Product Description

The Traditional I/O Subsystem Includes:

- I/O interface carrier (a DIN rail surface mounted) on which all I/O related components are installed
- Bulk AC to 24V DC power supply for field devices
- An I/O interface consisting of an I/O card and an I/O terminal block
- A variety of analog and discrete I/O cards enclosed in a common form factor that easily plugs into the I/O interface carrier
- A variety of I/O terminal blocks mounted on the I/O interface carrier that can be pre-wired before I/O card installation

I/O Cards

A variety of analog and discrete I/O cards are available to meet your specific requirements. The following cards support simplex or redundant installation:

- AI 4-20 mA HART 8 channels
- AO-4-20 mA HART 8 channels
- DI, 24V DC Dry Contact, 8 channels
- DO 24V DC High-Side, 8 channels



A Traditional I/O Card Easily Plugs into an I/O Carrier.

- AI (Plus) 4-20 mA HART, 16 channels
- AO (Plus) 4-20 mA HART, 16 channels
- DI (Plus) 24V DC, Dry Contact, 32 channels
- DO (Plus) 24V DC, High-Side, 32 channels

The following I/O cards are supported in simplex format to meet your field wiring needs:

- RTD, 8-channels
- Thermocouple, 8 channels
- Millivolt, 8 channels
- DI, High Density, 32 channels
- DI 24V DC Isolated, 8 channels
- Multi-Function, 4 channels (Isolated DI)
- Sequence of Event, 16 channels (DI 24 V DC)
- DI 120V AC Low Side Detection, 8 channels
- DI 120V AC Isolated, 8 channels
- DO 24V DC Isolated, 8 channels
- DO 120/230V AC High-Side, 8 channels
- DO 120/230 Isolated, 8 channels

All I/O cards are enclosed in a common form factor that plugs into the I/O interface carrier. The housing is clearly labeled with the enclosed I/O card type. All cards have power and internal error indicators. Eight-channel cards have clearly visible channel status LEDs.

All cards meet ISA G3 corrosion specifications by the careful selection of superior electronic components and the use of conformal coating.

Pulse Counters are available on most DI cards. The supported maximum frequency varies from 0.1 Hz on AC signals to 75 or 120 Hz on 24V DC inputs. For higher pulse counts, up to 50 KHz, use the Multi-Function card's high speed pulse input.

The DeltaV system provides control module level time stamping for log events and alarms. For greater event resolution, the 16-channel Sequence-of-Events DI card can provide signal driven events to a resolution of +/- 0.25 ms per card, or within 1 ms per controller. Please refer to the **Sequence of Events** PDS for more information on Sequence-of-Event data collection and system options for this feature.

I/O Card Redundancy

Redundant I/O cards are available for critical applications. The same card can be used in simplex or redundant applications. When installed on a two-wide redundant terminal block, the cards are recognized as a redundant pair by the controller. The controller scans each card and determines which card is acting as the active interface. When a fault is detected, the system automatically switches to the standby I/O card.

DeltaV Control modules reference simplex and redundant I/O channels identically and there is no special configuration required to take advantage of redundancy.

Switchover of a redundant I/O card is completed within two scans of the I/O bus. Make-before-break contacts ensure digital field instruments remain powered and the process is undisturbed. Analog output signals are briefly driven by both cards for < 5 ms during switchover of the card.

Hardware Alerts automatically report hardware integrity errors for both the primary and secondary cards. Any event that causes a switchover is also reported automatically through the system hardware alerts and is logged in the Event Chronicle.

Events that can cause a switchover include:

- Hardware failure within the active card.
- Communications failure between the active card and the controller.
- 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.

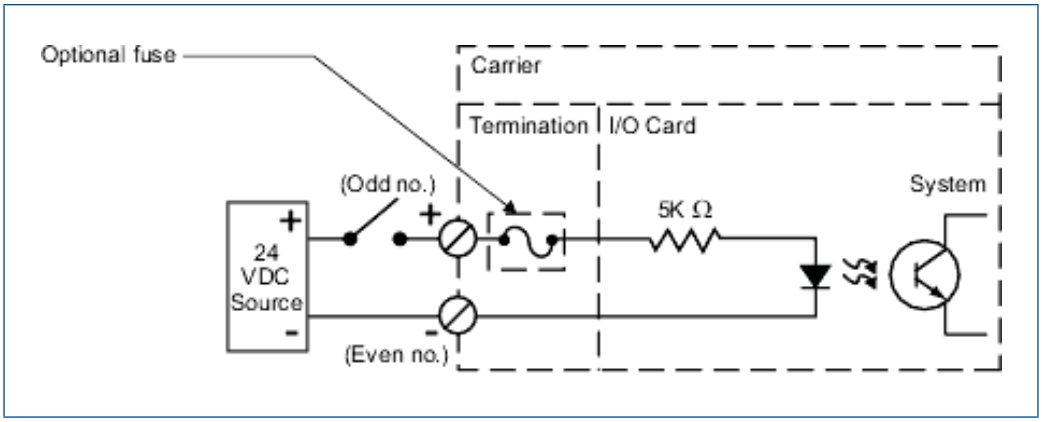
The system automatically commissions a new standby card. In safe areas, failed cards can be replaced under power. In hazardous areas, appropriate installation procedures must be followed.

Hardware Specifications

Common Environmental Specifications for all I/O Interfaces	
Category	**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 Conformal coating
Protection Rating	IP 20
Shock	10 g ½-sine wave for 11 ms
Vibration	1 mm peak-to-peak from 5 to 16 Hz; 0.5 g from 16 to 150 Hz
Dimensions	H 10.7 cm (4.2 in.) W 4.1 cm (1.6 in.) Depth 10.5 cm (4.1 in.)

*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 DI Card, 8-channel, 24V DC, Isolated	
Number of Channels	Eight
Isolation	Each channel is optically isolated from the system and from each other and factory tested to 1500V DC
Detection Level for On	>10V DC
Detection Level for Off	<5V DC
Input Impedance	5 mA at 24V
LocalBus Current (12V DC nominal) per Card	75 mA typical, 100 mA maximum
Field Circuit Power per Card	None
Optional Fuse	2.0 A



Simplified Circuit and Connection Diagram for DI Card, 8-channel, 24V DC, Isolated.

Discrete Input Cards and Termination Blocks	
Description	**Model Number**
Discrete Input Card: 8 Channels, 24V DC, Isolated	
Standard I/O Termination Block	VE4001S2T1B1
Fused I/O Termination Block	VE4001S2T1B2
16-Pin Mass Termination Block	VE4001S2T1B3
Discrete Input Card: 8 Channels, 24V DC, Dry Contact	
Standard I/O Termination Block	VE4001S2T2B1
Redundant Standard I/O Termination Block	VE4031S2T2B1
Fused I/O Termination Block	VE4001S2T2B2
16-Pin Mass Termination Block	VE4001S2T2B3
Discrete Input Card: 32 Channels, 24V DC, Dry Contact	
Standard Termination Block	VE4001S2T2B4
40-pin Mass Termination Block	VE4001S2T2B5
Discrete Input Plus Card: 32 Channels, 24V DC, Dry Contact	
32-Channel DI Terminal Block for Series 2 Plus	VE4001S2T2B6
Redundant32-Channel DI Terminal Block for Series 2 Plus	VE4031S2T2B6
40-pin DI Mass Termination Block for Series 2 Plus (to be used with DeltaV Signal Conditioning Cards for PLC-5 DI, or P+F HiC IS barriers and terminal boards for DeltaV DCS)	VE4001S2T2B7
40-pin DI Mass Termination Block for Series 2 Plus including 2 x 16-channel DI Plus Mass Connection Boards*	VE4051S2T2B7
Redundant 40-pin DI Mass Termination Block for Series 2 Plus (to be used with DeltaV Signal Conditioning Cards for PLC-5 DI, or P+F HiC IS barriers and terminal boards for DeltaV DCS)	VE4031S2T2B7
Redundant 40-pin DI Mass Termination Block for Series 2 Plus including 2 x 16-channel DI Plus Mass Connection Boards*	VE4081S2T2B7
Discrete Input Card: 8 Channels, 120V AC, Isolated	
Standard I/O Termination Block	VE4001S3T1B1
Fused I/O Termination Block	VE4001S3T1B2
Discrete Input Card: 8 Channels, 120V AC, Dry Contact	
Standard I/O Termination Block	VE4001S3T2B1
Fused I/O Termination Block	VE4001S3T2B2
Pulse Count Input Card: 4-Channels, 24V DC, Dry Contact	
Discrete 32 Channel Terminal Block	VE4015
Sequence of Event Input Card: 16 Channels, 24V DC Dry Contact	
Discrete 32-Channel Terminal Block	VE4001S5T2B4
40-pin Mass Terminal Block	VE4001S5T2B5

*For more details on the Mass Connection Boards and connection cables, please refer to the **M-series Mass Connection Solutions** PDS.