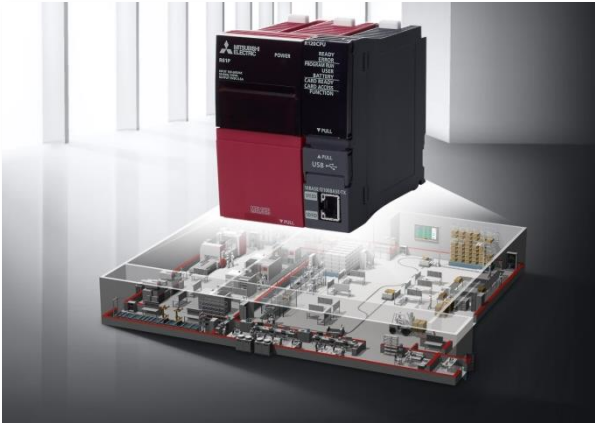


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indestructible and sometimes seem to go on forever.

Most industrial machinery is controlled by a PLC or similar controller (often forming a node within a larger control system). These can do their job so well for so long that they end up being all but forgotten by the plant engineers, who may then be taken unawares when the PLC does finally go wrong. This is a particularly relevant issue for us as Mitsubishi Electric makes extremely reliable products.

It is not unreasonable for controllers to eventually develop a fault – for example in a PSU (power supply unit) or CPU (central processor unit) or a mechanical issue with a relay output card. What happens if it does stop: there are a multitude of things to consider.

Generation Game

One of the principles regularly quoted by plant engineers is: 'If it ain't broke, don't fix it'. This isn't always appropriate but when it is, it can relate to machinery that has delivered over 10, 20 or even 30 years with almost total reliability. The question is, what happens when the equipment's age becomes an issue in itself?

Jeremy Shinton of Mitsubishi Electric shares his experience of managing obsolescence and maintaining, updating and replacing tried and trusted hardware in the field of automation technology.

Many manufacturing and processing companies have some production machinery that has been in service for a generation or more. In some cases, the machinery will have had little more than basic maintenance, such as lubrication and replacement of wearing mechanical parts. In other cases there will have been periodic refurbishments and upgrades or even – occasionally – repurposing to a different task.

Older machinery may also have had its motors rewound or replaced. When motors are replaced it is often with modern more energy efficient ones or may include the introduction of variable speed electric drives to improve efficiency and enhance the machine's performance capabilities.

However, when it comes to the machine's control system - slightly different dynamics come into play. Mechanical relays and switches may have worn out or been broken and been replaced. Solid state electronics however can appear to be virtually

- How much does it cost per hour while the repair is being done?
- Once fixed do you just forget about it until the next time?
- Would you be better off replacing the whole controller with a new one and if so should you go for a like-for-like swap out or upgrade to a state of the art control unit?
- If you upgrade, does this affect other parts of the control system and thus lead to more work and expense?

Some manufacturers of PLCs are not good at backwards compatibility, so if you replace a unit that is say five years old, you will probably also have to re-engineer other parts of the control system as well. However, other PLC manufacturers - perhaps most notably Mitsubishi Electric - pride themselves on maintaining continuity with each new generation of controller.

So for instance; Mitsubishi Electric A- and Q-series controllers manufactured back in the 1980s could be directly swapped out for today's model PLCs at any time. Furthermore they were supported in terms of spares, user manuals, software etc all the way up to 2012 (basically over a generation). Post-1980s Mitsubishi Electric controllers are still being supported. This is part of a cherished Mitsubishi Electric philosophy, in which customer support is focussed on maintaining clients' production rather than generating product sales.



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Options

Eventually there will come a time when clients decide to upgrade a controller. It is the clients' choice if this is after a couple of years or a couple of decades, Mitsubishi Electric will support them whatever their decision and the goal is to make it as simple as possible.

Unlike other manufacturers who force customers to effectively "start again", Mitsubishi Electric has a range of options that let you take a staged approach to implementing the upgrade. Mitsubishi Electric has adopted a plug and play methodology to upgrading, which allows its customers to replace their system in stages, at a time and to a schedule that is most convenient to them.

To facilitate this, new parts are always sized and shaped so that they can fit into the space vacated by the old ones and reuse the existing fittings. This allows the parts to be swapped with the minimum expenditure of time and effort and means that any system, no matter how complex can be renewed one part at a time if necessary. Thus it is always possible to upgrade a system in a timeframe without disruption to production - even if the plant runs 24 hours a day six and a half days a week, in which case the project will be executed in small steps, each sized to be achievable in the small time slots available.

Plants with limited shutdown periods can utilise this upgrade method. The project can be done in simple stages, therefore minimising plant downtime for the changeover. It also means that should unforeseen difficulties arise the plant can quickly be reverted back to its original state and production restarted on schedule, giving the project team time to resolve the problems.

Many plant engineers will worry about rewiring. It is a task that can be both disruptive and time consuming, so alternative solutions are always attractive options. Again part of Mitsubishi Electric's plug and play approach extends to the wiring. More often than not, the existing wiring can stay in place and adaptor plugs can be used to convert the old style wiring connector to the new style format. This means that little or no rewiring is required which eliminates the potential for mistakes during the upgrade, and it can also be done in the minimum of time.

Finally, software support for legacy equipment is

something that Mitsubishi Electric has developed into a fine art, so that it is possible to take code from a 30 year old PLC and transfer it to the latest technology. Software support tools and utilities are available free of charge and full reports for any function changes are identified.

Cost

There are few industrial projects where the first questions are not about costs and disruption to production! With Mitsubishi Electric's thorough backwards compatibility, the cost of change is minimal – certainly when compared to having to start all over again. In fact many Mitsubishi Electric customers use this system to progressively upgrade their control systems and processes one step at a time, with minimum fuss and the confidence that they will be supported for years to come.

Unsurprisingly, additional benefits often accrue while upgrading control equipment. Probably the most significant of these is the opportunity to add new communication technologies, such as fieldbus, Industrial Ethernet and Internet connections to existing systems. Upgraded systems with improved communications allow users to take advantage of getting much more information from the plant and ensuring it is running at its optimal performance.

There are many other benefits to replacing a 20-30 year old PLC with a modern state of the art alternative. For instance the latest Mitsubishi Electric PLCs offer data-logging capabilities, which could help with compliance and legislation. They also allow easy connectivity to databases for recipe and historian transactions, making manufacturing processes more transparent.

The greater diagnostic options built into today's controllers mean reduction of downtime while their increased programming capacity enables machinery enhancements which could lead to an increase in productivity. Other benefits include upgrading to the latest programming software, supported by the latest operating systems; a greater range of I/O modules which could give additional scope to the machine and enhanced options for networking with wider control systems.

With the Mitsubishi Electric maximum compatibility approach there is the ongoing assurance that the system will be reliable and fully supported in the



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future, with spares and support for the system secured for decades to come.

About Mitsubishi Electric

With over 90 years of experience in providing reliable, high-quality products to both corporate clients and general consumers all over the world, Mitsubishi Electric Corporation is a recognized world leader in the manufacture, marketing and sales of electrical and electronic equipment used in information processing and communications, space development and satellite communications, consumer electronics, industrial technology, as well as in products for the energy sector, water and waste water, transportation and building equipment.

With around 124.000 employees the company recorded consolidated group sales of 39.3 billion US Dollar* in the fiscal year ended March 31, 2014.

Our sales offices, research & development centres and manufacturing plants are located in over 30 countries.

Mitsubishi Electric Europe, Industrial Automation – UK Branch is located in Hatfield, United Kingdom. It is a part of the European Factory Automation Business Group based in Ratingen, Germany which in turn is part of Mitsubishi Electric Europe B.V., a wholly owned subsidiary of Mitsubishi Electric Corporation, Japan.

The role of Industrial Automation – UK Branch is to manage sales, service and support across its network of local branches and distributors throughout United Kingdom.

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