

Smart-EP-Level Level Gauging System



The Wärtsilä Smart-EP-Level is a complete and stand-alone level measuring unit that utilizes electro-pneumatic technology to measure the level of any liquid inside a tank.

The hydrostatic pressure of a liquid is measured by introducing compressed air into the tank by way of a pipe. Signals corresponding to the pressure measured are used locally or can be transmitted to a centralized system to assess the level measure. External barometric pressure is required as a reference for measurement correction.

The Smart-EP-Level can also process the measured pressure using pre-recorded tank data and in this way can be used as a stand-alone level measuring device.

The Smart-EP-Level generates a second and separate 4-20 mA signal that corresponds to the pressure measured which can be used for local monitoring.

Applications

The Smart-EP-Level is specifically designed for all on-board applications where the continuous measurement of levels in tanks carrying any type of liquid (fuel, oils, ballast, fresh water, etc.) is required.

Each Smart-EP-level unit comprises:

- Smart-EP-module containing the flow regulators, pressure sensors and electronic card (level sensing unit-LSU) which handles all functions.
- Stop-check-valve to be fitted at the top of the tank.
- Measuring pipe that connects the module to the stop-check-valve and then goes into the tank.

For certain applications where air bubbling is not permitted in the tank, for example in potable water tanks, a 1:1 pneumatic converter is installed instead of the stop-check-valve (see dedicated chapter). The Smart-EP-Level can also be used to measure a ship's draught.

Up to 32 Smart-EP-Level units (32 tanks) can be connected in parallel with an interface board (DCU) which is generally located above the bulkhead deck. Each unit is fully independent so that no malfunctions that could occur in one unit can affect units connected to the same DCU. Up to 32 DCUs can be connected together in a loop.

Main Features

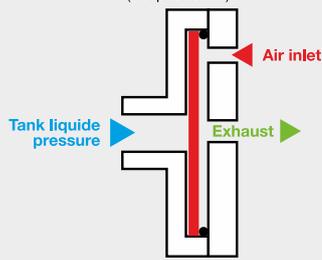
- Fully redundant pressure measuring unit: three pressure sensors for each unit and therefore for each measured point.
- Fully redundant compressed air flow regulators.
- Possibility of using compressed service air.
- Low consumption of compressed air.
- Automatic purging of measuring pipe.
- Fully redundant power supply.
- Fully redundant serial interface (RS485). Standard 4-20 mA output.
- No calibration required.
- Level control unit with built-in self-diagnostics.
- Installation of module on a DIN rail.

Interface

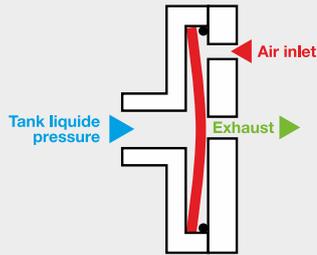
- Stand-alone sensor with 4-20 mA output.
- Stand-alone sensor with RS485 BUS Modbus protocol.
- System with single or redundant BUS connected by DCU (data concentration unit).



Condition without liquid in the tank
(no pressure)



Condition with liquid in the tank



Stop-Check-Valve

The stop-check-valve is a non-return valve that blocks any liquid from the tank entering the measuring pipe. This is important for safety and also to prevent any clogging in the measuring pipe. The stop-check-valve should be installed as close as possible to the tank (generally on top of the tank or where inspection/maintenance is possible).

Pneumatic Converter 1:1

A pneumatic converter 1:1 is to be installed in applications where air cannot be allowed to bubble inside tanks, for example in potable water tanks.

● Condition with tank empty:

When the tank is empty there is no pressure exercised by the liquid on one side of the membrane. Therefore the value of the measuring air at the inlet is the same as the exhaust plus an offset on the opposite side of the membrane.

● Condition with liquid in the tank:

The liquid exerts pressure against one side of the membrane. The membrane moves towards the exhaust hole as shown in the diagram. The force of the liquid against one side of the membrane is balanced by the force exercised by the measuring air pressure. The equilibrium is reached when the two forces are equal. By way of this principle, the pressure measured at the

measuring air inlet is the same as the pressure of the liquid plus an offset. This value is then used to determine the level of the liquid inside the tank. In both cases, there is no contact between the bubbling air and the measured liquid.

Data Available

On 4-20 mA signal:

- Standard level range 0-15 mt H₂O
- Optional level range 0-30 mt H₂O.

On the bus:

- Level
- Smart-EP-level card temperature
- AVG absolute pressure
- Absolute pressure sensor 1
- Absolute pressure sensor 2
- Absolute pressure sensor 3
- Level measurement status
- Temperature measurement status
- Status of pressure transmitter 1
- Status of pressure transmitter 2
- Status of pressure transmitter 3
- Status of flow regulator 1
- Status of flow regulator 2
- Low level alarm
- High level alarm.

sales.apss.it@wartsila.com

www.wartsila.com

WÄRTSILÄ® is a registered trademark. Copyright © 2017 Wärtsilä Corporation. Specifications are subject to change without prior notice.