

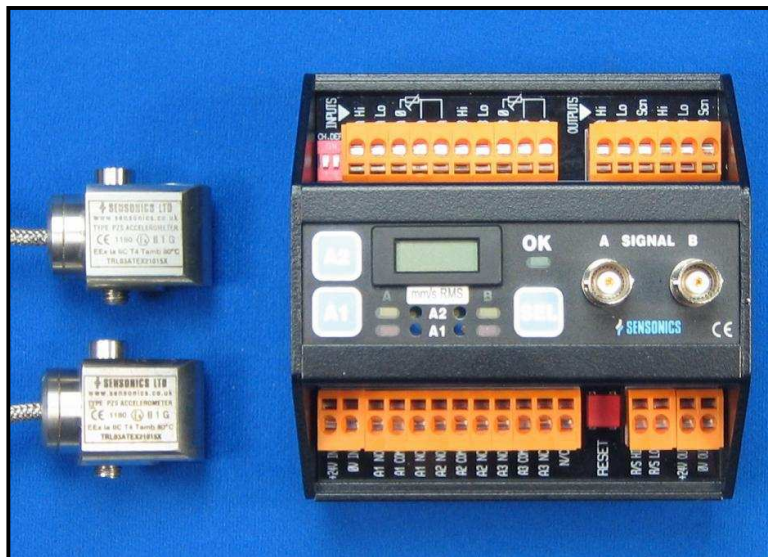
Sensonics Technical Note – DS1213

IEC 61508 Vibration Protection Systems for Centrifuges

One of the challenges facing centrifuge designers and end users is to ensure appropriate safe operations over the life of the equipment. BS.EN12547 defines the common safety requirements for centrifuge designs and compliance ensures appropriate legislation is met. However, the operational mode of the centrifuge can have a large effect on wear and fatigue of the rotating elements, particularly considering this can involve up to 50,000 stop / start cycles per year. An appropriate measurement and maintenance regime is required based on the operational scenario to maintain system integrity.

Vibration monitoring and protection is one of the key parameters to monitor and as with the other control systems must be a high integrity design to ensure failure of this process measurement does not present a safety risk. The IEC61508 international standard for functional safety can be applied to ensure sufficient integrity is designed in to the electrical / electronic systems employed for this function. This standard is being increasingly applied to the industry by the end users to ensure the legislative health and safety requirements are being met.

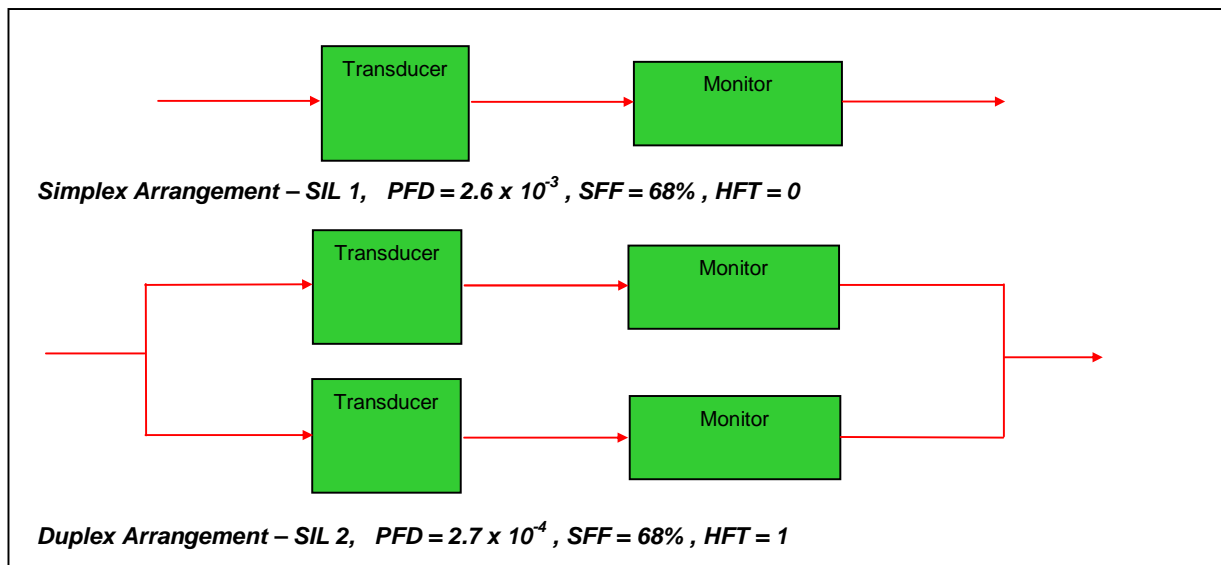
Sensonics for a number of years has been providing smart vibration protection systems for this industry and has recently enhanced the product range through the supply of SIL rated systems according to IEC61508. The DN2611 illustrated below is a dual channel monitor, ideal for centrifuge casing and bearing vibration monitoring. The unit offers dual level alarms (warning and danger) for each channel and provides a relay interface for alarms and vibration transducer integrity. Two levels of alarm permit one alarm to be used as an interlock during start up to prevent run up in the presence of excessive vibration, while the other can be utilised for shutdown in the event of failure during operation.



DN2611 Protection Monitor and PZS4 ATEX approved accelerometer

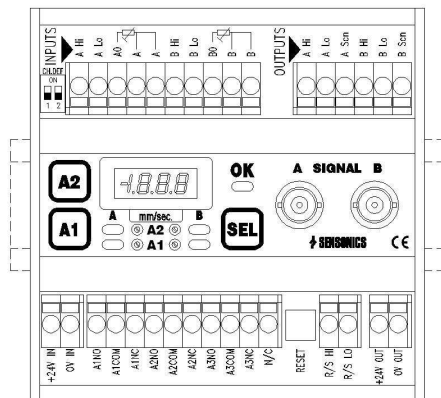
The DN2611 is DIN Rail mountable for ease of installation in to existing panels and operates from a +24V supply. Current loop outputs for each channel are provided for interfacing with a PLC for trending and further alarm monitoring. The transducer interface can be configured for operation with or without safety barriers.

Analysis of both the DN2611 monitor and PZS4 accelerometer to IEC61508 was carried out for both simplex and duplex arrangements. The simplex arrangement consisted of a single transducer driven from the monitor. The duplex configuration was two parallel channels with a logical OR decision on both alarm trip outputs.

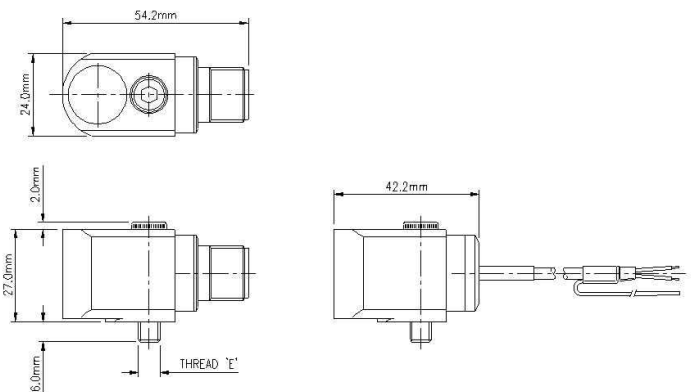


In a simplex configuration with no redundancy (HFT = 0) the accelerometer and monitor is suitable for SIL 1 applications. In a duplex configuration (HFT = 1) protection can be provided at SIL 2 levels. While the probability of failure to trip on demand for each configuration meets with the 61508 requirements, the spurious trip performance is also excellent. Therefore offering a high integrity protection solution with minimal downtime due to spurious events.

Please note with regards to meeting the requirements of IEC61508 it is key the necessary life cycle activities are put in place (i.e. periodic equipment maintenance), to ensure the system integrity is maintained. Contact Sonenics to discuss your specific application needs.



DN2611 Dual Channel Vibration Protection Monitor



PZS4 Accelerometer 100mV/g Intrinsicly Safe, ICP Type Interface

Sonenics are a leading supplier of turbine supervisory and high integrity protection equipment to industry. With nearly 30 years experience in providing vibration, displacement and speed instrumentation solutions in demanding environments, not only do they supply a full range of probes and API 670 compliant measuring and protection equipment, but also offer design through to installation & commissioning services.