

# DeltaV™ Media Converters

- Facilitates deployment of Electronic Marshalling in the field
- Supports both single-mode and multi-mode fiber optic cable
- Redundant power supply connections
- Hazardous area certified models available
- Includes wire terminals for easy installation
- Works with both DeltaV and DeltaV SIS



*100 Mbit 1-port SM Media Converter makes it easier than ever to deploy Electronic Marshalling in the field.*

## Introduction

The DeltaV Media Converters provides an easy way to connect remote field enclosures with CHARM I/O Cards (CIOC) to the DeltaV Control Network. Fiber Optic cable can go longer distances than copper Ethernet cables and these media converters allow you to extend the DeltaV Control Network distances up to 15km.

The media converters change the means of communication from copper to fiber Ethernet and vice versa and facilitates easy connectivity using both Single-Mode and Multi-Mode Fiber Optic cable.

There are three different models of DeltaV Media Converters available with the following port options:

- Single-Mode Media Converter with one fiber port and one copper port
- Multi-Mode Media Converter with one fiber port and one copper port
- 2-Port SFP Media Converter with one copper port and 2 SFP cages that can be used for copper or fiber SFP modules (for safe area installation only)

All three DeltaV Media Converters come in a Dual Media Converter Assembly with a Dual Media Converter Carrier and two media converters. This facilitates easy deployment for redundant DeltaV Control Networks.

## Benefits

### **Facilitates deployment of Electronic Marshalling in the field:**

DeltaV with Electronic Marshalling can be installed in cabinets in control rooms but installing it in enclosures in the field will mean that the I/O is installed closer to the field devices and thus can reduce the distance between the field devices and where the wire is terminated to the control system. Many times fiber optic technology must be deployed in order to connect CHARM I/O Cards in field enclosures with the controllers located in the control room building. Emerson has switches that offer both copper and fiber optic Ethernet, but the DeltaV Media Converters are specialized devices that will convert from copper to fiber in order to make it easier to deploy Electronic Marshalling in the field. Some installations require use of copper IOPs on the CIOCs to facilitate daisy-chaining of Ethernet from one CIOC to the next – eliminating the requirement for switches. The media converters allow longer distances from the control room to a group of enclosures with CIOCs daisy-chained in the field.

**Supports multiple types of fiber optic:** Both Multi-Mode and Single-Mode fiber types are supported. Multi-Mode can go distances up to 2km and Single-Mode can go up to maximum 15km distance with proper installation.

**Redundant power supply connections:** The Dual Media Converter Carrier includes terminals for redundant 24V DC Power Supplies and the Media Converter have LED diagnostics that will indicate any failure in the power supply.

**Hazardous area certifications available:** The Single-Mode and Multi-Mode media converters have hazardous area certifications and can be mounted in Class 1, Div. 2 and Zone 2 hazardous areas. The 2-Port SFP Media Converter allows various SFP modules connected to the SFP cages on the media converters and therefore cannot be certified for hazardous installation.

**Includes wire terminals for Easy Installation:** Each Dual Media Converter Carrier includes terminals for redundant power supplies. These terminals are duplicated to allow daisy-chaining of the 24VDC power for easy installation. This reduces the need for a separate terminal block to feed power to additional Media Converters or CIOCs.

**Works with both DeltaV and DeltaV SIS:** There are many use cases for the DeltaV Media Converters covering both DCS and SIS installations. Although most uses in DCS applications will be to connect a CIOC to the DeltaV Control Network, it can also be used to connect Wireless I/O Cards, Ethernet I/O Cards, DeltaV Controllers, DeltaV Zone 2 Remote I/O etc.



For DeltaV SIS it can be used to connect the SZ Controller to the DeltaV Control Network, but it can also be used to connect CSLs to the SZ Controllers.

## Specifications

Common 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								
Shock	10g 1/2 sinewave for 11 ms								
Vibration	1mm Peak-to-Peak from 2 to 13.2HZ; 0.7g from 13.2 to 150HZ								
Protection Class	IP20								
Namur	NE21								
Dimensions	<table border="0"> <tr> <td>Media Converters:</td> <td>Dual Media Converter Carrier:</td> </tr> <tr> <td>Height: 98 mm</td> <td>Height 130 mm</td> </tr> <tr> <td>Width: 25 mm</td> <td>Width 107 mm</td> </tr> <tr> <td>Depth: 113 mm</td> <td>Depth: 47.5 mm</td> </tr> </table>	Media Converters:	Dual Media Converter Carrier:	Height: 98 mm	Height 130 mm	Width: 25 mm	Width 107 mm	Depth: 113 mm	Depth: 47.5 mm
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Height: 98 mm	Height 130 mm								
Width: 25 mm	Width 107 mm								
Depth: 113 mm	Depth: 47.5 mm								
Single-Mode Media Converter									
Power Requirement	+24V DC +/-20% @ 100mA maximum								
Copper-Wire Port	One 10/100 BASE-TX port with RJ45 connector, capable of half- and full-duplex operation.								
Fiber optic Ports	<ul style="list-style-type: none"> <li>■ One 100 BASE-FX single-mode port with LC connector, configured for full-duplex operation</li> <li>■ Power budget: At least 12 dBm on 9/125 micron SMF</li> <li>■ Distance range: 15km with proper installation</li> </ul>								
Multi-Mode Media Converter									
Power Requirement	+24V DC +/-20% @ 100mA maximum								
Copper-Wire Port	One 10/100 BASE-TX port with RJ45 connector, capable of half- and full-duplex operation.								
Fiber optic Ports	<ul style="list-style-type: none"> <li>■ One 100 BASE-FX multi-mode port with LC connector, configured for full-duplex operation</li> <li>■ Power budget: At least 8 dBm on 50/125 micron MMF or 11 dBm on 62.5/125 micron MMF</li> <li>■ Distance range: 2km with proper installation</li> </ul>								

2-Port SFP Media Converter																									
Power Requirement	+24V DC +/-20% @ 150mA maximum (2-Port version)																								
Copper-Wire Port	One 10/100 BASE-TX port with RJ45 connector, capable of half- and full-duplex operation.																								
Fiberoptic Ports	Two SFP cages to be used with 100 BASE-FX SFP modules – The following SFPs have been tested and need to be purchased separately.  <table border="1"> <thead> <tr> <th>Type</th> <th>Manufacturer</th> <th>PartNumber</th> </tr> </thead> <tbody> <tr> <td>MM</td> <td>Opticom</td> <td>SFP-155LX-AT2K-T</td> </tr> <tr> <td>MM</td> <td>Avago</td> <td>HFBR-57E5APZ</td> </tr> <tr> <td>MM</td> <td>IMC</td> <td>808-38102</td> </tr> <tr> <td>MM</td> <td>BLACKBOX</td> <td>LFP402</td> </tr> <tr> <td>SM</td> <td>Opticom</td> <td>SFP-155LX-AT20K-T</td> </tr> <tr> <td>SM</td> <td>Avago</td> <td>AFCT-5760ATLZ/ATPZ</td> </tr> <tr> <td>SM</td> <td>BLACKBOX</td> <td>LFP403</td> </tr> </tbody> </table>	Type	Manufacturer	PartNumber	MM	Opticom	SFP-155LX-AT2K-T	MM	Avago	HFBR-57E5APZ	MM	IMC	808-38102	MM	BLACKBOX	LFP402	SM	Opticom	SFP-155LX-AT20K-T	SM	Avago	AFCT-5760ATLZ/ATPZ	SM	BLACKBOX	LFP403
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### LED indications

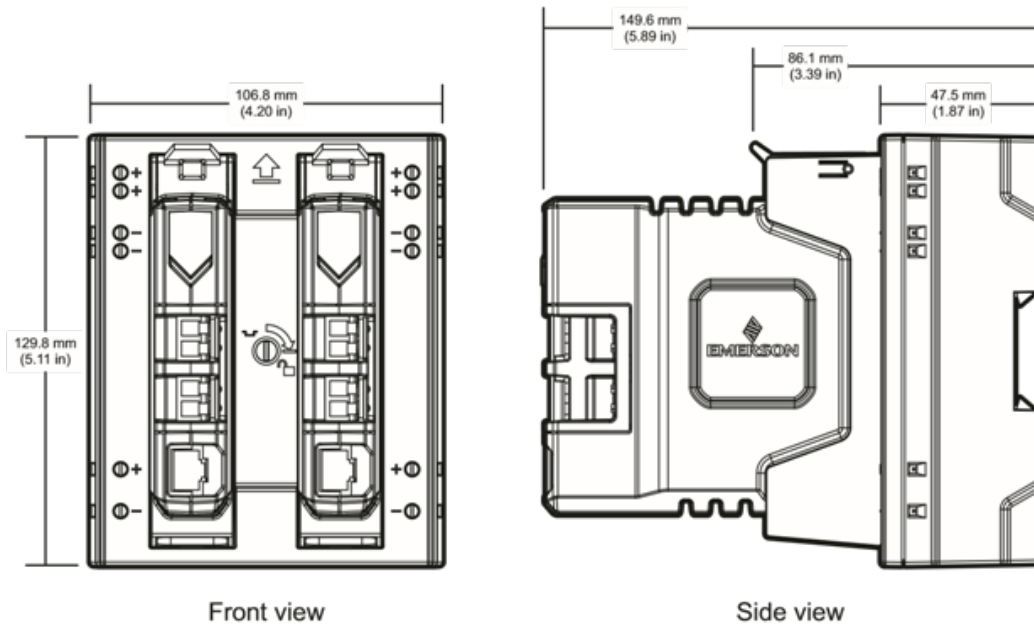
LED	Correct Operating Condition	Fault Condition	Fault Indication	Corrective Action
Green – Power on 	On	Off	System power is not supplied to the media converter due to a possible line power problem.	Check power connections.
			Internal fault	Contact Emerson technical support.
Red – Input voltage out of range 	Off	On (continuous)	The input voltage is outside the 24 V ± 10% range, or there is a loss of power on either primary or secondary.	Check power supply.

Power LED indications.

LED	Media Converter	Condition	Indication
Fiber-optic port top LED	100 Mbit 1-Port Media Converters	On	The port is ready for connection.
	100 Mbit 2-Port SFP Media Converter	On	An SFP module is inserted in this position.
Fiber-optic port bottom LED	All 100 Mbit Media Converters	On/Blinking	Link/activity is present on this port.
RJ45 port LED	All 100 Mbit Media Converters	On/Blinking	Link/activity is present on this port.

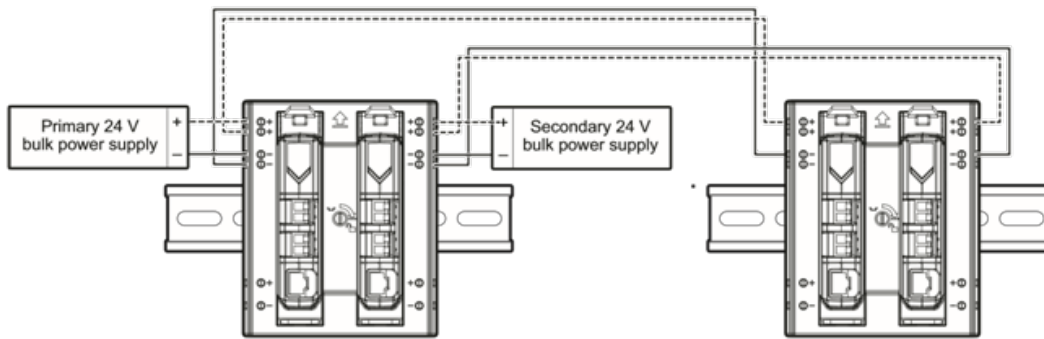
Port LED indications.

### Dimensions



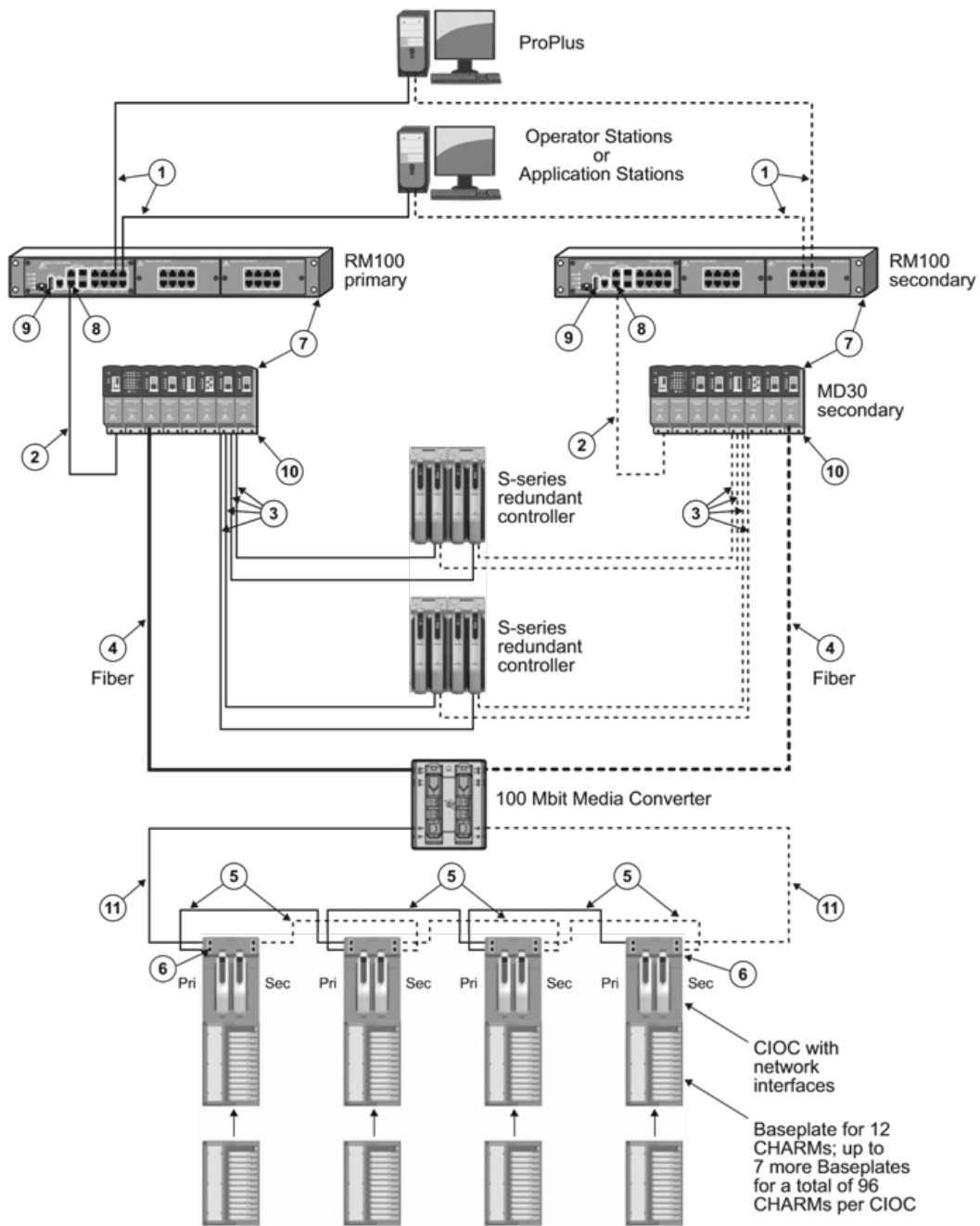
Dimensions of the Media Converters and Carrier.

### Wiring Diagrams

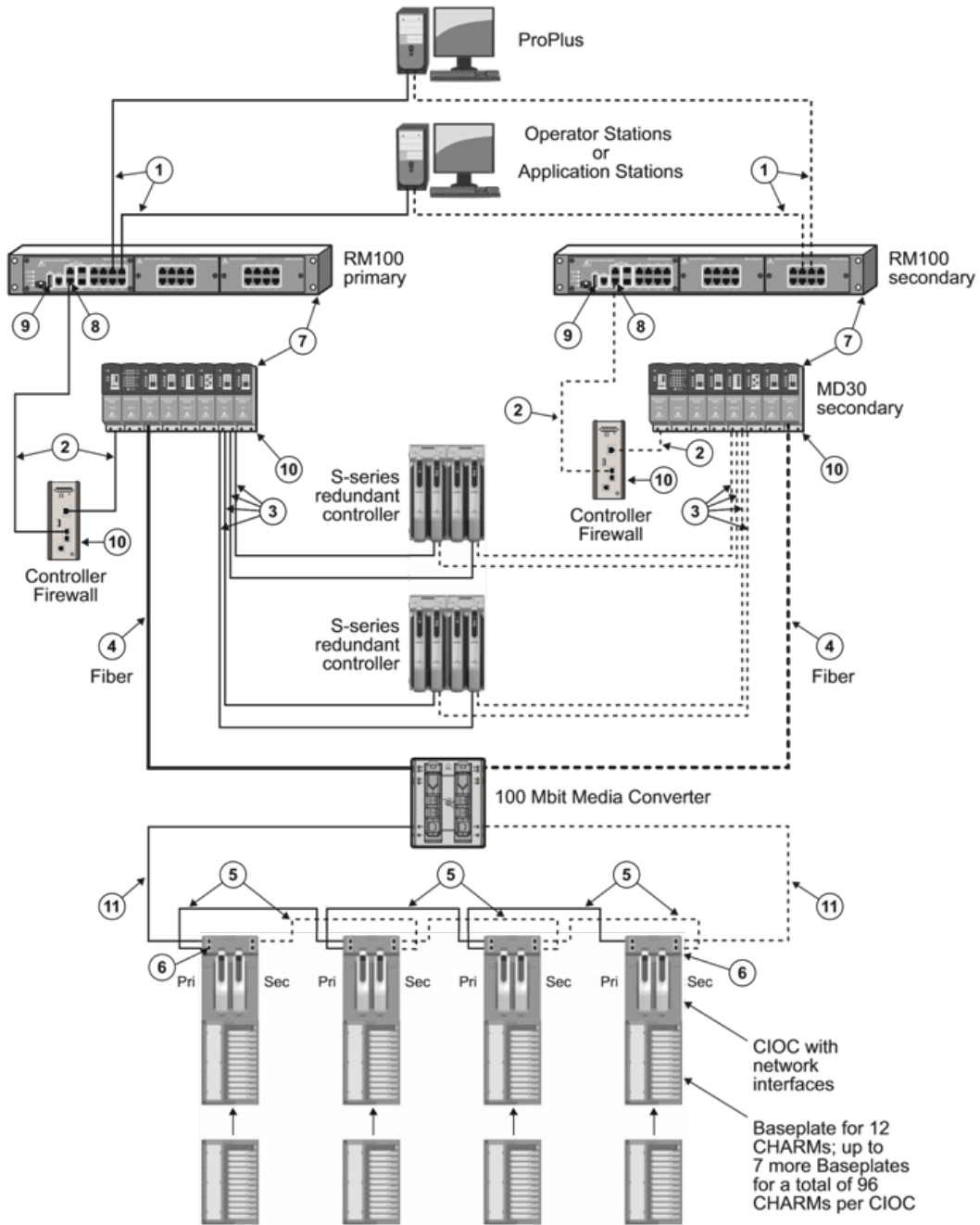


Powering two redundant pairs of Media Converters.

## Examples of using DeltaV Media Converters with DeltaV Smart Switches and Controller Firewalls



Example 1 - DeltaV Smart Switches with CHARMs I/O and DeltaV Media Converters.



Example 2 - DeltaV Smart Switches with CHARMs I/O, DeltaV Media Converters, and Controller Firewalls.

Callouts from architecture drawings above	
1	100 m (max) straight-through or crossover cable. To prevent ground loops, build this cable assembly with a shielded, metal-enclosed RJ45 connector on one end and an isolated, plastic-enclosed RJ45 connector on the other end. The metal connector end of this cable must be placed on the switch and not on the PC.
2	100 m (max) straight-through or crossover cable. To prevent ground loops, build this cable assembly with a shielded, metal-enclosed RJ45 connector on one end and an isolated, plastic-enclosed RJ45 connector on the other end. The metal connector end of this cable assembly can be placed on either end of the link.
3	100 m (max) straight-through or crossover cable. The shield on the controller's RJ45 connector connects only to a Faraday cage in the controller; not to the controller's DC ground. Therefore, the RJ45 connectors are floating and the single point of ground is made at the switch to which the controller is connected. Build this cable assembly with a shielded, metal-enclosed RJ45 connector on both ends.
4	Fiber-optic cable must be used for outdoor building-to-building communications to provide immunity from electromagnetic interference; for ground isolation between buildings; and to connect for distances greater than 100 m (328 ft). Either single-mode or multimode fiber-optic cable can be used with the appropriate DeltaV Smart Switches, but only multimode fiber-optic cable can be used with the fiber-optic I/O Port (IOP) on the CIOC Carrier. The 100 Mbit Media Converters are Ethernet switches, available with one RJ45 twisted-pair port and one of the following: <ul style="list-style-type: none"> <li>■ One LC single-mode fiber-optic port</li> <li>■ One LC multimode fiber-optic port</li> <li>■ Two small form-factor pluggable (SFP) slots for fiber-optic SFP transceivers</li> </ul>
5	100 m (max) straight-through or crossover cable. The shield on the CIOC's RJ45 connector connects only to a Faraday cage in the CIOC; not to the CIOC's DC ground. Therefore, the RJ45 connectors are floating and the single point of ground is made at the switch to which the CIOC is connected. In this figure, the CIOC cards are daisy-chained, so that the cable shield grounding is passed through from the first switch's shield ground to the first CIOC's shield ground and then from CIOC to CIOC throughout the chain. Note that the Primary and Secondary RJ45 shielded connectors are isolated from each other so there is no ground loop possible between Primary and Secondary shield grounds. CIOCs are daisy-chained in order to use short lengths of cable, for example within a cabinet, where the links are protected against damage. The cascade port, which is used to create the daisy-chain, is the lower port on the CIOC Carrier. It is recommended that for long lengths of cable, a star-wired connection from each CIOC back to the switch is used. Build this cable assembly with a shielded, metal-enclosed RJ45 connector on both ends.
6	The I/O ports on the CHARM I/O Carrier hold a control network port and a cascade port. The cascade port is the lower port. The image in CHARM I/O Carrier specifications shows the two ports. When the cascade port is used to daisy-chain the CIOCs, it is recommended that you use counter-rotating wiring to increase availability in case a CIOC fails. When counter rotating wiring is used, the primary control network connects to the first CIOC which is the CIOC on the left in the image and the secondary control network connects to the last CIOC which is the CIOC on the right in the image. Use 100 m (maximum) straightthrough or crossover cables. The shield on the CIOC's RJ45 connector connects only to a Faraday cage in the CIOC, not to the CIOC's DC ground. Therefore, the RJ45 connectors are floating and the single point of ground is made at the switch to which the CIOC is connected. Build this cable assembly with a shielded, metal-enclosed RJ45 connector on both ends.  The I/O ports are powered by the CIOCs installed in the carrier. If both CIOCs are removed from a CIOC carrier, enabled cascade ports become unpowered causing loss of communication to downstream CIOCs. Use redundant CIOCs if cascade ports are enabled to ensure that the cascade ports are powered and the CIOC is communicating with downstream CIOCs. In DeltaV Explorer, use the CIOC's Properties page to enable the cascade ports.
7	Any combination of DeltaV RM100, MD30, and FP20 Smart Switches can be daisy-chained in series up to 12 total.
8	If more than one RM100 or MD30 switch is required to increase port count in an area, use the gigabit uplink ports for the switch-to-switch connection to provide ample performance headroom on these aggregating links. 100mbit/s links can also be used for this purpose but normally those links are reserved for single devices on the edge of the network such as controllers and workstations. The RM100 and MD30 switches have two fixed 10/100/1000mbit/s uplink ports and two SFP uplink ports. The SFP ports can be fitted with optional fiber-optic SFP transceivers for long distance communications. Only two of the four uplinks in this area of the switch can be active at a time in any combination of twisted pair and SFP. Refer to the Smart Switch Product Data Sheet for available SFP fiber optic transceivers for the RM100 and MD30 switches.



## Callouts from architecture drawings above

9	The serial port is not required for process communications; it is used only for occasional out-of-band switch setup and management.
10	Use a ring tongue terminal to connect the ground screw on the switch or firewall to a suitable shield ground. This connection provides a ground for the twisted pair Ethernet shielded connectors.
11	100 m (max) straight-through or crossover cable. The shield on the CIOC RJ45 connector connects only to a Faraday cage in the CIOC; not to the CIOC's DC ground. Therefore, the RJ45 connectors are floating. The 100 Mbit Media Converter RJ45 connector is also floating.



## Certifications

The following certifications are available for DeltaV Media Converters:

- CE:
  - EMC - EN 61326-1
  - Low Voltage Directive (LVD) - 2014/35/EC
- FM:
  - FM 3600
  - FM 3611
  - FM 3810
- CSA:
  - CSA C22.2 No 213-M1987
  - CSA C22.2 No 1010-1
- ATEX:
  - ATEX 94/9/EC
  - EN60079-0
  - EN60079-15
- IEC-Ex:
  - IEC60079-0
  - IEC60079-15
- Marine Certifications: IACS E10
  - ABS Certificate of Design Assessment
  - DNV-GL Marine Certificate

## Hazardous Area/Location

DeltaV Media Converters can be installed and used based on the following Standards:

- 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:
  -  Ex nA IIC T4 Gc
- IEC-Ex:
  -  Ex nA IIC T4 Gc

*Regarding the installation instructions please refer to the following Documents:  
 Class 1 Division 2 Installation Instructions DeltaV Electronic Marshalling 12P5401  
 Zone 2 Installation Instructions DeltaV Electronic Marshalling 12P5403*

## Ordering Information

Description	Model Number
Dual Single Mode Media Converter Assembly, includes Dual Media Converter Carrier and two 1-port Single Mode Media Converters.	VE6060
Dual Multi Mode Media Converter Assembly, includes Dual Media Converter Carrier and two 1-port Multi Mode Media Converters.	VE6061
Dual 2-port SFP Media Converter Assembly, includes Dual Media Converter Carrier and two 2-port SFP Media Converters.	VE6062*

\*Only suitable for safe area installations. SFPs must be ordered separately and is not available directly from Emerson.

## Spare Part Ordering Information

Description	Model Number
Dual Media Converter Carrier	KL1720X1-BA1
1-port Single Mode Media Converter	KL1720X1-BB1
1-port Multi Mode Media Converter	KL1720X1-BC1
2-Port SFP Media Converter	KL1720X1-BD1*

\*Only suitable for safe area installations. SFPs must be ordered separately and is not available directly from Emerson.

### Emerson

#### North America, Latin America:

+1 800 833 8314 or  
+1 512 832 3774

#### Asia Pacific:

+65 6777 8211

#### Europe, Middle East:

+41 41 768 6111

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