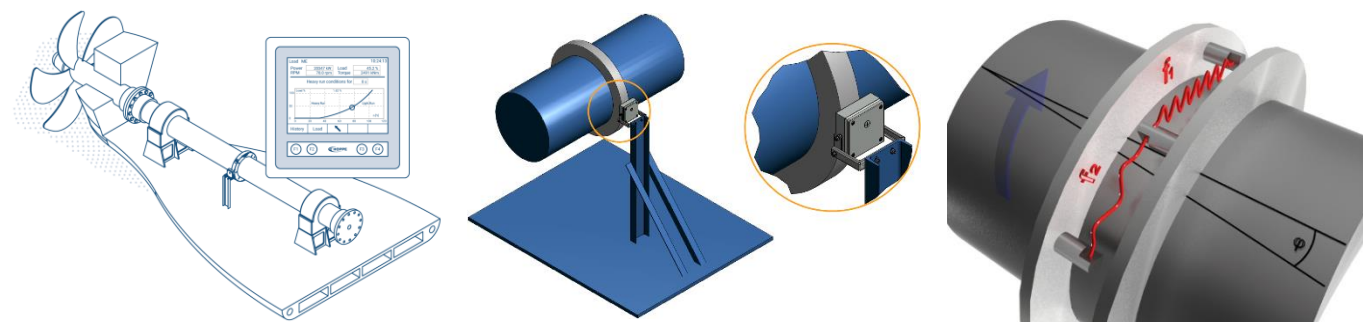


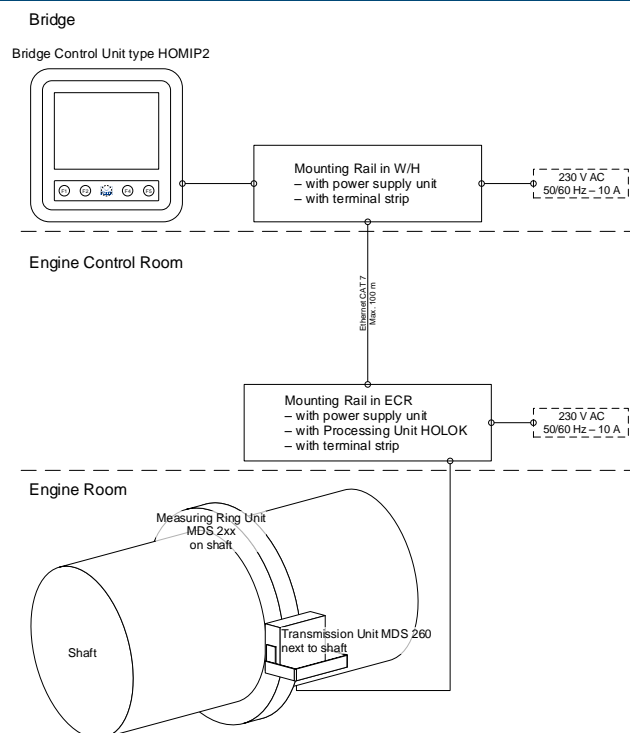
## PRODUCT

The **MAIHAK Shaft Power Limitation System (MAIHAK SHaPoLi)** is for continuous measurement of effective shaft power, torque and shaft speed of the ship's main propulsion system. A Graphical User Interface on the bridge, the Hoppe embedded iPC for System Control HOMIP2, provides a user-friendly display as well as a constant logging of the actual shaft speed in 1/min, shaft torque in kNm, and shaft power in kW. In case statutory limitations are exceeded, the HOMIP gives visible and audible alarms for the operator. The measuring principle is based on two vibrating strings. These two metal rings are mounted force-fit on the shaft. If torque is applied to the shaft (i.e. during rotation), the tension on one of the strings increases while the tension on the other decreases. According to the increasing respectively decreasing tension, the frequency increases and decreases as well. The system permanently measures and logs these frequency changes as well as the shaft revolutions, thus allowing for accurate indications/calculations of shaft speed, shaft torque, and shaft power as well as the indication of corresponding warnings when exceeding any limits.



## TECHNICAL FEATURES

- Measuring Ring Unit **MDS 210...222**  
(depending on the size of the shaft) installed on the shaft including:
  - 2 pcs. **MDS 31** Vibrating String Sensors
  - 1 pc. **MDS 263** shaft measuring block
  - 1 pc. Ring cover (for protection and induced power transmission)
- **MDS 260** Transmission Unit installed next to the shaft
- ECR Processing Unit **HOLOK** installed at the engine control room
- Bridge Control Unit **HOMIP2** installed at the wheel house/bridge
- Standard DIN mounting rails
- Audible alarms via certified HOMIP2 internal alarm horn
- Dimmable HOMIP2 display
- For retrofits and system updates, the MAIHAK SHaPoLi system can be combined with existing MAIHAK Shaft Power Meter systems of the latest version (MDS2010).



## COMMUNICATIONS / SIGNALS

### ECR HOLOK

RS485	COM	For communication with Transmission Unit
Ethernet	ETH	For communication with Bridge Control Unit HOMIP2

### Bridge HOMIP2

RS 485	NMEA	Optional GPS/Time interface
Ethernet	ETH0	For communication with ECR Processing Unit HOLOK

## TECHNICAL DATA

### ECR HOLOK

Power supply	18-48V; 100mA; plus aux energy for process supply
Relay	30V DC, 1A, resistive / 125V AC, 0.5A, resistive
Max. operation temperature	0°C – +70°C
Max. ambient humidity	0% to 85%
Computer data	CPU: ARM M3 50MHz; Internal memory: 96kB RAM, 2256kB Flash; On board memory: 32MB SDRAM, 8MB EEPROM; External memory: Micro SD card

### Bridge HOMIP2

Power supply	24V (+30% / -25% = 18V – 31.2V), fuse 5A (fast)
Power consumption	15W, approx. (30W max.)
max. operation temperature	+5°C – +55°C
Protection class	IP44
Computer data	Processor ARM Cortex A9 Dual Core, 800 MHz, 32 bit

### Transmission Unit (MDS260)

System voltage	24V DC - 3.5A
Interfaces	Bluetooth (for communication with MDS 263); RS-485 (for communication with PLC)
LEDs on PCB	“Status” LED (for Bluetooth connection status); “RX”/“TX” LEDs (for communication status with PLC)
Oscillator frequency	30kHz (for inductive power supply of MDS 263)
Max ambient temperature	+55 °C

### Vibrating String Sensor (MDS31)

Operating frequency	600Hz (default) +/- 100Hz
Accuracy	0.2%
Material	Stainless Steel
Max ambient temperature	+55°C
Typical arrangement	Two sensors per unit

### Shaft Measuring Block (MDS263)

Supply voltage	12V DC (inductive)
Interfaces	Bluetooth (for communication with MDS 260)
Max ambient temperature	+55°C
Connector	Phoenix 1,5/8-ST-3,81
Drilling size	M4

## DIMENSIONS OF CORE COMPONENTS

