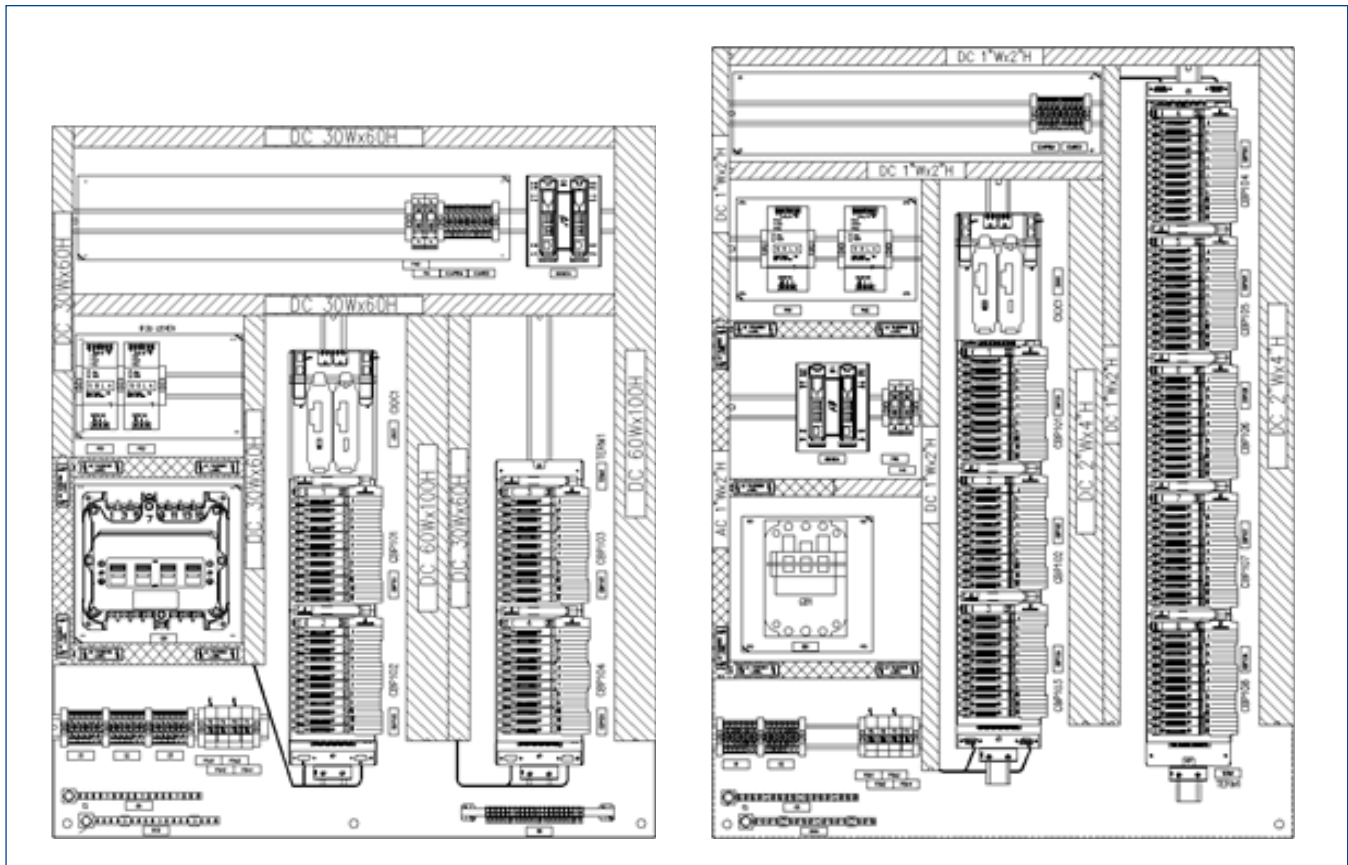


# CTO CHARM Field Enclosure



Configure to Order (CTO) CHARM Field Enclosures.

- Delivers Electronic Marshalling enabled by CHARacterization Modules (CHARM) technology
- Reduce system footprint
- Eliminate I/O home run cables
- Significantly reduce cabinet design engineering
- Fully documented package

## Introduction

The Delta™ CTO CHARM Field Enclosures provide an off-the-shelf solution for faster project execution and reduced installation costs. Field Enclosures are factory tested products and ready for installation in the field. Electronic Marshalling eliminates traditional I/O design tasks and allows field wiring to start long before control strategies are finalized.

The field enclosures are designed for hazardous areas and harsh environments, from extreme temperatures to corrosive gases.

## Benefits

**Delivers Electronic Marshalling enabled by CHARMS technology:** The CHARM Field Enclosures offer the full benefits of Electronic Marshalling. The individual channels can be defined for any combination of field signal type, as required by the process equipment. This allows for 100 % utilization of channels, regardless of the I/O signal mix. Late changes are easily accommodated with minimal re-engineering and no rewiring.

**Reduce system footprint:** Equipment room footprint is greatly reduced by replacing traditional marshalling cabinets with field mounted I/O cards.

**Eliminate I/O home run cables:** Field instrumentation wiring is reduced to the signal pair that connects the field device to the Field Enclosure. Save on home run multi-core cables, cable trays, associated engineering, and documentations.

**Significantly reduce cabinet design engineering:** The CHARM Field Enclosures are pre-engineered and factory tested. The I/O flexibility allows the same design to serve a wide variety of I/O signals, conditioned individually by the CHARM. Field wiring design is complete at the terminal block.

**Fully documented package:** Each Field Enclosure is supplied with full documentation and engineering drawings showing internal lay-out, bill of materials, and internal wiring. They are designed to meet local building code and industry best practices in order to deliver proven functionality with minimal costs.

## Description

The CTO CHARM Field Enclosures offering comprises a range of pre-engineered solutions based on industry standard, wall mounting enclosures that are available in AC-powered and DC-powered version with space for 48 or 96 CHARM I/O depending on the model chosen.

The designs have considered specific requirements related to outdoor installation in the field, including environmental protection, heat dissipation, power and grounding requirements, and installation in hazardous areas.

All components are prewired and tested at the factory. Simply select the required DeltaV Electronic Marshalling equipment and the enclosure is ready to install, connect the field wiring, power and network cables. Install needed CHARMS to commission your loops and autosense the hardware into your DeltaV system.

Before delivery, each field enclosure undergoes a full in-house inspection and test, to assure that it is fully operational before leaving the factory. Electronic Marshalling eliminates the need for custom designs. These enclosures can be ordered, together with the DeltaV Electronic Marshalling equipment and CHARM I/O and delivered directly to site to begin field wiring (Factory Acceptance Test (FAT) with client may be optional).

The CTO CHARM Field Enclosures are ordered by selecting a base enclosure model and required options to meet specific project needs.

A range of base enclosure models are available:

- For different I/O quantities: 48 or 96 I/O's.
- For different power distribution needs: DC-Powered or AC-Powered.
- For different environmental requirements: Safe Area or Hazardous Area.
- For different electrical codes/regulations (world areas): Europe and US/Canada.

Each base model is further explained in the coming sections.

Configurable options include the type of CHARMS (I.S. or non I.S.), network (Fiberoptic or Copper), enclosure material, cable entry, nameplate engraving, injected power, heater, etc.

## System planning

Electronic Marshalling changes the game with respect to control system I/O planning. The field I/O wiring can be designed independently from the control strategy design, allowing E&I engineers to determine the number and type of I/O based on the process design.

- Count the I/O requirements and determine the number of CHARM Field Enclosures you need.
- Determine whether the enclosure is for a safe area or hazardous area.
- Plan the power distribution and install the enclosures.
- Wire the field devices and commission them.
- When control strategies and associated controller hardware is finalized, simply assign the I/O signals to the controllers as needed, no wiring changes. You can change controller I/O assignments with the click of a mouse, without touching a wired connection.

## CHARM Field Enclosures

All CHARM Field Enclosures come with the following equipment installed:

- Power distribution and isolation components for primary and secondary 24V DC Power to CHARM I/O Cards.
- AC power feeds with redundant AC/DC 24V DC bulk power supplies.
  - or -
  - 24V DC power distribution from remote.*
- Halogen-Free wire ducts.
- Grounding bars for CG (Chassis Ground) and DC Reference Ground.
- Reference.
- Name Plate.
- Removable Gland Plate (5mm).

Enclosures are designed for bottom entry for all cables (power, network, and I/O signals)

The CTO CHARM Field Enclosures support all available low voltage CHARM I/O types with 24V DC bussed field power.

*CHARM I/O Cards (CIOC), Non-standard CHARM terminal blocks, and CHARMs are not included and are to be ordered separately.*

## CTO Options

For a particular base enclosure model, a number of pre-engineered CTO options can be specified. These options include:

- Type of CHARMs:
  - 48IO (Non-IS)/ 48IO (IS)/ 48IO with 24 (IS)+24(Non-IS)
  - 96IO (Non-IS)/ 96IO (IS)/ 96IO with 60(IS)+36 (Non-IS)
  - Actual CHARMs to be ordered separately.
- Enclosure material: stainless steel SS304 or SS316L. Stainless steel provides protection for corrosive environments (category CSA TYPE 4X). SS316L provides superior corrosive protection and is typically applied in off-shore applications (salt resistant).

- Pre-drilled bottom entry with Nickel Plated Brass wire glands for I/O, power, communications and grounding cables. With standard drill pattern (with stop plugs). Or cable transit system with flexible cable gland blocks that are installed in a cable entry frame.
- Name plate engraved with custom supplied cabinet identification information.
- 24V DC power distribution for injected power or 4-wire transmitter power: 8 or 12 fused circuits, prewired to all base plates. (Selecting this option, upgrades the power supplies and includes a redundancy diode to bring primary and secondary power feeds to a common injected power distribution).
- Heaters, for extreme low temperature installations.
- Blue marking for wire ducts.
- Breather: Brass Ni plated / SS316L.
- Ethernet: Fiberoptic / Copper.
- Warning label languages other than standard English, French, Spanish, and German.

All CTO options are implemented, tested and shipped to site as one package, significantly reducing the required upfront design and certification effort.

The following sections provide a more detailed specification for the CTO CHARM Field Enclosures and available options.

Overview of CHARM Field Enclosures – Base Models:

Base Model No.	Description	No. CHARM IO	Power Requirements (Prim and Sec)	Permitted Location / World Area
EU-FE-48-DC-CIOC-SA	DC Powered Field Enclosure for 48 CHARM I/O; CE; Safe Area Locations.	48	24V DC	Safe Area CE (Europe)
NA-FE-48-DC-CIOC-SA	DC Powered Field Enclosure for 48 CHARM I/O; NEC/CEC Ordinary Locations.	48	24V DC	Safe Area (US/Canada)
EU-FE-48-DC-CIOC-HA	DC Powered Field Enclosure for 48 CHARM I/O; CE; ATEX; IECEx, Zone 2 Locations.	48	24V DC	Hazardous Area ATEX/IECEx Zone 2
NA-FE-48-DC-CIOC-HA	DC Powered Field Enclosure for 48 CHARM I/O; NEC/CEC Hazardous Locations; Class I, Division 2; Class I, Zone 2.	48	24V DC	Hazardous Area (US/Canada)
EU-FE-48-AC-CIOC-SA	AC Powered Field Enclosure for 48 CHARM I/O; CE; Safe Area Locations.	48	120/230V AC	Safe Area CE (Europe)
NA-FE-48-AC-CIOC-SA	AC Powered Field Enclosure for 48 CHARM I/O; NEC/CEC Ordinary Locations.	48	115V AC	Safe Area (US/Canada)
EU-FE-48-AC-CIOC-HA	AC Powered Field Enclosure for 48 CHARM I/O; CE; ATEX; IECEx, Zone 2 Locations.	48	120/230V AC	Hazardous Area ATEX/IECEx Zone 2
NA-FE-48-AC-CIOC-HA	AC Powered Field Enclosure for 48 CHARM I/O; NEC/CEC Hazardous Locations; Class I, Division 2; Class I, Zone 2.	48	115V AC	Hazardous Area (US/Canada)
EU-FE-96-AC-CIOC-SA	AC Powered Field Enclosure for 96 CHARM I/O; CE; Safe Area Locations.	96	120/230V AC	Safe Area CE (Europe)
NA-FE-96-AC-CIOC-SA	AC Powered Field Enclosure for 96 CHARM I/O; NEC/CEC Ordinary Locations.	96	115V AC	Safe Area (US/Canada)
EU-FE-96-AC-CIOC-HA	AC Powered Field Enclosure for 96 CHARM I/O; CE; ATEX; IECEx, Zone 2 Locations.	96	120/230V AC	Hazardous Area ATEX/IECEx Zone 2
NA-FE-96-AC-CIOC-HA	AC Powered Field Enclosure for 96 CHARM I/O; NEC/CEC Hazardous Locations; Class I, Division 2; Class I, Zone 2.	96	115V AC	Hazardous Area (US/Canada)
EU-FE-96-AC-VLV-SA	AC Powered Indoor Field Enclosure with 60 CHARM I/O and ASCO Valve Island; CE; Safe Area Locations	60	24V DC	Safe Area CE (Europe)
EU-FE-96-DC-VLV-SA	DC Powered Indoor Field Enclosure with 60 CHARM I/O and ASCO Valve Island; CE; Safe Area Locations	60	120/230V AC	Safe Area CE (Europe)

Overview of CHARM Field Enclosures.

The CTO base model reference for field enclosures uses the following naming convention:

"EU or NA-FE-XX-YY-CIOC-ZZ", where

- EU = Europe Design Standards and Regulations or NA = US/Canada Design Standards and Regulations.
- XX = maximum I/O's count in this CTO model.
- YY = Incoming Power, DC: 24V DC or AC: 120/230V AC/115V AC.
- CIOC = short description of content and purpose.
- ZZ = SA: for use in Safe Area, HA: for use in Hazardous Area (Class 1 Div 2 or Class 1 Zone 2)

Overview of CHARM Field Enclosures base models and options for EUROPE World Area

- : Default option setting
- o: Configure to option setting. (Different from Default)
- ☐: Intentionally left blank to fill in your configuration choices

			Base Model				EU-FE-48-DC-CIOC-SA	EU-FE-48-DC-CIOC-HA	EU-FE-48-AC-CIOC-SA	EU-FE-48-AC-CIOC-HA	EU-FE-96-AC-CIOC-SA	EU-FE-96-AC-CIOC-HA	EU-FE-96-DC-VIV-SA	EU-FE-96-AC-VIV-SA
			#CHARM I/O	48IO	48IO	48IO	48IO	96IO	96IO	96IO	96IO			
			Power Input (230V AC / 24V DC)	DC	DC	AC	AC	AC	AC	DC	DC	DC	AC	
			Location (Safe Area -SA, Hazardous Area -HA)	SA	HA	SA	HA	SA	HA	SA	HA	SA	SA	
			Certification as per World Area	CE	ATEX	CE	ATEX	CE	ATEX	CE	ATEX	CE	CE	
Enclosure Options			Enclosure Options				Options Selection							
Enclosure Material	A	1	Stainless Steel SS304 with single gland plate	•	•	•	•	•	•	•	•	•	•	
		2	Stainless Steel SS316L with single gland plate	o	o	o	o	o	o	o	o	o	o	
		3	Hygienic Design enclosure	NA							o	o		
Cable Entry	B	1	Undrilled Gland Plate	•	•	•	•	•	•	•	•	•	•	
		2	Gland Plate with Standard Drill Pattern	o	o	o	o	o	o	o	o	o	o	
		3	Gland Plate with Roxtec Glands	o	o	o	o	o	o	NA				
Type of CHARMs	C1	1	48IO - NONIS	•	•	•	•	NA						
		2	48IO - IS	o	o	o	o							
		3	24IO (IS) + 24IO (NONIS)	o	o	o	o							
	C2	1	96IO - NONIS	NA				•	•	NA				
		2	96IO - IS					o	o					
		3	60IO (IS) + 36IO (NONIS)					o	o					
C3	1	60IO - NONIS					NA		•	•				
	2	60IO - IS							o	o				
24V DC Injected power	D1	1	No (5A Power Supply)	•	•	•	•	NA						
		2	Yes (8 Circuit - 10Amp Power Supply + Diode)	o	o	o	o							
	D2	1	No (10A Power Supply)	NA				•	•	•	•			
		2	Yes (12 Circuits - 20Amp Power Supply + Diode)					o	o	o	o			
Ethernet - Safety Network	E	1	Multimode Fibre Optic w / Adapter	•	•	•	•	•	•	NA				
		2	Multimode Fibre Optic w / Splice Cassettes	o	o	o	o	o	o					
		3	Single-mode Fibre Optic w / Adapter	o	o	o	o	o	o					
		4	Single-mode Fibre Optic w / Splice Cassettes	o	o	o	o	o	o					
		5	Copper	o	o	o	o	o	o	•	•			
		6	Fiber Optic (Single Mode IOP)	NA							o	o		
Heater	F	1	No	NA			•	•	•	•	NA			
		2	Single Heater				o	o	o	o				
		3	Two Heaters				o	o	NA					
		4	Three Heaters				NA		o	o				
Warning Label Languages	G	1	English + French + German + Spanish	•	•	•	•	•	•	•	•	•	•	
		2	English + French + German + User Specific Language	o	o	o	o	o	o	o	o	o	o	
		3	English + French + Spanish + User Specific Language	o	o	o	o	o	o	o	o	o	o	
Type of Valve Island	H	1	12 Coil Standard Configuration Valve Island	NA							•	•		
		2	12 Coil Custom Configuration Valve Island								o	o		
		3	24 Coil Standard Configuration Valve Island								o	o		
		4	24 Coil Custom Configuration Valve Island								o	o		
		5	32 Coil Custom Configuration Valve Island								o	o		
		6	32 Coil Standard Configuration Valve Island								o	o		
WIOC	I	1	No	NA				•	•	NA				
		2	Yes (reduces qty of CHARM baseplates by 2)					o	o					

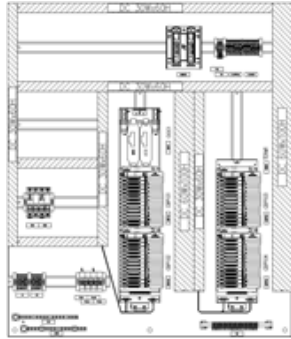
Overview of CHARM Field Enclosures base models and options for US/Canada World Area

- : Default option setting
- o : Configure to option setting. (Different from Default)
- ☐ : Intentionally left blank to fill in your configuration choices

Base Model	NA-FE-48-DC-CIIOC-SA	NA-FE-48-DC-CIIOC-HA	NA-FE-48-AC-CIIOC-SA	NA-FE-48-AC-CIIOC-HA	NA-FE-96-AC-CIIOC-SA	NA-FE-96-AC-CIIOC-HA
#CHARM I/O	48IO	48IO	48IO	48IO	96IO	96IO
Power Input (110 VAC / 24 VDC)	DC	DC	AC	AC	AC	AC
Location (Safe Area -SA, Hazardous Area - HA)	SA	HA	SA	HA	SA	HA
Certification as per World Area	cCSAus	cCSAus	cCSAus	cCSAus	cCSAus	cCSAus

Enclosure Options				Enclosure Options	Options Selection						
Enclosure Material	A	1	☐	Stainless Steel SS304 with single gland plate	•	•	•	•	•	•	
		2	☐	Stainless Steel SS316L with single gland plate	o	o	o	o	o	o	
Cable Entry	B	1	☐	Undrilled Gland Plate	•	•	•	•	•	•	
		2	☐	Gland Plate with Standard Drill Pattern	o	o	o	o	o	o	
		3	☐	Gland Plate with Roxtec Glands	o	o	o	o	o	o	
Type of CHARMs	C1	1	☐	48IO - NONIS	•	•	•	•	NA		
		2	☐	48IO - IS	o	o	o	o			
		3	☐	24IO (IS) + 24IO (NONIS)	o	o	o	o			
	C2	1	☐	96IO - NONIS	NA				•	•	
		2	☐	96IO - IS					o	o	
		3	☐	60IO (IS) + 36IO (NONIS)					o	o	
C3	1	☐	60IO - NONIS	NA				NA			
	2	☐	60IO - IS								
24V DC Injected power	D1	1	☐	No (5A Power Supply)	•	•	•	•	NA		
		2	☐	Yes (8 Circuit - 10Amp Power Supply + Diode)	o	o	o	o			
	D2	1	☐	No (10A Power Supply)	NA				•	•	
		2	☐	Yes (12 Circuits - 20Amp Power Supply + Diode)					o	o	
Ethernet - Safety Network	E	1	☐	Multimode Fibre Optic w / Adapter	•	•	•	•	•	•	
		2	☐	Multimode Fibre Optic w / Splice Cassettes	o	o	o	o	o	o	
		3	☐	Single-mode Fibre Optic w / Adapter	o	o	o	o	o	o	
		4	☐	Single-mode Fibre Optic w / Splice Cassettes	o	o	o	o	o	o	
		5	☐	Copper	o	o	o	o	o	o	
		6	☐	Fiber Optic (Single Mode IOP)	NA						
Heater	F	1	☐	No	NA			•	•	•	•
		2	☐	Single Heater				o	o	o	o
		3	☐	Two Heaters				o	o	NA	
		4	☐	Three Heaters				NA		o	o
Warning Label Language	G	1	☐	English + French + German + Spanish	•	•	•	•	•	•	
		2	☐	English + French + German + User Specific Language	o	o	o	o	o	o	
		3	☐	English + French + Spanish + User Specific Language	o	o	o	o	o	o	
Surge Protection Device (for non-CSLS Field Enclosures)	H	1	☐	No	NA			•	•	•	•
		2	☐	Yes				o	o	o	o

Enclosure Options			Enclosure Options	Options Selection		
Type of Valve Island	I	1	12 Coil Standard Configuration Valve Island	NA		
		2	12 Coil Custom Configuration Valve Island			
		3	24 Coil Standard Configuration Valve Island			
		4	24 Coil Custom Configuration Valve Island			
		5	32 Coil Custom Configuration Valve Island			
		6	32 Coil Standard Configuration Valve Island			
WIOC	J	1	No	NA	•	•
		2	Yes (Reduces qty of CHARM baseplates by 2)		○	○

EU-FE-48-DC-CIOC-SA	
Material (*)	Stainless Steel SS304, 1.5 mm
Dimensions	915mm (W) x 1070mm (H) x 325mm (D)
Access	Single door, left hand hinged
Protection Category (*)	IP 66 – Type 4X (Corrosive Environment)
Cable Entry (*)	Bottom, single gland plate
Name Plate (*)	Outside Door: laser engraved plastic
Weight	~ 125 kg
Certifications	CE, installation in Safe Area Locations
Power Requirements – Internal Power Distribution.	<p>Primary and secondary 24 VDC power to be supplied from outside the Field Enclosure.</p> <p>Includes full redundant (primary and secondary) 24 VDC distribution through power terminals and circuit breakers.</p>
Control Network (*)	<p><b>Redundant Single Mode or Multi-Mode FO Converter:</b> One 100 BASE-FX, Single Mode or Multi-mode port with LC Connector.</p> <p><b>Fiber Optic control network Includes:</b> FO to Copper Converter (MM or SM), SC adaptors, SC-LC FO patch cables, Multimode 50/125-micron core/cladding diameters (OM2) or Single mode 9/125-micron cable.</p>
Example Layout and Installed DeltaV CHARM Equipment (*) 	<p>This field enclosure has space for 48 CHARM I/O channels, including:</p> <ul style="list-style-type: none"> <li>■ 1 x CHARM I/O Carrier with redundant copper Ethernet connectors.</li> <li>■ 4 x CHARM Base Plates and address plugs.</li> <li>■ 48 x CHARM standard terminal blocks - Screw type.</li> <li>■ Base Plate and Channel Identifier Labels.</li> </ul> <p><b>No DeltaV equipment is included in the base model. All DeltaV equipment is to be specified separately through the Emerson quoting tools.</b></p>
Other	Mounting plate, Halogen-Free wire ducts, external wall mounting brackets, door clamps, ground bars, external grounding bolt, drip edge, breather-drain.

(\*) Specifications given for the base model with default option settings. For other available configurations: see Overview of CTO Options.

Specifications for EU-FE-48-DC-CIOC-SA.

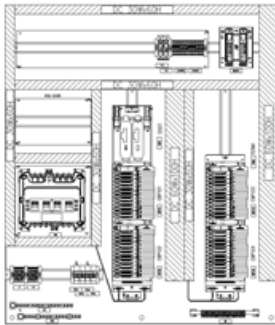


NA-FE-48-DC-CIOC-SA	
Material (*)	Stainless Steel SS304, 1.5 mm
Dimensions	915mm (W) x 1070mm (H) x 325mm (D)
Access	Single door, left hand hinged
Protection Category (*)	IP 66 – Type 4X (Corrosive Environment)
Cable Entry (*)	Bottom, single gland plate
Name Plate (*)	Outside Door: laser engraved plastic
Weight	~ 125 kg
Certifications	cCSAus for Ordinary Locations
Power Requirements – Internal Power Distribution.	Primary and secondary 24 VDC power to be supplied from outside the Field Enclosure.  Includes full redundant (primary and secondary) 24 VDC distribution through power terminals and circuit breakers.
Control Network (*)	<b>Redundant Single Mode or Multi-Mode FO Converter:</b> One 100 BASE-FX, Single Mode or Multi-mode port with LC Connector.  <b>Fiber optic control network includes:</b> FO to Copper Converter (MM or SM), SC adaptors, SC-LC FO patch cables, Multimode 50/125-micron core/cladding diameters (OM2) or Single mode 9/125-micron cable.
Example Layout and Installed DeltaV CHARM Equipment (*)	This field enclosure has space for 48 CHARM I/O channels, including: <ul style="list-style-type: none"> <li>■ 1 x CHARM I/O Carrier with redundant copper Ethernet connectors.</li> <li>■ 4 x CHARM Base Plates and address plugs.</li> <li>■ 48 x CHARM standard terminal blocks - Screw type.</li> <li>■ Base Plate and Channel Identifier Labels.</li> </ul> <p><b>No DeltaV equipment is included in the base model. All DeltaV equipment is to be specified separately through the Emerson quoting tools.</b></p>
Other	Mounting plate, Halogen-Free wire ducts, external wall mounting brackets, door clamps, ground bars, external grounding bolt, drip edge, breather-drain.

(\*) Specifications given for the base model with default option settings. For other available configurations: see Overview of CTO Options.

Specifications for NA-FE-48-DC-CIOC-SA.

EU-FE-48-DC-CIOC-HA	
Material (*)	Stainless Steel SS304, 1.5 mm
Dimensions	915mm (W) x 1070mm (H) x 325mm (D)
Access	Single door, left hand hinged
Protection Category (*)	IP 66 – Type 4X (Corrosive Environment)
Cable Entry (*)	Bottom, single gland plate
Name Plate (*)	Outside Door: laser engraved plastic
Weight	~ 135 kg
Certifications	ATEX, IECEx; Ex d e ic nA nC [op is Ga] IIC T4 Gc for NON-IS CHARMS ATEX, IECEx; Ex d e [ia Ga] [ic] nA nC [op is Ga] IIC T4 Gc for IS CHARMS
Power Requirements – Internal Power Distribution	Primary and secondary 24 VDC power to be supplied from outside the Field Enclosure. Includes full redundant (primary and secondary) 24 VDC distribution through power terminals and circuit breakers.
Control Network (*)	<b>Redundant Single Mode or Multi-Mode FO Converter:</b> One 100 BASE-FX, Single Mode or Multi-mode port with LC Connector. <b>Fiber Optic control network Includes:</b> FO to Copper Converter (MM or SM), SC adaptors, SC-LC FO patch cables, Multimode 50/125-micron core/cladding diameters (OM2) or Single mode 9/125-micron cable.
Example Layout and Installed DeltaV CHARM Equipment (*)	This field enclosure has space for 48 CHARM I/O channels, including: <ul style="list-style-type: none"> <li>■ 1 x CHARM I/O Carrier with redundant copper Ethernet connectors.</li> <li>■ 4 x CHARM Base Plates and address plugs.</li> <li>■ 48 x CHARM standard terminal blocks - Screw type.</li> <li>■ Base Plate and Channel Identifier Labels.</li> </ul> <p><b>No DeltaV equipment is included in the base model. All DeltaV equipment is to be specified separately through the Emerson quoting tools.</b></p>
Other	Mounting plate, Halogen-Free wire ducts, external wall mounting brackets, door clamps, ground bars, external grounding bolt, drip edge, breather-drain.



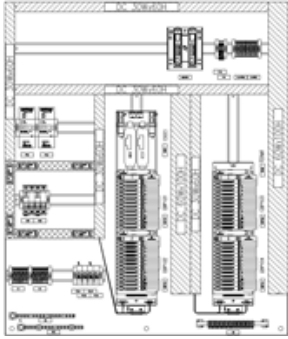
(\*) Specifications given for the base model with default option settings. For other available configurations: see Overview of CTO Options.

Specifications for EU-FE-48-DC-CIOC-HA.

NA-FE-48-DC-CIOC-HA	
Material (*)	Stainless Steel SS304, 1.5 mm
Dimensions	915mm (W) x 1070mm (H) x 325mm (D)
Access	Single door, left hand hinged
Protection Category (*)	IP 66 – Type 4X (Corrosive Environment)
Cable Entry (*)	Bottom, single gland plate
Name Plate (*)	Outside Door: laser engraved plastic
Weight	~135 kg
Certifications	cCSAus for Hazardous Locations; Non-IS CHARMS: Class I, Division 2, Groups B, C and D; Class I, Zone 2, A/Ex e d ic nA nC IIB+H2 T4 Gc IS CHARMS: Class I, Division 2, Groups A, B, C and D; Class I, Zone 2, A/Ex e d ic nA nC [ia IIC Ga] [ic IIC Gc] IIB+H2 T4 Gc
Power Requirements – Internal Power Distribution	Primary and secondary 24 VDC power to be supplied from outside the Field Enclosure.  Includes full redundant (primary and secondary) 24 VDC distribution through power terminals and circuit breakers.
Control Network (*)	<b>Redundant Single Mode or Multi-Mode FO Converter:</b> One 100 BASE-FX, Single Mode or Multi-mode port with LC Connector.  <b>Fiber Optic control network Includes:</b> FO to Copper Converter (MM or SM), SC adaptors, SC-LC FO patch cables, Multimode 50/125-micron core/cladding diameters (OM2) or Single mode 9/125-micron cable.
Example Layout and Installed DeltaV CHARM Equipment (*)	This field enclosure has space for 48 CHARM I/O channels, including: <ul style="list-style-type: none"> <li>■ 1 x CHARM I/O Carrier with redundant copper Ethernet connectors.</li> <li>■ 4 x CHARM Base Plates and address plugs.</li> <li>■ 48 x CHARM standard terminal blocks - Screw type.</li> <li>■ Base Plate and Channel Identifier Labels.</li> </ul> <p><b>No DeltaV equipment is included in the base model. All DeltaV equipment is to be specified separately through the Emerson quoting tools.</b></p>
Other	Mounting plate, Halogen-Free wire ducts, external wall mounting brackets, door clamps, ground bars, drip edge, breather-drain.

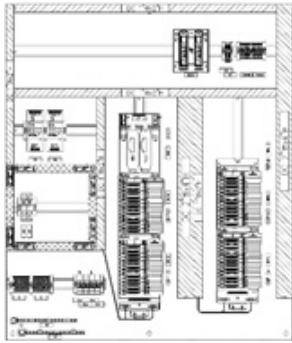
(\*)Specifications given for the base model with default options. WIOC is optional. For other available configurations: see Overview of CTO Options.

Specifications for NA-FE-48-DC-CIOC-HA.

EU-FE-48-AC-CIOC-SA	
Material (*)	Stainless Steel SS304 1.5 mm
Dimensions	915mm (W) x 1070mm (H) x 325mm (D)
Access	Single door, left hand hinged
Protection Category (*)	IP 66 – Type 4X (Corrosive Environment)
Cable Entry (*)	Bottom, single gland plate
Name Plate (*)	Outside Door: laser engraved plastic
Weight	~125 kg
Certifications	CE, installation in Safe Area Locations
Power Requirements – Internal Power Distribution	<p>Primary and secondary 120/230 VAC power supply supplied from outside the Field Enclosure.</p> <p>Redundant 120/230 VAC distribution through power terminals, and circuit breakers. 24 VDC bulk power supplies: 2 x 5A and full redundant (primary and secondary) 24 VDC distribution.</p>
Control Network (*)	<p><b>Redundant Single Mode or Multi-Mode FO Converter:</b> One 100 BASE-FX, Single Mode or Multi-mode port with LC Connector.</p> <p><b>Fiber Optic control network includes:</b> FO to Copper Converter (MM or SM), SC adaptors, SC-LC FO patch cables, Multimode 50/125-micron core/cladding diameters (OM2) or Single mode 9/125-micron cable.</p>
Example Layout and Installed DeltaV CHARM Equipment (*) 	<p>This field enclosure has space for 48 CHARM I/O channels, including:</p> <ul style="list-style-type: none"> <li>■ 1 x CHARM I/O Carrier with redundant copper Ethernet connectors.</li> <li>■ 4 x CHARM Base Plates and address plugs.</li> <li>■ 48 x CHARM standard terminal blocks - Screw type.</li> <li>■ Base Plate and Channel Identifier Labels.</li> </ul> <p><b>No DeltaV equipment is included in the base model. All DeltaV equipment is to be specified separately through the Emerson quoting tools.</b></p>
Other	Mounting plate, Halogen-Free wire ducts, external wall mounting brackets, door clamps, ground bars, external grounding bolt, drip edge, breather-drain.

(\*) Specifications given for the base model with default options. For other available configurations: see Overview of CTO Options.

Specifications for EU-FE-48-AC-CIOC-SA

NA-FE-48-AC-CIOC-SA	
Material (*)	Stainless Steel SS304 1.5 mm
Dimensions	915mm (W) x 1070mm (H) x 325mm (D)
Access	Single door, left hand hinged
Protection Category (*)	IP 66 – Type 4X (Corrosive Environment)
Cable Entry (*)	Bottom, single gland plate
Name Plate (*)	Outside Door: laser engraved plastic
Weight	~125 kg
Certifications	cCSAus for Ordinary Locations
Power Requirements – Internal Power Distribution	<p>Primary and secondary 115 VAC power supply supplied from outside the Field Enclosure.</p> <p>Redundant 115 VAC distribution through power terminals and circuit breakers. 24 VDC bulk power supplies: 2 x 5A and full redundant (primary and secondary) 24 VDC distribution.</p>
Control Network (*)	<p><b>Redundant Single Mode or Multi-Mode FO Converter:</b> One 100 BASE-FX, Single Mode or Multi-mode port with LC Connector.</p> <p><b>Fiber Optic control network Includes:</b> FO to Copper Converter (MM or SM), SC adaptors, SC-LC FO patch cables, Multimode 50/125-micron core/cladding diameters (OM2) or Single mode 9/125-micron cable.</p>
<p>Example Layout and Installed DeltaV CHARM</p> 	<p>This field enclosure has space for 48 CHARM I/O channels, including:</p> <ul style="list-style-type: none"> <li>■ 1 x CHARM I/O Carrier with redundant copper Ethernet connectors.</li> <li>■ 4 x CHARM Base Plates and address plugs.</li> <li>■ 48 x CHARM standard terminal blocks - Screw type.</li> <li>■ Base Plate and Channel Identifier Labels.</li> </ul> <p><b>No DeltaV equipment is included in the base model. All DeltaV equipment is to be specified separately through the Emerson quoting tools.</b></p>
Other	Mounting plate, Halogen-Free wire ducts, external wall mounting brackets, door clamps, ground bars, drip edge, breather-drain.

(\*) Specifications given for the base model with default options. WIOC is optional. For other available configurations: see Overview of CTO Options.

Specifications for NA-FE-48-AC-CIOC-SA .

EU-FE-48-AC-CIOC-HA	
Material (*)	Stainless Steel SS304 1.5 mm
Dimensions	915mm (W) x 1070mm (H) x 325mm (D)
Access	Single door, left hand hinged
Protection Category (*)	IP 66 – Type 4X (Corrosive Environment)
Cable Entry (*)	Bottom, single gland plate
Name Plate (*)	Outside Door: laser engraved plastic
Weight	~135 kg
Certifications	ATEX, IECEx; Ex d e ic nA nC [op is Ga] IIC T4 Gc for NON-IS CHARMS ATEX, IECEx; Ex d e [ia Ga] [ic] nA nC [op is Ga] IIC T4 Gc for IS CHARMS
Power Requirements – Internal Power Distribution	Primary and secondary 120/230 VAC power supply supplied from outside the Field Enclosure.  Redundant 120/230 VAC distribution through power terminals and circuit breakers. 24 VDC bulk power supplies: 2 x 5A and full redundant (primary and secondary) 24 VDC distribution.
Control Network (*)	<b>Redundant Single Mode or Multi-Mode FO Converter:</b> One 100 BASE-FX, Single Mode or Multi-mode port with LC Connector.  <b>Fiber Optic control network Includes:</b> FO to Copper Converter (MM or SM), SC adaptors, SC-LC FO patch cables, Multimode 50/125-micron core/cladding diameters (OM2) or Single mode 9/125-micron cable.
Example Layout and Installed DeltaV CHARM	This field enclosure has space for 48 CHARM I/O channels, including: <ul style="list-style-type: none"> <li>■ 1 x CHARM I/O Carrier with redundant copper Ethernet connectors.</li> <li>■ 4 x CHARM Base Plates and address plugs.</li> <li>■ 48 x CHARM standard terminal blocks - Screw type.</li> <li>■ Base Plate and Channel Identifier Labels.</li> </ul> <p><b>No DeltaV equipment is included in the base model. All DeltaV equipment is to be specified separately through the Emerson quoting tools.</b></p>
Other	Mounting plate, Halogen-Free wire ducts, external wall mounting brackets, door clamps, ground bars, external grounding bolt, drip edge, breather-drain.

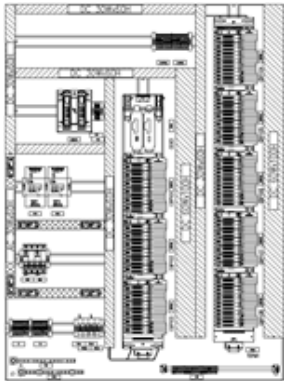
(\*) Specifications given for the base model with default options. WIOC is optional. For other available configurations: see Overview of CTO Options.

Specifications for EU-FE-48-AC-CIOC-HA.

NA-FE-48-AC-CIOC-HA	
Material (*)	Stainless Steel SS304 1.5 mm
Dimensions	915mm (W) x 1070mm (H) x 325mm (D)
Access	Single door, left hand hinged
Protection Category (*)	IP 66 – Type 4X (Corrosive Environment)
Cable Entry (*)	Bottom, single gland plate
Name Plate (*)	Outside Door: laser engraved plastic
Weight	~135 kg
Certifications	cCSAus for Hazardous Locations; Non-IS CHARMS: Class I, Division 2, Groups B, C and D; Class I, Zone 2, A/Ex e d ic nA nC IIB+H2 T4 Gc IS CHARMS: Class I, Division 2, Groups A, B, C and D; Class I, Zone 2, A/Ex e d ic nA nC [ia IIC Ga] [ic IIC Gc] IIB+H2 T4 Gc
Power Requirements – Internal Power Distribution	Primary and secondary 115 VAC power supply supplied from outside the Field Enclosure.  Redundant 115 VAC distribution through power terminals and circuit breakers. 24 VDC bulk power supplies: 2 x 5A and full redundant (primary and secondary) 24 VDC distribution.
Control Network (*)	<b>Redundant Single Mode or Multi-Mode FO Converter:</b> One 100 BASE-FX, Single Mode or Multi-mode port with LC Connector.  <b>Fiber Optic control network includes:</b> FO to Copper Converter (MM or SM), SC adaptors, SC-LC FO patch cables, Multimode 50/125-micron core/cladding diameters (OM2) or Single mode 9/125-micron cable.
Example Layout and Installed DeltaV CHARM Equipment (*)	This field enclosure has space for 48 CHARM I/O channels, including: <ul style="list-style-type: none"> <li>■ 1 x CHARM I/O Carrier with redundant copper Ethernet connectors.</li> <li>■ 4 x CHARM Base Plates and address plugs.</li> <li>■ 48 x CHARM standard terminal blocks - Screw type.</li> <li>■ Base Plate and Channel Identifier Labels.</li> </ul> <p><b>No DeltaV equipment is included in the base model. All DeltaV equipment is to be specified separately through the Emerson quoting tools.</b></p>
Other	Mounting plate, Halogen-Free wire ducts, external wall mounting brackets, door clamps, ground bars, drip edge, breather-drain.

(\*) Specifications given for the base model with default options. For other available configurations: see Overview of CTO Options.

Specifications for NA-FE-48-AC-CIOC-HA.

EU-FE-96-AC-CIOC-SA	
Material (*)	Stainless Steel SS304 1.5 mm
Dimensions	915 mm (W) x 1220mm (H) x 475 mm (D)
Access	Single door, left hand hinged
Protection Category (*)	IP 66 – Type 4X (Corrosive Environment)
Cable Entry (*)	Bottom, single gland plate
Name Plate (*)	Outside Door: laser engraved plastic
Weight	~165 kg
Certifications	CE, installation in Safe Area Locations
Power Requirements – Internal Power Distribution	<p>Primary and secondary 120/230 VAC power supply supplied from outside the Field Enclosure.</p> <p>Redundant 120/230 VAC distribution through power terminals and circuit breakers. 24 VDC bulk power supplies: 2 x 10A and full redundant (primary and secondary) 24 VDC distribution.</p>
Control Network (*)	<p><b>Redundant Single Mode or Multi-Mode FO Converter:</b> One 100 BASE-FX, Single Mode or Multi-mode port with LC Connector.</p> <p><b>Fiber Optic control network includes:</b> FO to Copper Converter (MM or SM), SC adaptors, SC-LC FO patch cables, Multimode 50/125-micron core/cladding diameters (OM2) or Single mode 9/125-micron cable.</p>
Example Layout and Installed DeltaV CHARM Equipment (*) 	<p>This field enclosure has space for 96 CHARM I/O channels, including:</p> <ul style="list-style-type: none"> <li>■ 1 x CHARM I/O Carrier with redundant copper Ethernet connectors.</li> <li>■ 4 x CHARM Base Plates and address plugs.</li> <li>■ 96 x CHARM standard terminal blocks - Screw type.</li> <li>■ Base Plate and Channel Identifier Labels.</li> <li>■ 1 x WIOC (Optional) with 72 CHARM IO</li> </ul> <p><b>No DeltaV equipment is included in the base model. All DeltaV equipment is to be specified separately through the Emerson quoting tools.</b></p>
Other	Mounting plate, Halogen-Free wire ducts, external wall mounting brackets, door clamps, ground bars, external grounding bolt, drip edge, breather-drain.

(\*) Specifications given for the base model with default options. For other available configurations: see Overview of CTO Options.

Specifications for EU-FE-96-AC-CIOC-SA.

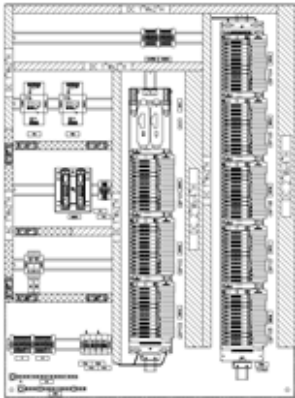


NA-FE-96-AC-CIOC-SA	
Material (*)	Stainless Steel SS304 1.5 mm
Dimensions	915 mm (W) x 1220mm (H) x 475 mm (D)
Access	Single door, left hand hinged
Protection Category (*)	IP 66 – Type 4X (Corrosive Environment)
Cable Entry (*)	Bottom, single gland plate
Name Plate (*)	Outside Door: laser engraved plastic
Weight	~165 kg
Certifications	cCSAus for Ordinary Locations
Power Requirements – Internal Power Distribution (*)	<p>Primary and secondary 115 VAC power supply supplied from outside the Field Enclosure.</p> <p>Redundant 115 VAC distribution through power terminals and circuit breakers. 24 VDC bulk power supplies: 2 x 10A and full redundant (primary and secondary) 24 VDC distribution.</p>
Control Network (*)	<p><b>Redundant Single Mode or Multi-Mode FO Converter:</b> One 100 BASE-FX, Single Mode or Multi-mode port with LC Connector.</p> <p><b>Fiber Optic control network includes:</b> FO to Copper Converter (MM or SM), SC adaptors, SC-LC FO patch cables, Multimode 50/125-micron core/cladding diameters (OM2) or Single mode 9/125-micron cable.</p>
Example Layout and Installed DeltaV CHARM Equipment (*)	<p>This field enclosure has space for 96 CHARM I/O channels, including:</p> <ul style="list-style-type: none"> <li>■ 1 x CHARM I/O Carrier with redundant copper Ethernet connectors.</li> <li>■ 8 x CHARM Base Plates and address plugs.</li> <li>■ 96 x CHARM standard terminal blocks - Screw type.</li> <li>■ Base Plate and Channel Identifier Labels.</li> <li>■ 1 x WIOC (Optional) with 72 CHARM IO</li> </ul> <p><b>No DeltaV equipment is included in the base model. All DeltaV equipment is to be specified separately through the Emerson quoting tools.</b></p>
Other	<p>Mounting plate, Halogen-Free wire ducts, external wall mounting brackets, door clamps, ground bars, external grounding bolt, drip edge, breather-drain.</p>

(\*) Specifications given for the base model with example options. For other available configurations: see Overview of CTO Options.

Specifications for NA-FE-96-AC-CIOC-SA.

EU-FE-96-AC-CIOC-HA	
Material (*)	Stainless Steel SS304, 1.5 mm
Dimensions	915 mm (W) x 1220mm (H) x 475 mm (D)
Access	Single door, left hand hinged
Protection Category (*)	IP 66 – Type 4X (Corrosive Environment)
Cable Entry (*)	Bottom, single gland plate
Name Plate (*)	Outside Door: laser engraved plastic
Weight	~175 kg
Certifications	ATEX, IECEx; Ex d e ic nA nC [op is Ga] IIC T4 Gc for NON-IS CHARMS ATEX, IECEx; Ex d e [ia Ga] [ic] nA nC [op is Ga] IIC T4 Gc for IS CHARMS
Power Requirements – Internal Power Distribution (*)	Primary and secondary 120/230 VAC power supply supplied from outside the Field Enclosure.  Redundant 120/230 VAC distribution through power terminals and circuit breakers. 24 VDC bulk power supplies: 2 x 10A and full redundant (primary and secondary) 24 VDC distribution.
Control Network (*)	<b>Redundant Single Mode or Multi-Mode FO Converter:</b> One 100 BASE-FX, Single Mode or Multi-mode port with LC Connector.  <b>Fiber Optic control network Includes:</b> FO to Copper Converter (MM or SM), SC adaptors, SC-LC FO patch cables, Multimode 50/125-micron core/cladding diameters (OM2) or Single mode 9/125-micron cable.
Example Layout and Installed DeltaV CHARM Equipment (*)	This field enclosure has space for 96 CHARM I/O channels, including: <ul style="list-style-type: none"> <li>■ 1 x CHARM I/O Carrier with redundant copper Ethernet connectors.</li> <li>■ 8 x CHARM Base Plates and address plugs.</li> <li>■ 96 x CHARM standard terminal blocks - Screw type.</li> <li>■ Base Plate and Channel Identifier Labels.</li> <li>■ 1 x WIOC (Optional) with 72 CHARM IO</li> </ul> <p><b>No DeltaV equipment is included in the base model. All DeltaV equipment is to be specified separately through the Emerson quoting tools.</b></p>
Other	Mounting plate, Halogen-Free wire ducts, external wall mounting brackets, door clamps, ground bars, external grounding bolt, drip edge, breather-drain.



(\*) Specifications given for the base model with default options. For other available configurations: see Overview of CTO Options.

Specifications for EU-FE-96-AC-CIOC-HA.

NA-FE-96-AC-CIOC-HA	
Material (*)	Stainless Steel SS304, 1.5 mm
Dimensions	915 mm (W) x 1220mm (H) x 475 mm (D)
Access	Single door, left hand hinged
Protection Category (*)	IP 66 –Type 4X (Corrosive Environment)
Cable Entry (*)	Bottom, single gland plate
Name Plate (*)	Outside Door: laser engraved plastic
Weight	~175 kg
Certifications	cCSAus for Hazardous Locations; Non-IS CHARMS: Class I, Division 2, Groups B, C and D; Class I, Zone 2, A/Ex e d ic nA nC IIB+H2 T4 Gc IS CHARMS: Class I, Division 2, Groups A, B, C and D; Class I, Zone 2, A/Ex e d ic nA nC [ia IIC Ga] [ic IIC Gc] IIB+H2 T4 Gc
Power Requirements – Internal Power Distribution (*)	Primary and secondary 115 VAC power supply supplied from outside the Field Enclosure.  Redundant 115 VAC distribution through power terminals and circuit breakers. 24 VDC bulk power supplies: 2 x 10A and full redundant (primary and secondary) 24 VDC distribution.
Control Network (*)	<b>Redundant Single Mode or Multi-Mode FO Converter:</b> One 100 BASE-FX, Single Mode or Multi-mode port with LC Connector.  <b>Fiber Optic control network Includes:</b> FO to Copper Converter (MM or SM), SC adaptors, SC-LC FO patch cables, Multimode 50/125-micron core/cladding diameters (OM2) or Single mode 9/125-micron cable
Example Layout and Installed DeltaV CHARM Equipment (*)	This field enclosure has space for 96 CHARM I/O channels, including: <ul style="list-style-type: none"> <li>■ 1 x CHARM I/O Carrier with redundant copper Ethernet connectors.</li> <li>■ 8 x CHARM Base Plates and address plugs.</li> <li>■ 96 x CHARM standard terminal blocks - Screw type.</li> <li>■ Base Plate and Channel Identifier Labels.</li> <li>■ 1 x WIOC (Optional) with 72 CHARM IO</li> </ul> <p><b>No DeltaV equipment is included in the base model. All DeltaV equipment is to be specified separately through the Emerson quoting tools.</b></p>
Other	Mounting plate, Halogen-Free wire ducts, external wall mounting brackets, door clamps, ground bars, external grounding bolt, drip edge, breather-drain.

(\*) Specifications given for the base model with default options. For other available configurations: see Overview of CTO Options.

Specifications for NA-FE-96-AC-CIOC-HA.

EU-FE-96-DC-VLV-SA	
Material (*)	Stainless Steel SS304, 1.5 mm (Clean Room Enclosure optional)
Dimensions	915 mm (W) x 1070mm (H) x 325 mm (D)
Access	Single door, left hand hinged
Protection Category (*)	IP 65 (Corrosive Environment)
Cable Entry (*)	Bottom, single gland plate
Name Plate (*)	Outside Door: laser engraved plastic
Weight	~ 125 kg
Certifications	CE, installation in Safe Area Locations
Power Requirements – Internal Power Distribution (*)	Primary and secondary 24 VDC power supply supplied from outside the Field Enclosure. Redundant 24 VDC distribution through power terminals; full redundant (primary and secondary) 24 VDC distribution.
Control Network (*)	<b>Redundant Single Mode or Multi-Mode FO Converter:</b> One 100 BASE-FX, Single Mode or Multi-mode port with LC Connector. <b>Fiber Optic control network Includes:</b> FO to Copper Converter (MM or SM), SC adaptors, SC-LC FO patch cables, Multimode 50/125-micron core/cladding diameters (OM2) or Single mode 9/125-micron cable.
Example Layout and Installed DeltaV CHARM Equipment (*)	This field enclosure has space for 60 CHARM I/O channels, including: <ul style="list-style-type: none"> <li>■ 1 x CHARM I/O Carrier with redundant copper Ethernet connectors.</li> <li>■ 5 x CHARM Base Plates and address plugs.</li> <li>■ 60x CHARM standard terminal blocks - Screw type.</li> <li>■ Base Plate and Channel Identifier Labels.</li> <li>■ 1 x ASCO valve (12 Channel Valve by default)</li> </ul> <p><b>No DeltaV equipment is included in the base model. All DeltaV equipment is to be specified separately through the Emerson quoting tools.</b></p>
Other	Mounting plate, Halogen-Free wire ducts, external wall mounting brackets, door clamps, ground bars, external grounding bolt, drip edge, breather-drain.

(\*) Specifications given for the base model with default options. For other available configurations: see Overview of CTO Options.

Specifications for EU-FE-96-DC-VLV-SA.

EU-FE-96-AC-VLV-SA	
Material (*)	Stainless Steel SS304, 1.5 mm (Clean Room Enclosure optional)
Dimensions	915 mm (W) x 1070mm (H) x 325 mm (D)
Access	Single door, left hand hinged
Protection Category (*)	IP 65 (Corrosive Environment)
Cable Entry (*)	Bottom, single gland plate
Name Plate (*)	Outside Door: laser engraved plastic
Weight	~ 125 kg
Certifications	CE, installation in Safe Area Locations
Power Requirements – Internal Power Distribution (*)	<p>Primary and secondary 120/230 VAC power supply supplied from outside the Field Enclosure.</p> <p>Redundant 120/230 VAC distribution through power terminals and circuit breakers. 24VDC Power Supplies: 2x10A and full redundant (primary and secondary) 24 VDC distribution.</p>
Control Network (*)	<p><b>Redundant Single Mode or Multi-Mode FO Converter:</b> One 100 BASE-FX, Single Mode or Multi-mode port with LC Connector.</p> <p><b>Fiber Optic control network Includes:</b> FO to Copper Converter (MM or SM), SC adaptors, SC-LC FO patch cables, Multimode 50/125-micron core/cladding diameters (OM2) or Single mode 9/125-micron cable</p>
Example Layout and Installed DeltaV CHARM Equipment (*)	<p>This field enclosure has space for 60 CHARM I/O channels, including:</p> <ul style="list-style-type: none"> <li>■ 1 x CHARM I/O Carrier with redundant copper Ethernet connectors.</li> <li>■ 5 x CHARM Base Plates and address plugs.</li> <li>■ 60x CHARM standard terminal blocks - Screw type.</li> <li>■ Base Plate and Channel Identifier Labels.</li> <li>■ 1 x ASCO valve (12 Channel Valve by default)</li> </ul> <p><b>No DeltaV equipment is included in the base model. All DeltaV equipment is to be specified separately through the Emerson quoting tools.</b></p>
Other	Mounting plate, Halogen-Free wire ducts, external wall mounting brackets, door clamps, ground bars, external grounding bolt, drip edge, breather-drain.

(\*) Specifications given for the base model with default options. For other available configurations: see Overview of CTO Options.

Specifications for EU-FE-96-AC-VLV-SA.

## Design Considerations

### Environmental Specifications

With the Two and Three heaters options this can be extended to -40 to +50 degrees C.

The humidity specification for the CTO field enclosures is 5-95% relative humidity, none condensing.

The table below specifies the impact of CTO configurable options on the heat dissipation within the CTO enclosures: assuming wall-mount installation (back side not used for heat dissipation), installation in shaded area (no direct sunlight) and an internal heat dissipation not greater than the value specified in the column “Maximum allowed heat dissipation inside the enclosure.”

It is advised to calculate the heat dissipation and power consumption for each individual enclosure with the actual quantity and mix of CHARM types. In high ambient temperatures the CHARM capacity of the enclosure may have to be reduced depending on the mix of CHARM types.

CTO Enclosure Model	Maximum allowed heat dissipation	User Configurable Heat contributing options			Total Dissipation (A+B+C)	CIOC Heat Dissipation (W)	Maximum allowable heat load for CHARM HW
		A Ethernet	B Inj. Power	C Power Supply			
EU-FE-48-DC-CIOC-SA	115	FO	NO	-	16,4	8	90,6
		FO	YES	-	24,2		82,8
		COPPER	NO	-	0		107
		COPPER	YES	-	7,8		99,2
NA-FE-48-DC-CIOC-SA	115	FO	NO	-	16,4	8	90,6
		FO	YES	-	24,2		82,8
		COPPER	NO	-	0		107
		COPPER	YES	-	7,8		99,2
EU-FE-48-DC-CIOC-HA	115	FO	NO	-	16,4	8	90,6
		FO	YES	-	24,2		82,8
		COPPER	NO	-	0		107
		COPPER	YES	-	7,8		99,2
NA-FE-48-DC-CIOC-HA	115	FO	NO	-	16,4	8	90,6
		FO	YES	-	24,2		82,8
		COPPER	NO	-	0		107
		COPPER	YES	-	7,8		99,2
EU-FE-48-AC-CIOC-SA	115	FO	NO	5amp	28,4	8	78,6
		FO	YES	10amp	48,2		58,8
		COPPER	NO	5amp	12		95
		COPPER	YES	10amp	31,8		75,2
NA-FE-48-AC-CIOC-SA	115	FO	NO	5amp	28,4	8	78,6
		FO	YES	10amp	48,2		58,8
		COPPER	NO	5amp	12		95
		COPPER	YES	10amp	31,8		75,2
EU-FE-48-AC-CIOC-HA	115	FO	NO	5amp	28,4	8	78,6
		FO	YES	10amp	48,2		58,8
		COPPER	NO	5amp	12		95
		COPPER	YES	10amp	31,8		75,2
NA-FE-48-AC-CIOC-HA	115	FO	NO	5amp	28,4	8	78,6
		FO	YES	10amp	48,2		58,8
		COPPER	NO	5amp	12		95
		COPPER	YES	10amp	31,8		75,2
EU-FE-96-AC-CIOC-SA	160	FO	NO	10amp	40,4	8	111,6
		FO	YES	20amp	62,2		89,8
		COPPER	NO	10amp	24		128
		COPPER	YES	20amp	45,8		106,2
NA-FE-96-AC-CIOC-SA	160	FO	NO	10amp	40,4	8	111,6
		FO	YES	20amp	62,2		89,8
		COPPER	NO	10amp	24		128
		COPPER	YES	20amp	45,8		106,2
EU-FE-96-AC-CIOC-HA	160	FO	NO	10amp	40,4	8	111,6
		FO	YES	20amp	62,2		89,8
		COPPER	NO	10amp	24		128
		COPPER	YES	20amp	45,8		106,2
NA-FE-96-AC-CIOC-HA	160	FO	NO	10amp	40,4	8	111,6
		FO	YES	20amp	62,2		89,8
		COPPER	NO	10amp	24		128
		COPPER	YES	20amp	45,8		106,2

CTO Enclosure Model	Maximum allowed heat dissipation	User Configurable Heat contributing options			Total Dissipation (A+B+C)	CIOC Heat Dissipation (W)	Maximum allowable heat load for CHARM HW
		A Ethernet	B Inj. Power	C Power Supply			
EU-FE-96-DC-VLV-SA	115	FO	NO	-	16,4	8	90.6
		FO	YES	-	24 ,2		82.8
		COPPER	NO	-	0		107
		COPPER	YES	-	7,8		99 ,2
EU-FE-96-AC-VLV-SA	115	FO	NO	10amp	40,4	8	66.6
		FO	YES	20amp	62 ,2		44.8
		COPPER	NO	10amp	24		83
		COPPER	YES	20amp	45.8		61.2

**Power Calculations**

It is advised to calculate power requirements for each individual enclosure with the actual quantity and mix of CHARM types.

**Enclosure Location**

The ambient temperature specification provided assumes the enclosure is not exposed to direct sunlight. It is recommended to mount the field enclosures in a permanently shaded area.

**Project Customizations**

**“...What if a CTO Field Enclosure is 90% what I need, but I really need my Field Enclosure to have...”**

Minor customizations as a variation or addition to the standard CTO offering can often be developed in such a way that the additional effort is incremental.

In case your project would require a customer witnessed FAT, this can also be accommodated.

Please work with your local Emerson Sales office or regional Emerson assembly center to evaluate any impacts of requested customizations to cost, delivery time and certifications.

**System Compatibility**

CTO Field Enclosures are compatible with DeltaV v11.3.1 and above.

CHARM I/O cards require S-series Controllers.

**Certifications**

The CTO CHARM Field Enclosures are designed with components that meet or exceed the following certifications. Depending on the enclosure type (see specs):

- CE
  - EN 61326-1:2013 , EN 61010-1 :2010

- ATEX
  - EN 60079-0:2012/A11:2013, EN 60079-1:2007, EN 60079-7:2007
  - EN 60079-11:2012, EN 60079-15:2010, EN 60079-28:2015
- IECEx
  - IEC 60079-0:2011 Ed. 6, IEC 60079-1: 2007 Ed 6
  - IEC 60079-7: 2007 Ed 4, IEC 60079-11:2011 Ed 6
  - IEC 60079-15:2010 Ed 4, IEC 60079-28:2015 Ed 2
- cCSAus Ordinary Locations
  - CAN/CSA C22.2 No. 61010-1-2012
  - UL 61010-1-12 (3rd Edition)
- cCSAus Hazardous Locations
  - CAN/CSA C22.2 No. 60079-0: 2015
  - CAN/CSA C22.2 No. 60079-1: 2011
  - CAN/CSA C22.2 No. 60079-7: 2012
  - CAN/CSA C22.2 No. 60079-15: 2012
  - CAN/CSA C22.2 No. 60079-11: 2014
  - C22.2 No. 213-M1987
  - UL 60079-0: 2013
  - UL 60079-1: 2015
  - UL 60079-7: 2008
  - UL 60079-11: 2013
  - UL 60079-15: 2013
  - ANSI/ISA 12.12.01: 2013

Refer to the **DeltaV S-series Electronic Marshalling** or to the **DeltaV S-series IS Electronic Marshalling** Product Data Sheet for certification information on the DeltaV system components.

## Related Products

- CHARM I/O Card Carrier must be ordered separately
- CHARM I/O Cards must be ordered separately
- CHARM Baseplates must be ordered separately
- CHARMs and terminal blocks must be ordered separately

## How to order a CTO CHARM Field Enclosure?

CTO CHARM Field Enclosures are pre-engineered solutions developed by Emerson's Project Management Office (PMO) and made available from Emerson Supply Chain. Basically, the following steps are followed to obtain a CHARM Field enclosure:

1. Specify the CHARM Field Enclosure by selecting the base model and the options required for the project. A Configuration tool is available to aid in the selection of the right combination of options for your CTO field enclosure.
2. Generate the specification sheet from the configuration tool and send this to your world area contact.

3. Based on the specification, you will then receive:
  - A quotation for the fully assembled Field Enclosure.
  - The detailed specification (drawing package) matching your configuration, including the Bill of Materials.
4. Approve the drawing package for construction.
5. Order the CHARM Field Enclosure as per provided quotation and approved drawings.
6. The CHARM Field Enclosure is assembled, factory tested and delivered to site. The delivery includes the as-built drawing package (AutoCAD).

For questions related to specific project quotations or order processing, please contact your local Emerson Sales office or your regional Emerson assembly center:

For US/Canada (NASAD):  
**iCenterSTL.Quotes@Emerson.com**

For Europe iCenter Cluj:  
**Cabinets.Quotes@Emerson.com**

For Asia Pacific Singapore iCenter:  
**iCenterSGPQuotes@Emerson.com**

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 ☎ +1 512 832 3774

**Asia Pacific:**  
 ☎ +65 6777 8211

**Europe, Middle East:**  
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🌐 [www.emerson.com/deltav](http://www.emerson.com/deltav)

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