



Technical Notes

Mission Critical

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MISSION CRITICAL

What is implied when a piece of equipment, process or design is classified Mission Critical?

The answer for this question will differ for each and every organization or business, because it first has to be determined what the mission of the particular organisation or business is.

Strange as it may seem, it is unfortunately true that many businesses cannot adequately define what business they are in, and whilst it may seem sufficient to state that something is 'Mission Critical' if it will cost the business loss of profit or cash flow or reputational damage, the fact is each and every organisation must first know what their mission is and ensure that the crucial aspects of the systems they operate, the designs they employ, the equipment they choose and the procedures they use will ultimately meet their stated mission.

So if we accept that a business does actually know what business they are in (other than the obvious 'making money', or not for profit involvement in 'saving lives' etc) and can differentiate between what aspects of their systems, designs, equipment and procedures are significant, important or mission critical then that business is well placed to undertake a ground up approach to ensuring that those aspects which are truly mission critical are adequately designed and implemented at every level and integrated throughout the structure.

For example, a kitchen exhaust system may not be mission critical to a small family run country restaurant where some cross flow ventilation can be achieved by opening a few kitchen windows if the range hood

exhaust fan fails. It would be a different story in a large multinational fast food restaurant if the kitchen exhaust fan fails and the cooking fumes and smoke fills the restaurant! They would fail to meet their mission by being unable to deliver until the problem was rectified.

Now think about elegant fine dining restaurants. When customers are paying for these levels of excellence it does not cut the mustard if some kitchen fumes invade the dining area. This is mission critical and would hopefully have multiple exhaust systems in place, but nevertheless the business would be smart to have adequate back up measures in place to care of such an event.

Likewise an older office building with small windows that tenants can open in the event of an air conditioning failure – this may not be mission critical, as the solar gain on smaller windows is nowhere near as significant as modern walls of glass which cannot be opened when the air conditioning fails.

It's not rocket science, to take care of such mission critical events the design should incorporate back up equipment and procedures to take care of such probabilities.

Naturally cost considerations need to be taken into account. It may be acceptable to be without comfort conditions in your office for a relatively short period of time whilst repairs are carried out, rather than have a costly level of redundancy designed into the equipment.

If you are operating a CBD A-grade building with its associated cost of rental, your tenants may find the discomfort caused by plant failure totally unacceptable. In which case this is mission critical and should be supported by appropriate design, equipment redundancy and procedures in place to mitigate such possibilities.

On the other hand, some applications such as fire and safety are by implication Mission Critical – whether they contribute to your bottom line or not. They simply must work reliably and continue to operate under adverse conditions.

Smoke spill, floor pressurisation, and fire stair pressurisation are all very important life saving applications closely associated with variable speed drives and consequently serious consideration needs to be given to protecting their integrity with solid proven environmental protection against ingress of dust and water and the appropriate Australian Standard ASI668.

To meet the reliability implied by ASI668 we recommend VSD drive enclosure protection against ingress of dust and water to IP66 in compliance with AS60529-2004.

For more information on Dust and Water protection and Australian Standards IP ratings please see our *Technical Note: What are IP Ratings?*

For example, if an intelligently and adequately designed mission critical multiple pump system with built in redundancy and backup is to be redesigned to utilise variable speed system process control it follows that to continue to meet the mission critical aspects of the system design that the duty pump, the stand-by pump and the backup maintenance pump (a common arrangement for public water supply utilities) should all have VSDs fitted.

It will not deliver on mission criticality if only one VSD is employed and switched between the three pumps. It would be foolish to think that only pumps fail – in this case if mission critical backup is required then that also applies to the VSDs, the associated switchgear and the control system.

You may be surprised to learn how often only one VSD would be installed in such circumstances if the decision is left to others purely on a cost basis. If it's mission critical to your business make sure it stays that way!

An equipment supplier cannot know the intricacies of your business plan and what is or is not mission critical. And don't think that others will know what is best for you or act in your best interests. Think of Fukushima. One would like to think that nuclear facilities would take number one priority when it comes to determining that the crucial aspects of the systems, the design, equipment selected and the procedures used would ultimately meet the mission of reliable power generation and most importantly the ultimate safety of people and their environment.

Sadly this proved not to be the case, so if you truly believe that you have a mission critical application make sure you have your contingencies in place, either by built in backup or a proven plan B such as clearing the smoke from the kitchen by opening a few windows.

The key word here is proven, that means you have tried it before and know in advance that it works. Other contingencies may include bypassing VSDs if there has been a failure but again make sure you know what you want to achieve and that such action will deliver the desired outcome and indeed that it is systemically possible to achieve. If so test it and prove it. See our *Technical Note: VSD Bypass* for more information.

The Bottom Line

If your existing arrangements are already inadequate and incapable of meeting mission critical outcomes then adding complexity or variable speed drives will not improve the situation.

It is the obligation of the designer and system integrator to ensure that the design, the equipment selection and the procedures are adequate to deliver a satisfactory mission critical result. It is your job to make sure they know what is required.

Got some questions, or is this troubling you then send us an email or call our engineers to discuss.

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