

Best Practices for Lightning Protection of the Rosemount™ 2410 Tank Hub



1.0 Introduction

Lightning can cause high transient voltages and currents, which can damage electric components when discharging within the electric circuit.

This document provides recommendations on how to minimize the risk of damaging the Rosemount 2410 Tank Hub, in the event of lightning. By limiting and/or diverting potential transient voltages and currents, the tank hub can remain undamaged.

2.0 Install the tank hub at the foot of the tank

Lightning takes the path of least resistance to ground. Since air is a poor conductor of electricity, the lightning will choose to travel through a more conductive medium. Lightning is likely to strike the nearest (i.e. tallest) objects in the area, thus shortening the distance to travel through air.

By locating the tank hub at the foot of the tank, the path to the tank hub will be of higher resistance and the risk of a direct lightning strike to the tank hub is decreased.

3.0 Use shielded cables

Lightning strikes create strong electromagnetic fields in their vicinity, which might induce voltage surges. Even though voltage surges are less damaging than a direct lightning strike, they are likely to cause damage to electric components. Shielded cables can provide protection against voltage surges. A foil or a braided shielding grounded at one end of the cable run supplies an alternative path around the electric circuit.

4.0 Ground the cable shield at one end only

If the cable shield is grounded at both ends, and there is a potential difference between the two grounding points, a ground loop is generated. The ground loop works as an antenna and might pick up electromagnetic waves, causing disturbances. Good practice is to ground the cable shield at one end only. Then no potential difference will occur, and the risk of creating a ground loop is avoided.

5.0 Use proper grounding

A good ground connection is important when mitigating lightning damage. The ground connection should provide no or very low resistance, preferably less than 0.1 ohm. That will divert any stray current to ground instead of traveling through the electronic devices.

6.0 Install a transient protection device

Primary protection such as transient protection devices, also known as surge protectors, are designed to be installed close to the input terminals of the terminating equipment. Gas discharge tubes (GDTs) are commonly used for these purposes. GDTs are designed to create a low-resistance current-path when the voltage between two terminals exceeds a specific design limit (called “strike voltage” or “breakdown voltage”).

GDTs are excellent at conducting current, although they have a relatively long response time compared to other types of surge protectors. The GDT might let pulses of damaging voltage pass through before it is triggered and conducts properly. It is therefore advised to install a device with a shorter response time in cascade with a GDT, to add a delaying element. The silicon avalanche diode is an example of a transient protection device with a shorter response time. Although it cannot withstand the same amount of voltage as a GDT, its fast response will give the GDT enough time to be triggered.

These transient protection devices are examples and cannot provide complete protection by themselves. Installing an unsuitable combination of protection devices might lower the protection and can alter the function of the system and increase the damage from a surge. Make sure your specific system/site is evaluated by professionals before installing any primary protection devices. The system must comply with hazardous location certifications as well as national, local, and site specific regulations.

7.0 Use protection devices with sufficient safety rating

It is recommended to use explosion proof (Ex d) versions of protection devices for the relays, to decrease the risk of an ignition caused by the protection devices.

The relays are the parts of the tank hub that are the most exposed to damage from lightning strikes. Protection of the K1 and K2 relays should be prioritized, since they are connected directly to the Rosemount 2410 Tank Hub motherboard.

It is important to use a protection device with an equal or higher safety integrity level (SIL) when protecting a SIL relay, to keep the existing safety integrity level for the system. If a device with a lower level is used, the safety integrity level for the whole system will be reduced to the same level, or an even lower level.

8.0 Consult a lightning protection professional

A lightning protection professional can help to ensure that the design and number of grounding points are sufficient in the event of a lightning strike. A professional can also provide other services, such as lightning strike risk assessments, testing, and maintenance.

Global Headquarters and Europe Regional Office Tank Gauging

Emerson Automation Solutions

Box 150

(Visiting address: Layoutvägen 1)

SE-435 23 Mölnlycke

Sweden

+46 31 337 00 00

+46 31 25 30 22

Sales.RTG@Emerson.com

North America Regional Office Tank Gauging

Emerson Automation Solutions

6005 Rogerdale Road

Mail Stop NC 136

Houston, TX 77072, USA

+1 281 988 4000 or +1 800 722 2865

Sales.RTG.HOU@Emerson.com

Latin America Regional Office

Emerson Automation Solutions

1300 Concord Terrace, Suite 400

Sunrise, FL 33323, USA

+1 954 846 5030

+1 954 846 5121

RMTLAContactUS@Emerson.com

Asia Pacific Regional Office

Emerson Automation Solutions

1 Pandan Crescent

Singapore 128461

+65 6777 8211

+65 6777 0947

Specialist-OneLevel.RMT-AP@Emerson.com

Middle East and Africa Regional Office

Emerson Automation Solutions

Emerson FZE

P.O. Box 17033

Jebel Ali Free Zone - South 2

Dubai, United Arab Emirates

+971 4 8118100

+971 4 8865465

RTGMEA.Sales@Emerson.com



[Linkedin.com/company/Emerson-Automation-Solutions](https://www.linkedin.com/company/Emerson-Automation-Solutions)



[Twitter.com/Rosemount_News](https://twitter.com/Rosemount_News)



[Facebook.com/Rosemount](https://www.facebook.com/Rosemount)



[Youtube.com/user/RosemountMeasurement](https://www.youtube.com/user/RosemountMeasurement)



[Google.com/+RosemountMeasurement](https://www.google.com/+RosemountMeasurement)

Emerson Terms and Conditions of Sale are available upon request.
The Emerson logo is a trademark and service mark of Emerson Electric Co.
Rosemount is a mark of one of the Emerson family of companies. All other marks
are the property of their respective owners.
© 2018 Emerson. All rights reserved.