M-series FOUNDATION™ Fieldbus I/O

Use DeltaV™ state-of-the-art FOUNDATION™ Fieldbus redundant I/O for your process control system.

- Increase I/O capacity while reducing wiring
- Takes advantage of all smart device capabilities
- Facilitates multi-drop 16 devices on one port
- Features secure uninterrupted control
- Provides third-party device support
- 1:1 redundancy for M-series FOUNDATION™ Fieldbus I/O
- Autosense of redundant I/O
- Automatic switchover
- Provides synchronized control

Introduction

Are you looking for an efficient, yet robust, I/O subsystem? *M-series FOUNDATION Fieldbus I/O* is a modular subsystem that communicates digitally with field devices, increases your input/output capacity, and gives you access to more information about your process than conventional I/O subsystems.

If you want an *efficient, economical, and secure* process control system, use DeltaV™ M-series FOUNDATION Fieldbus redundant I/O. It greatly enhances device diagnostics that affect your control strategy and alerts operators to device malfunctions.

The modular design of M-series FOUNDATION Fieldbus I/O offers flexibility during installation. It's designed to be installed in the field, close to your devices. M-series FOUNDATION Fieldbus I/O is equipped with *function and field-wiring protection keys* to ensure that the correct I/O card is always plugged into the corresponding terminal block. Modularity, protection keys, and increased input/output capacity make M-series FOUNDATION Fieldbus I/O a smart choice for your process control system.

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Benefits

Increases input/output. Use M-series FOUNDATION Fieldbus I/O instead of Classic I/O to increase information flow. Take advantage of FOUNDATION Fieldbus digital communications to access additional information from your smart devices. Get more information over one wire than over multiple wires, as with Classic I/O.

Takes advantage of all smart device capabilities. Increase your ability to communicate with your devices using DeltaV M-series FOUNDATION Fieldbus I/O; field device status is updated continuously. For multi-variable devices, all process variables are available on the single fieldbus connection.

Facilitates multi-drop 16 devices on one port. Save on wiring expenditures by installing M-series FOUNDATION Fieldbus I/O in the field, close to the actual field devices. *Mounting the controller with the I/O* further reduces your wiring costs by eliminating the need for long runs of multi-cores. Multi-dropping up to 16 devices on one port reduces your wiring expenses substantially. The integrated design of the M-series FOUNDATION Fieldbus I/O can eliminate the need for marshalling panels. This saves you even more time and money.

Features secure uninterrupted control. A DeltaV system offers back-up link active schedule (LAS) to ensure secure control when upgrading a card or in the case of card failure. LAS control is automatically transferred to the backup device when upgrading or experiencing card failure. Control is automatically transferred back to the H1 Interface Card when the system detects a new card. *This process requires no user interaction.*

Provides third-party device support. The DeltaV system provides third-party device support for devices that have successfully passed rigorous testing by Emerson. This testing ensures reliability and safety and allows you to benefit from the open fieldbus architecture when selecting field devices.

1:1 Redundancy for M-series FOUNDATION Fieldbus I/O cards. You can easily add redundancy to an existing system. DeltaV redundant M-series FOUNDATION Fieldbus I/O uses the same Series 2 I/O cards as non-redundant I/O. This allows you to leverage your investment in installed I/O and in I/O spares. No additional configuration is required.

Autosense of redundancy. DeltaV autosenses redundant I/O which greatly simplifies the task of adding redundancy to the system. The redundant pair of cards are treated as one card in the system tools.

Automatic Switchover. Should a primary I/O card fail, the system automatically switches to the "standby" card without user intervention. The operator is given clear notification of a switchover at the operator display.

Provides synchronized control. The DeltaV system provides the ability to assign DeltaV function blocks to run in the DeltaV M-series FOUNDATION Fieldbus I/O card.

DeltaV function blocks that run in the DeltaV M-series FOUNDATION Fieldbus I/O card are included in the fieldbus macrocycle, and their execution is fully synchronized with function blocks running in fieldbus devices on the segment, thus minimizing scheduling delays that commonly occur in control loops in which the control spans the controller and field devices.

Increase your process control system's level of sophistication using M-series FOUNDATION Fieldbus I/O. You are already aware of the increased input/output capabilities and improved communication with your smart devices. Now go one step further and use AMS Device Manager with your M-series FOUNDATION Fieldbus I/O — from the control room or maintenance shop. Using AMS Device Manager, you can access all the necessary information to configure, commission, monitor, and troubleshoot all your FOUNDATION Fieldbus smart devices.

Using AMS Device Manager you can also access status and diagnostic data from smart devices and monitor their performance. Increase product quality and minimize unplanned downtime with this dynamic application. Improve the productivity and profitability of your process control system.

Fieldbus devices not manufactured by Emerson divisions are categorized as third-party devices. The DeltaV system provides third-party device support for devices that have successfully passed rigorous testing by Emerson and are registered by the Fieldbus FOUNDATION. This allows you to benefit from the open fieldbus architecture when selecting field devices.

Product Description

The I/O card is enclosed in a DeltaV-designed common form factor that plugs into the I/O interface carrier. The housing is clearly labeled with the enclosed I/O card type. Clearly visible LEDs on the top of the I/O card display the power, error, and status to the two channels included in the I/O card.

The Fieldbus I/O Card meets ISA G3 corrosion specifications by using superior electronic components and conformal coating.

Redundancy Made Easy. The active and standby I/O cards are connected to the field at the redundant terminal block. When a fault is detected, the system automatically switches to the backup I/O card. The reliability rating of the terminal block is greater than the high reliability of the I/O cards.

The controller scans each card of a redundant pair. Incremental controller loading is a function of the number of redundant cards. In addition, the redundant cards have dedicated communication between the pair and the backup card monitors the health of the active card.

Configuration of redundancy is not required as the DeltaV system automatically recognizes the redundant pair of cards and assigns a device signal tag (DST) to the channels on the primary card.

Signals referenced for each connected FOUNDATION Fieldbus device will count at most 1 DST. The DST type counted will be the most valuable type used to reference a signal for each device. For example, a device with 1 AI signal reference and 1 AO signal reference will count as 1 AO DST.

Switchover time for redundant I/O is minimal, and the process will be undisturbed.

An alarm on the integrity error for the primary notifies the operator of a switchover. The backup card is also monitored for integrity alarms. Events that can cause a switchover include.

- Hardware failure within the active card.
- Communications failure between the active card and the controller.
- Removal of the active card from the carrier.
- Detection of a fault in the field wiring.

A switchover may also be initiated from the diagnostics explorer, and the health and status of both cards and their channels are available in the diagnostics explorer.

The system automatically commissions a new standby card. In safe areas, failed cards can be replaced under power. In hazardous areas, appropriate installation procedures must be followed.

The M-series FOUNDATION Fieldbus I/O subsystem includes:

- H1 interface card and simplex terminal block, or
- 2 H1 interface cards and redundant terminal block

FOUNDATION Fieldbus I/O.

Hardware Specifications

Environmental Specifications	
OperatingTemperature*	-40 to 70°C (-40 to 158°F)
Storage Temperature	-40 to 85°C (-40 to 185°F)
Relative Humidity	5 to 95%, non-condensing
Protection Rating	IP 20
Airborne Contaminants	ISA-S71.04-1985 Airborne Contaminants Class G3 Conformal coating
Shock	10 g ½-sine wave for 11 ms
Vibration	1 mm peak-to-peak from 5 to 13.2 Hz; 0.7 g from 13.2 to 150 Hz

*Operating any electronics at the higher end of its temperature range for long periods of time will shorten its expected lifetime, see **Effects of Heat and Airflow Inside an Enclosure White Paper** for more information.

Specifications for H1 card, 2 channels, FOUNDATION Fieldbus	
Number of Channels (ports)	2
Number of Field Devices:	16 per port (dependent on device power consumption – an IS requirement)
Number of Ff Function Blocks	96 per card (64 fieldbus and 32 standard DeltaV)
Isolation	Each channel is isolated from the system and from each other and factory tested to 1500V DC
Nominal Signal Range (span)	Fieldbus FOUNDATION IEC 61158-2
Localbus Current per Card (12V DC nominal)	200 mA maximum
Field Circuit Power per Card	9 TO 32V DC, 12 mA per channel
Standards	IEC 61158 data link layer
Airborne Contaminants	ISA-S71.04-1985 Airborne Contaminants Class G3 Conformal coating

Certifications

The following certifications are available for M-series FOUNDATION Fieldbus I/O:

- **CE:**

  EMC: EN 61326-1

- **FM:**

  FM 3600

  FM 3611

- **CSA:**

  CSA C22.2 No. 213-M1987

  CSA C22.2 No. 1010-1

- **ATEX:**

  EN60079-0

  EN60079-7

- **IEC-Ex:**

  IEC60079-0

  IEC60079-7

- **Marine Certifications:** IACS E10

  ABS Certificate of Design Assessment

  DNV Marine Certificate

Hazardous Area/Location

M-series FOUNDATION Fieldbus I/O cards can be installed and used based on the following Standards (see actual certificates for exact product markings for each product):

- **FM (USA):**

  Class I, Division 2, Groups A, B, C, D, T4

- **cFM (Canada)**

  Class I, Division 2, Groups A, B, C, D, T4

- **ATEX:**

  II 3G Ex ec IIC T4 Gc

- **IEC-Ex:**

  II 3G Ex ec IIC T4 Gc

Regarding the Installation instructions please refer to the following Documents:
Class 1 Division 2 Installation Instructions DeltaV M-series 12P1293
Zone 2 Installation Instructions DeltaV M-series 12P2046

Ordering Information

Description	Model Number
M-series H1 I/O Interface Card and Terminal Block (includes 1 Interface Card and a simplex Terminal Block)	VE4017P0
Redundant M-series H1 I/O Interface Card and Terminal Block (includes 2 Interface Cards and a redundant Terminal Block)	VE4037P0

Prerequisites

- A fieldbus power supply is required for each bus segment.

- Each fieldbus segment must be terminated at both ends.

- A fieldbus brick and terminator for each segment are recommended.

- Contact your local sales office for more information on complementary Fieldbus components.

Compatibility

- The Current M-series H1 I/O Interface cards are supported on DeltaV v10.3.1 and later. If cards are required for earlier version of DeltaV, please request KJ3242X1-BA1 or KJ3242X1-BA2.

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