

Rise of LNG Fuel

With clean burning properties and lower operating costs for emission compliance, the marine transportation industry is turning to LNG as a fuel. The safe control and operation of small scale LNG transfers and fuelling (also known as bunkering) pose special challenges requiring innovative technical solutions. LNG's deep cryogenic risk requires careful handling in large and small quantities. Linked ship-shore Emergency Shut Down (ESD) systems for large scale LNG have underpinned an exemplary safety record for over 35 years.

Trelleborg Marine Systems is the acknowledged world leader providing this technology to the large scale LNG industry where its systems overcome inter-compatibility issues and support data and control requirements while assuring Safety Integrity to IEC 61508 SIL2.

For LNG transfer and fuelling the link should:

- Enable a single operator to monitor and control both sides of the transfer process to ensure that measurements remain within safe criteria
- Shut down the process automatically and safely without risk of damaging surge pressures should these criteria be exceeded
- Operate safely and reliably in a gas-hazardous zone
- Overcome problems of inter-compatibility between LNG fuelled vessels and onshore LNG terminals

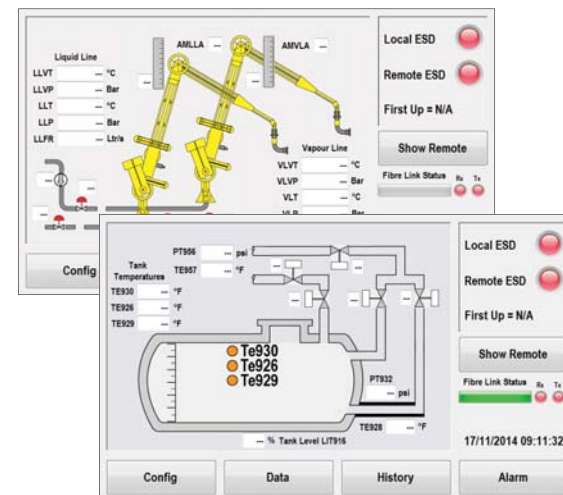
Small Scale System, Large Scale Expertise

The Trelleborg SeaTechnik™ USL-8810 system provides main and back-up systems in compliance with large scale LNG practice within ISO28460:2010. The fiber optic system uses standard digital SONET data transmission. Standard military-specification harsh-environment expanded beam connectors couple the USL system to its shore or ship counterpart; the connectors can transmit light signals without interruption despite contamination.

Typical Systems Comprise:

- USL-8810 Main Control Unit with colour data display monitor in English and other languages
- USL-8812 Transfer area/shipboard connection box with primary fiber optic socket and a back-up electric socket for ESD only operation
- USL-8815 Hand portable cable reel including 25 metre umbilical cable with MIL-DTL-83526 military specification expanded beam plugs for primary (fiber optic) system
- SIG-8972 Hand portable cable reel including 25 metre umbilical cable with SIGTTO link plugs for back-up (electric) system
- USL-8816 Fiber optic loopback 'self test' for pre-operation system check
- HTP-8220 Hotline communication telephone

With the fiber optic system activated, the umbilical cable is connected to a counterpart system. The fiber optic system performs a data handshake and the counterpart LNG tank configurations are set for the operator to observe. The ESD trip signals are set to 'healthy' enabling the LNG transfer to begin. The principal operator can observe temperatures and pressures of both systems throughout the transfer process. Pre-set alarm limits enable the transfer to be monitored in order to manage and, where possible, avoid an ESD trip event.



Safety screen mimics

Following an ESD trip, a 'first-up' indication shows where the ESD was initiated. This facilitates quick identification of the cause of the ESD event, helping to minimize downtime in primary and back-up modes.

Design - The System Supports:

- High integrity ESD signals
- 128 process monitoring alarm & control signals
- Interconnection of custody transfer system
- Mooring line data
- CCTV signals
- IP telephony
- Network interface (for up to 100BaseT)



Fixed connection box



Portable fiber optic and electric umbilical cable reels

Benefits:

- A primary system with high integrity secure digital transmission and robust signal path
- A common system architecture and interface reducing work-load and training costs
- Reduces workload on staff during the transfer operation
- An intrinsically safe ESD back-up system
- Assured inter-compatibility of safety link systems throughout the small scale and fuelling supply chain
- Future-proof for new process data
- Assists safety and monitoring of simultaneous fuel oil bunkering if required
- In-built system test & diagnostics



Fixed control unit

