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Rosemount™ 2090 Pressure Transmitter

Safety Instrumented Systems (SIS) Requirements

1.0 Overview

The safety-critical output of the Rosemount 2090 Pressure Transmitter is provided through a two-wire, 4–20 mA signal representing pressure. The Rosemount 2090 safety certified pressure transmitter is certified to: Low Demand; Type B.

- SIL 2 for random integrity @ HFT=0
- SIL 3 for random integrity @ HFT=1
- SIL 3 for systematic integrity

1.1 Rosemount 2090 safety certified identification

All Rosemount 2090 transmitters must be identified as safety certified before installing into SIS systems. To identify a safety certified Rosemount 2090:

1. Check Namur Software Revision located on the metal device tag. “SW _._._”.

Namur Software Revision Number

SW[1] 1.0.x –1.4.x

1. NAMUR Software Revision: Located on the metal device tag

2. Verify that option code QT is included in the transmitter model code.

1.2 Installation in SIS applications

Installations are to be performed by qualified personnel. No special installation is required in addition to the standard installation practices outlined in this document. Always ensure a proper seal by installing the electronics housing cover(s) so that metal contacts metal.

Environmental and operational limits are available in “Specifications and Reference Data,” in the Reference Manual.

The loop should be designed so the terminal voltage does not drop below 10.5 Vdc when the transmitter output is set to 23 mA.

Position the security switch to the ( ) position to prevent accidental or deliberate change of configuration data during normal operation.

1.3 Configuring in SIS applications

Use any HART capable configuration tool to communicate with and verify configuration of the Rosemount 2090.

Note
Transmitter output is not safety-rated during the following: configuration changes, multidrop, and loop test. Alternative means should be used to ensure process safety during transmitter configuration and maintenance activities.

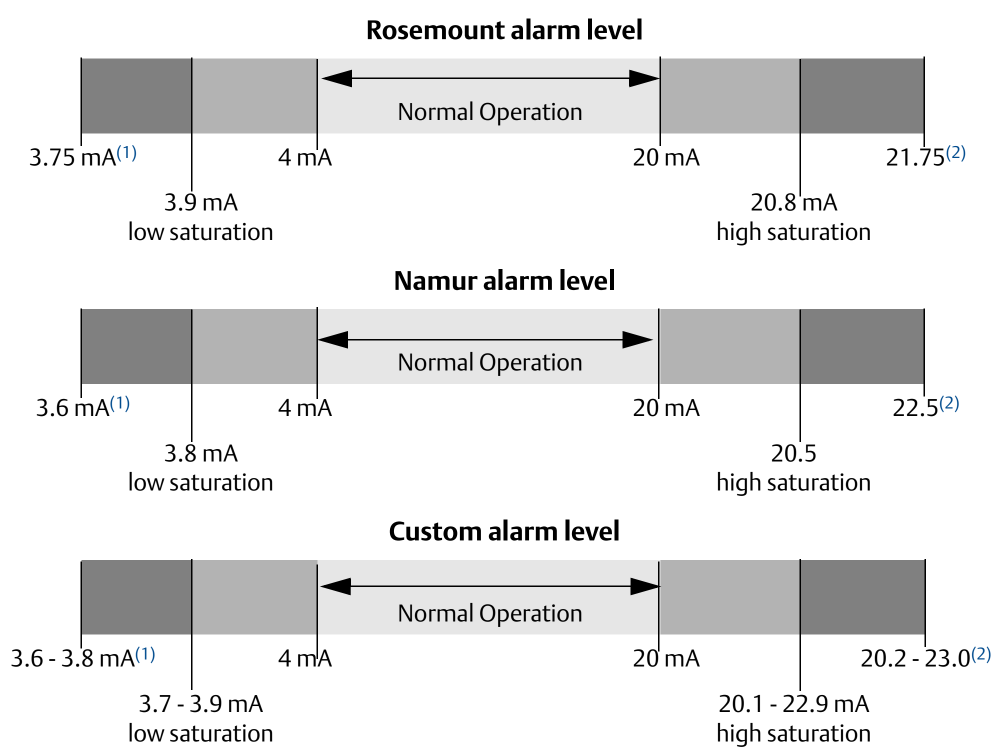
1.4 Damping

User-selected damping will affect the transmitters ability to respond to changes in the applied process. The *damping value + response time* must not exceed the loop requirements. See the Reference Manual.

1.5 Alarm and saturation levels

DCS or safety logic solver should be configured to match transmitter configuration. Figure 1-1 identifies the three alarm levels available and their operation values.

Figure 1-1. Alarm levels



1. Transmitter Failure, hardware or software alarm in LO position.

2. Transmitter Failure, hardware of software alarm in HI position.

2.0 SIS operation and maintenance

2.1 Proof test

The following proof tests are recommended. In the event that an error is found in the safety and functionality, proof test results and corrective actions taken can be documented at Emerson.com/Rosemount/SafetyWeb-Apps/Report-A-Failure.

All proof test procedures must be carried out by qualified personnel.

Use Field Communicator Menu Trees and Fast Keys to perform a Loop Test, Analog Output Trim, or Sensor Trim. Security switch should be in the ( ) position during proof test execution and repositioned in the ( ) position after execution. See Appendix D of the Reference Manual.

2.2 Partial proof test

The simple suggested proof test consists of a power cycle plus reasonability checks of the transmitter output. Reference the FMEDA Report for percent of possible DU failures in the device.

FMEDA report can be found at: Emerson.com/Rosemount/Safety-Products.

Required tools: Field Communicator and mA meter.

1. Bypass the safety function and take appropriate action to avoid a false trip.
2. Use HART® Communications to retrieve any diagnostics and take appropriate action.
3. Send a HART command to the transmitter to go to the high alarm current output and verify that the analog current reaches that value[(1)]. See Verifying alarm level in the Reference Manual.
4. Send a HART command to the transmitter to go to the low alarm current output and verify that the analog current reaches that value[(1)].
5. Remove the bypass and otherwise restore the normal operation.
6. Place the Security switch in the ( ) position.

2.3 Comprehensive proof test

The comprehensive proof test consists of performing the same steps as the simple suggested proof test but with a two point calibration of the pressure sensor in place of the reasonability check. Reference the FMEDA Report for percent of possible DU failures in the device.

Required tools: Field Communicator and pressure calibration equipment.

1. Bypass the safety function and take appropriate action to avoid a false trip.
2. Use HART communications to retrieve any diagnostics and take appropriate action.
3. Send a HART command to the transmitter to go to the high alarm current output and verify that the analog current reaches that value[1]. See Verifying alarm level, in the Reference Manual.
4. Send a HART command to the transmitter to go to the low alarm current output and verify that the analog current reaches that value [2].
5. Perform a two-point calibration check of the sensor (see Section 5: Trim the pressure signal in the Reference Manual) over the full working range and verify the current output at each point.
6. Remove the bypass and otherwise restore the normal operation.
7. Place the Security switch in the (🔒) position.

1. This test for possible quiescent current related failures.
2. This tests for compliance voltage problems such as a low loop power supply voltage or increased wiring distance. This also tests for other possible failures.

Note
- The user determines the proof test requirements for impulse piping.
- Automatic diagnostics are defined for the corrected percent DU: The tests performed internally by the device during runtime without requiring enabling or programming by the user.

2.4 Calculation of average probability of failure on demand (PFDAVG)

PFDAVG calculation can be found in the FMEDA report located at: Emerson.com/Rosemount/Safety-Products.

3.0 Inspection

3.1 Product repair

The Rosemount 2090 is not repairable and must be replaced in case of failure.

All failures detected by the transmitter diagnostics or by the proof-test must be reported. Feedback can be submitted electronically at Emerson.com/Rosemount/SafetyWeb-Apps/Report-A-Failure.

All product repair and part replacement should be performed by qualified personnel.

3.2 Rosemount 2090 SIS reference

The Rosemount 2090must be operated in accordance to the functional and performance specifications provided in Specifications and Reference Data in the Reference Manual.

3.3 Failure rate data

The FMEDA report includes failure rates and common cause Beta factor estimates. The report is available at Emerson.com/Rosemount/Safety-Products.

3.4 Failure values

Transmitter response time: Reference Appendix A: specifications and reference data in the Reference Manual.

Self-diagnostics test interval: At least once every 60 minutes

3.5 Product life

50 years - based on worst case component wear-out mechanisms - not based on wear-out of process wetted materials

Report any safety related product information at: Emerson.com/Rosemount/Safety-Web-Apps/Report-A-Failure

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