Product Data Sheet
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Electro-Pneumatic Tank Level Gauging System

Tank Level Measurement for Marine Solutions

The electro-pneumatic tank level gauging system provides reliable information on tank levels, tank volumes and ship's draft. The system provides solutions for all types of vessels measuring ballast, fuel, miscellaneous tank and void spaces using electro-pneumatic technology. The system offers trouble-free ownership with limited life-cycle cost, ease-of-use configuration and fault finding utilities.

- Accurate and robust measurement in all types of tanks
- System scalable for a number of various application designs
- Well proven technology used by Emerson Tank level gauging
- Up to 24 measurement channels in each cabinet reducing the bulkhead space needed
- Quick and easy installation with seamless system integration
- Simple and fast commissioning independent from host system readiness
- Easy and efficient maintenance with electronics located remote from harsh marine tank environments
- Configurable settings and diagnostics functions throughout the systems dedicated software offering remote troubleshooting functions and less demand for service engineering time onboard
- Smooth replacement of system parts minimizes the maintenance effort
- Optimized functionality when integrated with other Emerson marine systems

EMERSON

System Description

The electro-pneumatic Tank Level Gauging System consists of cabinets with level measurement equipment, air piping and valves on tanks commonly used for ballast, fuel, draft, miscellaneous and void spaces. The system can be connected and integrated with the Aperio ICMS or Rosemount CMS software. It is also possible to connect to the ship's IAS and add stand-alone displays placed where needed on the vessel.

The system is seamlessly integrated to the Aperio ICMS system or the Rosemount CMS. Each cabinet* can accommodate up to 24 measuring channels and there is no limitation to how many measuring channels the electro-pneumatic system can have.

The system compensates for temperature variations as well as measurement point offset. The differential pressure, compensated for pipeline resistance, provides the hydrostatic pressure and thus an accurate liquid level is calculated. Each cabinet comes with an air treatment unit mounted either inside or on cabinet wall. The standard output is an RS-485 MODBUS RTU utilized to communicate with Aperio ICMS, Rosemount CMS or ship's IAS. It is also possible to add analog outputs for analog displays or other host systems.

The cabinet comes in two different setups, continuous measurement and scanning measurement.

Scanning

The scanning system is using less hardware to perform tank level gauging. Pressure transmitters are efficiently shared between every sixth measuring channel to reduce the need of additional hardware. The system scans through every measuring channel one by one and a sequence takes less than 8 second.

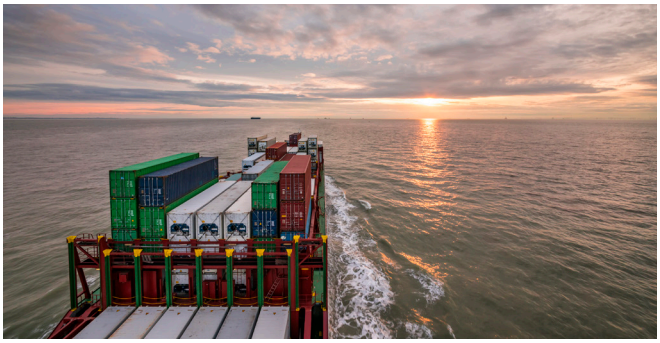
Continuous

The continuous system is using one pressure transmitter point per measuring channel which gives a continuous air flow to all measuring points to perform tank level gauging. The tank content is continuously updated without any interruption.

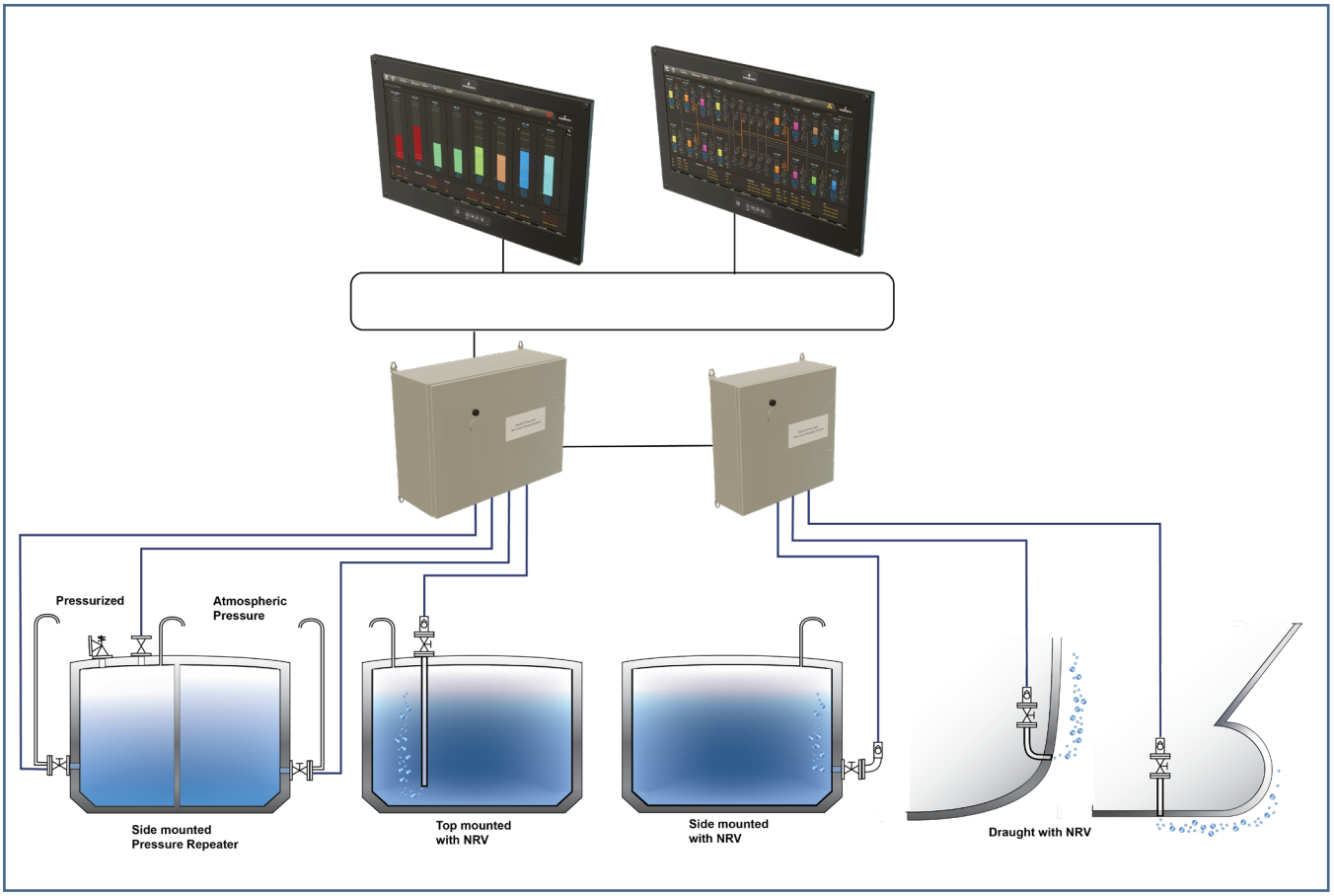
*) Cabinet with piping parts are manufactured by Kocum Sonics and integrated with our Marine system for best performance and data handling.

Miscellaneous Equipment

To speed up commissioning, remote services, and increase system uptime throughout the vessels whole operational lifetime it is strongly recommended to use isolation valves for each measuring point. Also, if the cabinets are located below the highest tank entry it is recommended to use Non return valves. Pressure repeaters (1:1 converters) are available for tanks where it is not possible to blow pressurized air.



Installation Flexibility



Flexible Installation for Best Result

Depending on possible entry access to a tank, the air pipe can be entered from either the top or the side. To avoid back flow of tank contents, an additional non-return valve can be fitted onto the pipe. The atmospheric pressure is connected to the system by a venting pipe, used as reference pressure when calculating the liquid level. If a tank is pressurized, an additional measurement line can be connected to measure the tank top pressure for compensation when calculating actual liquid level. Pressurized tanks uses a pressure repeater (1:1 converter) instead of blowing air into the tank.

It is also possible to measure draft. The draft is measured by feeding a pipe through the bottom of the ship hull at multiple points to get an accurate draft reading.

Optional analog 4-20 mA output/input signals can be added through e.g. inclinometer for trim and list. Static pressure transmitter Rosemount 520 and radar gauges Rosemount 5408 and Rosemount 5300 can easily be integrated through the analog channels.

Technical Data

Feature/Functionality	
Measuring Points	Up to 24 channels per cabinet. No limitation on numbers of cabinets.
Measurement Range	0 - 32 m
Standard Interface	2 x Modbus RTU RS-485 (Optional analog output/input)
Sensor Conformity	Maximum ±0.15 % F.S. (including linearity error, hysteresis and repeatability)
Supply Air	5-8 bar dry and clean instrument air
Color	RAL 7035
Cabinet Size (H x W x D)	300 x 500 x 230 mm 600 x 600 x 230 mm 600 x 800 x 230 mm Dependent on no. of channels
Enclosure Rating	IP 54
Marine approvals	ABS, LR, BV, DNV-GL, NK and CCS

For technical data on Cabinets, vents and piping please refer to Kockums Data Sheets and Manuals.

Valves, Pressure Repeters and Pipe Connectors

Options
Non-Return Valves
NRV, AISI 316L, Thread, BSP 1/4” In - BSP 3/4” Out
NRV, AISI 316L, Thread, BSP 1/4” In - BSP 1/2” Out
NRV, AISI 316L, Flange, DIN DN20 PN16
NRV, AISI 316L, Flange, JIS 5K-20A
NRV, AISI 316L, Flange, JIS 5K-25A
NRV, AISI 316L, Flange, JIS 10K-50A
NRV, AISI 316L, Flange, JIS 10K-65A
Others on request
Pressure Repeter (1:1 Converter)
Pressure Repeater, 316L, Flange, DIN DN20 PN16
Pressure Repeater, 316L, Flange, DIN DN40 PN16
Ball Valve
Ball Valve, AISI 316L, Thread, BSP 1/2”
Ball Valve, AISI 316L, Flange, DIN DN20 PN16
Ball Valve, AISI 316L, Flange, DIN DN20 PN16, Cert
Ball Valve, AISI 316L, Flange, JIS 5K-20A
Ball Valve, AISI 316L, Flange, JIS 5K-25A
Others on request
Pipe Connectors
Pipe connector, 8mm, AISI 316L, BSP 1/4” Out
Pipe connector, 10mm, AISI 316L, BSP 1/4” Out
Pipe connector, 12mm, AISI 316L, BSP 1/4” Out
Pipe connector, 8mm, AISI 316L, BSP 1/2” In
Pipe connector, 10mm, AISI 316L, BSP 1/2” In
Others on request

Emerson Automation Solutions
Damcos A/S
Aaderupvej 41
DK-4700 Naestved
T +45 5578 7200
F +45 5578 7272

www.Emerson.com/marine

Emerson Automation Solutions
Rosemount Tank Radar AB
Box 150
SE-435 23 Mölnlycke
T +46 31 337 00 00
F +46 31 25 30 22

www.Emerson.com/marine

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