K-Gauge TOP

KONGSBERG

KONGSBERG Tank Overfill Protection System

Features

- No moving parts
- Continuous verification - AutroCAL®
- Configurable alarm limits
- Closed level gauge suitable for all tank designs
- Utilize 50 mm still pipe
- Modular design
- Intrinsically safe for use in all zones

General description

The KONGSBERG radar based Tank Overfill Protection System for gas carriers meets the IMO requirements 'Cargo Tank Overfill Protections System'.

The system includes radar tank gauges, processing and alarm handling units, and a dedicated operator panel. Integration to K-Gauge level gauging system is included with mimic presentation on the Operator Stations.

All equipment on deck is designed for rugged marine environment and manufactured in AISI 316L stainless steel. Accurate measurement is possible regardless of the tank atmospheric conditions. Flexible hardware and software modules ensure easy adaptation to Liquefied Petroleum Gases (Propane, Butane), Ethylene, Ammonia (NH_3), and Liquefied Natural Gas.

Principle of operation

The RTG emits a frequency sweeping microwave signal through a still pipe. The distance is derived from the time delay of the reflected signal.

The still pipe is assembled by one top-, middle- and bottom section. Total length of the still pipe is typically 10 meter, and the system allows for several adjustable alarm limits in the area of the middle section (6 meter).

The pipes have ventilation holes allowing the vapour pressure inside and outside the pipe to stabilize, thus allowing the liquid to rise or fall unimpeded in the pipe.

Each pipe section is supplied with flanges prepared with reference markers. The liquid level and the markers are measured simultaneously, so the system automatically verifies itself at every measurement. By careful calibration of the pipe sections length before installation, the positions of the markers are recorded and stored in the system. By comparing the liquid echo with the reference marker echo, a continuous auto-calibration of the level gauge is done.

The electronic unit in the RTG includes a patented signal detection method that ensures optimum performance. Combined with its superb signal-to-noise ration, GLA-310/5TOP offers the highest measurement reliability and accuracy.

Each RTG is connected to a dedicated signal processing unit, where the AutroCAL® principle is employed.

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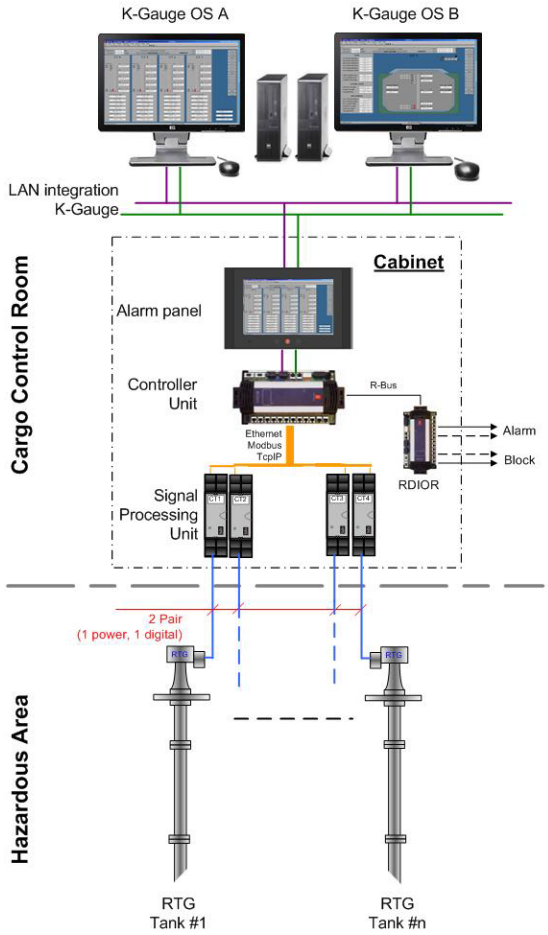
AutroCAL®

AutroCAL® is a unique calibration and verification function in the KONGSBERG system. Gas vapor density and mixture of gases influence the propagation speed of the radar signal, thus the accuracy of the measurement.

By using pipe joint reference markers, AutroCAL® continuously compensates for the changes caused by the differences in the propagation speed.

With AutroCAL®, the influence of the gas vapor density and composition is measured and compensated for automatically.



Building blocks

The K-Gauge TOP system consists of the following hardware units:

- Radar Tank Gauge: GLA-310/5TOP (1 ea tank)
- Radar Processing Unit: GLK-300/x (1 ea tank)
- Remote Controller Unit: RCU502
- Relay output unit: RDIOR420
- Operator/Alarm Panel
- Interface to K-Gauge Operator Station

Technical specifications

Radar Tank Gauge GLA-310/5

Measuring range:	0 to 10 meter (increased measuring ranges on request)
RTG RMS accuracy:	2 mm
System RMS accuracy:	5 mm
Ex classification:	Ex ia IIC T4
Ex certification:	09ATEX1330X
Frequency:	X-band (10 GHz)
Materials:	AISI 316(L) in housing and connection box PTFE/PEEK antenna lense facing the cargo AISI 316(L) or Al alloy 5083 in still pipe
Protection:	IP 66/67
Weight:	10.7 kg
Cable size:	Ø12-Ø20 mm
Environmental temperature:	-45 °C to +85 °C
Tank temperature:	Down to -165 °C
Tank pressure	Up to 10 bar g

TOP processing system

Power supply voltage:	24 VDC ±20 %
Operating temperature:	0 °C to +70 °C
Operating humidity:	95 %, non-condensing
Quality standard:	ISO 9001
Generic EMC standard:	Emission: IEC 60945 / Immunity: IEC 61000-4

KONGSBERG MARITIME AS

NO-7005 Trondheim Norway km.sales@kongsberg.com

Phone: +47 815 73 700 Fax: +47 85 028 028 **www.km.kongsberg.com**

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