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Why a commercial UPS should never be used in an industrial application

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Many process industries often create harsh environments due to various factors. These include mechanical vibration and chemical vapour contamination. The latter results in corrosion, high levels of dust (which can be corrosive and/or conductive) and vermin ingress (rodents, reptiles, insects). Other factors are temperature extremes (both high and low), condensing humidity and reciprocating tilting actions (such as onboard a ship or an oil rig), among other onerous conditions.

In applications with harsh environments, an industrial UPS should be the automatic choice due to higher safety levels, less risk of expensive downtime due to power failures, a longer lifespan and reduced servicing costs. All industrial processes are controlled by automation and control systems (SCADA/DCS/PLC), field instrumentation, MCCs, VSDs, actuators and field communication systems, all of which require perfect control power. To ensure continuous, safe operation of production processes in harsh environments, as well as emergency shutdown of potentially dangerous processes, it is always critical that the power supply to these systems is continuous.

**Safety-critical systems**

Situations where human life could be threatened (eg. disaster warnings, evacuation warnings, rail signalling, emergency lighting) require absolute security of electrical power for their operation.

Furthermore, safety-critical systems such as signalling (rail), emergency evacuation warnings, fire warnings and emergency evacuation lighting cannot fail under any circumstance due to the possibility of injury and/or loss of life, as well as massive financial losses due to extensive plant damage and loss of production.

**Expected lifespan**

In a ‘controlled’ or ‘normal’ environment, the design life of a commercial UPS is typically ten years. An industrial UPS is designed to last a minimum of 15 years, while operating at high loads and in harsh conditions.

**What are the implications of using an incorrect UPS for an application?**

A commercial UPS is designed to operate in less aggressive environments – that is, temperature-controlled and free of dust, vibration, corrosion and vermin. Due to this, UPS designers can set the internal components of a commercial UPS to operate closer to their design limits. This assists in reducing the cost of manufacture.

The expected lifespan of internal components in a commercial UPS installed in a harsh environment is likely to be far shorter than that of a UPS designed for industrial applications. The results of using a commercial UPS design in an industrial process could therefore result in premature, unplanned failure of the UPS, leading to costly downtime, loss of production and possible damage to equipment, which could concurrently give rise to unsafe/unstable conditions.

**Possible risk implications**

There are a number of risks associated with using an incorrectly rated or designed UPS that may not be able to cope with the stresses under which it is expected to function. Commercial UPS designs are not expected to perform under the same environmental conditions that an industrial designed unit will.

ABB has 13 different UPS families designed for all global standards, from 1kVA to 5MW (LV) and 11kV, 2.25MVA UPS blocks, which can be paralleled for capacity up to the utility supply capacity. Of these, three families are specifically intended for industrial applications in the IEC market, namely the ABB PowerLine DPA, the ABB PCS100 UPSi and the PCS120 MV UPS.

By engaging with our customers and our partner network, ABB can assist with designing a solution to ensure technical compliance that is relevant to the environmental conditions under which the UPS is expected to operate. In addition, factory trained and certified UPS technicians means that ABB can effectively service the global installed UPS base.

**Main features of a commercial UPS**

* Applications are data centres in banks, offices, airports and central train stations
* The interruption of AC power may disrupt data processing and telecoms, but does not present an inherent risk of injury to people or property damage
* Aimed at business continuity and data protection
* Key attributes for control room and data centre infrastructure are energy efficiency, power expansion capability, optimised footprint, optimised cooling system, standardised power blocks and N+1 redundancy, remote control and monitoring
* Manufacturing process order: Configure to order

**Main features of an industrial UPS**

* Applications are digital automation and control systems, instrumentation, communication and electronic devices in manufacturing, transportation and utilities
* The interruption of AC power may result in the loss of finished products or hundreds of person hours to reset production equipment
* Aimed at 24/7 operation and personnel and operational safety
* Key attributes for manufacturing plants and industrial control rooms are continuous operation, parallel redundant operation, galvanic isolation, system degree of protection, short-circuit and overload capability, safety, fire protection, integration into the electrical control system
* Manufacturing process order: Engineered per order/configure to order + customisations

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