

# DeltaV™ Controller Redundancy



A redundant DeltaV™ M-series or S-series or controller protects your critical process from unexpected shutdowns

- Uninterrupted control operation
- Online upgradeable
- Automatic commissioning
- Bumpless transition

## Introduction

Now you don't have to worry about a controller hardware failure interrupting your process and causing costly downtime. Using a redundant controller, your process is automatically protected in case of a hardware failure.

When an active controller fails, the standby controller takes over, providing uninterrupted control operation without initialization or user intervention. The switchover generates no *disturbances* to the field output signals; the process continues as though nothing had happened. No special cabling is required to add redundancy. Simply add a controller.

Redundant controllers also support the online upgrade of controller firmware. Redundant controllers can also be physically replaced online when a hardware upgrade is desired. You can therefore upgrade your MD Plus to an MQ or MX or your SD Plus to an SQ or SX controller on line, with no configuration changes.

## Benefits

**Uninterrupted control operation.** Using the capabilities of the, MQ, MX, , SQ and SX Controllers, you can establish a “safety net” to protect your process from unexpected controller failures by installing redundant controllers. The standby controller stands ready to maintain control and maintain process uptime in the face of hardware failures.

**Online Upgradeable.** Installing redundant DeltaV controllers enables you to perform online upgrades to your DeltaV system. New firmware can be installed in the standby controller during system upgrades. Once upgraded, the Standby unit automatically goes configured and available, allowing a switchover to the new firmware without disrupting the process. The original active controller can then be upgraded. In addition, MQ can be upgraded online to an MX or your SQ can be upgraded online to an SX controller if the control strategy load grows beyond what the original hardware is able to handle.

**Automatic commissioning.** The system automatically detects, commissions, and downloads a standby controller so you can safely replace a unit in the field. Redundancy can be added on line by simply installing a new 2-wide backplane, system power supply and new, MQ, MX or SQ or SX controller on it.



The SZ controller carrier or the Dual Universal Safety Carrier provides 2 slots for SZ controllers, so there is nothing other to add than just the controller. The engineering database will be automatically updated. Simply assign the controller redundancy license and download to activate the standby controller.

There are no dip-switches, jumpers or addresses to assign. The standby controller is automatically assigned the associated standby address and begins working, protecting your process.

**Bumpless transition.** DeltaV controllers are designed for a bumpless transfer of control from the active controller to the standby, as it transition to the active role. During this time, output channels hold their output states until the switchover is complete and control modules begin executing. The control

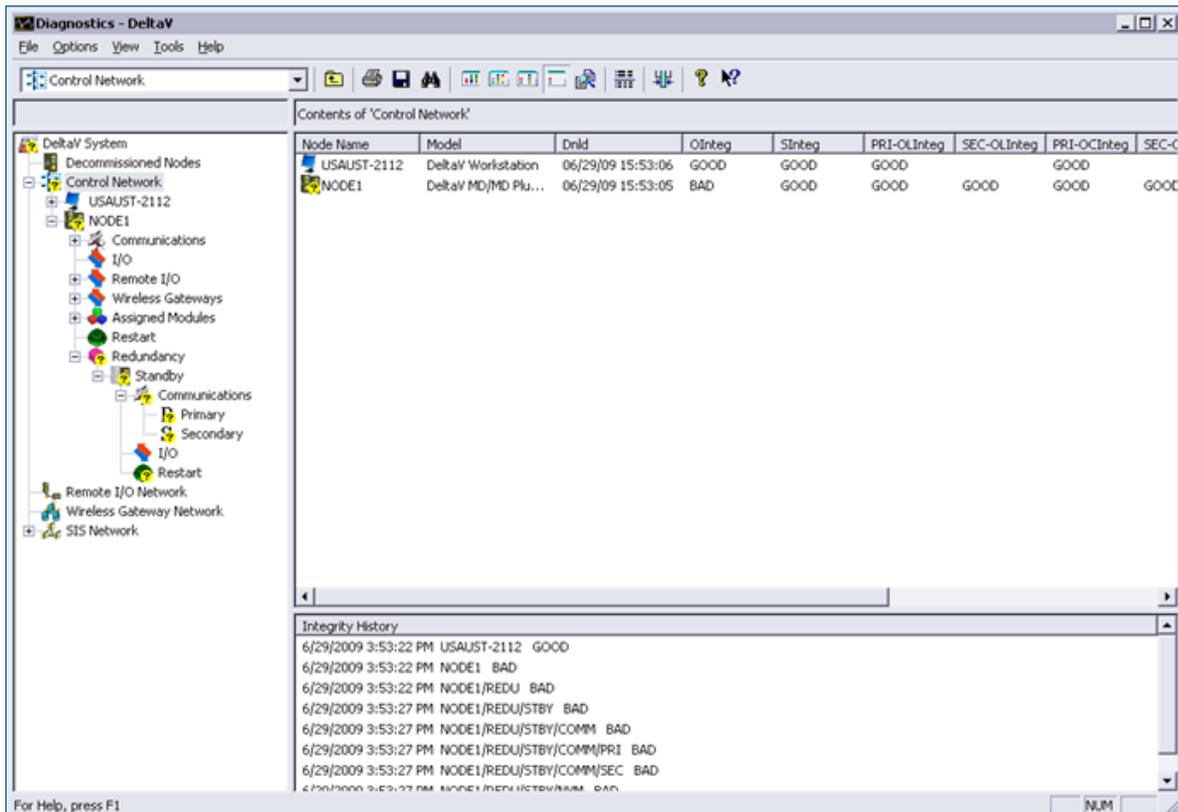
module uses signal status to ensure all I/O channels are good before taking control action on them, and all output signals are synchronized through I/O readback features to ensure control calculations are based on current output states.

This ensures a bumpless transfer of controller during the switchover, when either using CHARM or DeltaV Classic I/O cards or with Ff devices.

## Product Description

For critical process control applications where you can't afford interruptions, the DeltaV system offers controller redundancy. The Standby controller contains the same control strategies as the Active controller and the redundancy link transfers key control parameters to the standby.

The DeltaV Diagnostics Explorer application also indicates the active controller, as shown in the figure below.



The Diagnostics Explorer allows you to retrieve diagnostics from both the active and standby controllers

With redundancy enabled, each module calculates the required updates for the Standby controller when the module executes. The redundancy link transfers this information to the standby every 50 ms. Enabling controller redundancy will typically reduce your CPU free time by approximately 10%.

When a fault is detected, the standby controller is able to take over without bumping the process control signals. The DeltaV Event Chronicle stores a record of each switchover and the reason it occurred (if the reason has been identified).

Replacing an existing standby controller is as simple as removing the existing unit and installing a new controller. The active controller will detect the standby and communicate with the Profession Plus station automatically to commission and download the new hardware. A redundancy license is required in addition to the redundant hardware. The redundant controller appears in the Explorer window as a single controller icon.

## Switchover Detection

The redundant controllers continuously monitor themselves and each other for conditions that require a switchover. Each controller runs continuous selftest routines to determine their ability to function. A hard failure of the Active controller will trigger an immediate switchover to the standby unit. The standby controller also monitors the I/O bus traffic to detect if the Active controller stops functioning and failed to issue a switchover command. This switchover requires a verification cycle, during which time all output signals hold their values until the new active controller begins executing control strategies.

Some of the events that can cause a switchover are:

- Hardware failure within the active controller
- Communications failure between the active controller and I/O
- Communications failure on both control network ports of the Active controller
- Removal of the active controller from the carrier
- User request from Diagnostic Explorer

## System Compatibility

M-series S-series and SZ controllers are supported on v12.3 and beyond.

M-series and S-series controllers cannot be connected together as a redundant pair.

Although an SX controller can operate as a standby controller to an or SQ active controller, it is recommended that both the active and standby controllers be of the same hardware. The SQ may not have sufficient Memory or CPU capacity to accept the configuration that runs in an SX controller. Only mix controller types as a temporary condition during a hardware upgrade.

Although an MX controller can operate as a standby controller to an MQ active controller, it is recommended that both the active and standby controllers be of the same hardware. The MQ may not have sufficient Memory or CPU capacity to accept the configuration that runs in an MX controller. Only mix controller types as a temporary condition during a hardware upgrade.

The, MQ, MX, SQ and SX Controllers are capable of redundancy. For more information on these controllers, refer to the, MQ, MX, SQ and SX Controller product data sheets.

SZ Controllers are capable of redundancy. For more information on this controller, refer to the DeltaV SIS Electronic Marshalling or DeltaV SIS IS Electronic Marshalling product data sheets.

## Ordering Information

| Description                               | Model Number |
|---|--------------|
| Redundancy License for DeltaV Controllers | VE31RED      |

## Prerequisites

- S-series SQ and SX Controllers require DeltaV v11.3.1 or later.
- S-series SZ Controllers require DeltaV v12.3 or later.
- M-series MX Controllers require DeltaV v10.3 or later.
- M-series MQ Controllers require DeltaV v11.3.1 or later.
- Each controller in a redundant pair must have its own dedicated control network communications (not needed on SZ Controllers).
- Each controller in a redundant pair requires a dedicated system power supply on the same 2-wide carrier. (not needed on SZ Controllers).

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