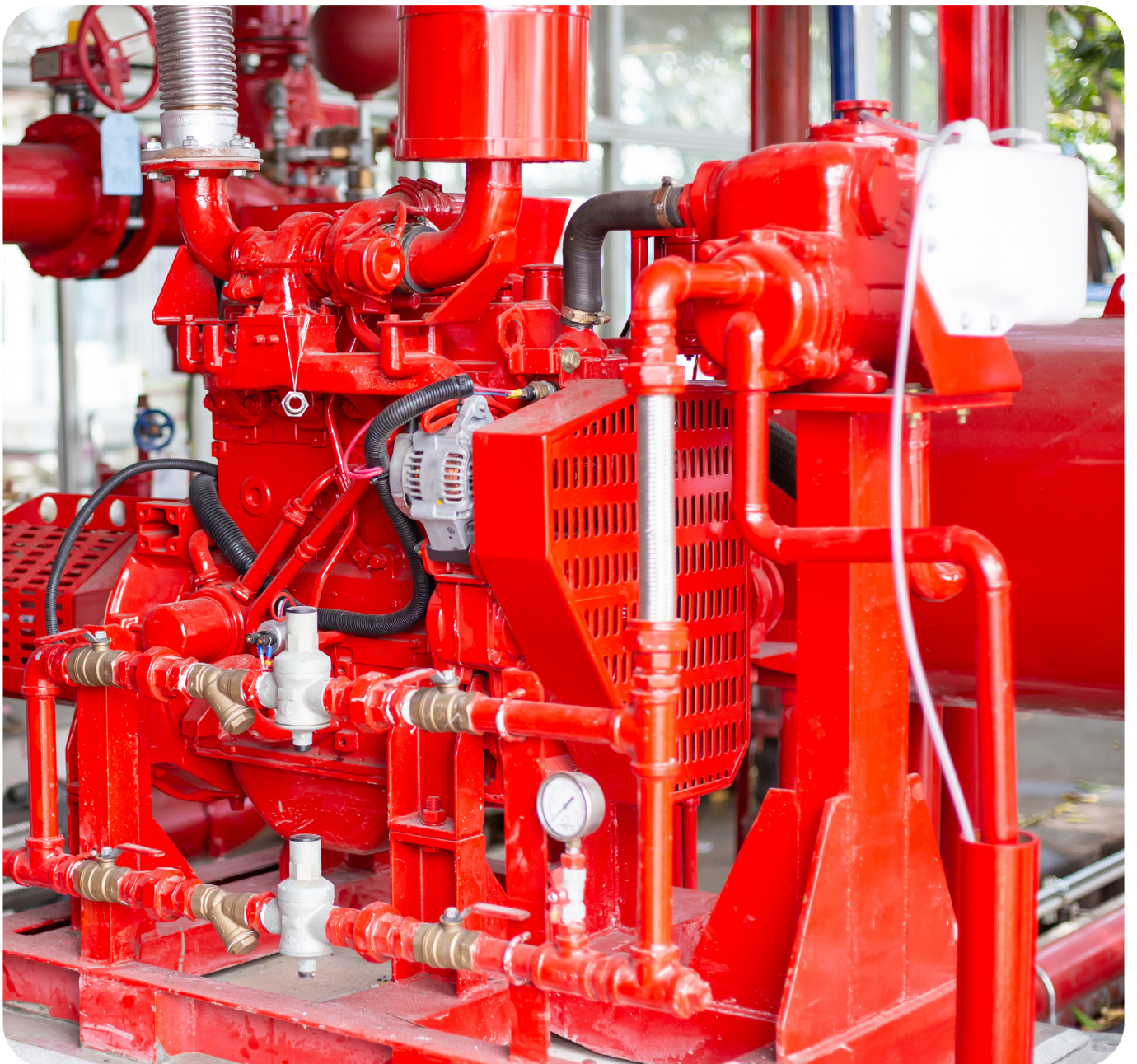


Real-Time Protection: Smarter Pressure Control for Safer Buildings



The most recent report by the National Fire Protection Association (NFPA) on sprinkler system performance in the United States stated that in fires where sprinklers were present, civilian fire death and injury rates were 90% and 32% lower, respectively, than reported fires in properties without automatic extinguishing systems. Firefighter injuries were 35% lower. Overall, sprinkler systems operated and were effective in 89% of the fires considered large enough to activate them¹. These statistics show on a small scale the importance of a well-functioning fire suppression system.

One of the key aspects of an effective fire suppression system is the fire pump. It ensures that buildings and facilities receive the water pressure needed to suppress fires. And where there's pressure, there's a need for a pressure sensor.

In this white paper, we'll examine:

- 1 The role of the pressure sensor in modern fire protection systems.
- 2 How selecting the right pressure sensor can improve the safety, reliability and compliance of a fire pump system.
- 3 How building owners, facility managers and system integrators can benefit from integrating the FM-specification tested DST P140 pressure sensors in their fire pump systems.



¹ <https://www.nfpa.org/news-blogs-and-articles/blogs/2021/11/22/the-biggest-problem-with-fire-sprinklers-not-enough-places-have-them>

The importance of pressure sensors

Once a sprinkler or suppression system is activated, the water pressure in the system drops. This prompts a response from the fire pump system, which ensures the sprinklers, hydrants and hose reels have the water pressure and flow they need during a fire.

A fire pump system typically includes a main fire pump, a jockey pump, controllers, valves and piping. When a sprinkler or hydrant is activated, the water pressure in the system drops. This drop in pressure automatically triggers the main fire pump. During normal conditions, the jockey pump maintains system pressure, compensating for small leaks or temperature-related drops in the system. It also prevents the main pump from starting unnecessarily.

Since having the right water pressure available when a fire breaks out is so critical, regulatory authorities and associations require that buildings have a reliable, fully monitored water pressure management system. This is where sensor technology comes into the frame.

Pressure sensors serve as the primary control and monitoring devices for both the jockey and main pumps, ensuring they perform reliably and enabling building managers and inspectors to run system diagnostics.

In the **jockey pump**, the pressure sensor:

- Sends real-time pressure data to the controller
- Enables precise start/stop control to maintain the set pressure.
- Allows for trend monitoring and predictive maintenance.

In the **main pump system**, the pressure sensor:

- Monitors pressure drops during fire events.
- Verifies that the pump is performing as it should.
- Supports integration with building management systems, providing alarm notifications and logging pump activity.

Additionally, sensors must be able to withstand harsh mechanical, electrical and environmental conditions, while consistently delivering accurate readings.

Given the risks associated with fire pump failure, choosing the right sensor is critical, both from an engineering and safety perspective. So, which sensor is the right choice for your project or building?

How the DST P140 pressure sensor ensures reliability, safety and compliance

The DST P140 pressure sensor offers premium MEMS technology along with excellent vibration stability and a high degree of EMC/EMI protection. The sensor is fully welded with precision engineered sealing, ensuring it remains hermetically protected. Stainless steel is used for all parts in contact with the

media, giving it excellent durability and making it a perfect fit for demanding water based applications such as fire protection systems.

Its extremely robust encapsulation ensures long-term stability against humidity and temperature variations.

Extensive testing of the DST P140 demonstrates that it:



Has a wide operating range supporting media temperatures from -40°C to 100°C and ambient temperatures from -40°C to 85°C



Proven durability with more than 10 million pressure cycles in 10–90% of FS



Reliable precision for consistent fire protection system pressure.



A stainless-steel media interface that ensures longevity in demanding industrial environments.



A compact size and versatile mounting options for easy integration



Water hammer and pressure spike resistance, which minimizes downtime and protects system components.





The DST P140 also includes an ARM-based microcontroller that enables advanced monitoring and troubleshooting. Features such as output clamping help ensure the signal stays within safe limits if pressure readings move outside the normal range, while a fault detection level clearly indicates sensor issues. These capabilities make it easier to identify problems early and maintain reliable operation. See the datasheet for full technical details.

The DST P140 has also passed the test according to FM specifications, a globally recognized, third-party certification for fire system components. This approval confirms that the sensor has been tested for reliability, performance and safety under fire protection conditions; that it complies with relevant fire protection standards, such as the NFPA 20; and that it is compatible with other FM-approved fire protection equipment.



The right choice for system integrators, facility managers and building owners

The DST P140's documented reliability, safety and accuracy offer considerable benefits for all stakeholders in fire protection system design, operation and maintenance.



System integrators get a pressure sensor designed for pump manufacturers that fits into modern fire pump assemblies and is certified to work with other FM-approved components.

Building owners get a fire pump system that meets regional and international fire codes and insurance requirements. The reduced maintenance needs and false alarms made possible by the remote diagnostic features also contribute to a lower total cost of ownership.

Facility managers benefit from a reduced risk of downtime or failure, due to the built-in diagnostics features. They can also perform proactive maintenance, remote monitoring and data-driven pump management, which can help them comply with local and national regulations related to periodic fire pump maintenance and inspections.





Conclusion

Fire pump systems are a mission-critical aspect of fire protection, helping to limit loss of life and property in buildings around the world. Pressure sensors play an invaluable role in these systems, ensuring water pressure is available when it's needed, and making sensor selection a vital engineering and safety decision. Extensive testing demonstrates that the DST P140 pressure sensor—tested according to FM specifications—represents a new benchmark in sensor reliability, safety and compliance for system designers, facility managers and building owners alike.

About Danfoss Sensing Solutions

With over 50 years of sensor technology experience, Danfoss is proud to support enhanced safety, operational excellence, and industry leadership with its solutions for fire pump systems. Through strong partnerships and solid application know-how, we combine engineering expertise with the latest digital technologies to develop smart, reliable temperature and pressure sensors for a wide range of industries. Learn more at sensors.danfoss.com.



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