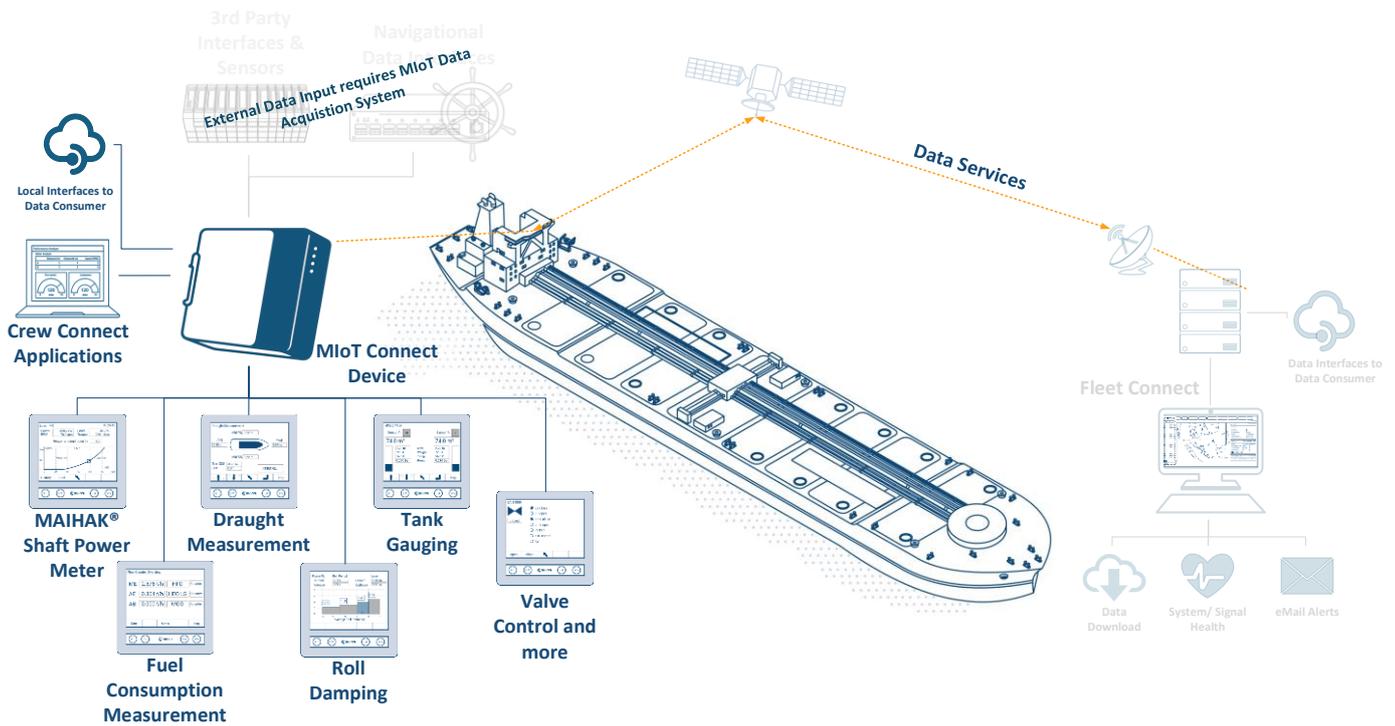


System

The Maritime Internet of Things (**MIoT**) **Digitalization Upgrade** supports the digitalization of new and existing Hoppe Marine systems. It offers a plug-and-play approach, enabling self-commissioning by the crew, along with key functionalities such as logging **high-quality data**, providing various interface options for **data sharing**, and serving as the basis for **Data Services** that enable remote troubleshooting and support.



General System Digitalization Features

- Applicable to **newbuild** and **retrofit** projects, enabling seamless integration into existing Hoppe systems and plug and play installation for **self-commissioning**.
- Data Logging Module: **High performance database** for continuous recording of system data, sensor values, and system health information.
- Crew Connect Web Module: Includes Crew Connect - BASIC and supports additional Crew Connect applications for **onboard data access**, data quality feedback, and visualization.
- Ship to Shore Module: Prerequisite for **Hoppe Data Services**, enabling cyber secure Ship-to-Shore connectivity and **cloud-based data access**, data sharing and **remote services**.
- Service Module: Advanced troubleshooting features, digitalized Hoppe system documentation, and an integrated spare parts catalogue.
- Optional standardized onboard interfaces for data exchange via **REST API** and **Modbus TCP**.

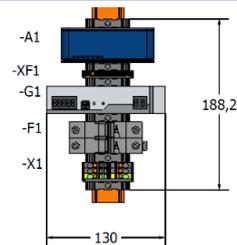
System Specific Data and Information (Sample)

| | |
|--|--|
| All Systems | System Alerts, Interface Monitoring, Sensor Failures, PLC Status |
| MAIHAK® Shaft Power Meter | Shaft Power, Shaft Torque, Shaft Speed, Shaft Energy Counter |
| Fuel Consumption Measurement | Actual Consumption and Fuel Counters per Consumer and per Consumer Group |
| Tank Content Measurement | Tank Levels, Tank Content, Tank Content Density |
| Draught Measurement | Draughts at Draft Marks, Perpendiculars, and Sensor Positions; Vessel Trim |
| Dynamic Draught and Floating Measurement | Dynamic Draughts, Dynamic Trim; Angles, Rate, Period, and Acceleration for Roll and Pitch Movements |
| Valve Control | Valve Operations, Valve Positions, Valve Runtimes, Valve Failures, Relevant Air or Hydraulic Pressures |
| Roll Damping | Angles, Rate, Period, and Acceleration for Roll and Pitch Movements; Tank Level, Tank Content, Tank Levels, System Usage |
| Anti Heeling | Heel Angle, Pump Operation, Pump Runtime, Pump Vibrations, Valve Position, Tank Level, Tank Content, System Usage |

Technical Data

MloT Digitalization Upgrade kit

- includes: MloT Connect device, Power supply 24 VDC, Power circuit breaker, Terminals, cabling, mounting rail
- Dimensions (W × H × D): 188.2 × 130.0 × 130.0 mm



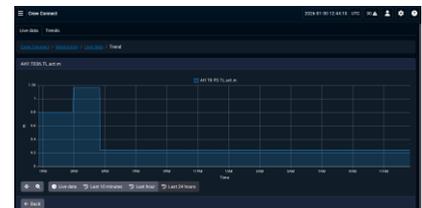
MloT Connect device

- Processor: Raspberry Pi Compute Module 4 (CM4), Broadcom BCM2711, Cortex-A72 (ARM v8)
 - Storage: 128 GB (M.2 SATA SSD)
 - Interfaces: 2 × Ethernet port (1 GbE LAN, separated)
- Dimensions (W × H × D): 102.5 × 129 × 38 mm



Crew Connect Basic

- Self-hosted web application accessible from any computer connected to the MloT Connect device network.
- Includes: Data Visualization, Signal Quality overview, System alert history, Device Configuration, Digital Documentation Package, User Management, Raw Data download



Additional Options

- **Switch Cabinet:** Housing MloT Digitalization Upgrade kit.
- **Crew Connect MAIHAK®:** Noon and Event Report Advanced data visualization
- **Custom Data Output via Modbus TCP interface:** Data sharing to other data loggers, systems and applications.
- **Data Services (Service Connection, Data Butler, Data Inspector):** Cyber secure ship to shore transmission, remote troubleshooting, advanced data sharing options and access to Fleet Connect

