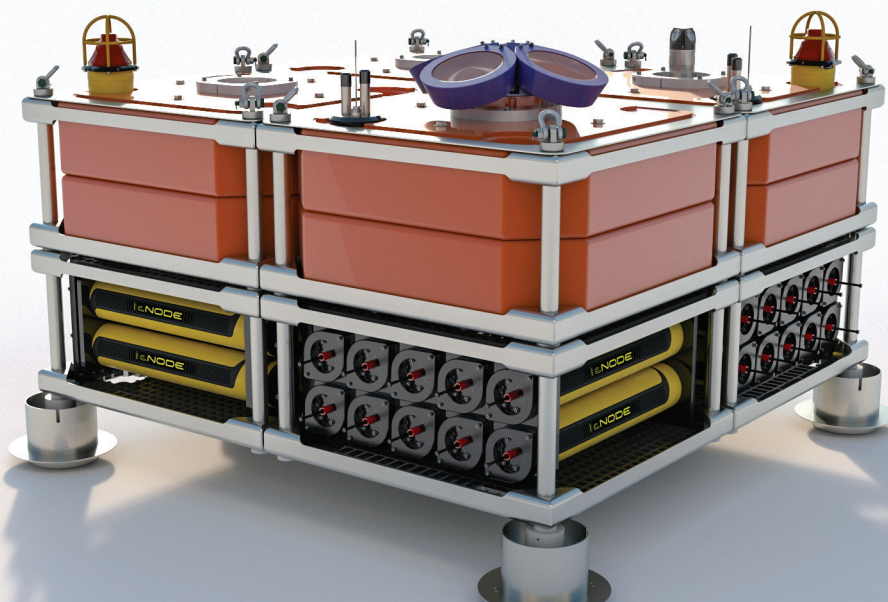


K-LANDER 4S2H



KONGSBERG



MODULAR SEABED SENSOR CARRIER

The K-Lander seabed observatory is the core of the Kongsberg Modular Subsea Monitoring-Network (MSM). With a unique building block concept, the K-Lander can be customized for a variety of long-term deployments. The modular design, coupled with a self-floating buoyancy based recovery system, allows for easy integration and recovery of various sensors suited for diverse subsea monitoring applications.

The core principles of the K-Lander encompass a building block concept that provides efficient total cost of ownership combined with a scalable approach to subsea monitoring. The modular design utilizes modules that are supported by identical (non-corrosive) base frames, thus allowing projects to grow over time by connecting up to four stacks on the seafloor.

One of the key features of the K-Lander is the self-floating buoyancy based recovery system. Instead of employing a rope, the K-Lander uses a releasable ground weight system for recovery, making it independent from cost-intensive recovery equipment like ROVs, ropes, etc. A steel anchor weight is mounted below the bottom module and counteracts the remaining positive drag of the overall lander system. The floating design allows for safe recovery from water depths down to 2,000 metres and is independent from recovery limitations induced by current speed.

The DPU (Data Processing Unit) is the nerve center of each K-Lander system, managing and controlling sensor operations as well as collecting sensors data. Intelligent algorithms allow for event-based changes in scheduling and switching between sample scenarios. The incoming data is computed within the DPU into a comprehensive environmental model rather than plain event logging, making it quicker and more efficient to act on data received.

Communication between the K-Lander systems in the same area as well as the surface, is conducted via the field proven HiPAP or μ PAP transducers, using the established Kongsberg Maritime developed cNODE technology and the proprietary HiPAP Cymbal acoustic protocol for positioning and data link. These proven technologies ensure confidence that the K-Lander will continue delivering data even after months below the surface.

Each K-Lander frame module measures about 1 x 1 x 0.5 m, offering over half a cubic metre of payload space, which is available to install sensors, batteries and buoyancy based on the customer requirements.

Fully equipped, each frame can hold up to 10 batteries or about 200 kg of net buoyancy. Each module is easy to assemble and take apart. Interfaces and batteries can be determined by the user, making it suitable for a wide range of projects including:

- Environmental Monitoring
- Offshore Oil & Gas
- Marine Renewables
- Marine Research

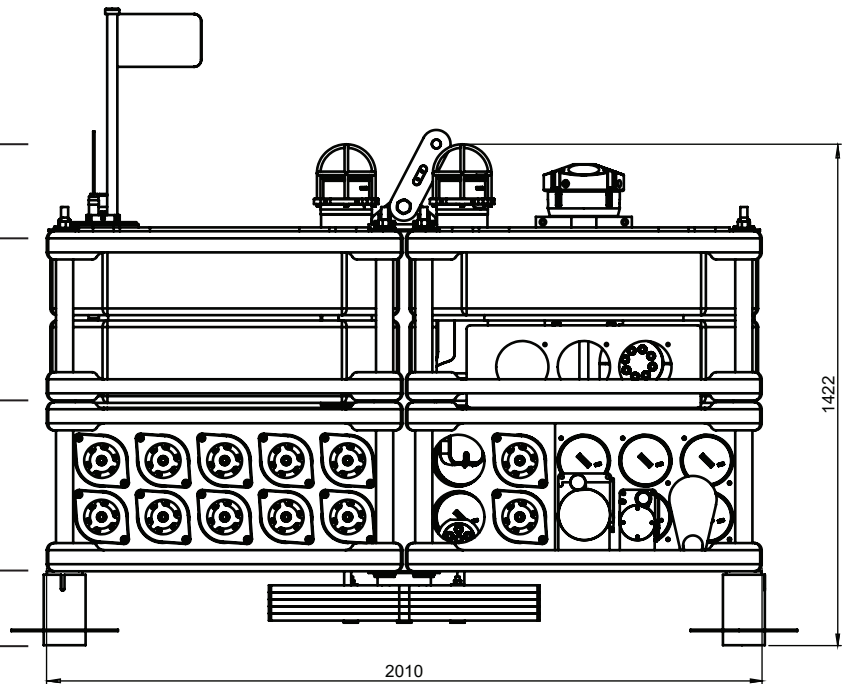
DIMENSIONS K-LANDER 4S2H

Communication and Release

Buoyancy Module

Battery and Payload Module

Anchor Module



TECHNICAL SPECIFICATIONS

WEIGHT AND DIMENSIONS

Complete assembly with 30 batteries, typical sensor suite and anchor weight

- Dimensions: ~2.1 m x 2.1 m x 1.42 m ^{*1}
- Weight in air of frame and basic components: 1.95 t ^{*1}
- Weight in water of frame and basic components (net buoyancy): 180 kg uplift ^{*1}
- Anchor weight: 240 kg ^{*1}

POWER SUPPLY

up to 30 cNODE battery packs each

- nominal capacity 156 Ah @20°C, 180mA
- nominal voltage 14.4V @20°C, 2mA

STANDARD SENSORS AND DEVICES

- cNODE for release, communication and positioning
Optional: additional cNODE for backup release
- Data Processing Unit (DPU)
- Power Management Unit (PMU) for max. 30 batteries
- Optional: CONTROS HydroC CH₄, CONTROS HydroC CO₂, HydroFlash Optode, 3rd Party Sensors incl. ADCP

DATA PROCESSING UNIT - SENSOR INTERFACES:

- 5x serial, 1x Ethernet 1x analogue ^{*2}

MAXIMUM OPERATING DEPTH

- 2,000 m standard

MATERIALS

- Frame: Titanium
- Connection materials: Titanium, POM, PE
- Lifting Point: coated stainless steel
- Buoyancy modules: Syntactic foam for up to 2,000 m ^{*3}

COMMUNICATION, POSITIONING & LBL

- HiPAP Cymbal acoustic protocol for :
 - Vessel bound positioning (LBL/USBL) ^{*4}
 - data link ^{*4}
 - autonomous LBL between K-Lander systems ^{*4}
- Compatible with cNODE, μ PAP, HiPAP

SOFTWARE

- K-Lander Control*, Retrieve system status (topside)
 - μ PAP or HiPAP system on vessel required

HARDWARE REQUIREMENTS

- Win 7/8 32 Bit, 200MB free disk space, Dual Core CPU, 2GB RAM

^{*1} depending on system configuration

^{*2} other configurations on request

^{*3} other depth available on request

^{*4} software option

Specifications subject to change without any further notice.

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