

Rosemount 8700 Magnetic Flow Sensor Direct Burial Overview and Installation Procedure



June 2013

1.1 Introduction

The purpose of this guide is to provide a general resource on how a magnetic flow meter may be subject to specific issues surrounding direct burial, and to present a procedure of how to protect against this problematic application. The magnetic flow meter is a technology that has been utilized for many years in a wide range of applications. Overtime this flow measuring instrument has been established and regarded as a technology that has great reliability and a long life span. While the magnetic flow meter is known for its durability, these instruments are often installed underground through a direct burial process. This application subjects the flow meter to harsh elements over time such as soil stress and leaching soil leading to corrosive harm. Installations such as these cause greater corrosion as time progresses, which call for the need of additional protection measures from the elements to assure the proper life span of the instrument.

Rugged applications such as direct burial where the flow meter is susceptible to chemical breakdown, mechanical stress, and earth movement overtime can be prevented by following a set of protective system guidelines. Taking recommended pre-installation precautions can also help to prolong the life of the flow meter in environments such as these. Using long-lasting anticorrosion wax-tape systems provide the most affective form of protection for the Rosemount 8700 magnetic flow meter family.

1.1.1 Wax-Tape Systems

Wax-tape systems are well established systems that have proven to be effective belowground in harsh environments. These systems can provide a complete protection of coating for irregular shape fittings in a variety of applications. With a combination selection of primers, tapes, and outer wraps magnetic flow meters subject to harsh environments can be protected quickly, efficiently and cost effectively. The applications of wax-tape systems can be used belowground, where the tape slowly firms up and protects against the elements over time.

1.2 Applications

Disclaimer

Rosemount Inc. neither represents nor warrants the accuracy or sufficiency of the wax-tape material systems information set forth in this guide for specific end-user applications. Please consider process temperature limits when selecting a protection method. Ultimate responsibility for materials selection remains with the end-user. Nothing in this guide constitutes a change to the terms and conditions under which the Rosemount product was sold.

The data presented in this guide is based on field experience and published data given forth by TRENTON® Wax-Tape Systems. However, because of the wide variety of processes and applications it is impossible to guarantee material compatibility in a given process without performing corrosion tests under actual operating conditions.

1.2.1 Common Protective Materials

The following is a list of protective materials and options that can be utilized to help protect against the failure of the 8700 flow sensors belowground for a direct burial application:

- **High-Temperature Primers:** microcrystalline wax-based coating compounds



- **Wax Tape Primers:** blend of microcrystalline waxes, plasticizers, and corrosion inhibitors. Have a paste-like consistency and designed to displace moisture and wet the surface ensuring adhesion of the tape.



- **Wax-Tape Wraps:** microcrystalline waxes, plasticizers, corrosion inhibitors and other ingredients saturated into a nonwoven, nonstitch bonded synthetic fabric, forming a tape wrapper.



- **Curing Outer Wraps:** specialized blend of quick-curing resins impregnated into a polyester fabric.



- **Rubber Outer Wraps:** PVC film with synthetic rubber adhesives



- **Plastic Outer Wraps:** three membranes of clear, polyvinylidene chloride high cling- plastic wound together as a single sheet.



- **Polyester Outer Wraps:** spun bonded polyester mat saturated with microcrystalline wax that is laminated to a polyester film.



1.2.2 Choosing a Solution

Applications	Material
<u>Belowground (Direct Burial)</u>	Wax-Tape Wraps <i>(Use with below materials for specified direct burial applications)</i>
Normal Conditions	High-Temperature Primer
Above 80 °F Ambient	High-Temperature Primer
Below 50 °F	High-Temperature or Wax-Tape Primer
Wet Sensor	Wax-Tape Primer
Large-Diameter Sensor	Curing or Polyester Outer Wrap
Soil Stress	Curing, Polyester, or Rubber Wrap
Leaching Soil	Polyester or Plastic Outer Wrap

1.3 Procedure

1.3.1 Ordering Procedure

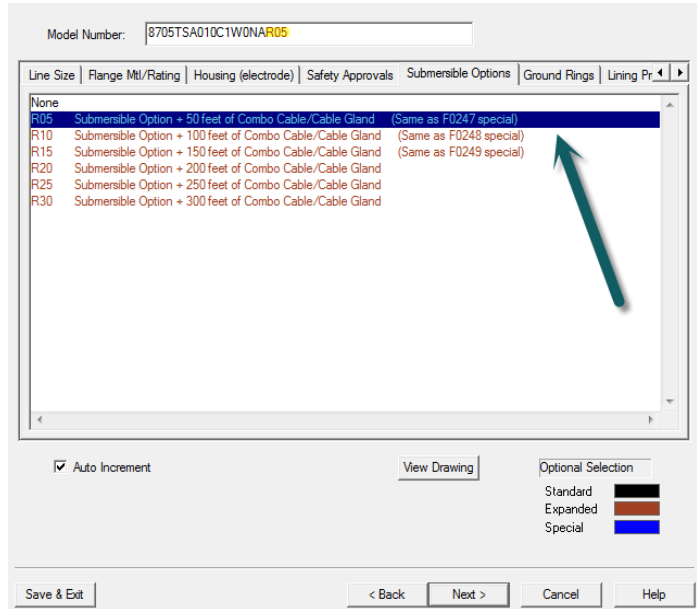
The following ordering procedure selections are strongly recommended during the sizing and model building process. These four options highlighted below within Emerson's Instrument Toolkit will help to assure the best quality life span of your Rosemount 8700 magnetic flow sensor subject to a direct burial.

Note: *These steps refer to model number creation utilizing Instrument Toolkit for the 8700 Industrial standard flow sensor and the 8700 utility standard flow sensor.*

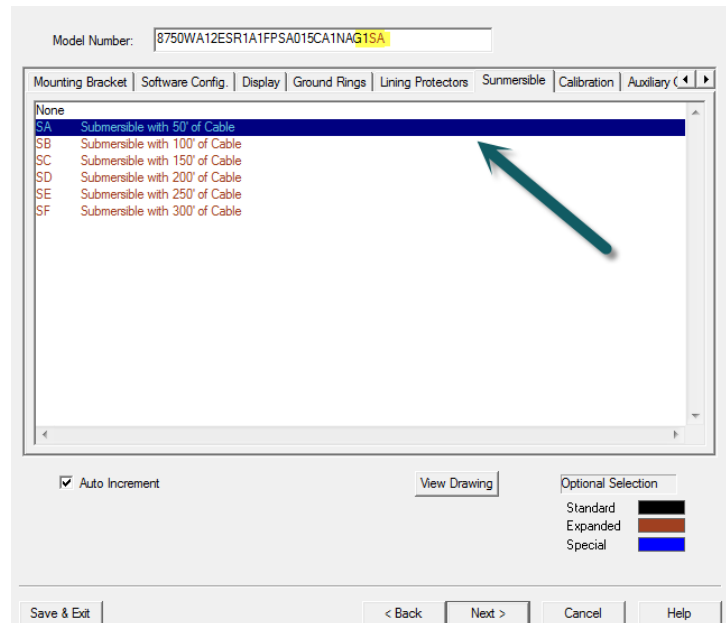
Step 1:

Under the Submersible options tab select the appropriate R05-R30 (Industrial) or SA-SF (Utility) combo cable option to assure protection against water ingress along with the correct length of cable for the application.

Industrial Sensor



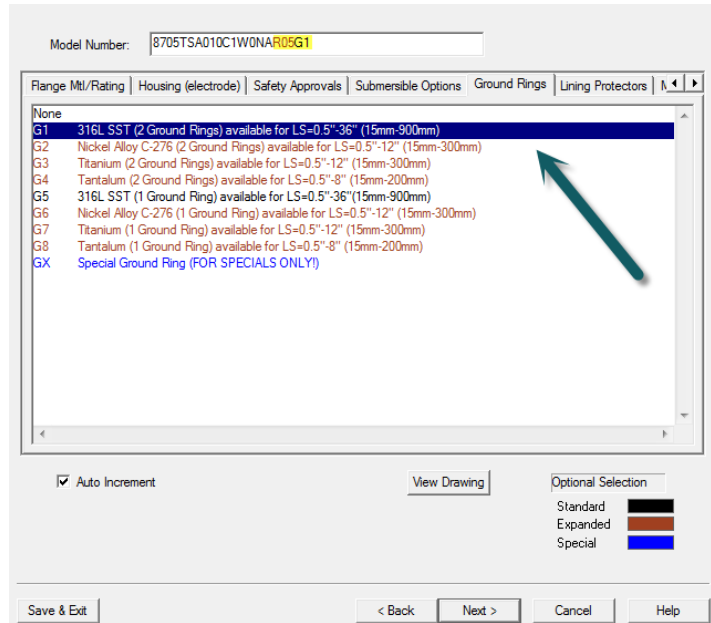
Utility Sensor



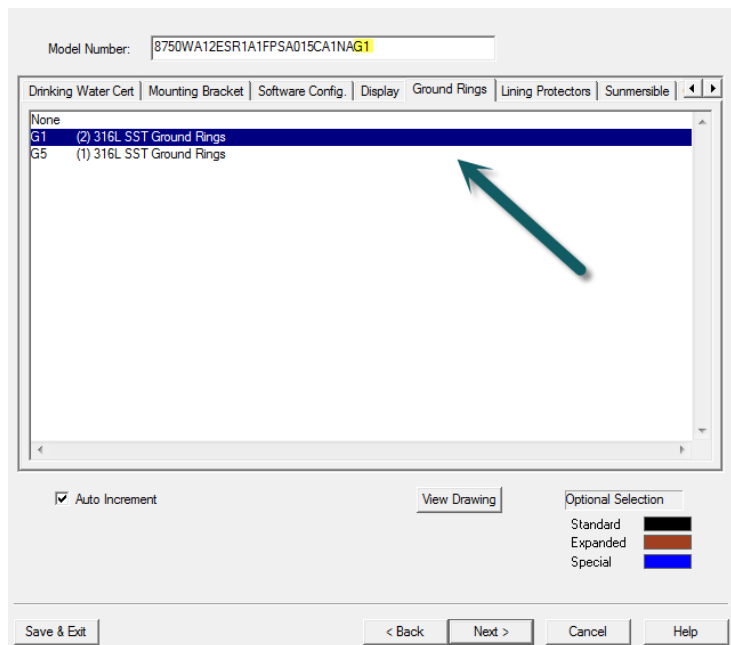
Step 2:

Under the Ground Rings tab select the G1: 316L SST (2 Ground Rings) option to assure proper earth grounding for the direct burial process.

Industrial Sensor



Utility Sensor

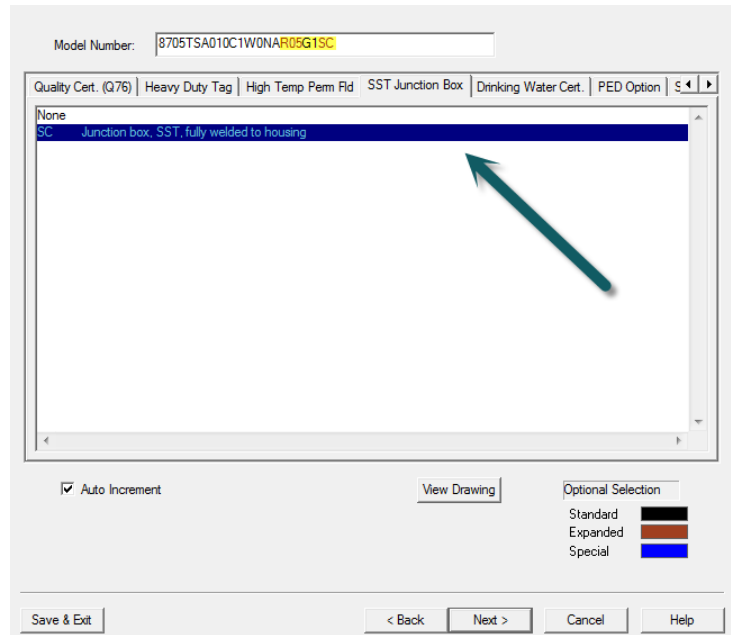


Step 3:

Under the SST Junction Box tab for the industrial sensor select the SC: Junction box, SST, fully welded to housing option to assure a more robust set-up with less vulnerability for leak points.

The Utility Sensor has an overall robust welded junction box design implemented into every flow sensor.

Industrial Sensor



Utility Sensor

**** (Standard with each flow sensor) ****

Step 4:

Under the special paint tab select the V1: Submersible Paint (Coal Tar) option is selected to assure extra resistance against corrosive agents when the wax-tape system is in place.

Industrial Sensor

Model Number: 8705TSA010C1W0NAR05G1SCV1

High Temp Perm Fld | SST Junction Box | Drinking Water Cert. | PED Option | **Special Paint** | CRN Approval | Fire Purr

None
V1 Submersible Paint (Coal Tar)
V2 Off-Shore (Three layer high build epoxy)

Auto Increment View Drawing

Optional Selection
Standard Expanded Special

Save & Exit < Back Next > Cancel Help

Utility Sensor

Model Number: 8750WA12ESR1A1FPPSA015CA1NAG1SAV1

Lining Protectors | Sunmersible | Calibration | Auxiliary Output | Q certs | **Submersible Paint** | Heavy Duty Tagging | US

None
V1 Submersible Paint

Auto Increment View Drawing

Optional Selection
Standard Expanded Special

Save & Exit < Back Next > Cancel Help

1.3.2 Pre-Burial Procedure

The following pre-burial procedure steps should be taken when applying an anticorrosion system and prepping a Rosemount 8700 magmeter flow sensor for direct burial. It is strongly recommended that the anti-corrosion system is applied by a specialist who has experience with corrosion protection methods.

Step 1:	Ensure the signal and coil drive cables are installed using IP68 approved conduit and conduit plugs (flexible conduit is preferred) provided by the contractor.
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Step 2:

Coat the entire sensor other than the flanges in either a high-temperature or wax tape primer.

Step 3:

Wrap the entire sensor other than the flanges with a wax-tape.

Ensure that cable glands at a minimum of at least 6" (153 mm) of cable are also covered.

After the initial wrapping go over all surface area firmly pressing the tape against the meter to remove air bubbles.

1.3.3 Burial Procedure

The following burial procedure steps should be taken when continuing to applying the anticorrosion system and directly burying the Rosemount 8700 magmeter flow sensor. It is strongly recommended that the anti-corrosion system is applied and buried by a specialist who has experience with corrosion protection methods.

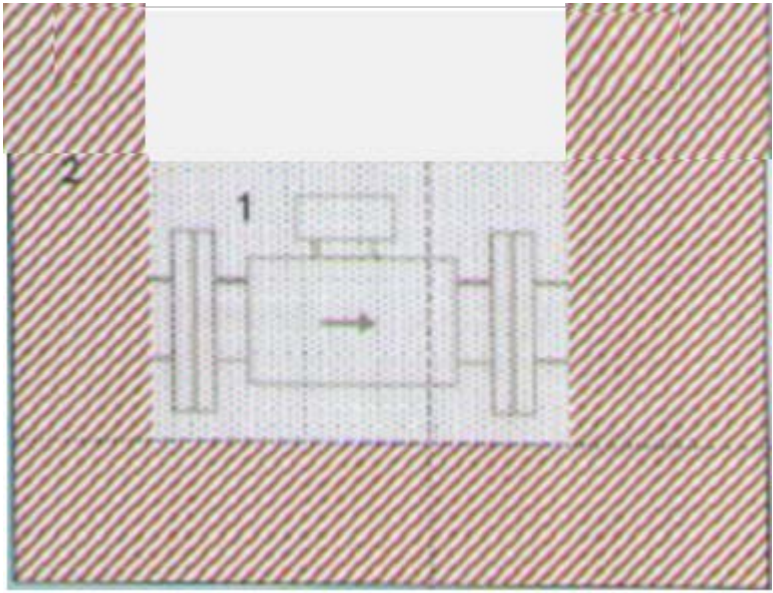
<p>Step 1:</p>	<p>Install the flow sensor beneath ground using Rosemount's Quick Installation Guide. Be sure that proper wiring and grounding procedures are followed.</p> <p>Also be sure to comply with all national and local electrical and seismic installation codes for direct burial.</p>
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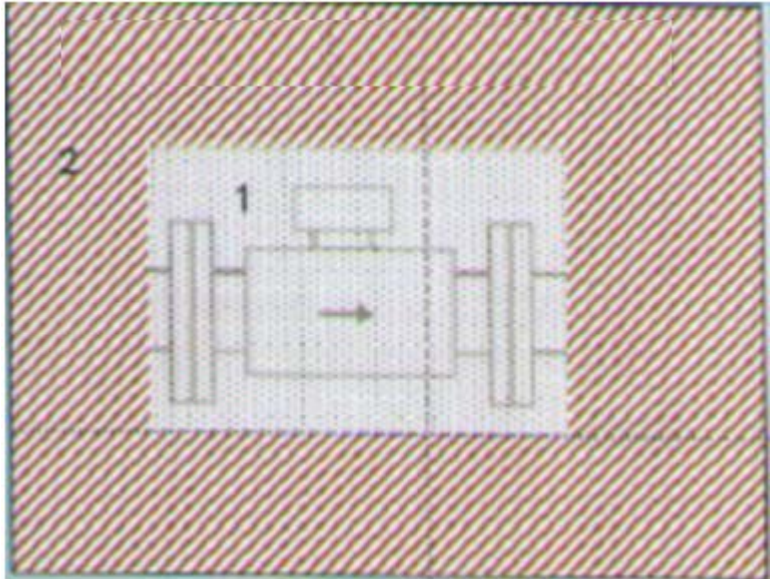
Step 2:

Cover the entire 8700 flow sensor (including the flanges) with a curing, polyester, plastic, or rubber outer wrap (3 layers).

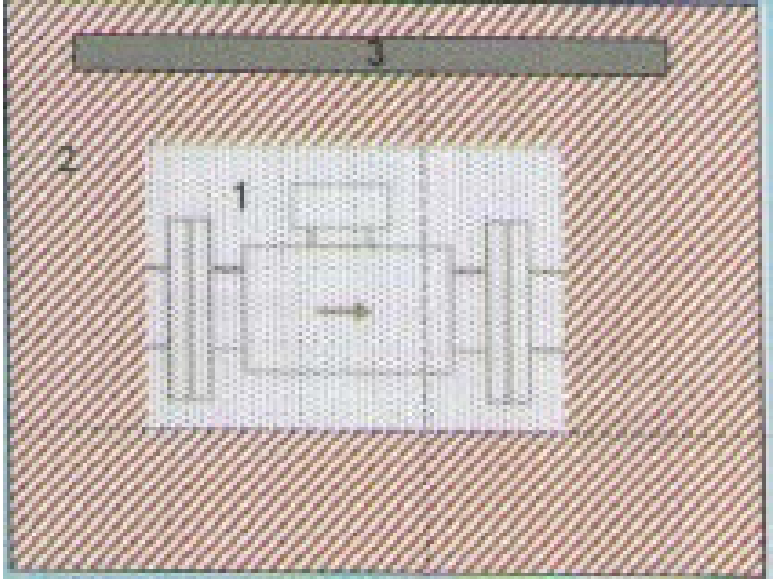
This will ensure additional mechanical protection against external mechanical forces, soil stress, and leaching soil.

<p>Step 3:</p>	<p>The complete area surrounding the wrapped sensor should be backfilled with pea gravel or sand [1] to a recommended minimum distance of 12" (305 mm) from any contact area of the sensor.</p>	 <p>The diagram illustrates a cross-section of a sensor installation. A central rectangular sensor is shown with a red arrow pointing to the right, indicating the direction of flow. The sensor is surrounded by a layer of backfill material, represented by a red and white diagonal hatched pattern. The backfill extends to a minimum distance of 12 inches (305 mm) from the sensor. The sensor is labeled with '1' and the backfill area is labeled with '2'. The top of the diagram shows a white rectangular area, likely representing the ground surface or a protective layer.</p>
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<p>Step 4:</p>	<p>Fill the rest of the surrounding dug out area with ground soil [2].</p>	
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<p>Step 5:</p>	<p>Place a concrete slab [3] directly above the installed sensor location. This slab will help absorb and distribute any large external forces from above caused by any activity or machinery.</p> <p>The concrete slab will also provide a point of reference to locate the sensor for future servicing.</p>	
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