

Solution Note

Replacing Displacers with SmartLine Level GWR Transmitters



Challenge

Mechanical displacer technology is a common older technology capable of measuring process tank levels and interfaces of liquid media. While popular, users have realized that mechanical displacers are not the ideal solution. The mechanical nature of a float or displacer has a high cost to maintain or repair the longer the unit remains in service. This maintenance, repair, or even replacement of the displacer consumes labor hours and may result in the shutdown of the process for prolonged periods.

Additionally, displacers are affected by density and temperature variations thus affecting their accuracy which is in addition to potential inaccuracies due to physical hindrances. Coupled with lack of or limited ability to provide diagnostics data, like modern smart instruments, users are looking for better alternatives to this aging technology.

Displacer Challenges	
Accuracy	Product density must remain constant since deviations from initial density will impact the measurement accuracy.
Interface level	The lower product level must always be less than the expected minimum top liquid level.
Maintenance	Displacers have moving parts that are subject to wear and tear, and need replacement or cleaning. Vibration and turbulent conditions contribute to increased maintenance.
Flexibility	Changing liquid media, thus density changes, and temperature changes affect the measurement.
Coating or buildup	Coating or buildup on the displacer will affect the measurement due to increased weight on the parts, affecting accuracy and increasing maintenance.

Solution

Guided wave radar technology is fast becoming the technology of choice due to its wide applicability for measuring tank levels. The SmartLine SLG 700 series is a viable solution to replace traditional mechanical floats or displacers. The SLG 700 series is an accurate, reliable and repeatable level transmitter capable of measuring liquid interfaces.

This Solution Note directly replaces faulty and problematic displacers with the SmartLine model SLG720 level transmitter and does so without any mechanical modifications to the chamber and thus using the existing process connection. The key to easy replacement of displacers is the ability to offer flanges specific that match the current installation, which are:

- Fisher 249B/259B cages (600lb rating)
- Fisher 249C (600lb rating)
- Masoneilan 7-1/2" (600 psi rating)

General specifications of the SLG720 transmitter are:

- 4-20mA with HART or FF output
- 316 SS rod probes (6.3m max) and wire probes (50m max)
- 316 SS centering disks (for use in stilling wells or bypasses)
- Temperature range -40 to 392 deg F (-40 to 200 deg C)
- Pressure to 580 psi (40 bar)
- Ability to measure low (Dk=1.4) dielectric constant liquids
- Interface measurements
- SIL 2/3 certification
- CSA, ATEX, IEC Ex and CSA US approvals, FM Approval (coming soon)
- WHG overfill protection
- CRN and PED certification
- Basic, advanced or no display options
- Three button option

SmartLine Level Advantage

The SmartLine Level SLG 700 series transmitters have the following advantages over displacers:

- Accuracy unaffected by density or temperature changes
- Maintenance free due to no moving parts
- Free from mechanical drift
- Ability to accommodate changing media; not affected by density variations or changes.
- Unaffected by upper gas phases.
- None or minimal affect from product build up and fouling from dirty service.
- Advanced diagnostics

Besides the advantages over displacer technology, the SmartLine Level transmitter features these additional winning advantages:

- **Performance** – SmartLine Level features best-in-class performance including:
 - +/- 3mm accuracy
 - +/- 1 mm repeatability
 - 1 mm resolution

In addition to transmitter performance, SmartLine offers differentiated performance from an engineering configuration perspective with its Field Service Tool. The SmartLine Field Service Tool utilizes the standard unified DTM technology to access device parameters and DTM technology allows vendors to develop configuration tools more like today's modern applications. For example, the Field Service Tool offers novice users a guided experience to setup the device parameters while expert users can easily access the parameters desired through the well organized parameter pages. Older technology like DD files and older DTMs force users to navigate through pages of configuration parameters. SmartLine's Field Service Tool raises the bar in terms of user experience.

- **Lowest Cost of Ownership** – besides the lower maintenance advantage inherent with guided wave radar technology over displacers, SmartLine's modular components enable the lowest cost of ownership from two other perspectives: reduced maintenance time/effort and reduced inventory. SmartLine transmitters consist of field replaceable modules and users can leave the transmitter connected to the process while the module is replaced. This results in a potential maintenance cost savings of up to 80%. From an inventory reduction

perspective, modularity allows users to stock one full transmitter and as many modules as necessary to cover variants or to reduce risk. No longer is it necessary to purchase an additional 10%, 20%, or even 30% whole complete transmitters. 70% savings in inventory is possible using SmartLine's modular offering.

The SmartLine Application and Validation Tool is a unique tool that not only ensures that our solution will work for the target tank application but it also reduces the overall engineering effort. The Application and Validation Tool is an online, collaborative engineering tool to help validate that the actual tank application is a suitable candidate for the SmartLine Level transmitter. It also validates the correct model number configuration. Additionally, the engineering data is preserved and can be loaded into the transmitter configuration parameters while being built at the factory. With this capability, the transmitter arrives from the factory, out-of-the box ready to use. Do the engineering work once upfront and that's it.

- **Smart Connection Suite** – All SmartLine transmitters are fully integrated with Honeywell's Experion system resulting in less engineering effort for field startup and commissioning, for both end users and engineering project teams. Tighter integration with Experion also elevates the user experience, with features like the ability to send messages to the specific transmitter so it is easily identified for service, or the automated ability to put the transmitter in maintenance mode when removed from Auto mode.

SmartLine transmitters also feature more in-depth diagnostics than the industry standard set of diagnostics. These diagnostics reveal potential issues with specific components or modules. Coupling this additional diagnostic capability with SmartLine's modularity concept, users have a solution (with real financial benefit) to proactively maintain their assets.

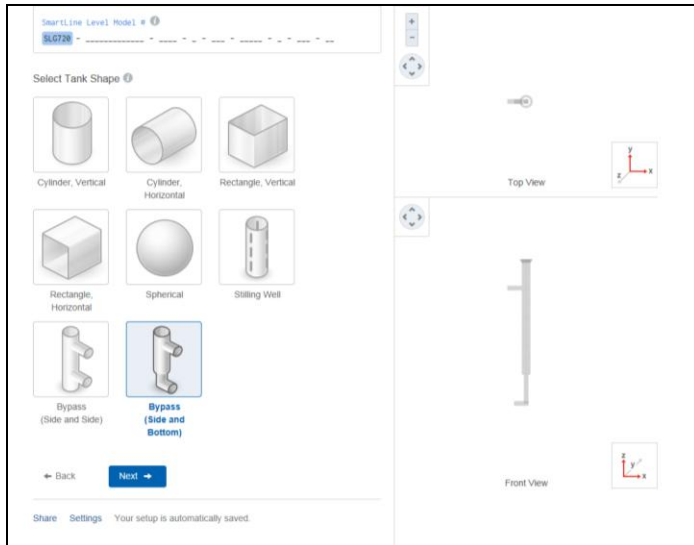
Applications

The practical considerations when replacing displacers with SmartLine Level are:

- Probe must be larger than the length of displacer.
- The probe should avoid contact along the displacer chamber; a centering disk is available to support this goal.
- The end of the probe should not touch the bottom of the chamber.
- Match the manufacturer or the displacer chamber flange. Common chamber manufacturers are Masoneilan and Fisher Leveltrol.

Application and Validation Tool

To easily determine the configuration and specification of the SmartLine Level transmitter for the specific customer tank (bypass chamber), please start the process by using the SmartLine Level Application and Validation Tool (AVT). The AVT includes a specific selection for a bypass chamber and thus can provide a validated transmitter model number.



With the Application and Validation Tool (AVT) there is no need to look at product manuals, product specifications, guidance information, or to fill in application data sheets. Input the user's bypass chamber information and let the tool validate the application and the transmitter model. The online collaboration feature allows an expert to join in the active session if desired.

A link to the tool is on the SmartLine microsite:

https://www.honeywellprocess.com/en-US/online_campaigns/smartline-pressure-transmitters/Pages/home.html

Use this link to directly access to the AVT; no login is required:

<https://levelconfig.honeywellsmartline.com>

The AVT works on iPad, iPhone, Droid devices, and common web browsers.

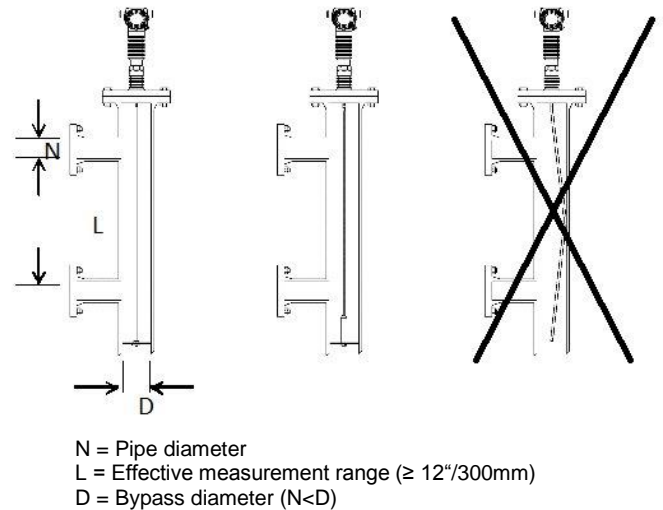
Bypass Installation

Recommended bypass chamber diameters for the SLG720 are:

Probe type	Recommended diameter	Minimum diameter
Rod probe	3" or 4" (75mm or 100mm)	2" (50mm)
Rope probe	4" (100mm)	2" (50mm)

Chambers with smaller diameter can lead to problems with build-up. A centering disc is recommended for rigid probes over 1m length. Clearance from the bottom of should be 1" (25mm).

General recommendations on installing the SLG720 transmitter is shown in below.



The Honeywell Advantage

The success of the SmartLine platform is due three key advantages:

1. Performance
2. Lowest Cost of Ownership
3. Smart Connection Suite

Details to support these three key advantages are mentioned in this note and are available from various available training materials. Both end users and EPC companies derive value from these advantages (shown in the table), although from different perspectives.

Advantage	End User	EPC
Performance	●	
Field Setup Tool	●	●
Modularity – maintenance + inventory	●	
Polarity insensitivity	●	●
Application and Validation Tool	●	●
Out of the box ready to use	●	●
Experion integration - commissioning	●	●
Experion integration - maintenance	●	
More advanced diagnostics	●	

For More Information

Learn more about Honeywell's solutions visit our website www.honeywellprocess.com or contact your Honeywell distributor.

Honeywell Process Solutions

Honeywell
1250 West Sam Houston Parkway South
Houston, TX 77042

Honeywell House, Arlington Business Park
Bracknell, Berkshire, England RG12 1EB UK

Shanghai City Centre, 100 Junyi Road
Shanghai, China 20051

www.honeywellprocess.com

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