Level Pressure Flow Temperature Liquid Analysis Registration Systems Components Services Solutions

TDR Level Measurement in Corn Silos in an Ethanol Plant

Special extended version of Levelflex M – FMP40 is used to measure the corn level in 125ft tall storage silo

Corn is used as raw material for Ethanol production

Corn storage silos in Ethanol plant

Ethanol is used in automobile gas

Levelflex M – FMP40 is used to measure the corn level in a storage silo. To meet the application requirements for a 125ft tall silo a special extended version was provided. To optimize the measurement results a centering disk was installed to prevent the cable from shifting in the nozzle on top of the silo.

Customer Profile

Ethanol plant in the Midwest.

Ethanol plants produce automotive gas substitutes using a variety of feedstock thus helping the energy economy become more independent from crude oil-based products. The most common processes use corn as a feed stock.

Local Ethanol production provides a benefit to agriculture (farmers) by stimulating the rural communities which produce corn and other starch crops beyond food production. 80% of all revenue generated by an ethanol facility is spent within a 50 mile radius of the plant, thereby creating substantial pockets of rural economic development.

Application description

Corn storage silos

- Silo heights: 125ft (38m)
- Silo diameter: 50 ft (15.3m)

Installation in nozzle

- nozzle diameter: 4”
- nozzle height: 12”

Instrument used

FMP40 with 125ft cable (MVT6N0198)

Centering disk

HMP40-A2G (4” diameter, 8.5” rod)

Application challenges:

The standard Levelflex M – FMP40 is available with cable length up to 115 ft (35m). Limitations are pull forces at the cable and signal strength. In this case the pull force of corn in a 125' (38m) high and 50' (15.3m) wide cylinder shape silo is within the limits. A test showed that the signal strength is sufficient. Thus, a probe with special software settings for extended measurement range was provided (TSP: MVT6N0198).

Instrument description:

The Levelflex M is a top-mounted, compact level transmitter for process control or inventory/storage applications that operates with micro-impulse radar on the guided time-of-flight principle. Fluctuations in the density, temperature, or build-up of dust do not influence the measurement.

Measuring principle

The Levelflex is a “downward-looking” Time-of-Flight (ToF) measuring system which measures the distance from the process connection to the material surface. An electrical pulse is launched and guided down the probe, which acts as a surface wave transmission line. The pulses are reflected by the product surface, received by the electronics, evaluated and converted into level information

For more information contact:

Travis Sauers
Engineered Sales Co.
Bloomington, MN 55420

Christoph Rompf
Endress + Hauser Inc.
Greenwood, IN 46143

Endress+Hauser

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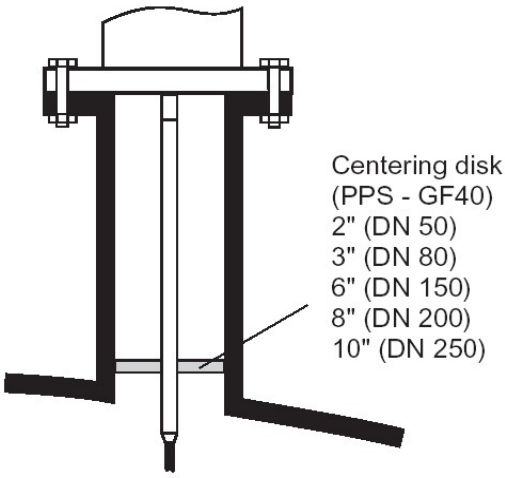
Levelflex M – FMP40 installed on top of 125ft high silo

Levelflex M – FMP40 connected to a laptop computer via service adapter to view the current settings and envelope curve

Levelflex M – FMP40 envelope curve

Levelflex M – FMP40 installed in nozzle (12” tall, 4” diameter)



Installation in tall nozzle requires a centering disk HMP40 at the bottom of the nozzle. The centering disk prevents the rod / cable to touch the wall and from changing its position in the nozzle (mapping).

USA
Endress+Hauser, Inc.
2350 Endress Place
Greenwood, IN 46143
Tel. 317-535-7138
Sales 888-ENDRESS
Service 800-642-8737
Fax 317-535-8498
inquiry@us.endress.com
www.us.endress.com

Canada
Endress+Hauser Canada
1075 Sutton Drive
Burlington, ON L7L 5Z8
Tel. 905-681-9292
800-668-3199
Fax 905-681-9444
www.ca.endress.com

Mexico
Endress+Hauser
Paseo del Pedregal No. 610
Col. Jardines del Pedregal
01900, Mexico D.F.
MEXICO
Tel. 525-568-2405
Fax 525-568-7459

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