

Signaling Solutions for SIL requirements

Alarm and Warning Devices to Enhance the Safety of Operating Machinery and Industrial Processes



Standards and Regulations Relating to SIL

Process Hazards Analysis (PHA) is effective for determining whether a SIL should be assigned for critical systems. Criteria for such analysis can be found in written standards that address the safety measures for processes and machinery. These include:

ANSI/ISA 84.00.01-2004: "Application of Safety Instrumented Systems. (SIS) for Process Industries", International Society of Automation, Standards and Practices

IEC-61508: "Functional safety of electrical/electronic/programmable electronic safety-related systems", International Electrotechnical Commission, Technical Committee.

IEC-61511: "Functional safety - Safety instrumented systems for the process industry sector", International Electrotechnical Commission, Technical Committee.

29 CFR Part 1910.119: Process Safety Management of Highly Hazardous Chemicals, OSHA.

Purpose

SIL or Safety Integrity Level is the target statistical representation of the reliability of a Safety Instrumented System (SIS). In order to achieve the target SIL rating, all components of the SIS must realize the target SIL. To support the safety goals of machinery and processes that strive to comply with SIL, all risks must be adequately mitigated. Even after all possible design criteria and complementary safety barriers are considered, a risk gap may still remain for many circumstances. In such situations, a signaling solution will help narrow the risk gap.

Pfannenberg offers audible and visual signaling devices that are specifically designed to meet SIL 1 and SIL 2 requirements. Backed with documented statistical data, self monitoring, and fault reporting, these units eliminate the need for redundant devices.

Applications for SIL Signaling

Systems that require SIL signaling are generally divided into two application categories: machinery alarms and process alarms.

Machinery Alarm Systems:

- Startup Alarms
- Failure Alarms
- Muting Alarms (for situations where the safety barrier is temporarily disengaged such as for set-up or maintenance)

Process Alarm Systems

- Alarm systems for toxic gas leaks or chemical spills
- High pressure and temperature situations
- High voltage situations
- Chemical vapor recovery systems
- Natural gas pipeline, supply, and transport systems
- Hazardous substance handling

SIL signaling devices from Pfannenberg can help protect personnel from dangerous and life-threatening situations and narrow the risk gap associated with hazardous process systems and machinery.



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Typical SIL Applications

Machinery Start-up Alarm

Especially for large machines such as paper making machines and textile machines, or hazardous operating equipment such as laser cutting tools.

Mechanical or Process Failure Alarm

Trouble with machinery operation, jammed feedstock mechanisms, failed operator safety guards, inoperable overflow shut-off, ruptures & leaks, and problems with other plant-wide controlled processes.

Muting Alarm

Situations where safety barriers or other mechanisms are temporarily disengaged or "muted", often for setup, maintenance, or startup.

Toxic, Combustible, or Hazardous Gas Leaks and Chemical Spills

Evacuation alarm systems for electrochemical plants, oil refineries, pharmaceuticals production, and chemical production facilities.

Temperature and Pressure Control

Situations where controlled processes fail or exceed normal operating parameters and pose a safety risk.

High Voltages

Situations where personnel may be vulnerable to contact with dangerous electrical apparatus, such as an electric arc furnace or plasma cutter.

Chemical Vapor Recovery Systems

Situations where gas and vapor collection devices or ventilation systems fail, thereby posing danger to personnel.

Natural Gas Pipeline, Supply, and Transport Systems

Situations where there is risk of tank or pipeline rupture.



SIL Signaling-1011

Available SIL Products



Series DS 5-SIL / DS 10-SIL

Robust multi-tone sounder for audible alarm and warning, even in harsh environments. Excellent tonal amplitude and frequency range permits signals to penetrate walls and transmit over further distances, thereby reducing the number of sounders required for large area installations. Self-monitoring relay contact closure permits remote notification or system lockout in the event of malfunction.

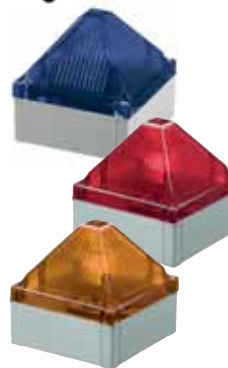
- Nominal 105 dB (A) or 110 dB (A) SPL
- Cast aluminium housing
- Robust, weatherproof construction: IP 66, IP 67
- 31 unique tones, 4 stages
- Versions for 24 VDC, 115 VAC, and 230 VAC



Series PMF 2015-SIL

High-visibility flashing xenon strobe beacon with either bracket mounting or direct surface mounting. Prismatic Fresnel lens provides the highest signaling effect for generating a visual impact which can span wide areas. Self-monitoring relay contact closure permits remote notification or system lockout in the event of malfunction.

- Up to 200 cd light intensity (clear lens)
- 10 Joules flash energy
- 60 flashes per minute
- Surface mount or bracket mount
- Weatherproof, IP 55 construction
- Offered in clear, amber, red, green, blue
- Versions for 24 VDC and 230 VAC



Series Quadro F12-SIL

High-visibility flashing xenon strobe beacon for direct mounting, particularly for machinery safety requirements. Strong, polycarbonate construction offers a high degree of impact resistance. Self-monitoring relay contact closure permits remote notification or system lockout in the event of malfunction.

- Up to 118 cd light intensity (clear lens)
- 10 Joules flash energy
- 60 flashes per minute
- Rugged, polycarbonate construction
- IK 08 rated impact survivability per EN 50102
- Flash tube secured by steel clamp for durability
- Weatherproof, IP 66, IP 67 construction
- Offered in clear, white, yellow amber, red, green, blue
- Versions for 24 VDC, 115 VAC, and 230 VAC

