



ON THE

LEVEL

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#### MONITOR NEWS

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#### INDUSTRY NEWS

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- >> Industry News Center at [www.powderandbulk.com](http://www.powderandbulk.com)
- >> Storage Industry Zone at [www.powderbulksolids.com](http://www.powderbulksolids.com)

## The "What's" and "Why's" of the RF Capacitance Bin Level Sensor

Often people have questions concerning the "theory of operation" for RF capacitance probes or the "principle of operation" for RF capacitance probes.

A capacitance probe is a point level sensor using the principles of capacitance to detect or measure the level of a solid or a liquid.

Capacitance is defined as 1) the property which permits storage of electrically separated charges when potential differences exist between conductors, and 2) the magnitude of such a charge in relation to an applied voltage. A common device in which such a phenomena occurs is a capacitor, an electronic device able to store a charge. The probe acts like a capacitor.

A capacitor is an electronic device able to store a charge; as shown in Figure 2, a capacitor usually consists of two "conductors" with the area "A" separated by a fixed distance "d", in the case of Monitor's MK line the active probe of the unit and the vessel's wall make up the two "conductors" or "A".

In between the two "plates" is what's called the dielectric material which has a "dielectric constant", "K". When the two plates are oppositely charged, there results a potential energy between the two plates. The magnitude of the potential energy is dependent upon the three variables, "A", "d", and "K".

A capacitor stores the energy according to the property called capacitance, denoted by the letter "C".



Figure 1 - Monitor's MK2 Line

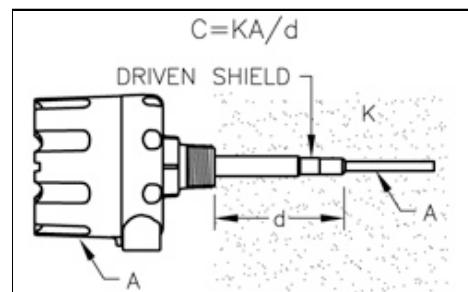


Figure 2 - RF Capacitance Principle of Operation

> Versatile. Capacitance probes are applicable to liquids as well as solids.

> Reliable. Since there are no moving parts, a properly applied probe will provide reliable indication for a long time.

> Long Life. Capacitance probes can last much longer than electromechanical products.

> Built-in Fail Safe Selection. A fail safe selection is standard on MK2 / MK2e RF capacitance probes.

> Built-in Delays. The MK2 / MK2e RF capacitance probes have built-in delays so no external relays are needed.

More on next page

## TRIVIA

### 3rd Quarter Question:

What was the singer Sting's former occupation?

Win an item by E-mailing us the correct answer at [monitor@monitortech.com](mailto:monitor@monitortech.com)



A radio frequency is applied to the probe and is continually analyzed to determine the influence caused by the surrounding environment. As material contacts the probe the radio frequency shifts indicating an increase in capacitance, "C".

The probe's insulator and surrounding air provide the dielectric material (with the dielectric constant "K"). As the air ("K" = 1.0) is displaced with any other material ("K" > 1.0) the capacitance effect "C" is enhanced thereby changing the application's impedance.

Monitor's MK2 and the MK2e sensors (See Figure 1) detect the difference between air and virtually all types of target materials like grain, plastics, cement, fly ash, pellets, sugar, flour, and liquids.

The driven shield portion of the probe is what enables the probe to ignore product build up on the probe that would otherwise cause false sensing. Therefore RF probes with build up immunity can be used successfully with target materials that are sticky, viscous, or clingy.

**There are many advantages** to using a MK2 or MK2e RF capacitance probe.

- > No Maintenance. Aside from calibration, a capacitance probe should not require attention since there are **no moving parts**.
- > Sealed Probe. Material will not infiltrate the probe through the housing.

**Typical applications** include high and low level sensing in bins, silos, tanks, hoppers, and other vessels. The MK2 / MK2e can also be used for plugged chute detection.

**Target materials** include but are not limited to: Pellets, Granular Solids, Cement, Sand / Gravel, Feed / Grain, Plastics, Coal, Powders, Liquids, Food Ingredients, Slurries, Paints and Coatings, Chemicals, and Pharmaceuticals.

Monitor Technologies offers a complete line of RF capacitance probes. We offer two models: the top of the line MK2 and the cost-minded MK2e (an OEM favorite). **Features include:**

- < Microcontroller based electronics for maximum reliability and performance, push-button calibration, sensitivity selection and self-test (MK2 only)
- < Automatic temperature compensation for unmatched calibration stability (MK2 only)
- < Superior 0.5 pF sensitivity
- < Build-up immunity through our driven shield technology
- < High Intensity LED indicating light (Ordinary location sensors only)
- < Universal power supply
- < Available with hazardous location approvals
- < Available in many options to handle the most demanding applications

For more information, please visit

[http://www.monitortech.com/product\\_point.shtml](http://www.monitortech.com/product_point.shtml)

or call us in the USA at 800-766-6486 or from anywhere at 630-365-9403. Also, check out our Level Measurement blog at

<http://monitortech.typepad.com>. ▼

## Upcoming Shows (Visit Monitor at the following trade shows)



**Booth # N 1117**  
**February 2 - 5 , 2010**  
**Las Vegas Convention Center**  
[www.worldofconcrete.com](http://www.worldofconcrete.com)



**Exchange 2010**

**Booth # 929**  
**February 21 - 23 , 2010**  
**Wichita, KS**  
[www.geaps.com](http://www.geaps.com)

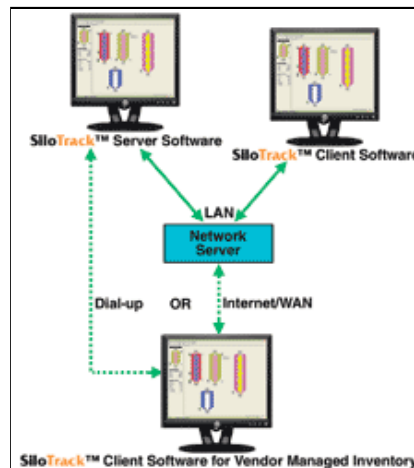
## Tech Tip: Don't Sweat The Small Stuff

I was happily sitting at my desk today, reading up on how one of my colleagues was spending his week when the phone rang from a frantic caller wanting to know why his SiloTrack inventory software wasn't working with his SiloPatrol sensors. He had installed his SiloTrack software around 2 years ago and didn't have a problem with it until he received a call from his inventory controller letting him know that both of his second generation SiloPatrol SMU's were reporting a COM error in the software. From the get-go, he was adamant on getting support, and from the sounds of it, he had not been in this situation before. For the record, his electricians had to do some work on the vessels, so the power was turned off to the sensors the previous day, but upon restoration of the power, the sensors reported a COM error.

I proceeded to walk him through the normal rings of troubleshooting a COM error in SiloTrack.

Power? Check. End-user was able to climb up to the sensors and perform a manual measurement. (Users who may have problems like this frequently, listen up)

Good connections? Check. End-user was also able to verify that the sensors were properly addressed and that there was no solder bridging between the two wires of the RS-485 cable on the DB-9 connector. At this time, I presumed that he had measured the resistance of the two wires. While this is a good practice, you must remember to do this when all power to the sensor(s) is OFF. This measurement, in a good environment, should read about 120 ohms depending on how much network termination resistor switches are in the 'on' position. (Remember, you only want the end points of your network to have those switches in the 'on' position) This proves that there are no breaks in your RS485 line running from the PC to the sensors. But wait!



**SiloTrack™ Inventory Management Software**

I would imagine when he had measured the resistance, he had accidentally pulled out the Y-cable from the RS485 PCI card and it had fallen on the floor. The call had dropped for some odd reason, and I was about ready to yank all my hair out while I was calling him back, only to him getting on the phone and explaining what had happened.

At least he knows now exactly what to check for when he has this problem! I hope that all the other users who may have this problem check all the necessary things, as well as checking to make sure all the connections into your equipment are sound! Don't sweat the small stuff!

Please visit our blog at . . .  
<http://monitortech.typepad.com>

John Mish

Sales / Technical Support



## Featured Product:

# Evolution of the SiloPatrol® SE



SiloPatrol® SMU -  
1999



SiloPatrol® SE -  
2009

On July 22, 1999, a day before the Space Shuttle Columbia launched with the first female shuttle Commander - Eileen Collins, the first SiloPatrol® SMU level sensor was shipped out from Monitor Technologies' Elburn, IL facility. It was among the industry's first electronically controlled "smart" cable-based level sensors. Ten years later, the SiloPatrol is still an industry-leading continuous level sensor. Since the original unit, the SiloPatrol has evolved into the Second Edition (SE) with product enhancements like a sealed split compartment design, a serviceable wiper seal compartment, enhanced motor control features, and unique lock-out circuitry which if utilized prohibits a sensor from making a measurement when activated.

The SiloPatrol® SE is a rugged, reliable and accurate level measuring system designed for the harshest and most dynamic conditions. It is effectively used to improve material inventory control of powder / bulk solids and many liquids in storage silos, hoppers, vessels, etc. The sensors measure the inventory level automatically and on-demand without the need for your operator or plant personnel to climb silos. The smart cabled-base sensors automatically lower a weight & cable into the silo until it contacts the material surface. Upon contact the weight & cable system is immediately retracted and the measurement is fed to the plant control system or operator interface. A microcontroller directs all of the functions of the sensor to ensure the proper travel of the weight & cable, which provides accuracy and reliability of the measurement. These sensors are easy to install and are also virtually maintenance free, requiring only a periodic inspection usually once or twice per year. Once the material level measurement is obtained, a variety of operator interface devices is available to calculate and display material volume, weight and more. A PC-based software package is also available that can automate report generation, send emails to suppliers or corporate locations and allow remote viewing of material level inventory.

For more information please visit:

[http://www.monitortech.com/product\\_c\\_c\\_sp.shtml](http://www.monitortech.com/product_c_c_sp.shtml)

## Newest Monitor Print Ad

Keep an eye out for Monitor's latest ad in industry magazines like: Processing, Powder Bulk Solids, Powder and Bulk Engineering and Concrete Producer.

**MONITOR**  
"Setting The Standard For Supplier Excellence"

Point Level Monitoring  
Continuous Level Monitoring

**SiloPatrol®** II  
"Smart" cable-based level sensor

**SafePoint®**  
Self-validating bin level monitor

**Flexar®**  
Guided Wave Radar

**► VERSATILITY**  
**► RELIABILITY**  
**► DURABILITY**  
**► VALUE**

Did we mention VERSATILITY?... Our bin level measurement instruments are engineered to offer a solution to meet your needs for most materials and process conditions. For five decades we've been providing high quality, reliable product experiences backed by trusted customer service for a variety of powders & bulk solids applications. Contact us today and let us assist you.  
**www.monitortech.com**  
monitor@monitortech.com ▼ 888-601-3232 ▼ www.flexar.info

Visit **www.monitortech.com** For the Latest  
Product News and Information

### SecureCare™ PROFILE

#### The Accounting Department



Melissa

Tonda

Cathie

**Name:** Cathie Bonine

**TITLE:** Accounting/HR  
Manager

**DEPT:** Accounting

**ANIV:** Jan. 25, 1982

#### Interview

**Q:** Where are you from originally?

**A:** Elburn, IL.

**Q:** What is your favorite food?

**A:** Pizza and Ice Cream!

**Q:** What consumer item reminds  
you most of Monitor?

**A:** Cereal.

**Q:** Previous positions you have held



at Monitor?

**A:** Hired as the Order Entry Clerk, then promoted to various positions over the years....Export Doc Clerk, AR Coordinator, Accountant/ Credit Mgr, Accounting Supervisor, Accounting Mgr.

**Q:** What is the best aspect of working at Monitor?

**A:** The wonderful people. Over the years I have been blessed with the opportunity to work with some of the most amazing people, both here at Monitor and through the business contacts.

**Q:** Current Projects?

**A:** I am currently learning a lot about the HR function. I am working on several HR projects involving job descriptions, the appraisal process and teamwork / community service projects.

**Name:** Tonda Fulton

**TITLE:** Accounts  
Receivable  
Associate

**DEPT:** Accounting

**ANIV:** July 24, 2000

#### Interview

**Q:** Where are you from originally?

**A:** I grew up in Quincy, IL (Born In Keokuk, IA).

**Q:** What is your favorite food?

**A:** Fish.

**Q:** What is the best aspect of working at Monitor?

**A:** The people.

**Q:** Current Projects?

**A:** Daily activities have been keeping me busy.

**Name:** Melissa  
McGowan

**TITLE:** Accounts Payable  
Associate

**DEPT:** Accounting

**ANIV:** July 3, 2007

#### Interview

**Q:** Where are you from originally?

**A:** South Elgin, IL.

**Q:** What is your favorite food?

**A:** Meat and potatoes.

**Q:** What consumer item reminds you most of Monitor?

**A:** Cereal.

**Q:** What is the best aspect of working at Monitor?

**A:** I have an amazing leader who is very patient and is always willing to

teach new me new aspects of the  
job. Thanks Cathie! Let us not  
forget all the employees that work  
together to make the company  
successful!!!

**Q:** Current Projects?

**A:** Fixed Assets.