

LMN6 electromagnetic speed log

The LMN6 log is designed to withstand the severe environment of a military naval vessel. It complies with major military and maritime standards in force with Wheelmark certification in progress.

- The log measures the speed over the water in the lengthwise and crosswise axis of the vessel using one or two electromagnetic sensors.
- It calculates the partial and total distance travelled.
- It distributes navigation information - speeds, distances travelled, the status and alarms - on analog and digital interfaces (NMEA protocol on series RS422 bus and Ethernet IP link).

Used by the French Navy

Upward compatible with LMN5

According to 96/98/CE Equipment Directive (acquisition in progress)



LMN6 functions

- Single-or dual-axis speed measurement on each sensor
- Separate port sensor / starboard sensor speed measurements, calculation of speed on each side and of average speed
- Ten-point linearization curve for each sensor
- Ergonomic MMI on touch screen (operating state, linearization graph / curves, etc.)
- Built-in Web server (Ethernet HTML)
- Synchronisation by Ethernet (NTP)
- Assisted calibration by on-board GPS
- Back-up of calibration settings on USB key or via an Ethernet connection.

Operating modes

Stand-alone mode:

- In this basic configuration, the log is controlled and configured from the color touch screen built directly into the front fascia of the measuring unit.

Remote steering stand-alone mode:

- A combined repeater incorporating a color touch screen is installed on the bridge. An RS422 link connects it to the log. The remote screen is used to control and display the log information.

Remote control mode:

- A navigation computer (or other computer system) is connected to the log via an RS422 link. Through this link it runs the log configuration and receives navigation information: speeds, distance and status.
- An Ethernet link is also available for the broadcasting of NMEA - IP frames or the supervision / maintenance via a built-in Web server.

Specifications

Maintenance

- The LMN6 modular architecture means easy maintenance and minimum non-availability if it fails.
- The log can be switched to:
 - 'TEST' mode, to check that all the equipment is working properly
 - 'SIMULATION' mode, to broadcast the NMEA frames to the sub-systems connected to the log.
- The results of built-in self-tests are summarised on the supervision screen.
- The maintenance menu accessible through the supervision screen gives access to the log configuration settings (sensor sensitivity, electronic gain). It is also used to launch the specific software modules (setting the zero, electronic gain, calibration, etc.).
- A stand-alone programming console also gives access to the main adjustment parameters from the unit.

Log unit option

- Additional log module to manage the second sensor
- Module 5 additional RS422 outputs IEC 61162 (or other standard, can be customised upon request)
- Module 1 output synchro-resolver (115/90 VAC-60 or 400 Hz) - 5 VA
- 1 x analog output 0 - 500 μ A or 0 - 10 VDC.

Performances

Measurement scale:

- Speed scale: +/- 60 knots
- Distance scale: 0 to 99,999.9 nautical miles.

Speed measurement:

- Speed accuracy: 0.1 knot for speed < 10 knots and 1% for speed > 10 knots (laboratory conditions)
- Speed indication resolution: 0.1 knot
- Damping: 4, 16 or 32 seconds
- Sampling period: 8.33 Hz
- Electronics linearity: instrument accuracy: 0.1% full scale reading
- Zero stability: 0.04 knot (damping at 32 sec.).
- Reliability of laboratory measurement: 0.1% full scale reading.

Distance calculation:

- Accuracy better than 0.1 nautical mile whatever the speed.

Analog interface

- 2 x dual-axis sensor inputs
- 2 x 1/10 nautical mile outputs(*)
- 2 x 1/200 nautical mile outputs(*)
- 2 x programmable outputs: 1/10, 1/100 or 1/200 nautical mile(*)
- 1 x alarm output (*)
- 1 x 0.500 mA output (galvanometer).
- (*): Dry contact breaking capacity: 24 VDC/250 mA.

Environment characteristics

- Power supply: 28 VDC or 85 to 264 VAC single-phase - frequency: 47 to 65 Hz
- Power: < 50 W
- Sensors: compatibles with the LMN5 electromagnetic sensors
- Study possible for adapting to other sensors on the market
- Inputs-outputs: by MIL-DTL-38999 series III or EMC gland connectors
- Operating temperatures: -15°C to +55°C
- Shock and vibration: as per GAM EG13
- Weight of measuring unit: 20 kg +/- 1 kg depending on options
- Dimensions of measuring unit: 400 mm x 250 mm x 250 mm (excluding shock absorbers)
- Four-point wall fixing (with or without shock absorbers depending on environment)
- Color RAL 7032, other colors on request.

Digital interfaces

- 5 x TX RS422 IEC 61162 user ports (NMEA frame broadcast)
- 2 x proprietary RS422 ports (interface with the combined repeater and with the navigation computer)
- 1 RS422 IEC 61162 port (reading on-board GPS frames)
- 1 x 10/100 Base-TX and 100 Base-FX Ethernet port
- 1 x proprietary maintenance/programming console RS422 port
- 1 maintenance/settings back-up USB port.

Architecture

The LMN6 comprises a modular-design processing unit that can be adapted very closely to requirements whilst maintaining the ability to evolve. A built-in 7" color touch screen is used to supervise the operation of the log.

The LMN6 is combined with one or two single- or dual-axis measurement electromagnetic sensors.

To this can be added:

- A combined repeater for remote control by an operator
- Speed and distance information repeaters
- External units or chassis used to duplicate the analog or digital interfaces broadcasting navigation information.

User interfaces

- Hardware: 1 x 7 inch color screen fitted with a built-in touch pad in the front fascia of the measuring unit.
- Software: Web server available on the Ethernet port.