
expo
Technologies
Innovation
in hazardous
area motor
protection

Simplifying
Complexity.

Delivering
Safety.

With more than 70 years of experience and deep knowledge of hazardous area standards, Expo Technologies develops and delivers simple, robust, certified solutions that improve safety and save our customers time and cost.

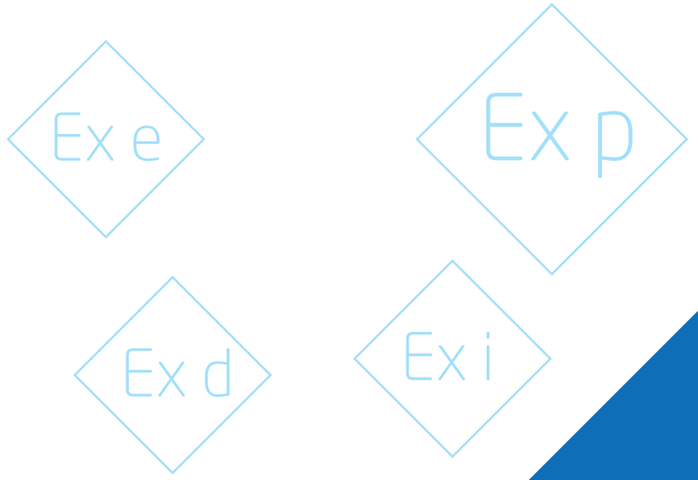
We work with end-users, integrators, and OEMs across a wide range of industries, including oil & gas, chemical & petrochemical, pharmaceutical & biotechnology, and power generation.

Expo has been working with motor and generator manufacturers for decades to solve their hazardous area problems by developing innovative solutions.

We were the first company to offer certified purge & pressurization systems specifically for large machines, and continue to innovate in areas such as pressure stability, with our CLAPS technology, and extremes of temperature, with certified systems for ultra-low temperature environments.

Our purge and pressurization systems are certified and approved to national and international standards (ATEX, CCC, cFMus, EAC, IECEx, KOSHA, INMETRO, PESO) and provide protection to more than 9,000 large electric motors and generators installed worldwide. Through our continued involvement with international standards committees, Expo is committed to remaining at the forefront of this important industry.

We have manufacturing centres in the UK, USA & China, and offer sales and service support through a global network of authorised channel partners.



Expo Technologies Vision

Creating a safer world through elegant design that systematically reduces complexity and risk.

Expo Technologies Mission

Our mission is to provide world-class, engineered solutions that deliver our clients' capabilities into hazardous and extreme environments. To continuously drive excellence through the development of our people and enhance our trusted position by projecting our expertise into new markets.

Electric motors & generators in hazardous areas

	Low (<1MW)	Medium (<10MW)	High (up to100MW)
Typical motor power			
Characteristics	High volume production. Standard units. Off the shelf.	Semi-custom modular motors for standard applications.	Custom build. Low volume production. Application specific.
Typical applications	Pumps, fans, blowers	Compressors, pumps, fans, blowers	Large pipeline compressors, LNG/IGCC plants
Construction	Cast iron	Cast iron/welded steel	Welded steel
Typical hazardous area protection	Explosion-proof / Flame-proof (Ex d) Increased safety (Ex e)	Increased safety (Ex e) Purge & Pressurization (Ex p)	Purge & Pressurization (Ex p)
Limitations	Casting size. Weight. Explosion test required.	Sparking risk & temperature limitations. Zone 1 / Div 1 certification difficult. May need **pre-start ventilation.**	Simpler certification. Must be fitted with certified **purge & pressurization system.**

Explosion-proof / Flame-proof (Ex d) – this method of construction is often used for small motors, but the technique becomes more expensive and less practical to implement as machines become larger, so other protection measures are required.

Increased Safety (Ex e) – Certification of larger / higher power machines is possible when designed to meet Increased Safety requirements, thus avoiding excessive casting weight and costs. These machines need special winding design and the installation of temperature monitoring. Ex e motors are required to be further assessed for possible air-gap sparking and may require additional measures, such as **pre-start ventilation** with air before start-up.

Purge & Pressurization (Ex p) - Alternatively, for large motors , provided that the leakage rate of the motor enclosure is not excessive, using a suitable purge & pressurization system will allow the motor to achieve (Ex p) certification after testing by a Notified Body.

Expo supports the world's largest installed base of hazardous area motors and generators

Around 9,000 large machines protected by Expo systems

Purge system flow rates from 1,500 to >20,000 Nl/min

Certified under 8 national & international schemes

Expo Technologies is the world leader in protection systems for large electric motors and generators. With the largest installed base of purge & pressurization and pre-start ventilation systems, we are a trusted partner to most of the world's leading manufacturers.

GE · ABB · SIEMENS · VEM · BHEL

TMEIC We drive industry · WEG · HYUNDAI · Nidec · WOLONG

Expo's systems have the widest range of certifications

ATEX · CCC · PESO · FM C US APPROVED

IEC · IECEx · EAC · KCs · INMETRO

Pre-Start Ventilation Core System Range

Expo system size & max. flow rate	Standard temperature -20°C to +60°C (4°F to 140°F)	Low temperature -60°C to +60°C (-76°F to 140°F)
Size 3: 1,500 Nl/min 53 ft³/min	3PV	3PV-LT
Size 5: 6,000 Nl/min 213 ft³/min	5PV	5PV-LT
Size 7: 14,000 Nl/min 498 ft³/min	7PV	7PV-LT

Purge & Pressurization Core System Range

Expo system size & max. flow rate	Standard temperature -20°C to +55°C (4°F to 131°F)	Low temperature -60°C to +55°C (-76°F to 131°F)	High temperature -20°C to +60°C (4°F to 140°F)
Size 3: 1,500 Nl/min 53 ft³/min	D818	D660	D670
Size 5: 6,000 Nl/min 213 ft³/min	D758	D760	D770
Size 7: 14,000 Nl/min 498 ft³/min	D808	D860	D870

Expo's pre-start ventilation systems are certified for use in Zone 1. They enable users to readily demonstrate compliance with standards, and greatly improve safety by eliminating any potentially flammable atmosphere from the machine enclosure before start-up, when the risk of sparking is at its highest.

Expo offers pre-start ventilation systems for the widest range of Ex e machines, with flow rates from 1,500 to 14,000 Nl/min.

System start-up can be initiated locally at the machine, or via a remote start option.

Expo's purge & pressurization systems are the preferred choice of leading motor and generator manufacturers. They enable machines to be certified for use in Zones 1/21 & 2/22, as well as North American Class I/II Div 1&2

All systems incorporate Expo's Closed Loop Automatic Pressurization System (CLAPS). This allows the system to detect any rise or fall of the enclosure's internal pressure and adjust the leakage compensation rate accordingly.

Pressure variations are more likely during the start-up of large machines, but can also be caused by changes in running speed and temperature. The CLAPS system will maintain a stable internal pressure within the enclosure and avoid unwanted alarms or trips.

Electrical outputs

Both pre-start ventilation and purge & pressurization systems use volt-free contacts inside an Ex e junction box as the default configuration. Intrinsically safe (IS) and Explosion-proof (Ex d) options are available if preferred, or where required to conform with local standards.

Innovation case study

Motor systems in extremely low-temperature environments

If the instrument air supply is too cold

Where the temperature of the incoming air cannot be maintained, not only is there a risk of damage to equipment, but, critically, the system might be operating outside of its certification limits.

Expo can provide users with additional security through a range of certified, in-line air heating units. These systems are specially designed for high flow applications and can be integrated into the overall motor purge installation.

Application

As oil & gas extraction has pushed into new, often more extreme environments, both the use and the protection of large motors starts to become problematic. A major motor OEM brought us just such a challenge to develop a motor purge system capable of operating in very low ambient temperatures.

Challenges

Very low ambient temperature plays havoc with electronic components such as LCDs and with the mechanical strengths of steels and plastics, leading to premature failure through reduced resistance to vibration and impact loading.

Purge & Pressurization (Ex p) standards expect the purge air to be between -20°C and +40°C and offer limited guidance on how to handle lower extremes. Most purge systems are certified for use between -20°C and +55°C.

Long exposed outlet piping from site air compressors often leads to the purge air becoming very cold, making a ‘black start’ very time-consuming, even with anti-condensation heaters inside the motor framework.

Solution & Outcome

Building on Expo’s proven purge systems and CLAPS technology, we developed a range of heated motor purge units that could push the ambient as low as -60°C.

Using Ex-certified heating components, high-efficiency insulation, and incorporating monitoring systems for critical temperatures, our low-temperature units have been successfully certified by a Notified Body, and are becoming industry standard for extreme temperature applications.

Application

As motor power increases, so generally the physical size increases, and hence the enclosure volume to be purged. A world-leading HV (High Voltage) motor manufacture had won a contract to provide a motor with sufficient power and torque to drive a very large reciprocating compressor used in plastics manufacture.

The increased motor size meant that the purge time would unacceptably long unless the throughput of the purge system could be significantly increased.

Challenges

To design a control unit that could provide both the exceptionally high purge flow and leakage compensation volumes, while maintaining tight pressure controls inside the motor during the various operating phases.

The specification was:

Purge Flow:	Up to 28,000 Nl/min, configurable in 1,000 Nl/min increments
Motor enclosure leakage:	Up to 5,000 Nl/min

Solution & Outcome

Although requiring double the flow rate of Expo's largest standard system, the main purge flow components were found to be capable of meeting the requirements. However, the purge outlet valve required an extensive redesign by Expo engineers to measure higher flow rates, as well as to deal with significantly higher flows under fault conditions - safely venting any excess compressed gas in the event of a failure mode, as required under the relevant standards. It was then necessary to update the ATEX & IECEx technical files for the product and submit to a Notified Body to obtain Zone 1 certification within the tight timescales required by the client.

Innovation case study

Motor systems for very high flow applications

If the instrument air supply is not clean enough

If the quality of the instrument air supply does not meet specification, there is a risk of long-term damage to the purge system and, potentially, the motor itself.

Expo can provide users with additional security through a range of high flow in-line filter units. Our packaged systems comprise a stainless-steel enclosure with two parallel filter lines. Each filter line can be isolated and blown down for maintenance or change-out while maintaining flow through the other line to ensure 100% purge system and motor uptime.

expo Technologies

Expo operates in more than 50 countries worldwide. To find out more about how Expo can help you solve your hazardous area problems, get in touch via our website **www.expoworldwide.com** or through your local channel partner.

Alternatively, speak to an applications engineer at one of our manufacturing centres.

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