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Rupture Disc Burst Sensors:

A Quick Guide

What are burst sensors, what do they do, and which type should you choose?

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WHAT ARE BURST SENSORS?

Rupture discs are one of the simplest and most reliable forms of overpressure protection. They are designed to burst open if the system pressure exceeds a defined limit, instantly relieve excess pressure and protecting personnel, equipment and the wider plant from catastrophic injury or damage. That reliability is one reason why rupture discs are widely used with or instead of pressure relief valves in industries ranging from chemicals and pharmaceuticals to energy, hydrogen, and food processing.

The “invisible disc” conundrum

However, there is a problem: How can you tell if a rupture disc has burst? In many installations, rupture discs sit inside holders, pipework, or vent lines with no external visual indication of their status. A process upset, an unexpected pressure drop, or a downstream alarm might tell you that something has happened, but it isn’t always easy to tell which disc has burst and where. In systems with multiple rupture discs, identifying the failed disc can quickly become guesswork.

Manually inspecting rupture discs is rarely practical. It often requires shutting down part or all of the process, removing the disc from its holder for a visual inspection, and then re-installing it if it turns out to be intact. However, re-installing a disc introduces new risks and is not generally recommended. Incorrect torque and gasket damage can lead to leakage, contamination, and then more downtime to replace the disc – and all for no gain if the disc if the disc had never burst in the first place.

Burst sensors: A simple, proven solution

To avoid headaches such as these, engineers often install a burst sensor with the rupture disc. A burst sensor provides immediate confirmation that a disc has activated. Most sensors can be wired into digital systems and send a signal to the control room, often pinpointing the exact location of the burst. Instead of a full plant shutdown, you can isolate and replace only the affected disc — saving time, labor, and money.

Standards and codes increasingly recognize this value. ASME Section XIII, the Pressure Equipment Directive (PED), and ISO guidance all emphasize correct installation, monitoring, and documentation of pressure relief devices. Burst sensors are a practical way to support compliance while improving operational efficiency.

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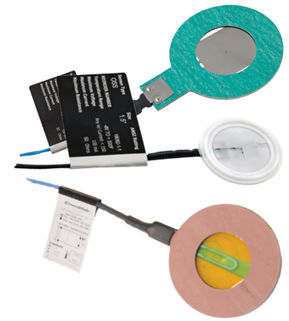
TYPES OF BURST SENSOR

There are three main types of burst sensor. Every manufacturer follows their own designs, but burst sensors generally fall into these three broad categories:

Membrane / Electrical Sensors

Membrane, or electrical, sensors contain a thin conductive membrane wired into an electrical alarm circuit. When the rupture disc bursts, the membrane ruptures at the same time, breaking the circuit. This triggers a signal to the control system for instant notification of burst. These sensors are compatible with a wide range of flange ratings and sanitary connections, and can often be retrofitted to many rupture disc types and brands.



As these sensors break upon activation, they must be replaced and rewired. Fragments of the ruptured membrane may clog pipework or downstream valves, making them unsuitable for some processes and media. In some designs, they may also be sensitive to back pressure: downstream pressure fluctations may break the membrane without rupturing the disc, resulting in a false alarm.

Reed Switch / Magnetic Sensors

Magnetic burst sensors offer a non-invasive, reusable burst detection solution that uses simple reed switch and magnet technology. The sensor fits into a holder tapping, with a magnet fitted to the rupture disc. In normal conditions, the magnet is positioned in close proximity to the reed switch in the sensor. When the disc bursts, the magnet arcs away from the sensor, giving an open-circuit signal. As the sensor is non-invasive, there is no risk of leak paths. It is also unaffected by back pressure, pressure fluctuations, or corrosion, which eliminates false alarms. Upon activation there is minimal risk of sensor fragments clogging pipework and there is no need for re-wiring after each activation.

The main limitation is compatibility. They require a disc and holder designed to accommodate the sensor, meaning they cannot always be retrofitted to existing installations without hardware changes.

Pressure Switches (or Pressure Transmitters)

Rather than monitoring the rupture disc directly, pressure switches (PS) or transmitters (PT) monitor pressure in the space downstream of the disc. When the disc bursts, downstream pressure changes trigger an alarm. PSs and PTs are widely used to automatically supervise and control systems as they provide real-time information with no need for manual inspection.

However, PTs and PSs need setting up correctly to interact with the control system, the readings can be affected by back pressure, and their overall accuracy depends on correct alarm configuration and system design.

WHICH TYPE OF SENSOR IS BEST?

Quick Comparison: Key Features

Feature	Membrane Sensor	Magnetic Sensor	Pressure Switch
Needs power	No	No	Depends on design
Integral junction head	No	Optional	Yes
Reusable	No	Yes	Yes
Rewiring after activation	Yes	No	No
Back pressure independent	No (unless special design)	Yes	No
PSV isolation / interspace monitoring	No	No	Yes (with setup)
Flow restriction	Negligible	Minimal	Negligible
Fragmentation risk	Possible	Designed for none	None
Disc compatibility	Broad, often retrofittable	Disc/holder specific	Requires gauge tap
Max temperature (typical)	Very high (up to ~800°C)	~150–300°C	Application dependent
Initial cost	$$	$	$$$
Operating cost	$$$	Nil	Nil

Each type of sensor has its own features and characteristics, and there is also some overlap between all of them. So how do you know which burst sensor to choose? The honest answer, and one most engineers will be familiar with, is: it depends.

For example, in a process operating at very high temperatures you might prefer a membrane sensor. However, if multiple discs are venting in a common header resulting in transient backpressure, a magnetic sensor could be a better option. Or if you wish to combine interspace monitoring with a burst alarm feature, for example when isolating a PSV, you may prefer a pressure switch that also offers backpressure monitoring.

Ultimately, burst sensors are a small addition to a rupture disc installation with a significant impact on safety, uptime, and compliance. Whether you choose a membrane sensor, magnetic sensor, or pressure switch, the right selection depends on your process conditions, regulatory obligations, and operational priorities.

Our Design Engineers are ready to help you learn how to select and install the most appropriate burst sensor in compliance with regulations.

Contact your local representative or Sales Manager for a no-cost, no-obligation consultation or site survey.

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