



Ventilation Flow Assurance in Shipboard LNG Fuel Safety System

Application Note Case Study ANCS023



FCI FLT93
Flow Switch

Marine vessel manufacturers and systems providers have been engaged with vessel operators to ensure compliance with an ever expanding list of environmental regulations. To comply with near-shore regulations to restrict engine produced air pollution, ships are deploying dual-fuel engines, capable of running on diesel while offshore, and switching to cleaner-burning fuels such as LNG while near-shore. The use of LNG in the ship's power plant also creates new shipboard safety challenges.

Problem

A globally leading manufacturer of dual-fuel marine engines uses a double-wall pipe ventilation system to prevent ignition of LNG in the event of a leak. It requires ship operators to be signaled if the vent's flow is in any way restricted or disrupted. The challenge was to find a highly sensitive flow sensor capable of detecting very low flows, with superior, continuously reliable design, with ruggedness to withstand marine/shipboard application and, with agency approvals for installation in a potentially explosive gas environment.

Flow Conditions

- Pipe Diameter: 2" SCH40, or double wall pipe, 4" SCH80 or 6" SCH80
- Media Composition: Air
- Flow Range: 0.3 ft/sec to 120 ft/sec [0,1 m/sec to 37 m/sec]
- Flow Alarm Level/Trip Point: Primary set at ≤ 1 ft/sec [$\leq 0,3$ m/sec] to signal critical low flow condition; an optional second alarm set at 6.6 ft/sec [2 m/sec] to warn of decreasing flow condition
- Relay Status: Normally energized when flow above trip point

Solution

FCI Model FLT93 flow switches. Either a single FLT93 or, if system design specifies redundancy, two FLT93 are inserted in custom spool-piece sections by a specialty marine instrumentation company. The FLT93 meets the requirement for low flow sensitivity, provides dual-relays for both the low and no flow alarm points, carries global approvals of installation in Div. 1/Zone 1 hazardous area locations, and has a 180 year MTBF and SIL 2 rating as proof of reliability and long service life. The FLT93's optional stainless steel enclosure provides superior corrosion resistances in the marine environment.

FCI Model FLT93S or **FLT93F** with optional stainless steel enclosure

Benefits

- Simple installation through threaded tap in pipe
- Hazardous area approved device saves on wiring and installation costs
- Robust circuit design and ultra-rugged enclosure assures worry-free, long service life
- No moving parts technology eliminates routine maintenance checks and expense
- IEC 61508 (SIL 2) compliance assures highest reliability and safe operation