



Serial Interface Redundancy



Redundant DeltaV Serial Interface cards provide a connection between the DeltaV system and other devices.

- Provides seamless information interface
- Plug-and-play easy to use
- Extends the life of existing equipment
- 1:1 redundancy for Serial Interface I/O cards
- Autosense of redundant I/O
- Automatic switchover

Introduction

DeltaV Serial Interface I/O has a high level of reliability, providing the process availability required for most applications. In certain situations, process availability can be increased through the use of Serial Interface I/O redundancy.

Benefits

Provides seamless information interface. Using the Serial Interface with the DeltaV system, you gain an extended view of your entire plant. All serial information is readily available for display at the Operator Interface.

When connected to a PLC, DeltaV software may pass supervisory information to the PLC facilitating the coordination of control strategies across systems.

Plug-and-play easy to use. Plug-and-play installation saves money. The Serial Interface works just like other DeltaV I/O interfaces. There are no dipswitches. *Just plug it in!*

The DeltaV controller auto-senses the Serial Interface and presents the configuration options. Online help makes this interface a snap to configure. After a simple point-and-click configuration exercise, your integrated solution is up and running.



Extends the life of existing equipment. Enhance existing capabilities—don't replace them. Many plants have a variety of devices already installed. With the Serial Interface you are able to effectively interface a DeltaV system with existing PLCs or other serial devices. This means that you can layer the state-of-the-art process control offered by a DeltaV system on to the devices you already have in place.

1:1 Redundancy for Serial Redundancy I/O cards. You can add redundancy to an existing system. DeltaV redundant 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 is 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.

Product Description and Specification

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

Autosensing is required; however, configuration for redundancy is not required, since the DeltaV system automatically recognizes the redundant pair of cards and assigns a device signal tag (DST) to the channels on the primary card.

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 (including field cable and slave port problems) between the active card and the controller
- Removal of the active card from the carrier

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.

Serial Interface redundancy is available in localized-language versions beginning with version 6.2.

The Redundant Serial Interface consists of a pair of serial cards and a redundant terminal block. The cards each contain two serial communications ports that support RS422/485 half duplex (in either single slave or multi-drop configurations), or RS422/485 full duplex (in single slave configuration only), as well as RS232. These ports are individually configurable and support data rates up to 115 Kbaud.

The card has the common DeltaV form factor and is clearly labeled with the interface type. LEDs, located on the front of the card, show the power, error, and port status of the interface at a glance.

The standard Modbus protocol includes the Serial Interface, the Modbus RTU, and ASCII communications protocol as defined in the Modicon Modbus Protocol Reference Manual dated March



1992 (PI-MBUS-300 REV D). Each redundant Serial Interface port may be configured as a master only.

The serial card supports the following features using the Modbus protocol:

- Reading input data from Modbus coils, input status, holding registers and normal input registers.
- Writing output data to coils and holding registers.
- Output data can be written in single-value or complete-block mode only while data direction is set to output. Output mode, data direction, and output readback are configurable parameters while in modbus master mode.
- Input data can be read in as a complete data set, providing the best performance.

The serial card supports the input and/or output of 16 different data sets per serial port, for a total of 32 data sets per Serial Interface.

When data values come into the DeltaV system through a serial card, each data set that lands on one module counts as one DST. Each data set can hold up to 100 data values. Therefore, if you have 100 data values in a data set that comes in on one module, it counts as only one DST. If you have the same 100 values in a data set that comes into six modules, you will have six DSTs. In both cases, you can alarm and control any of the 100 values and the DST count will remain the same. The maximum number of DSTs supported per port in the DeltaV Serial Interface is 250.

Both Modbus RTU and Modbus ASCII communications modes are supported by standard Modbus protocol.



Modbus Function Codes Supported

The Serial Interface uses the following Modbus communications protocol function codes to read and write values to and from the Modbus device when acting as a Modbus master device.

Modbus Function Codes Supported		
Code	Meaning	Description
1	Read coil status	Obtain current status (on/off) of a group of logic coils
2	Read input status	Obtain current status (on/off) of a group of discrete inputs
3	Read holding registers	Obtain current binary value of one or more holding registers
4	Read input registers	Obtain current binary value of one or more input registers
5	Force single coil	Force logic coil to a state of ON or OFF
6	Preset single register	Write a single binary value into a holding register
8	Diagnostics	Sub-function 2 is used to retrieve the Diagnostic Register of a PLC
15	Force multiple coils	Forces a series of consecutive logic coils to defined ON or OFF states
16	Preset multiple registers	Writes specific binary values into a series of consecutive holding registers
17	Report slave ID	Used to obtain the run (on/off) state of a PLC

For detailed information on the Modbus communications protocol and specific communications function codes refer to the *Modicon Modbus Protocol Reference Guide* dated March 1992 (PI-MBUS-300 REV D).



Serial Interface Redundancy Specifications	
Number of serial ports	2
Number of data sets per Serial Interface card	32 (16 per port)
Number of Device Signal Tags per Serial Interface	500 maximum (total of both ports)
Number of device signal tags per Serial Interface port	500 maximum*
Port types	RS232, RS422/485 half duplex, RS 422/485 full duplex (configurable with the DeltaV Explorer)
Isolation	Each port is isolated from the system and from the other. These ports must be externally grounded.
Baud rate	300, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200
Parity	Even, Odd, None
Data bits	7 or 8
Stop bits	1 or 2
Retry count	0 – 255
Message time out	100 – 25,500 msec. (100 msec. Increments)
Transmit delay	0 – 25,500 msec. (100 msec. Increments)
Send outputs on startup	In the DeltaV Explorer, the user is able to indicate whether or not outputs should be sent on interface initialization.

*Note that the total capacity of the Serial Interface Redundancy Card can be used with a single port. This provides maximum flexibility for project needs.



Environmental Specifications	
Storage temperature	-40 to 85 °C (-40 to 185 °F)
Operating temperature	-40 to 70 °C (-40 to 158 °F)
Relative humidity	5 to 95% , non-condensing
Airborne contaminants	ISA-S71.04-1985 Airborne Contaminants Class G3
Hazardous area/location*	ATEX EEx nA IIC T4 Class 1, Div 2, Groups A, B, C, D, T4 hazardous locations.
Protection rating	IP 20
Shock	10 g ½-sine wave for 11 ms
Vibration	3 mm peak-to-peak from 5 to 13 Hz; 0.5 g from 13 to 150 Hz

*Refer to Zone 2 installation instructions (12P2046) and/or Class 1 Division 2 installation instructions (12P1293) for information on installing in hazardous areas.



Ordering Information

The DeltaV Serial Interface Redundancy Cards ship from the factory with Modbus drivers pre-installed.

Users running pre-v9.3 DeltaV software must purchase a *Serial Interface port-license* to activate each port on the Serial Interface, regardless of what protocol they are using on the serial card. But if v9.3 or newer software is being used, Serial Interface port licenses are unnecessary.

Description	Model Number
Redundant Serial Interface, 2-ports, terminal block	VE4036P2
Serial Interface port license (one license per port is required if using pre-v9.3 DeltaV software; if using v9.3 or newer software, the Serial Interface port license is not required)	VE4102

Prerequisites

- DeltaV version 6.0 or later software.
- DeltaV MD controller.
- Series 2 I/O cards are required for redundancy.

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