

Quad-Band GPRS Remote Node for Harsh Environments

K-111



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Best in class ultra-low power consumption node with analog and digital inputs for remote monitoring and control. From the sensor to the Cloud.

The K-111 node is a plug & play solution to remotely measure any analog or digital sensor for any application requiring extremely low power consumption and remote configuration capabilities in harsh environments. In just some configuration steps the information is available in Kunak®Cloud, a powerful cloud based platform where the whole data, alarms, thresholds, remote configuration and calibration capabilities are available through the web interface, smartphone App. or its Open API.



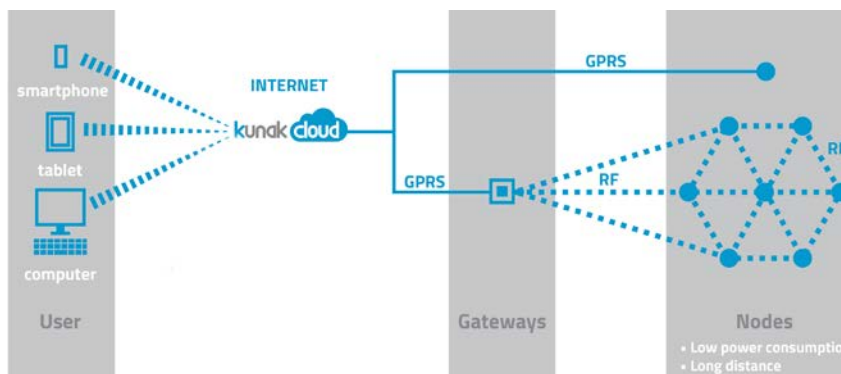
General Data

Main Features

- Plug and play remote monitoring solution for harsh environments.
- Powerful cloud-based platform; Kunak®Cloud.
- Easy to configure through Laptop, Smartphone or Tablet
- Ultra low power consumption (<10µA in sleep mode)
- 3 digital and 3 analog configurable inputs
- Primary or rechargeable battery included.
- 2 independent power supplies for sensors
- Built-in temperature, battery and RSSI sensors
- Remote configurable alarms, thresholds, calibration parameters, sampling and sending periods

Applications

- Remote Monitoring and Control in Harsh Environments
- Telemetry and Asset Monitoring
- Water & Waste Water Management
- Industry Security and Control
- Smart Utility Networks
- Environment & Agriculture
- M2M
- Smart Cities
- Industrial Internet of Things



Kunak® System Architecture

Radio-frequency and GPRS nodes, GPRS gateway, cloud-based platform “Kunak®Cloud” and user side.

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Technical Data¹

Electrical Specifications				
Power Consumption	Sleep Mode	Primary Battery	< 10 μ A	
		Rechargeable	< 50 μ A	
	Active Mode	For any power supply option	< 20 mA + sensors power consumption	
Power Supply	Sensors ²	Main Power Supply Plug-in	3 or 5 Vdc @ 200 mA	
		Secondary Power Supply Plug-in	5 V dc@ 200 mA or 12 Vdc @ 60 mA	
	Node	Primary Batteries or External Power Supply	5 – 24 Vdc ³	
		Rechargeable ⁴ (Li-Ion and LI-polymer)	Charger Input Voltage	From 5 to 17 Vdc @ 2 A max.
		Voltage Range	3.4 – 4.2 Vdc	
Internal Memory	4Mbits (> 46.500 data points + time stamp) ⁵			
Real Time Clock	Two independent RTC for time management. Automatic synchronization.			
Operating Temperature Range	-35°C to +80°C			
Batteries		Primary Battery	Secondary Battery ⁶	
	Technology	Lithium	Lithium-Ion	
	Nominal Capacity	20 Ah	11.6 Ah	
	Nominal Voltage	7.2 Vdc	3.7 Vdc	
	Charge Temperature Range	-	0°C to 45°C	
	Discharge Temperature Range	-55°C to 80°C	-20°C to 60°C	
	Cycle Life	-	500 @ 70% Rated Capacity	
	Self-Discharge Rate	1% per year	-	

¹ Most of the parameters can be customized. For any specific requirements contact sales@kunak.es

² Configurable pre-heating time to reduce power leakage to the sensors. Higher current power supplies options available: 5 V @ 450 mA, 12 V @ 220 mA or 24 V @ 100 mA.

³ Primary batteries or external power supply up to 42 Vdc is also available under request.

⁴ Power path management available. The power path feature allows powering the system from a high efficiency DC to DC converter while simultaneously and independently charging the battery. The power path also permits the battery to supplement the system current requirements when the adapter cannot. This enhances battery life.

⁵ Up to 64Mbits available under request. An SD card up to 64 Gbits is also available if required.

⁶ Extended temperature range available under request. Charge (-20°C to 60°C) and discharge (-50°C to 60°C).

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Input Channels		
Analog ⁷ (16 bits resolution)	Current ⁸	4 – 20 mA
	Voltage ⁹	0 – 10 Vdc
Digital ¹⁰	Dry Contact	Pulse Counter
		Frequencymeter
		Open/Close State
Communications		
Technologies	Transmission	Quad-Band GPRS Class 12
	Configuration	Bluetooth 3.0 + EDR compatible
		Micro USB 2.0
Antenna ¹¹	External SMA Female Connector	
Physical Specifications		
	Internal Enclosure	External Enclosure
Dimensions	87 x 57 x 36 mm	124 x 122 x 85 mm
Weight	150 g	800 g (total, all components included)
Material	ABS Plastic	Polycarbonate
Color	Black RAL 7011	Grey RAL 7035
Ingress Protection	IP54	IP67
Impact Protection	-	IK08
Interfaces	Screw Connector	IP68 Cordgrips
Combustion Behavior	-	5VA nach to UL 50/ UL 746C V-2 acc. to UL 94 960°C acc. to VDE
Rated Insulation Voltage AC	-	690 V
Rated Insulation Voltage DC	-	1000V

⁷ Analog input type has to be indicated in the ordering info section.

⁸ (-4 – 20 mA), (0 – 20mA) current analog input configurations available.

⁹ (-10 – 0), (-10 – +10) and (0 – +5 V) voltage analog input configurations available.

¹⁰ Voltage digital input type also available, for pulse counter, frequency meter and open/close state applications.

¹¹ Detachable antenna. Other options under request.

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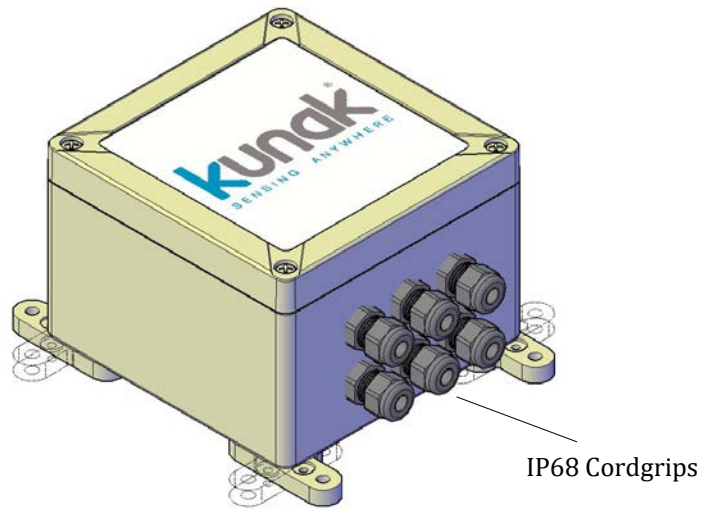
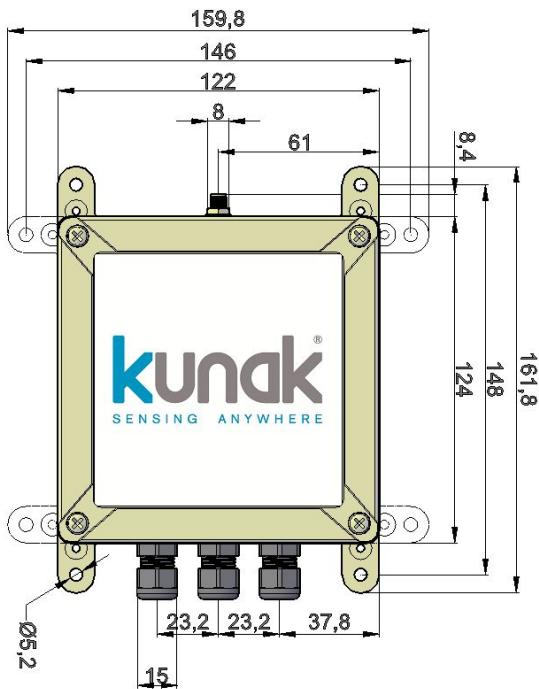
Additional Characteristics		
Temperature Sensor	Resolution	12 bits
	Accuracy	± 1°C (from -40°C to 125°C)
LED Indicators	For configuration and status assistance.	
GPRS Data Plan	15 or 100 MB data plan, with private IP and private APN to enhance security. Included within Kunak®Cloud services.	
Firmware Features		
Scheduling	Sampling	Local and remote scheduling at intervals between 10 seconds and 6 hours.
	Sending	Uploading period to the cloud from 1 minute to 1 day.
Configurable Working Mode	Normal Mode	The node takes readings every sampling period, stores them and sends them to the cloud every uploading period
	Power Safe Mode ¹²	The node takes readings every sampling period, and sends only the average to Kunak®Cloud every uploading period.
Thresholds and Alarms	Battery, signal, temperature and any input channel measured have maximum, minimum or asynchronous open/close state configurable thresholds via Kunak®Cloud. If a threshold is exceeded, it immediately triggers an alarm status to the cloud with the data measured since the last sending period (or just the averages in Power Safe Mode) and the overcome value. This feature is available in both the Normal and Power Safe Mode.	
Notifications	Email notifications are available when configured via Kunak®Cloud. Smartphone and tablet notifications via Kunak®Watcher.	
Open API	Secure RESTful WEB SERVICES	

¹² Very useful working mode to reduce power consumption and the amount of data transmitted while maintaining the control over any parameter or event checking the thresholds configured. This operating mode allows configuring higher sending periods and knowing just the average behavior of any parameter, while the thresholds are checked every sampling period for the analog and digital sensors (pulse counters and frequency meters) or when asynchronous open/close state is triggered (at any time).

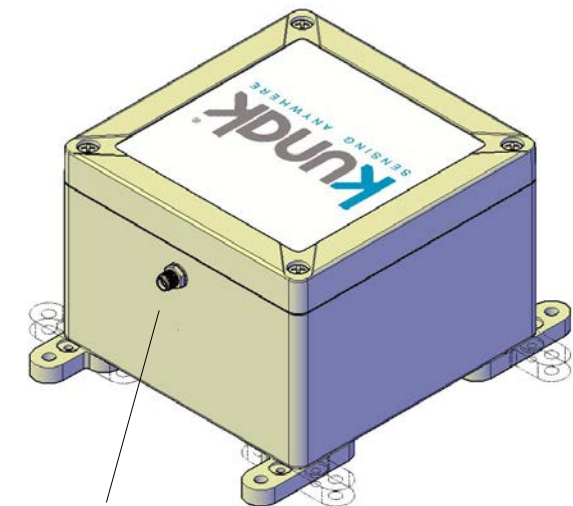
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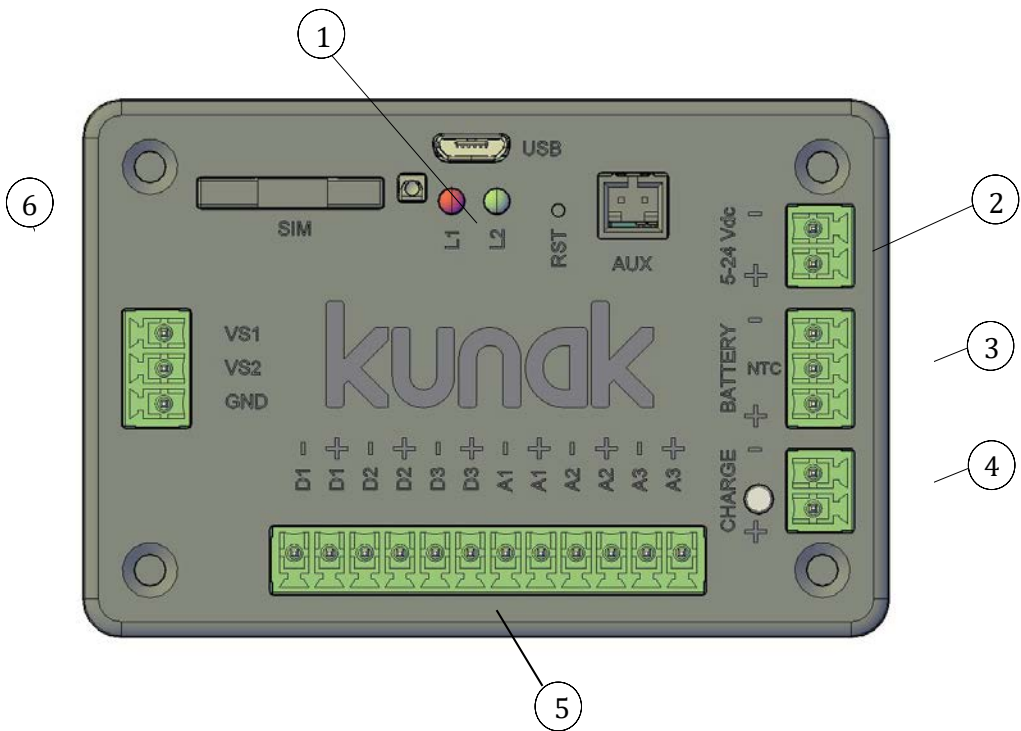
Drawings



IP68 Cordgrips



Female SMA Connector



All dimensions in millimeters.

Interior Enclosure Diagram:

1. LED Indicators.
2. Primary battery or external power source (5-24Vdc)
3. Rechargeable battery.
4. Charger (5-17Vdc)
5. Analog/Digital Inputs.
6. Sensors' power supply.

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Ordering Information

The device part number is very easy to calculate through the tables below. The initial characters are:

K-111-1-

The next 4-4 characters correspond to the inputs configuration:

Inputs					
Analog			Digital		
Current	Voltage	Codification	Dry Contact	Voltage	Codification
3	0	3C0V	3	0	3D0V
0	3	0C3V	0	3	0D3V
2	1	2C1V	2	1	2D1V
1	2	1C2V	1	2	1D2V

For example, the part number up to this point for a device with 2 current and 1 voltage analogue inputs, and 3 dry contact digital inputs will be:

K-111-1-2C1V-3D0V-

The next 4 characters of the part number correspond to the two sensors power supply inputs (VS1, VS2). The possible configurations of this inputs are indicated on the following table:

Sensors Power Supply		
VS1	VS2	Codification
3	5	S3S5
	12	S3S12
5	5	S5S5
	12	S5S12

For example, the part number up to this point for a device with 2 current and 1 voltage analogue inputs, and 3 dry contact digital inputs, with the VS1 input for 3V and the VS2 input for 12V will be:

K-111-1-2C1V-3D0V-S3S12-

The next 4 characters of the part number correspond to the device power supply inputs. According to the following table, it can be:

Device Power Supply		
Primary Battery	Secondary Battery Connector	Codification
Included	Not Included	BBP72
Not Included	Included	BBS

For example, the part number up to this point for a device with 2 current and 1 voltage analogue inputs, 3 dry contact digital inputs, with the VS1 input for 3V and the VS2 input for 12V and secondary battery included will be:

K-111-1-2C1V-3D0V-S3S12-BBS-

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The last two character of the part number are always 0 for this device.

Therefore, the complete part number for this example would be:

K-111-1-2C1V-3D0V-S3S12-BBS-0-0

The default configuration for K-111 device is:

- 3 current analog inputs
- 3 dry contact digital inputs
- VS1 and VS2 inputs at 5 and 12 V
- Primary power supply included.

Therefore, the resultant part number would be:

K-111-1-3C0V-3D0V-S5S12-BBP72-0-0



KUNAK – Sensing Anywhere

Kunik® designs and sells products and services for ultra-long range, low power and difficult to access scenarios, for wireless machine to machine (M2M) communications and Industrial Internet of Things (IIoT) markets.

The ultra-low power consumption electronics, long range wireless communications and the cloud platform Kunik®Cloud, which enable sensors interoperability as well as information compatibility, make Kunik® the best in class system for companies that build and/or operate local, national and international infrastructure assets or companies with remote assets requiring monitoring and management.

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