

S-series Serial Interface



The DeltaV™ S-series Serial Interface provides 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
- Automatic switchover

Introduction

The S-series Serial Interface provides a connection between the DeltaV™ system and devices that support a serial protocol, such as Modbus or Allen Bradley's Data Highway Plus.

The S-series Serial Interface is supplied with Modbus software drivers pre-loaded. Additional drivers are available to allow a wide variety of devices to be integrated directly into the DeltaV controller's I/O subsystem. Data can be used by control modules or communicated to workstations as SCADA tags for display and/or historising. Like all DeltaV I/O, the Serial Interface may be added online while the rest of the controller I/O is powered up and in use.

DeltaV Serial Interface can also be installed as a redundant pair for critical applications needing the highest availability.



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 from 3rd party systems, analyzers, PLC's, 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. It fits into any available slot on the controller I/O carrier. 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 I/O cards. You can add Serial interfaces as simplex cards or redundant pairs. The interfaces automatically detect the presence of the redundant terminal block and are autosensed by the system as a redundant pair. There is no additional configuration. Use redundant Serial interfaces with slave devices that support redundant serial ports.

Automatic Switchover. Should a primary Serial Interface 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. The standby card continually polls the slave devices for diagnostic to confirm its ability to take over communications.

Product Description

The Serial Interface consists of a serial card and a terminal block. The card contains two serial communications ports that support RS232 and RS422/485 half duplex, or RS422/485 full duplex signals. These ports are individually configurable and support data rates from 300 Baud up to 115 KBaud.

The S-series card plugs into an 8-wide I/O carriers in any of the possible 64 slots and communicates with the S-series controllers. 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 Serial Interface port may be configured as either a master or slave device.

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 coil, register mode, or complete data set mode. This output mode is a configurable parameter.
- 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.

Serial dataset registers can be referenced directly in control modules as analog or discrete I/O providing fast easy data exchange with the serial device. Direct module-to-Dataset/register references are recommended for control signals. Alternatively, users can read multiple registers form a Dataset into a single "marshalling" module at the cost of a single DST. Marshalling modules provide a cost effective way to integrate serial data from analyzers and other data sources. Serial dataset registers can also be passed as SCADA values directly to Workstations and Continuous Historians without consuming DST's

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



S-series simplex Serial Interface

Redundancy Made Easy

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.

Slave devices must provide two serial ports in order to allow the active and standby serial cards to be connected. The Active card continually poll input data and writes output data to the device on one serial link, while the standby card periodically polls the slave device for a diagnostic register. Verify with the device supplier for its ability to support redundant Modbus serial communications.

When a fault is detected, the system automatically switches to the backup serial card. Events that can cause a switchover include:

- Hardware failure within the active card
- Loss of Communications (including field cable and slave port problems) between the active card and the slave device.
- Removal of the active card from the carrier

A switchover may also be initiated from control logic. This allows additional watchdog logic to monitor multiple slave devices for communication faults not detected by the Serial Interface. A manual switchover can be initiated from diagnostics explorer

The redundant pair can be manually configured or Autosensed. The redundant terminal block couples the two cards as one redundant pair that when Autosensed, the DeltaV system automatically recognizes the redundant pair of cards and assigns a device signal tag (DST) to the datasets on the primary card (Odd numbered card).

Switchover time for redundant I/O is minimal, and the process will be undisturbed. Output channel behavior on switch over can be configured to resend outputs on a switchover. This can be coupled with Output Read back to ensure the output channels are driven to the desired state upon switchover.

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

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

Other Protocols Supported

The DeltaV S-series Serial Card can support other serial driver protocols downloaded directly into the serial card. Custom drivers available from Emerson Process Management include:

- AGA3 Gas Flow Calculators
- AGA8 Gas Flow Calculators
- Allen-Bradley Data Highway Plus
- Control Technique Drive (Modbus)
- Mettler O-082 Weight Scale
- Modbus Redundancy
- Moore Products LIL
- RMV9000MVCU3 Controller
- Rotork Pakscan
- Satorious MP-8 Weight Scale
- Satorious xBPI Weight Scale
- Siemens 3964R
- Spartan DeltaV Metering Program
- Turnbull TCS6000
- Brooks Instruments Petrocount Ratio Management System

Emerson Process Management has a long history of developing new custom serial driver protocols for its other control systems. Call your local sales office for availability of these drivers and any driver not listed above

Hardware Specifications

Specifications for Serial Interface I/O Card	
Number of serial ports	2
Number of data sets per Serial Interface card	32 (16 per port)
Port types	RS232, RS422/485 half duplex, RS 422/485 full duplex
Isolation	Each port is isolated from the system and from the other. These ports must be externally grounded.
Communication Specifications	
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.
Environmental Specifications	
Operating temperature	-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
Airborne contaminants	ISA-S71.04-1985 Airborne Contaminants Class G3
Protection rating	IP 20
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

System Compatibility

Requires DeltaV SD or SX controller.

Certifications

The following certifications are available on the S-series Serial Interface card.

■ CE:

- EMC- EN 61326-1:2006
- LVD- EN 61010-1:2001

■ CSA:

- CLASS 2252 05 - PROCESS CONTROL EQUIPMENT:

CAN/CSA-C22.2 No. 0-M91 General Requirements-
Canadian Electrical Code, Part II
CAN/CSA-C22.2 No. 61010-1-04 Safety
Requirements for Electrical Equipment for
Measurement, Control, and Laboratory Use,
Part 1: General Requirements

Complies with NAMUR NE21 per DeltaV Digital
Automation System NAMUR NE21 Installation Instructions
12P2822.

The following certifications have been submitted for Hazardous Locations and for Marine applications. Please verify with the appropriate certifying agency for a specific list of approved components

■ CENELEC Zone 2 ATEX/IEC EX

EN 60079-15:2005

Certifying agency: Nemko
Certificate Number: TBD

Refer to document TBD

*"DeltaV™ Scalable Process System Zone 2
Installation Instructions"*

■ FM Approval

Class 1 Division 2 Hazardous Locations

Certifying agency: FM Approvals
Certificate Number: TBD

Refer to document TBD

*"DeltaV™ Scalable Process System Class 1
Division 2 installation Instructions"*

■ Marine Certifications:

IACS E10:2006 Rev.5 Control, protection &
Safety

- ABS Certificate of Design Assessment
- Bureau Veritas Certificate
- DNV Marine Certificate
- Lloyds Register

■ GOST Hazardous Area certification Zone 2 (Russian)

Other country specific certifications may also be available. Verify with your local Emerson sales office to confirm any certification requirements not listed here.

Ordering Information

Description	Model Number
S-series Serial Interface Card, 2-ports (includes 1 Interface Card and a simplex Terminal Block)	SE4006P2
Redundant S-series Serial Interface Card, 2-ports (includes 2 Interface Cards and a redundant Terminal Block)	SE4036P2

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

To locate a sales office near you, visit our website at:
www.EmersonProcess.com/DeltaV
Or call us at:
 Asia Pacific: 65.6777.8211
 Europe, Middle East: 41.41.768.6111
 North America, Latin America: +1 800.833.8314 or
 +1 512.832.3774

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www.EmersonProcess-powerwater.com
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 Europe, Middle East, Africa: 48.22.630.2443
 North America, Latin America: +1 412.963.4000

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