Reliable. Safe. Cost Effective.

Electronic differential pressure for level measurement – with metal or ceramic sensors

Endress+Hauser

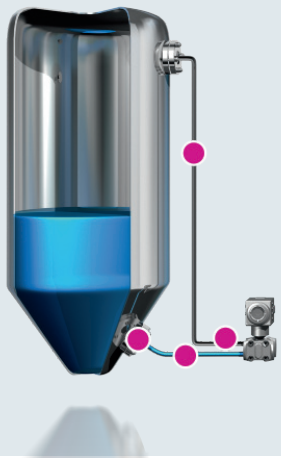
People for Process Automation

Imagine impulse line and capillary free multivariable level measurement:

Eliminate mechanical issues with Endress+Hauser's new electronic differential pressure systems

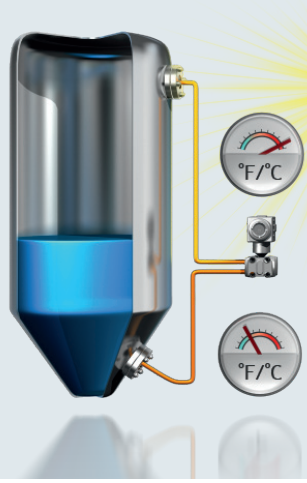
Differential Pressure measurement is often used to measure the level in pressurized and vacuum tanks. Traditional differential pressure measurement using impulse lines and capillaries have issues that can lead to less accuracy, process safety risks and greater total cost of ownership. This is especially the case with tall distillation towers, evaporators or other vessels with varying ambient temperatures.

Disadvantages of impulse lines



- Icing up
- Clogging
- Leaky tabs
- Dry/wet leg inconsistencies

Disadvantages of capillaries



- Temperature effect

The solution

The Deltabar FMD71/FMD72 system uses proven pressure sensor technology in a new and innovative way. The system consists of just one transmitter and two sensor modules. One sensor module measures the hydrostatic level (high pressure) and the other one the head/blanket pressure (low pressure).
The electronic dp system is available with piezo-resistive oil-filled measuring cells with a metal diaphragm – Deltabar FMD72 – as well as with capacitive Ceraphire® ceramic cells – Deltabar FMD71. The level is calculated in the transmitter using these two values. The design of the system and the electronic architecture increase the reliability and safety of the system and save costs.

Reliable.

- Eliminate measurement drift due to ambient temperature changes - up to 95%
- Differential pressure, head pressure and sensor temperature from one system - available via HART®
- Continuous health indication of the entire system via HART® diagnostics
- Faster response time than traditional capillary systems - up to 10 times faster!
- Right sensor technology for the application
- Self-monitoring Ceraphire® ceramic measuring cell
- Standard cabling connections provide flexibility

Safe.

- Eliminate tubing and connection leaks often seen with traditional systems
- Eliminate line condensation or evaporation events (dry/wet leg inconsistencies) and plugging events
- Reduce field personnel safety exposure risks
- Fully vacuum resistant Ceraphire® ceramic cells with highest overload protection

Cost Effective.

- Use existing wiring when installing replacement systems
- No system recalibration or reconfiguration required with any component change
- Water tight, quick disconnect between sensors
- Fewer spare parts – replace individual components of the system as needed
- No need for varying lengths of capillary systems, just shorten the cable
- Use industry standard cable
- Just one technician to install entire system
- No need for freeze protection/heat tracing, so save energy

Electronic differential pressure for level measurement

Sensors

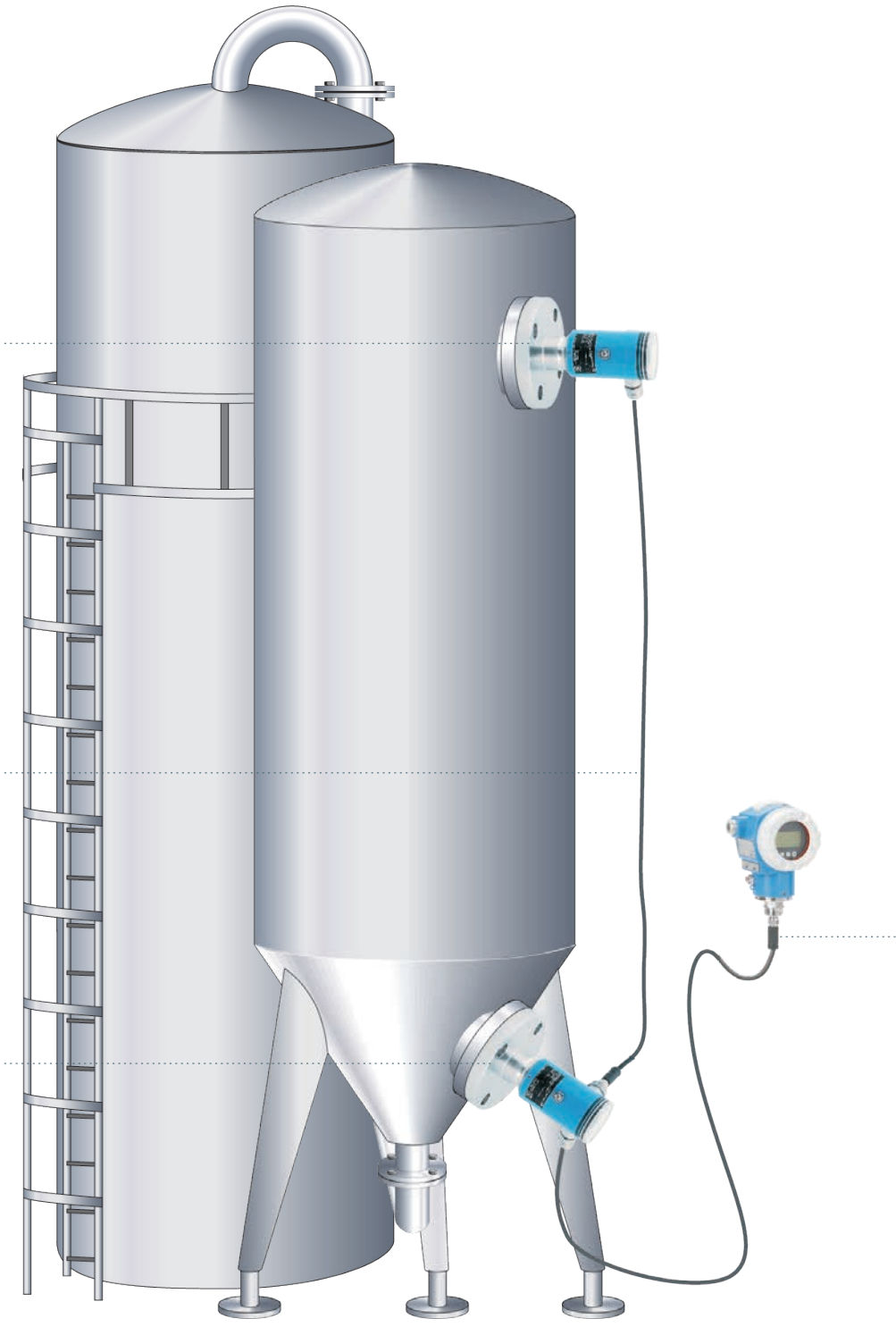
- Intuitive, menu-driven installation
- Screw terminals for easy connection
- Color coded wiring
- Ample space for installation
- NEMA 4x/6P (IP66/IP68) housing and cable
- Preconfigured at the factory with user defined settings
- Tether on sensor lids

Cable

- Field adjustable cable
- Uses industry standard cable

Sensor

- Fully vacuum resistant Ceraphire® ceramic cells
- Silicon cells with metal diaphragm for pressurized tanks
- Diaphragm seals and/or special membranes and connections on request



Additional benefits

- Multivariable level measurement – differential and head/blanket pressure, as well as sensor temperature and status
- Easy product selection and sizing via Online Applicator software
- W@M - Life Cycle Management compliant

Technical data

- Loop powered, 4...20mA HART®
- Supports 12VDC powered installations
- Replace individual components of system as needed
- Seamless integration into existing systems – no need to change power supply or cable

Transmitter

- Performance independent of transmitter position
- Transmitter can be installed in convenient personnel safe area
- Local operation compliant with hazardous area classification (via external push buttons)

Your advantages at a glance:

Reliable.

New electronic differential pressure system eliminates traditional mechanical issues resulting in greater process availability and reliability.

Safe.

Safety risks are minimized with the new electronic differential pressure system architecture and design.

Cost Effective.

Lowest total cost of ownership due to reduced installation time, maintenance, downtime and spare requirements.

For more information:
www.endress.com/electronic-differential-pressure

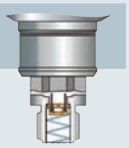
The application determines the correct sensor

The electronic dp system offers the highest flexibility on the market by configuring the right sensor technology for your application.

Every application has its specific requirements, be it vacuum, abrasion, acid, condensate, steam or temperature changes. During years of experience, Endress+Hauser has gained valuable industry know-how for the benefit of customers. Using this know-how, Endress+Hauser has developed Ceraphire® ceramic sensors and silicon sensors with a metal diaphragm, each presenting an optimum solution – even in demanding applications.

The electronic dp system is available with Ceraphire® ceramic cells – Deltabar FMD71 – as well as silicon metal cells – Deltabar FMD72.
Apart from the sensor technology system, Deltabar electronic dp also offers housing materials and process connections of various types which makes it the most flexible and customized electronic dp solution.

Advantages of the sensor technologies within the electronic dp system

	FMD71 (ceramic cells)	FMD72 (metal cells)
	Ceraphire®  Ceramic is one of the hardest materials in the world and ensures the best material properties for the medium. The property of the ultra-pure ceramic (99.9%) guarantees high resistance to corrosion, low temperature hysteresis and the best overload resistance. Endress+Hauser capacitive ceramic sensors have membranes up to 30 times thicker than conventional sensors. Even the tiniest of deflections result in measuring signals with the highest accuracy.	**Silicon technology**  Silicon sensors with metal diaphragm are available for gauge pressure and absolute pressure measurement. As a high-performance solution for high pressure applications up to 40bar, these sensors meet the highest requirements and work reliably across a large temperature range.
	Advantages Ceraphire®	**Advantages silicon technology**
Process industry 	▪ Vacuum resistant due to filling fluid free measuring cell ▪ Highest corrosion and abrasion resistance ▪ Self-monitoring measuring cell with membrane breakage detection	▪ Sealing free sensor cell ▪ Good behavior in steam ▪ Large selection of process connections
Hygienic industry 	▪ Vacuum resistant due to oil free, dry measuring cell ▪ FDA-listed and USP class VI-tested material ▪ Self-monitoring measuring cell with membrane breakage detection	▪ Smallest process connections and membrane diameter with constant accuracy ▪ FDA-listed filling oil ▪ Numerous process connections

Production availability extended in a chemical plant

Centauri Technologies LP minimized maintenance and costs with FMD72

"Installed in 10 minutes - just flanged it up and wired it - and all my problems were gone. This system perfectly fits for us in regards to cost reduction in combination with increased reliability of our process."

Don Vanderslice , Operations Manager
Centauri Technologies LP, Pasadena, Texas, United States

CENTAURI Technologies, LP

Centauri Technologies LP - founded in 1996 - is a privately held chemical producer for third parties (tolling business). With batch reactor capabilities to 8500 gallons, Centauri features flexible, multipurpose continuous production and conventional catalytic batch slurry autoclaves.

The results

- Greater process availability and reliability by eliminating temperature effects in measurements
- Lowest costs due to reduced installation time, maintenance and spare part requirements
- Production time savings

Customer challenge

- Batch production of chemicals in a distillation column
- Outdoor installation
- Temperature effects on capillaries jeopardized the reliability of the measurement
- Temperatures as well as vacuum destroyed the capillaries every four to six months
- High replacement costs due to cleaning demand before working at the chemical vessel

Our solution

- Deltabar FMD72 electronic dp solution with metal cells replaced the inferior capillary system.
- Level calculation from two values of the sensor modules within the transmitter
- No temperature issues anymore
- The device has been working for over 18 months without any need for maintenance
- The production output has increased due to the improvement of the process control thanks to the increased measurement reliability

www.addresses.endress.com

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