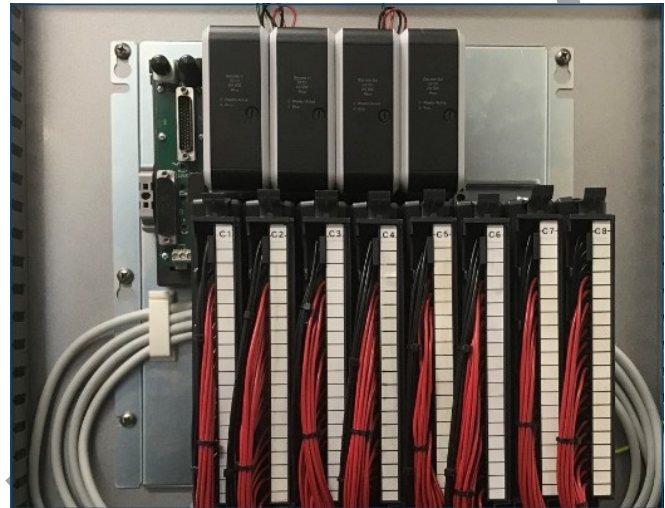


# DeltaV™ Signal Conditioning Cards for Allen Bradley® PLC-5® / 1771 I/O

- No re-wiring of PLC I/O
- Modular design
- Lowers overall termination footprint
- Significant labor and work reduction
- Easier and faster troubleshooting and maintenance
- Signification cost reduction
- Easy AI transmitter upgrades



## Introduction

The DeltaV™ Signal Conditioning Cards for Rockwell Automation, Allen Bradley®, PLC-5® / 1771 I/O Solutions provide a fast, easy and reliable connection from field device 1771 swing-arms to DeltaV M-series simplex and redundant, high density Series 2 Plus traditional I/O cards.

The modular design of the Signal Conditioning Cards for 1771 I/O further helps to lower the overall termination footprint with flexible mounting capabilities.

Ribbon cable connectors will easily connect the Signal Conditioning Cards for 1771 I/O to high density M-series Plus traditional I/O cards with mass-connection I/O terminal blocks.

## Benefits

**No re-wiring of the PLC I/O; Fast and easy way to connect.** The DeltaV M-series simplex and redundant high density traditional I/O cards can be easily connected to the Signal Conditioning Cards for 1771 I/O within seconds.

No tools are necessary to connect the ribbon cables, so you can significantly reduce labor costs by eliminating additional cabinet wiring.

The modular designed Signal Conditioning Cards and mounting panels for 1771 I/O will fit in to the same envelope as the OEM 1771 I/O chassis.

**Optimization of space.** The DeltaV Signal Conditioning Cards for 1771 I/O offer significant space advantages by integrating all needed wiring components and signal conditioning circuitry on one assembly.

**Significant labor work reduction.** No need for re-wiring of the 16-Channel 1771 I/O swing-arms to DeltaV I/O terminal blocks. Also, there is no need to add additional signal conditioning for compatibility with the DeltaV DCS.

**Easier and faster troubleshooting and maintenance.** System Technicians can access the field wiring on the OEM swing-arms with multi-meters during the troubleshooting process.

**Significant cost reduction.** Since off-the-shelf Round Ribbon cables can be used inside a cabinet with a maximum length of 10.0 m, significant cost reductions can be achieved.

**Easy AI transmitter upgrades.** Take advantage of DCS functionality by updating 4-20mA AI devices to include HART® functionality. This can be done over time with a simple configuration change.

## Product Description

### AI 4-20 mA Signal Conditioning Card



The **Analog Input (AI) 4-20 mA Signal Conditioning Card for 1771 I/O** connects to the simplex or redundant M-series Plus AI, 16-Channel cards by using the 48-pin Round Ribbon Cable.

The 21-position OEM contact 1771-WG/WH swing-arm is removed from the OEM 16-channel, AI, 4-20 mA single-ended, 1771-IFE card and placed on the AI 4-20 mA Signal Conditioning Card.

The Signal Conditioning Card has three connectors; swing-arm attachment point on the front which provides secure mechanical and electrical connections and two 24-pin (48-pins total) ribbon cable connectors on the bottom which is used to connect, via ribbon cables, to the 16-channel DeltaV AI card mass-connection terminal block.

Up to 16 Analog, 4-20 mA non-HART® based Field devices can be connected to the OEM 16-channel AI swing-arm by screw terminals. The 2- and 4-wire single-ended, field-powered, non-isolated channel-to-channel signals devices are supported. Field power from the DeltaV AI card is not supported.

Updating transmitters to include HART functionality is very easy with this solution. No DeltaV hardware needs to be changed when the legacy non-HART transmitters are upgraded to HART; just change the channel type from non-HART to HART in the DeltaV Explorer.

Please refer to the **Cross-Reference List** for your application.

### DI 24 VDC Signal Conditioning Card



The **Discrete Input (DI) 24 VDC Signal Conditioning Card for 1771 I/O** connects to the simplex or redundant M-series Plus DI, 32-Channel, 24 VDC, Dry Contact card by using two of the 20-pin standard Round Ribbon Cables; one for each of the two 16-channel Signal Conditioning Cards for 1771 I/O.

The 21-position OEM contact 1771-WH swing-arm is removed from the OEM 16-channel, DI, 24 VDC, 1771-IBD card and placed on the 16-channel DI 24 VDC, non-isolated, Signal Conditioning Card.

The Signal Conditioning Card has two connectors; swing-arm attachment point on the front which provides secure mechanical and electrical connections and a 20-pin ribbon cable connector on the bottom which is used to connect, via a ribbon cable, to the DeltaV DI card mass-connection terminal block.

Up to 16 Discrete Input 24 VDC based field devices can be connected to the OEM 16-channel DI swing-arm, by screw terminals. Non-isolated channel-to-channel signals are supported.

Each M-series Plus, DI, 32-Channel, 24 VDC, Dry Contact card supports two 16-Channel swing-arms from the 1771-IBD/IAD DI cards.

The M-series Plus DI, 32-Channel, 24 VDC, Dry Contact card has two parameters in the Explorer view, one for each cable connection. When these Parameters are turned on, DeltaV Diagnostics will mark the status of affected signals.

Please refer to the **Cross-Reference List** for your application.

## DO 24 VDC Signal Conditioning Card



The **Discrete Output (DO) 24 VDC Signal Conditioning Card for 1771 I/O** connects to the simplex or redundant M-series Plus DO, 32-Channel, 24 VDC, High-Side card by using two of the 20-pin standard Round Ribbon Cables; one for each of the two 16-channel Signal Conditioning Cards for 1771 I/O.

The 21-position OEM contact 1771-WH swing-arm is removed from the OEM 16-channel, DO, 24 VDC, 1771-OBDO card and placed on the 16-channel DO 24 VDC, non-isolated, Signal Conditioning Card.

The Signal Conditioning Card has two connectors; swing-arm attachment point on the front which provides secure mechanical and electrical connections and a 20-pin ribbon cable connector on the bottom which is used to connect, via a ribbon cable, to the DeltaV DO card mass-connection terminal block.

Up to 16 Discrete Output 24 VDC based field devices can be connected to the OEM 16-channel DO swing-arm, by screw terminals. Non-isolated channel-to-channel signals devices are supported.

Each M-series Plus, DO, 32-Channel, 24 VDC, High-Side card supports two 16-Channel swing-arms from the 1771-OBDO/OAD DO cards.

The M-series Plus DO, 32-Channel, 24 VDC, High-Side card has **two parameters in the Explorer view**, one for each cable connection. When these Parameters are turned on, DeltaV Diagnostics will mark the status of affected signals.

Please refer to the **Cross-Reference List** for your application.

## DI 120 VAC/VDC Signal Conditioning Card



The **Discrete Input (DI) 120 VAC/VDC signal conditioning card for 1771 I/O** connects to the simplex or redundant M-series Plus DI, 32-Channel, 24 VDC, Dry Contact card by using two of the 20-pin standard Round Ribbon Cables; one for each of the two 16-channel Signal Conditioning Cards for 1771 I/O.

The 21-position OEM contact 1771-WH swing-arm is removed from the OEM 16-channel, DI, 120 VAC/VDC, 1771-IAD card and placed on the 16-channel DI, non-isolated, Signal Conditioning Card.

The Signal Conditioning Card has two connectors; swing-arm attachment point on the front which provides secure mechanical and electrical connections and a 20-pin ribbon cable connector on the bottom which is used to connect, via a ribbon cable, to the DeltaV DI card mass-connection terminal block.

A filtering jumper is present to select the input delay at 5msec (default) or 20msec.

Up to 16 Discrete Input 120 VAC/VDC based field devices can be connected to the OEM 16-channel DI swing-arm, by screw terminals. Non-isolated channel-to-channel signals are supported.

Each M-series Plus, DI, 32-Channel, 24 VDC, Dry Contact card supports two 16-Channel swing-arms from the 1771-IAD/IBD DI cards.

The M-series Plus DI, 32-Channel, 24 VDC, Dry Contact card has **two parameters in the Explorer view**, one for each cable connection. When these Parameters are turned on, DeltaV Diagnostics will mark the status of affected signals.

Please refer to the **Cross-Reference List** for your application.

### DO 120 VAC Signal Conditioning Card



The **Discrete Output (DO) 120 VAC signal conditioning card for 1771 I/O** connects to the simplex or redundant M-series Plus DO, 32-Channel, 24 VDC, High-Side card by using two of the 20-pin standard Round Ribbon Cables; one for each of the two 16-channel Signal Conditioning Cards for 1771 I/O.

The 21-position OEM contact 1771-WH swing-arm is removed from the OEM 16-channel, DO, 120 VAC, 1771-OAD card and placed on the 16-channel DO, non-isolated, Signal Conditioning Card.

The Signal Conditioning Card has two connectors; swing-arm attachment point on the front which provides secure mechanical and electrical connections and a 20-pin ribbon cable connector on the bottom which is used to connect, via a ribbon cable, to the DeltaV DO card mass-connection terminal block.

Up to 16 Discrete Output 120 VAC based field devices can be connected to the OEM 16-channel DO swing-arm, by screw terminals. Non-isolated channel-to-channel signals are supported.

Each M-series Plus, DO, 32-Channel, 24 VDC, High-Side card supports two 16-Channel swing-arms from the 1771-OAD/OBD DO cards.

The M-series Plus DO, 32-Channel, 24 VDC, High-Side card has **two parameters in the Explorer view**, one for each cable connection. When these Parameters are turned on, DeltaV Diagnostics will mark the status of affected signal.

Please refer to the **Cross-Reference List** for your application.

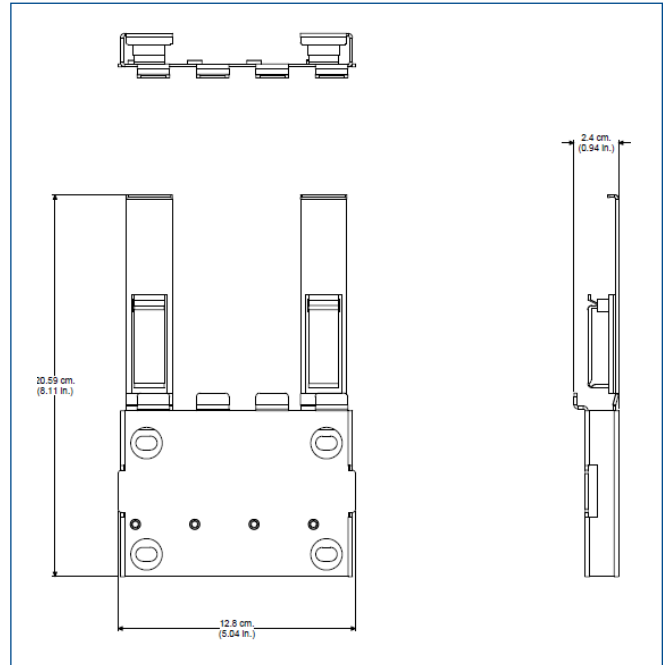
**Mounting Options**

Five (5) mounting kits (4, 8, 12 and 16-wide) are available that replace the 4, 8, 12 and 16-wide OEM I/O chassis. The mounting plate contained in the replacement I/O chassis mounting kit fits in to the same space and uses the same mounting bolts as the OEM I/O chassis. There is a DIN-rail installed on the mounting plate that is used for the DeltaV I/O carrier, carrier extenders, and possibly a DeltaV controller. There are 4-wide Signal Conditioning Card mounting hangers pre-installed on the mounting plate.

The ground stud location on the OEM I/O chassis and DeltaV mounting plate are the same location so the grounding mechanisms can be re-used.

For those installations where the mounting kit isn't required, the 4-wide Signal Conditioning Card mounting hanger assembly is available as a spare part. Four screws will be required to mount this assembly to the cabinet mounting sub panel.

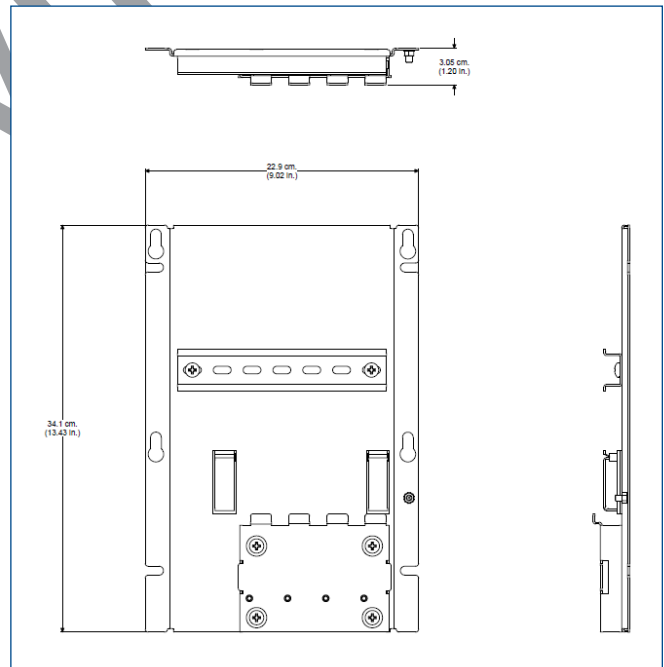
Please refer to the Ordering Information and Spare Part Ordering Information for the available mounting options.



4-card Hanger Assembly

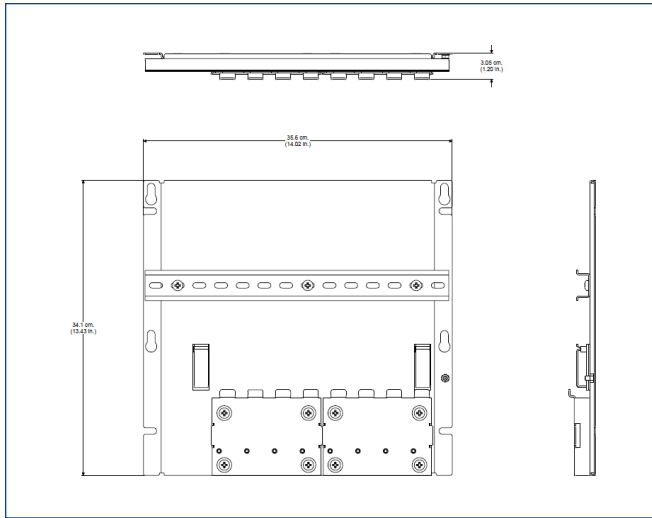
**Additional Details**

Type	OEM	Dimensions (L x W x H in CM)
4-wide	1771-A1B/B	22.9 x 34.1 x 3.05
8-wide	1771-A2B/B	35.6 x 34.1 x 3.05
12-wide, R0	1771-A3B/B	48.3 x 34.1 x 3.05
12-wide, R1	1771-A3B1/B	48.3 x 34.1 x 3.05
16-wide	1771-A4B/B	61.0 x 34.1 x 3.05
4-card hanger	N/A	12.8 x 20.59 x 2.4

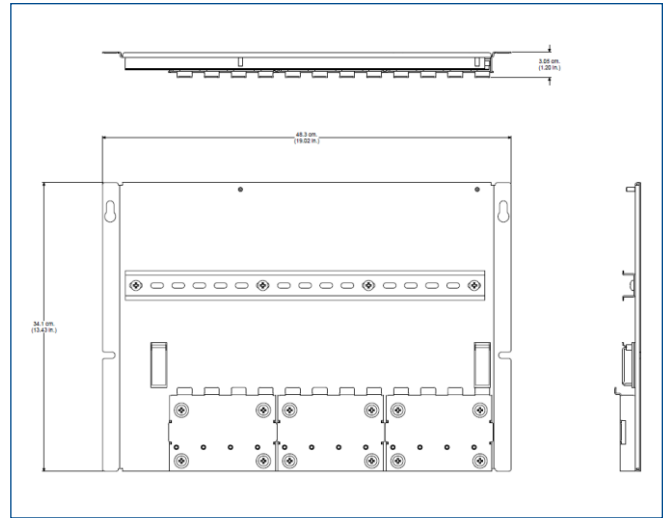


4-wide Mounting Kit

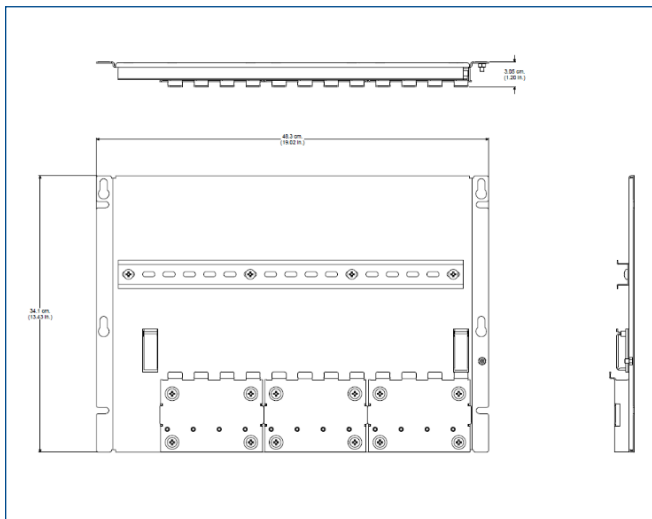
### Additional Details (cont'd)



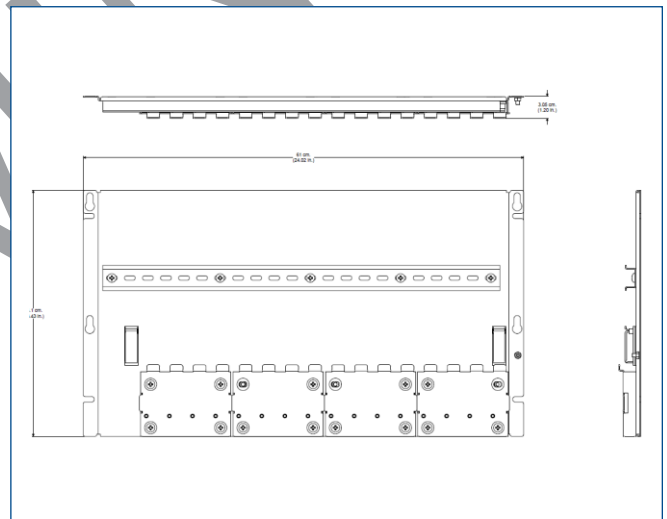
8-wide Mounting Kit



12-wide (R0) Mounting Kit



12-wide (R1) Mounting Kit



16-wide Mounting Kit

**Cross Reference List**

Signal Conditioning Card Description	OEM Information I/O Card / Swing-Arm Combination	VE4306S1T1	VE4301S1T1	VE4302S1T1	VE4303S1T1	VE4304S1T1	Compatible DeltaV M-series I/O card and Simplex Mass-Connection I/O Terminal Block (2)
AI, 4-20mA, 16-channel, single-ended (1)	1771-IFE16 / 1771-WG/WH	✓	—	—	—	—	VE4003S2B11
DI, 120 VAC/VDC, 16-channel, non-isolated	1771-IAD / 1771-WH	—	✓	—	—	—	VE4001S2T2B7
DO, 120 VAC, 16-channel, non-isolated	1771-OAD / 1771-WH	—	—	✓	—	—	VE4002S1T2B8
DI, 24 VDC, 16-channel, non-isolated	1771-IBD / 1771-WH	—	—	—	✓	—	VE4001S2T2B7
DO, 24 VDC, 16-channel, non-isolated	1771-OBDD / 1771-WH	—	—	—	—	✓	VE4002S1T2B8

Notes:

(1) Only Single-ended, field powered, transmitters are supported on this Signal Conditioning Card.

(2) Only simplex I/O terminal block shown for clarity. Check M-series Traditional I/O Product Data Sheet for redundant I/O terminal block part numbers.

PRELIMINARY

## Hardware Specifications

Common Environmental Specifications for all Signal Conditioning Cards	
Category	Specifications
Operating temperature	-40 to +60°C
Storage temperature	-40 to +85°C
Relative humidity	5 to 95% Non-Condensing
Airborne Contaminants	ISA-S71.04-1985 Airborne Contaminants Class G3 Conformal coating
Protection rating	IP 20
Shock	10g, 1/2 sine wave for 11 milliseconds
Vibration	1mm Peak-to-Peak from 2 to 13.2 Hz, 0.7g from 13.2 to 150 Hz

Specifications for AI 4-20mA Signal Conditioning Card	
Category	Specifications
Field Device Type	4-20mA HART
Number of Channels	16
Field Signals	2 or 4-wire field powered transmitters
Electrical Connections	Front; one 1771-WG/WH swing-arm, Bottom; two 24-Pin ribbon cables
Dimensions	Depth: 168 mm; Height: 208 mm; Width: 32 mm

Specifications for DI 24 VDC Signal Conditioning Card	
Category	Specifications
Field Device Type	24 VDC Dry Contact
Number of Channels	16
Isolation	No Channel-to-Channel isolation
Nominal Input Current	4.5 mA @ 10 VDC, 15 mA @ 30 VDC
Minimum ON-state Voltage	10 VDC
Minimum OFF-state Voltage	5 VDC
Nominal Input Impedance	2.2 K $\Omega$ (Max.)
Input Voltage Range	10 to 30 VDC
Electrical Connections	Front; one 1771-WH swing-arm, Bottom; one 20-Pin ribbon cable
Dimensions	Depth: 168 mm; Height: 208 mm; Width: 32 mm



Specifications for DO 24 VDC Signal Conditioning Card	
Category	Specifications
Field Device Type	24 VDC High Side
Number of Channels	16
Isolation	Channel to system – Factory tested to 1000 VDC No channel-to-channel isolation
User Supply Voltage	10 to 60 VDC
Output Current Rating	2A per output. Not to exceed 8A per card
Maximum Surge Current	4A per output for 10ms, repeatable every 2 seconds 25A per card for 10ms, repeatable every 2 seconds
Maximum ON-state Voltage Drop	1.5 VDC at rated current
Minimum Load Current	2.5 mA per output
Maximum OFF-state Leakage Current	0.5 mA per output
Electrical Connections	Front; one 1771-WH swing-arm, Bottom; one 20-Pin ribbon cable
Dimensions	Depth: 168 mm; Height: 208 mm; Width: 32 mm

Specifications for DI 120 VAC Signal Conditioning Card	
Category	Specifications
Field Device Type	120 VAC Dry Contact
Number of Channels	16
Isolation	Channel to system – Isolated at 250 VAC No channel-to-channel isolation
Nominal Input Voltage	120 VAC @ 50/60 Hz, 125 VDC
Nominal Input Current	9.9 mA @ 120 VAC @ 60 Hz, 8.7 mA @ 120 VAC @ 50 Hz, 2.56 mA @ 125 VDC
ON-state Voltage Range	79 to 138 VAC/VDC
Maximum OFF-state Voltage	43 VAC/VDC
Input Impedance	11.2 kΩ @ 60 Hz
Input Signal Delay OFF to ON	Time delay jumper for 5 and 20 ms
Electrical Connections	Front; one 1771-WH swing-arm, Bottom; one 20-Pin ribbon cable
Dimensions	Depth: 168 mm; Height: 208 mm; Width: 32 mm

Specifications for DO 120 VAC Signal Conditioning Card	
Category	Specifications
Field Device Type	120 VAC High-Side
Number of Channels	16
Isolation	Channel to system – Isolated at 250 VAC No channel-to-channel isolation
Output Voltage Range	10 to 138 VAC @ 47-63Hz
Output Current Rating	2A per channel, not to exceed 8A per card
Maximum Surge Current	25A per output for 10ms, repeatable every 1 second 25A per card for 10ms, repeatable every 1 second
Maximum ON-state Voltage Drop	1.5V at load current = 50mA to 2A
ON-state Load Current	50 mA minimum per output
Maximum OFF-state Leakage Current	3.0mA at 138 VAC
Fusing	One fuse (10A / 250 VAC, Fast Acting, Cartridge, Ceramic, 3AB, 3AG, ¼" x 1-1/4"); LittleFuse P/N 0332010.HXP
Electrical Connections	Front; one 1771-WH swing-arm, Bottom; one 20-Pin ribbon cable
Dimensions	Depth: 168 mm; Height: 208 mm; Width: 32 mm

Common Environmental / Specifications for Round Ribbon Cables	
Category	Specifications
Operating temperature*	-20 to +70°C
Storage temperature	-20 to +70°C
Relative humidity	5 to 95% Non-Condensing
Airborne Contaminants	ISA-S71.04-1985 Airborne Contaminants Class G3 Conformal coating
Protection rating	IP 20
Allowed Cable lengths	0.5 to 10 meters
Wires / Pairs per Cable	50/25 or 20/10
Wire Gauge	0.14 mm <sup>2</sup> / 26 AWG

\* 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.

## Certifications

The following certifications are available for Signal Conditioning Cards for 1771 I/O Solutions:

- **European EMC Compliance (CE MARK).**
- **IEC61010-1 personal safety and Low Voltage Directive approval**
- **CAN/CSA C22.2 No.61010-1-12**

## Hazardous Area/Location

Signal Conditioning Cards for 1771 I/O can be installed and used based on the following Standards:

- **FM 3611-Class 1 Division 2 Non- Incendive where applicable**
- **ATEX Zone 2: EN 60079-0, EN 60079-7**
- **IECEX Zone 2: IEC 60079-0, IEC 60079-7**

## Ordering Information

Description	Model Number
Analog Input Signal Conditioning Card for 1771-IFE; 16-Channel, 4-20mA, field powered, non-isolated, single-ended, 21-position WG/WH swing-arms*	VE4306S1T1
Discrete Input Signal Conditioning Card for 1771-IAD; 16-Channel, 120 VAC/VDC, non-isolated, 21-position WH swing-arm*	VE4301S1T1
Discrete Output Signal Conditioning Card for 1771-OAD; 16-Channel, 120 VAC, non-isolated, 21-position WH swing-arm*	VE4302S1T1
Discrete Input Sinking Signal Conditioning Card for 1771-IBD; 16-Channel, 24 VDC, non-isolated, 21-position WH swing-arm*	VE4303S1T1
Discrete Output Sourcing Signal Conditioning Card for 1771-OBD; 16-Channel, 24 VDC, non-isolated, 21-position WH swing-arm*	VE4304S1T1
4-wide replacement I/O chassis (1771-A1B/B) mounting panel for Signal Conditioning cards for 1771 I/O	VE4300S0T1
8-wide replacement I/O chassis (1771-A2B/B) mounting panel for Signal Conditioning cards for 1771 I/O	VE4300S0T2
12-wide replacement I/O chassis (1771-A3B/B) mounting panel for Signal Conditioning cards for 1771 I/O	VE4300S0T3
12-wide replacement I/O chassis (1771-A3B1/B) mounting panel for Signal Conditioning cards for 1771 I/O	VE4300S0T4
16-wide replacement I/O chassis (1771-A4B/B) mounting panel for Signal Conditioning cards for 1771 I/O	VE4300S0T5

\*Ribbon cables, replacement I/O chassis mounting panel and DeltaV traditional I/O cards / mass-connection terminal blocks are sold separately.

## Spare Part Ordering Information

Description	Model Number
4-card hanger assembly for mounting on locally supplied cabinet mounting panels	VE4300S0T6

## Related 3rd Party Products

Ribbon cables are required between the Signal Conditioning Cards for 1771 I/O and the DeltaV Mass-Termination I/O terminal blocks. These are orderable directly from Phoenix Contact.

## Ribbon cables for Discrete Input / Discrete Output (DI/DO) Signal Conditioning Cards

Description	Phoenix Contact Information	
	Part Number	Part Type
20-pin Round Ribbon Cable 0.5m	2296391	FLK 20/EZ-DR/ 50KONFEK
20-pin Round Ribbon Cable 1.0m	2296401	FLK 20/EZ-DR/ 100KONFEK
20-pin Round Ribbon Cable 1.5m	2296472	FLK 20/EZ-DR/ 150KONFEK
20-pin Round Ribbon Cable 2.0m	2296485	FLK 20/EZ-DR/ 200KONFEK
20-pin Round Ribbon Cable 3.0m	2296498	FLK 20/EZ-DR/ 300KONFEK
20-pin Round Ribbon Cable 4.0m	2296508	FLK 20/EZ-DR/ 400KONFEK
20-pin Round Ribbon Cable 8.0m	2296524	FLK 20/EZ-DR/ 800KONFEK
20-pin Round Ribbon Cable 10.0m	2296537	FLK 20/EZ-DR/1000KONFEK

## Ribbon cables for Analog Input (AI) Signal Conditioning Cards

Description	Phoenix Contact Information	
	Part Number	Part Type
24-pin Round Ribbon Cable 0.5m	2906950	CABLE-2FLK24/2FLK24/DV/ 0,5M/S
24-pin Round Ribbon Cable 1.0m	2906951	CABLE-2FLK24/2FLK24/DV/ 1,0M/S
24-pin Round Ribbon Cable 1.5m	2906952	CABLE-2FLK24/2FLK24/DV/ 1,5M/S
24-pin Round Ribbon Cable 2.0m	2906954	CABLE-2FLK24/2FLK24/DV/ 2,0M/S
24-pin Round Ribbon Cable 3.0m	2906955	CABLE-2FLK24/2FLK24/DV/ 3,0M/S
24-pin Round Ribbon Cable 4.0m	2906956	CABLE-2FLK24/2FLK24/DV/ 4,0M/S
24-pin Round Ribbon Cable 8.0m	2906958	CABLE-2FLK24/2FLK24/DV/ 8,0M/S
24-pin Round Ribbon Cable 10.0m	2906959	CABLE-2FLK24/2FLK24/DV/ 10,0M/S

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