

Enhancing Maintenance Efficiency and Safety with Expo Equipment

Introduction

The need for machines to run for longer periods with minimal to zero maintenance is a driving factor for many design improvements in the modern world. As AI and automated control loops become more prominent in industry to drive faster and more efficient production, the need for machines to run continuously without the need for maintenance becomes more vital as downtime is seen as a burden and inefficient.

Motor manufacturers are required to design motors for 5-year continuous running cycles, which means having to source critical components that can match or better that requirement. This task is more complex in hazardous areas as safety-critical systems, such as purge control systems, must be monitored regularly and maintained where necessary to preserve the integrity of the motor in the hazardous area.

Subject to local applicable laws and workplace safety guidelines, machinery that can be maintained under a "hot work permit" can use the Expo equipment described in this Application Note to implement safety measures and risk mitigation processes. By maintaining the pressure inside the enclosure and monitoring pressure with the sensors, the risk of flammable gas ingestion to the motor is significantly reduced. It allows for a greater scope of work or fewer additional safety measures while keeping the machines running and maintaining productive uptime.

Expo Solution

A combination of Expo products can be used together to support the purge system, to allow the replacement of critical components without the need for turning the pressurised motor off. This can be achieved by maintaining the pressure inside the motor with a separate isolated path of filtered air via the Expo LC Boost system. The path runs parallel to the purge system to supply a continuous flow of air into the motor, whilst air to the purge system can be isolated to permit maintenance. A manual override will need to be in place to continue power to the motor before isolating the air to the purge system. The supply to the motor via the parallel line can be controlled using a solenoid valve, connected to a DCS system or a manual switch. With the use of this by-pass, the critical components such as the filter, and pressure sensors inside the purge controller can be inspected and replaced if needed.

A separate Low Pressure Alarm System is required to monitor the pressure inside the motor during this maintenance schedule to ensure personnel are alerted if the pressure drops below the required minimum pressure. This system comprises three low-pressure sensors: one must be connected in the vicinity of the low pressure point of the purge system, whilst the other two sensors can be positioned at the discretion of the motor manufacturer.

When maintenance is required, the solenoid valve is switched to allow air to pass through the LC Boost unit, while the purge system is isolated by ball valves on the inlet and outlet. The operator can carry out the necessary inspections before allowing air to pass through the purge system again.

Furthermore, when equipment is situated in a Zone 2 environment, the solenoid valve can be programmed to switch on if a failure in the primary purge system is detected, ensuring that the motor remains pressurised via the by-pass, and allowing personnel to run diagnostics and correct the fault without the need to shut down the motor. Once resolved the purge system can be restarted.

The system will then need to complete the purge cycle and reach purge complete before switching off the air to the LC boost unit. In this case, the purge time can be reduced provided no flammable gases have been detected during the maintenance.

If the purge time is reduced, it must be reset to the original value once maintenance is complete.

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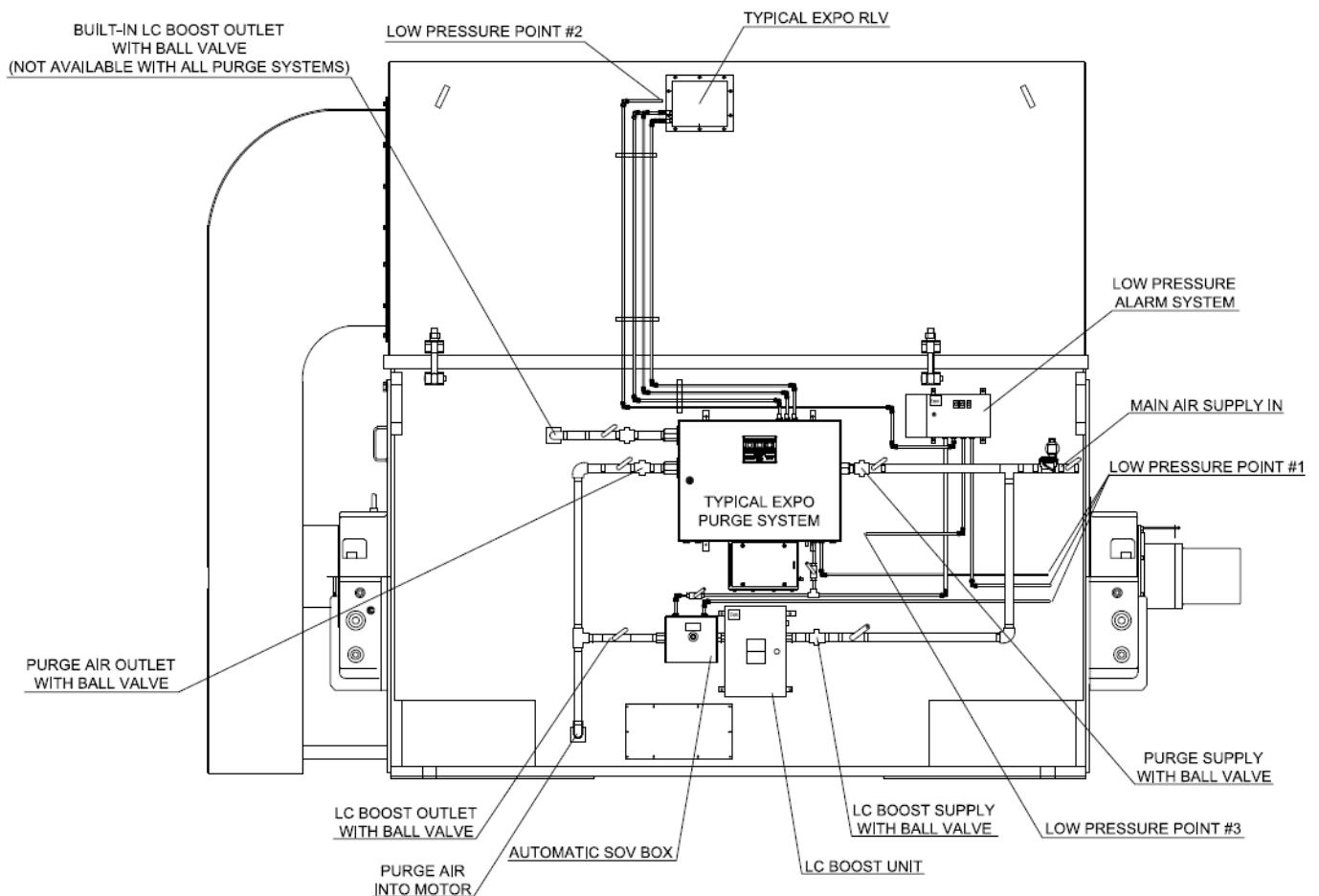
Hazardous Area considerations

- Certification: Suitable for ATEX/IECEEx: Zone 2; NEC Class1 Division 2
- The installer/user shall ensure that all equipment is included in the motor assembly certificate and complies with local applicable laws and workplace safety guidelines
- Expo is not the applicant of the motor certificate

Required Equipment

- Purge Controller
- Boost Air Control Unit
- Low Pressure Alarm System
- Automatic SOV Box

System Schematic



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