operating life, which can be further extended by adjusting the sensor configuration. To operate, the sensor requires a Move Solutions gateway installed nearby.

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Output data

The Communication Node is a wireless data logger that enables geotechnical probes for LoRaWAN wireless communication. Each node supports one geotechnical probe, and most models can also accommodate the probe's built-in NTC thermistor when present.

The Node can read and digitize geotechnical sensors in static regime such as strain gauges, temperature sensors, load cells, crack meters, humidity sensors, piezometers, anemometers, inclinometers, rain gauges and radar-based probes among others.
It is thus suitable for use in geo-environmental, hydrogeological, geotechnical, and structural monitoring.

The Communication node comes in eight different types, corresponding to different types of analog probes:

- 4-20 mA (either 3 or 4 wires)
- mV/V
- Voltage 5V
- Voltage 12V
- Vibrating Wire
- Pt100-Pt1000
- NTC
- Potentiometer

On top of that, diagnostic data is sent to the platform to estimate power consumption for reading the specific installed probe.

The Communication Node can be remotely configured through the MyMove IoT Platform, where it is also possible to visualize the data, convert it and analyze it.

Working principle

The data from the probe is sampled by the Communication Node in two possible modes:

- **Programmed sampling**: the node acquires data from the probe at fixed, configurable cadence.
- **Programmed + Triggered sampling**: on top of the Programmed sampling, an internal accelerometer is used to detect vibrational activity. If the registered acceleration exceeds the programmed threshold, the node acquires an extraordinary event.

The start of programmed events is time-sinchronized: this allows it to have multiple sensors that share the same settings to sample the respective probes at the same time.

The data is thus sent to the MyMove IoT Platform along with a few other data, such as temperature, probe power consumption, reading duration. The data can then be converted to the output format desired by the user through a set of formulas.

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Technical specifications

Operation		
Working modes	Programmed	
	Programmed + Acceleration-triggered [1]	
Cadence for scheduled acquisitions	2 minutes	
	10 minutes	
	20 minutes	
	30 minutes	
	1 hour	
	2 hours	
	6 hours	
	12 hours	
Absolute synchronization [2]	± 1 second	
Integrated accelerometer	Full-scale range	± 2 g
	Resolution	1 mg
	Bandwidth	0.7 – 25 Hz

[1] If more modes are enabled at the same time, their performance may be reduced. To reach the best performances for each mode, please avoid using combined mode.
[2] Under good LoRaWAN radio coverage.

General data	
Wireless connection technology	Sub-GHz LoRaWAN protocol [1] (Gateway required)
Supported LoRaWAN regions	EU868, US915, AU915
Wireless coverage [2]	1 km line of sight from the nearest gateway
Connections	Move Solutions 8-pole connector. For compatible accessories visit Move Solutions' website or contact support.
IP rating [3]	IP67
Power supply	2x 19Ah 3.6V replaceable lithium battery (D-type $LiSOCl_2$ with JST EHR-2 connector, suggested EVE ER34615 EHR2)
Operating temperature range	From -40 ºC to +85 ºC

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Dimensions [4]	130.0 x 171.2 x 62.0 mm
Weight [4]	0.6 kg
Case material	Polycarbonate
Installation options	Wall, floor, or ceiling mount. Two-points attachment using screw anchors (Ø6mm max). One set included in the package. Pole or wall mounting using special plates and screw.
Cable gland accepted cable diameter	3 to 8 mm
Screw terminals accepted cable	30 to 14 AWG
Software version	v3

[1] The sensor's LoRaWAN connection operates on a best-effort basis, which means that while most data packets are delivered, there is a slight possibility of occasional packet loss.

[2] Wireless coverage may vary based on the actual deployment scenario.

[3] Only when the connector is protected by the connected external cables and/or accessories, and an appropriate cable is correctly installed in the probe gland.

[4] Refers to the sensor unit itself. External accessories are not considered since they are optional and/or can be replaced with alternative parts to fit specific applications.

Analog specifications for SCN-MA0-LR-2	
Interface type	4 – 20 mA (2 or 3 wires)
Probe supply voltage	12.3 VDC
Probe supply max suggested current	30 mA
Accuracy [1,2]	± 0.1 % of reading
Measuring span	0 – 24 mA
Shunt resistance	10 Ω
Auxiliary NTC channel	Yes

Analog specifications for SCN-MVV-LR-2	
Interface type	mV/V
Probe supply voltage	5 VDC
Probe supply max suggested current	50 mA

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Accuracy [1, 2]	± 0.2 % of reading or 0.002 mV/V
Measuring span	± 8 mV/V
Input resistance (nominal)	2 GΩ
Auxiliary NTC channel	Yes

Analog specifications for SCN-V05-LR-2

Interface type	Voltage Output
Probe supply voltage	5 VDC
Probe supply max suggested current	50 mA
Accuracy [1, 2]	± 0.2 % of reading
Measuring span	0 – 5 V
Input resistance (nominal)	> 20 GΩ
Auxiliary NTC channel	Yes

Analog specifications for SCN-V12-LR-2

Interface type	Voltage Output
Probe supply voltage	12.3 VDC
Probe supply max suggested current	30 mA
Accuracy [1, 2]	± 0.2 % of reading
Measuring span	0 – 12 V
Input resistance (nominal)	> 20 GΩ
Auxiliary NTC channel	Yes

Analog specifications for SCN-VBW-LR-2

Interface type	Vibrating Wire
Measuring span	400 – 10000 Hz
Auxiliary NTC channel	Yes

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Analog specifications for SCN-PT1-LR-2

Interface type	Pt100 – Pt1000 (4 wires)
Accuracy [1,2]	± 0.03 % of reading
Measuring span	15 - 1500 Ω
Auxiliary NTC channel	No

Analog specifications for SCN-NTC-LR-2

Interface type	NTC
Accuracy [1,2]	± 0.1 % of reading
Measuring span	10 Ω - 1 MΩ
Auxiliary NTC channel	No

Analog specifications for SCN-POT-LR-2

Interface type	Potentiometer
Probe supply voltage	2.7 VDC
Probe supply max suggested current	50 mA
Accuracy [1,2]	± 0.02 % of reading
Measuring span	0 – 100 %
Input resistance (nominal)	2 MΩ
Auxiliary NTC channel	Yes

[1] Referred to absolute readings.
[2] Measurement conditions: room temperature 20 ºC, 45 %rh.

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Battery Life Estimation[1] (without Accelerometer Trigger)

Interface	Conditions	Read duration	Read cadence	Estimated battery life
4-20 mA, 2 wires	The node is reading half of its full scale (12 mA)	5 seconds	10 minutes	2 years
4-20 mA, 3 wires	Probe supply current of 30 mA	5 seconds	30 minutes	2.4 years
mV/V	Probe load resistance = 350 Ω	5 seconds	10 minutes	3.4 years
Voltage (5 V)	Probe supply current of 50 mA	8 seconds	20 minutes	2.5 years
Voltage (12 V)	Probe supply current of 30 mA	8 seconds	30 minutes	2.1 years
Vibrating Wire	—	2 seconds	10 minutes	4.1 years
Pt100-Pt1000	—	5 seconds	10 minutes	5.2 years
NTC	—	5 seconds	10 minutes	5.2 years
Potentiometer	Resistance of potentiometer = 1kΩ	5 seconds	10 minutes	5.2 years

Battery Life Estimation[1] (with Accelerometer Trigger)

Interface	Conditions	Read duration	Daily events	Estimated battery life
4-20 mA, 2 wires	The node is reading half of its full scale (12 mA)	5 seconds	20 events/day	1.6 years
4-20 mA, 3 wires	Probe supply current of 30 mA	8 seconds	20 events/day	2.5 years
mV/V	Probe load resistance = 350 Ω	5 seconds	100 events/day	2.1 years
Voltage (5 V)	Probe supply current of 50 mA	8 seconds	20 events/day	2.3 years
Voltage (12 V)	Probe supply current of 30 mA	8 seconds	20 events/day	2.0 years
Vibrating Wire	—	2 seconds	100 events/day	2.2 years
Pt100-Pt1000	—	5 seconds	100 events/day	2.5 years
NTC	—	5 seconds	100 events/day	2.5 years
Potentiometer	Resistance of potentiometer = 1kΩ	5 seconds	100 events/day	2.5 years

[1] The estimation refers to a sensor in a typical working environment with average quality of the radio connection between the sensor and the gateway. Actual battery life may be worse in case the product is used under extreme conditions, such as prolonged working in high or low temperatures, bad quality of radio connection between the sensor and the gateway, etc.
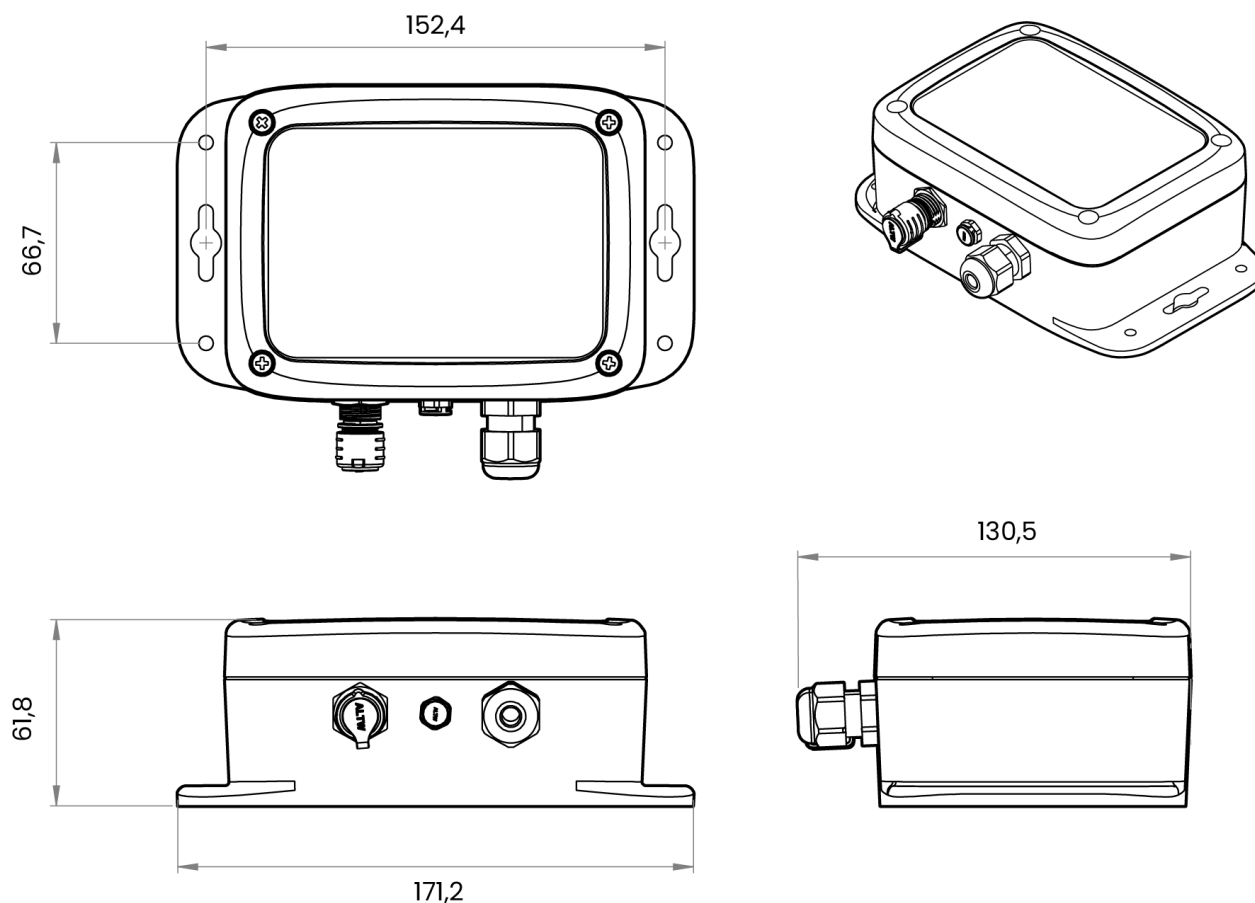
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Ordering information

Interface	Product code
4 – 20 mA	SCN-MA0-LR-2
mV/V	SCN-MVV-LR-2
Voltage 5V	SCN-V05-LR-2
Voltage 12V	SCN-V12-LR-2
Vibrating Wire	SCN-VBW-LR-2
Pt100 – Pt1000	SCN-PT1-LR-2
NTC	SCN-NTC-LR-2
Potentiometer	SCN-POT-LR-2

Accessories	Product code
Battery Pack	SBE-STD-CB-1
Data download cable	*Coming soon…*

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Mechanical drawings

All dimensions are in millimeters

Notice of publication

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