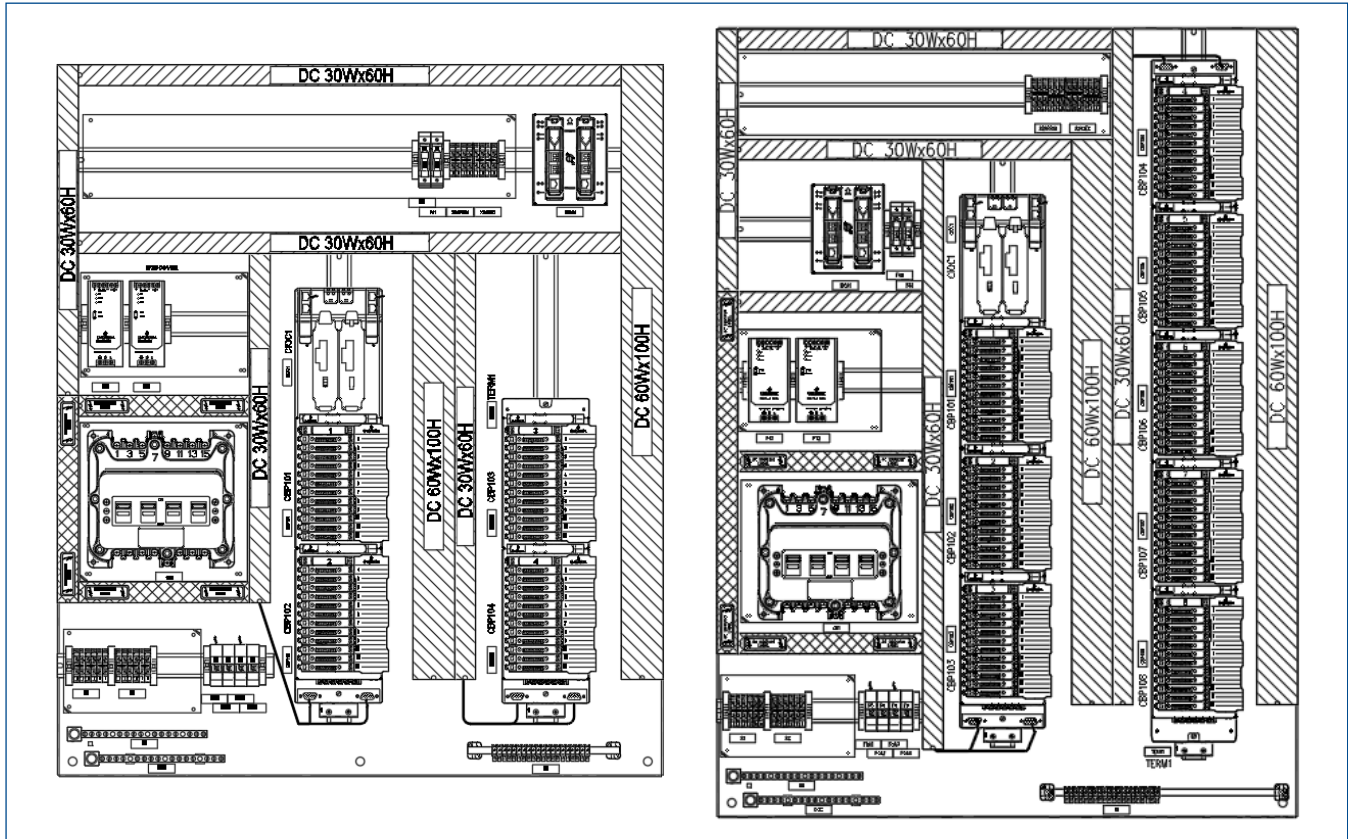


# CTO DCS CHARM Field Enclosures (CE; ATEX; IECEx, Ordinary and Zone 2 Locations)



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 DeltaV™ 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.
- Distributed CHARM IOs (combination of Max. 12 / 24 CHARMs inside FE and external 12 CHARM IO junction boxes - total IO count 96).
- For different power distribution needs: DC-Powered or AC-Powered.
- For different environmental requirements: Safe Area or Hazardous Area.
- European electrical codes/regulations.

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 (SS304/SS316), 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 (3mm thick).

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:
    - 48 IO Enclosure:** 48IO (Non-IS)/ 48IO (IS)/ 48IO with 24 (IS)+24(Non-IS)
    - 96IO Enclosure:** 96IO (Non-IS)/ 96IO (IS)/ 96IO with 60(IS)+36 (Non-IS)
    - Dist. CHARM IO Enclosure:** All 8 nos. external 12 CHARM IO junction boxes / 12 CHARMS (IS /NIS) inside FE and 7 nos. ext. 12 CHARM IO Junction Boxes / 24 CHARMS (IS /NIS) inside FE and 6 nos. ext. 12 CHARM IO Junction Boxes – total IO count 96.
- Actual CHARMS to be ordered separately.

- Enclosure Material: Stainless Steel SS304 or SS316L. Stainless steel provides protection for corrosive environments (category NEMA 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: 6 or 12 fused circuits, prewired to all base plates. (This option 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
<b>EU-FE-48-DC-CIOC-SA</b>	DC Powered Field Enclosure for 48 CHARM I/O; CE; Safe Area Locations.	48	24V DC	Safe Area CE (Europe)
<b>EU-FE-48-DC-CIOC-HA</b>	DC Powered Field Enclosure for 48 CHARM I/O; CE; ATEX; IECEx, Zone 2 Locations.	48	24V DC	Hazardous Area ATEX/IECEx Zone 2
<b>EU-FE-48-AC-CIOC-SA</b>	AC Powered Field Enclosure for 48 CHARM I/O; CE; Safe Area Locations.	48	230V AC	Safe Area CE (Europe)
<b>EU-FE-48-AC-CIOC-HA</b>	AC Powered Field Enclosure for 48 CHARM I/O; CE; ATEX; IECEx, Zone 2 Locations.	48	230V AC	Hazardous Area ATEX/IECEx Zone 2
<b>EU-FE-96-AC-CIOC-SA</b>	AC Powered Field Enclosure for 96 CHARM I/O; CE; Safe Area Locations.	96	230V AC	Safe Area CE (Europe)
<b>EU-FE-96-AC-CIOC-HA</b>	AC Powered Field Enclosure for 96 CHARM I/O; CE; ATEX; IECEx, Zone 2 Locations.	96	230V AC	Hazardous Area ATEX/IECEx Zone 2
<b>EU-FE-96-AC-VLV-SA</b>	AC Powered Indoor Field Enclosure with 60 CHARM I/O and ASCO Valve Island; CE; Safe Area Locations	60	230V AC	Safe Area CE (Europe)
<b>EU-FE-96-DC-VLV-SA</b>	DC Powered Indoor Field Enclosure with 60 CHARM I/O and ASCO Valve Island; CE; Safe Area Locations	60	24V DC	Safe Area CE (Europe)
<b>EU-FE-D96-AC-CIOC-SA</b>	AC Powered Field Enclosure for Distributed 96 CHARM I/O; CE; Safe Area Locations.	96	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-FE-XX-YY-CIOC-ZZ", Distributed CHARM: EU-FE-DXX-YY-CIOC-ZZ, where

- EU = Europe Design Standards and Regulations
- FE = Field Enclosure
- XX = maximum I/O's count in this CTO model.
- D = Distributed CHARM
- YY = Incoming Power, DC: 24V DC or AC: 230V AC.
- CIOC = short description of content and purpose.
- ZZ = SA: for use in Safe Area, HA: for use in Hazardous Area (ATEX/IECEx, Zone 2)

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

LEGENDS:

•: Default option setting

o: Configure to option setting.

(Different from Default)

NA Option setting not possible for Base Enclosure Model

☐: Intentionally left blank to fill in your configuration choices

Base Model	EU-FE-48-DC-CIO-C-SA	EU-FE-48-DC-CIO-C-HA	EU-FE-48-AC-CIO-C-SA	EU-FE-48-AC-CIO-C-HA	EU-FE-96-AC-CIO-C-SA	EU-FE-96-AC-CIO-C-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	AC
Location (Safe Area -SA, Hazardous Area -HA)	SA	HA	SA	HA	SA	HA	SA	SA
Certification as per World Area	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
		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
		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 ** (Applicable only for NIS CHARM Baseplates)	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				•	•	•	•
		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
		3	English + French + Spanish + User Specific Language	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

\*\* With 24V DC Injected power option selected "Yes", Enclosure will be rated for maximum. 50Deg. C ambient temperature.

\* Maximum Power supply rating allowed for 55Deg. C Ambient installation is 10Amp for 96IO FE & 5Amp for 48IO FE.

For 55Deg. C ambient installation, enclosure total internal heat dissipation cannot be exceeded beyond 90W for 96IO FE& 60W for 48IO FE.

Overview of Distributed CHARM Field Enclosures base models and options

LEGENDS:

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

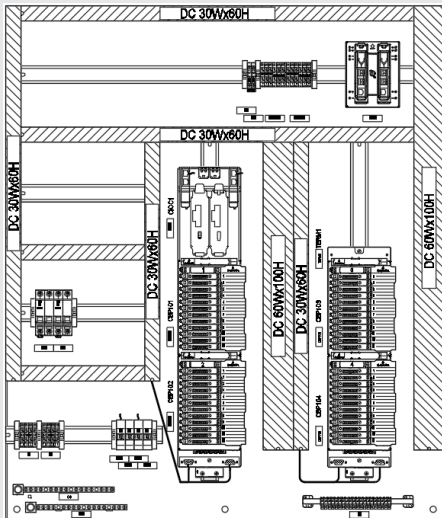
Base Model	EU-FE-D96-AC-CIOC-SA
#CHARM I/O	96IO
Power Input (230V AC)	AC
Location (Safe Area -SA, Hazardous Area - HA)	SA
Certification as per World Area	CE

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
Cable Entry	B	1		Undrilled Gland Plate	•
		2		Pre-drilled Gland Plate with Installed Cable Glands	o
		3		Pre-filled Rextec Frame	o
Heaters	C	1		No	•
		2		Single Heater	o
No. of Baseplates (Inj. Power will be connected by default to NIS CHARM Baseplates inside FE)	D	1		0	•
		2		1 (12 CHARMs)	o
		3		2 (24 CHARMs)	o
Type of CHARMs	E	1		All NIS	•
		2		All IS	o
External 12 CHARM IO Junction BOX 24VDC Supply	F	1		Simplex	•
		2		Redundant	o
CIOC Network	G	1		MM Fiber Optic with Media Converter	•
		2		Copper Ethernet	o
		3		MM Fiber Optic with Fiber IOP	o
		4		SM Fiber Optic with Media Converter	o
CHARM Gateway Network	H	1		Ring	•
		2		Star	o
Surge Protection Device	I	1		No	•
		2		Yes	o
Enclosure Light	J	1		No	•
		2		Yes	o
Warning Labels Languages	K	1		STANDARD LABEL (ENG+FRN+GER+SPN)	•
		2		ENG+FRN+GER+USER SPECIFIC LANGUAGE	o
		3		ENG+FRN+SPN+USER SPECIFIC LANGUAGE	o

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

(\*) Specifications given for the base model with default option settings. For other available configurations refer to Overview of CTO DCS CHARM Field Enclosures base models and options table.

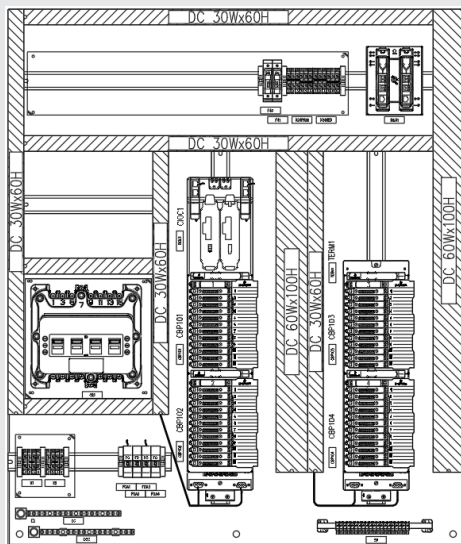
EU-FE-48-DC-CIOC-SA	
Material (*)	Stainless Steel SS304, Enclosure Thickness 2mm
Dimensions	915mm (W) x 1070mm (H) x 325mm (D)
Access	Single door, left hand hinged
Protection Category (*)	IP 66 –Type 4X (Corrosive Environment)
Cable Entry (*)	Bottom, single gland plate (Thickness 3mm)
Name Plate (*)	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 to be supplied from outside the Field Enclosure. Includes full redundant (primary and secondary) 24 VDC distribution through power terminals and circuit breakers.
24VDC for injected power or 4-wire transmitters	Applicable for Non-IS Baseplates only
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 (*)	<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>Design exclusions for Enclosure installation in 55 Deg. C Ambient:</b></p> <ol style="list-style-type: none"> <li>1. No Injected power (Max. 5Amp PS allowed, No redundancy module)</li> <li>2. No Heater</li> </ol> <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 for EU-FE-48-DC-CIOC-HA.

(\*) Specifications given for the base model with default option settings. For other available configurations refer to Overview of CTO DCS CHARM Field Enclosures base models and options table.

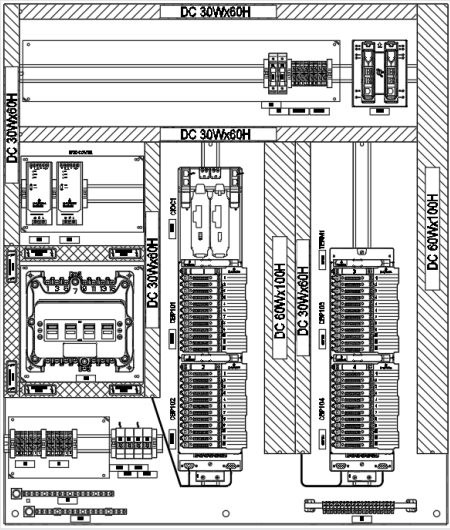
EU-FE-48-DC-CIOC-HA	
Material (*)	Stainless Steel SS304, Enclosure Thickness 2mm
Dimensions	915mm (W) x 1070mm (H) x 325mm (D)
Access	Single door, left hand hinged
Protection Category (*)	IP 66 – Type 4X (Corrosive Environment)
Cable Entry (*)	Bottom, single gland plate (Thickness 3mm)
Name Plate (*)	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.
24VDC for injected power or 4-wire transmitters	For Non-IS Baseplates only
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> <b>Design exclusions for Enclosure installation in 55 Deg. C Ambient:</b> <ol style="list-style-type: none"> <li>1. No Injected power (Max. 5Amp PS allowed, No redundancy module)</li> <li>2. No Heater</li> </ol> <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 for EU-FE-48-AC-CIOC-HA.

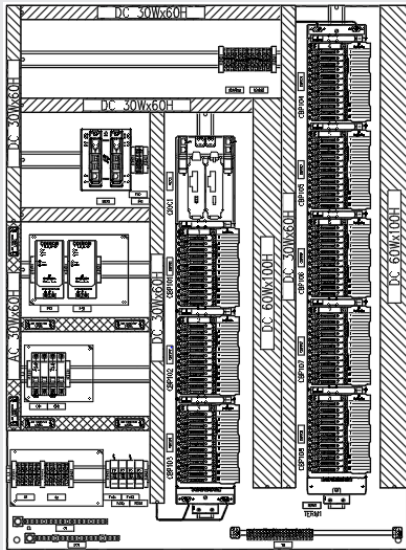
(\*) Specifications given for the base model with default options. For other available configurations refer to Overview of CTO DCS CHARM Field Enclosures base models and options table.

EU-FE-48-AC-CIOC-HA	
Material (*)	Stainless Steel SS304, Enclosure Thickness 2mm
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 (Thickness 3mm)
Name Plate (*)	Outside Door: Laser engraved plastic
Weight	~ 135 kg
Certifications	<p><b>For NON-IS CHARMS</b> ATEX, IECEx; Ex d e i c nA nC [op is Ga] IIC T4 Gc</p> <p><b>For IS CHARMS</b> ATEX, IECEx; Ex d e [ia Ga] [ic] nA nC [op is Ga] IIC T4 Gc</p>
Power Requirements – Internal Power Distribution	<p>Primary and secondary 230 VAC power supply supplied from outside the Field Enclosure.</p> <p>Redundant 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>
24VDC for injected power or 4-wire transmitters	Applicable for Non-IS Baseplates only
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 Equipment (*)</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>Design exclusions for Enclosure installation in 55 Deg. C Ambient:</b></p> <ol style="list-style-type: none"> <li>1. No Injected power (Max. 5Amp PS allowed, No redundancy module)</li> <li>2. No Heater</li> </ol> <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 for EU-FE-96-AC-CIOC-SA.

(\*) Specifications given for the base model with default options. For other available configurations refer to Overview of CTO DCS CHARM Field Enclosures base models and options table.

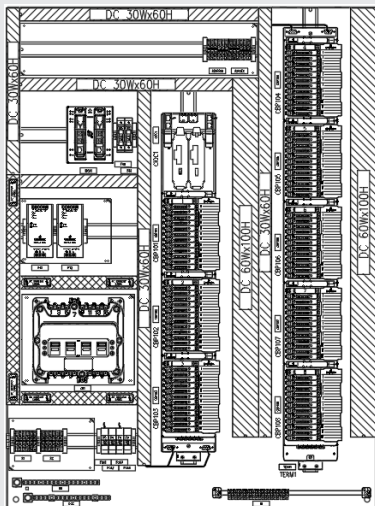
EU-FE-96-AC-CIOC-SA	
Material (*)	Stainless Steel SS304, Enclosure Thickness 2mm
Dimensions	915 mm (W) x 1220mm (H) x 475 mm (D)
Access	Single door, left hand hinged with door stop
Protection Category (*)	IP 66 – Type 4X (Corrosive Environment)
Cable Entry (*)	Bottom, single gland plate (Thickness 3mm)
Name Plate (*)	Outside Door: Laser engraved plastic
Weight	~ 165 kg
Certifications	cCSAus for Ordinary Locations
Power Requirements – Internal Power Distribution	Primary and secondary 120 VAC power supply supplied from outside the Field Enclosure.  Redundant 120 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.
24VDC for injected power or 4-wire transmitters	For Non-IS Baseplates only
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 (*)	<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</li> <li>■ 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> </ul> <p><b>Design exclusions for Enclosure installation in 55 Deg. C Ambient:</b></p> <ol style="list-style-type: none"> <li>1. No Injected power (Max. 10Amp PS allowed, No redundancy module)</li> <li>2. No Heater</li> </ol> <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, wire ducts, external wall mounting brackets, door clamps, ground bars, external grounding bolt, drip edge, breather-drain.



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

(\*) Specifications given for the base model with default options. For other available configurations refer to Overview of CTO DCS CHARM Field Enclosures base models and options table.

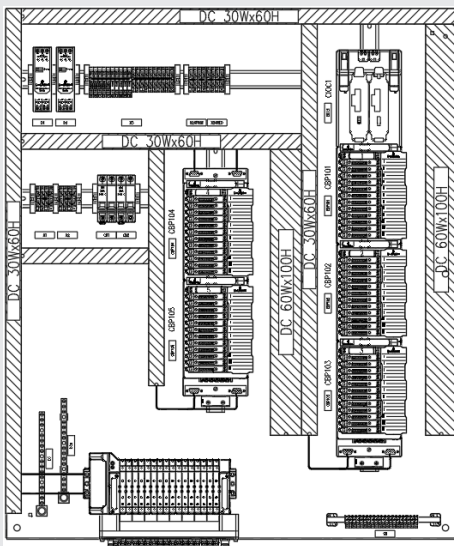
EU-FE-96-AC-CIOC-HA	
Material (*)	Stainless Steel SS304, Enclosure Thickness 2mm
Dimensions	915 mm (W) x 1220mm (H) x 475 mm (D)
Access	Single door, left hand hinged with door stop
Protection Category (*)	IP 66 – Type 4X (Corrosive Environment)
Cable Entry (*)	Bottom, single gland plate (Thickness 3mm)
Name Plate (*)	Outside Door: laser engraved plastic
Weight	~165 kg
Certifications	cCSAus for Ordinary Locations
Power Requirements – Internal Power Distribution (*)	Primary and secondary 230 VAC power supply supplied from outside the Field Enclosure. Redundant 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.
24VDC for injected power or 4-wire transmitters	For Non-IS Baseplates only
Control Network (*)	Redundant Single Mode or Multi-Mode FO Converter: One 100 BASE-FX, Single Mode or Multi-mode port with LC Connector. Fiber Optic control network Includes: 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 (*)	<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</li> <li>■ 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>Design exclusions for Enclosure installation in 55 Deg. C Ambient:</b></p> <ol style="list-style-type: none"> <li>1. No Injected power (Max. 10Amp PS allowed, No redundancy module)</li> <li>2. No Heater</li> </ol> <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 for Should be EU-FE-96-DC-VLV-SA.

(\*) Specifications given for the base model with default options. For other available configurations refer to Overview of CTO DCS CHARM Field Enclosures base models and options table.

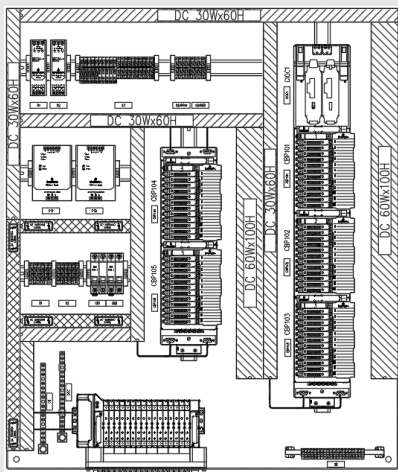
EU-FE-96-DC-VLV-SA	
Material (*)	Stainless Steel SS304, Enclosure Thickness 2mm
Dimensions	915 mm (W) x 1070mm (H) x 325 mm (D)
Access	Single door, left hand hinged
Protection Category (*)	IP 65 (Corrosive Environment)
Cable Entry (*)	Bottom, Single gland plate (Thickness 3mm)
Name Plate (*)	Outside 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.
24VDC for injected power or 4-wire transmitters	For Non-IS Baseplates only
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 for EU-FE-96-AC-VLV-SA.

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

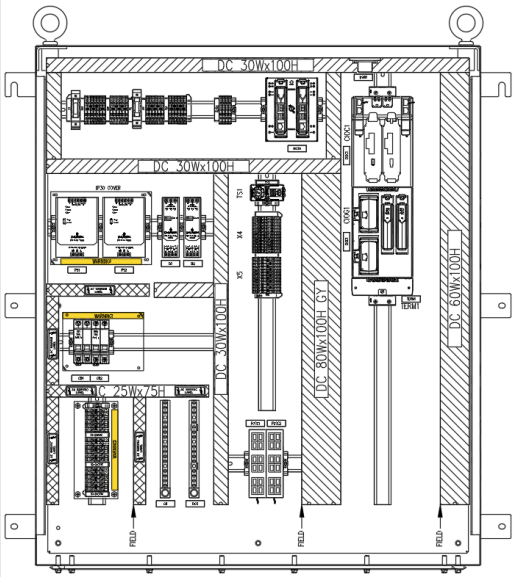
EU-FE-96-AC-VLV-SA	
Material (*)	Stainless Steel SS304, Enclosure Thickness 2mm
Dimensions	915 mm (W) x 1070mm (H) x 325 mm (D)
Access	Single door, left hand hinged
Protection Category (*)	IP 65 (Corrosive Environment)
Cable Entry (*)	Bottom, single gland plate (Thickness 3mm)
Name Plate (*)	Outside Door: laser engraved plastic
Weight	~ 125 kg
Certifications	CE, installation in Safe Area Locations
Power Requirements – Internal Power Distribution (*)	Primary and secondary 230 VAC power supply supplied from outside the Field Enclosure. Redundant 230 VAC distribution through power terminals and circuit breakers. 24VDC Power Supplies: 2x10A and full redundant (primary and secondary) 24 VDC distribution.
24VDC for injected power or 4-wire transmitters	For Non-IS Baseplates only
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 for EU-FE-D96-AC-CIOC-SA.

(\*) Specifications given for the base model with default options. For other available configurations refer to Overview of Distributed CHARM Field Enclosures base models and options table.

EU-FE-D96-AC-CIOC-SA	
Material (*)	Stainless Steel SS304, Enclosure, Thickness 2mm
Dimensions	915 mm (W) x 1070mm (H) x 325 mm (D)
Access	Single door, left hand hinged
Protection Category (*)	IP 66 – Type 4X (Corrosive Environment)
Cable Entry (*)	Bottom, single gland plate (Thickness 3mm)
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: 2x20A and full redundant (primary and secondary) 24 VDC distribution.</p> <p>24VDC Injected power will be provided by default to NIS baseplates installed inside FE.</p> <p>Max. Power available from FE to each external 12 IO CHARM box is 1.6 Amp. Max. Power available for CHARMS installed inside FE is 5.3Amp (including injected power).</p>
24VDC for injected power	By default available for NIS Baseplates installed inside FE
Provision of Power distribution for external 12 CHARM IO Junction boxes	<p>Input power required by 12 CHARM IO Junction box is 24VDC +/- 10%. Either simplex or redundant 24VDC will be provided from field enclosure via redundancy diode to 12 CHARM IO Junction box.</p> <p>Maximum power cable distance from field enclosure to 12 CHARM IO Junction box is 100mtr. Maximum power cable termination possible in 12 CHARM IO Junction box is 2.5mm<sup>2</sup> (14AWG).</p> <p>Bulk power Supply in FE is sized as per these details. Do not cross these power limits considered for 12 CHARM IO Junction box during installation.</p> <p>There will be no provision in this field enclosure to provide injected Power for IOs in 12 CHARM IO Junction box. In case this is required, it needs to be arranged externally.</p>

<p>Control Network (*)</p>	<p><b>Options available for Control Network:</b></p> <ol style="list-style-type: none"> <li>1. Redundant Single Mode FO with Media Converter</li> <li>2. Redundant Multi-Mode FO with Media Converter</li> <li>3. Redundant FO IOP (MM) without Media Converter</li> <li>4. Redundant Copper (RJ45)</li> </ol> <p><b>Fiber Optic control network Includes:</b></p> <ul style="list-style-type: none"> <li>- FO to Copper Media Converter (MM or SM as per type of FO selected). Media converter has one 100 BASE-FX (SM/MM) port with LC Connector.</li> <li>- SC Splice cassettes (MM or SM as per type of FO selected)</li> <li>- SC-LC FO patch cables, Multimode 50/125-micron core/cladding diameters (OM2) or Single mode 9/125-micron cable.</li> </ul> <p><b>SC – MTRJ Patch cable for FO IOP (MM) of CIOC</b></p>
<p>CHARM Gateway Network (**)</p>	<ol style="list-style-type: none"> <li>1. <b>Star Topology:</b> Options available for Star Topology Network: Redundant Copper (RJ45) with 8 Ports IOP</li> <li>2. <b>Ring Topology:</b> Options available for Ring Topology Network: Redundant Copper (RJ45) with 1 Port IOP</li> </ol>
<p>Example Layout and Installed DeltaV CHARM Equipment (*)</p> 	<p>Enclosure will be equipped with-</p> <ol style="list-style-type: none"> <li>1. Eyebolts</li> <li>2. Door switch (for door open alarm)</li> </ol> <p>This field enclosure has space for optional 24 CHARM I/O channels, which includes:</p> <ol style="list-style-type: none"> <li>1. 1 x CHARM I/O Carrier with redundant copper Ethernet connectors. Optional FO IOP is available for FO communication.</li> <li>2. 1 x CHARM I/O Gateway Carrier with optional Star / Ringtopology connections</li> <li>3. Base plate selection available from No Base to 2 CHARM IS/NIS Base Plates</li> <li>4. Simplex / Redundant Power option for external 12 CHARM IO Junction boxes</li> <li>5. Single mode / Multi mode FO communication for CIOC control network thru Media Converters.</li> </ol> <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>
<p>Other</p>	<p>Mounting plate, Halogen-Free wire ducts, external wall mounting brackets, door clamps, ground bars, external grounding bolt, drip edge, breather-drain.</p>

## Design Considerations

### Environmental Specifications

The CTO CHARM Field Enclosures are certified for an ambient temperature range of -20 to +55°C. With the two and three heaters options this can be extended to -40 to +50 °C. Higher ambient temperature will be limited to +50°C with heater.

**Caution:** 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.

The humidity specification for the CTO field enclosures is 5-95% relative humidity, non-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 for 50DegC Ambient	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	-	4.8	6.68	103.52
		FO	YES	-	12.48		95.84
		COPPER	NO	-	0		108.32
		COPPER	YES	-	7.68		100.64
EU-FE-48-DG-CIOC-HA	115	FO	NO	-	4.8	6.68	103.52
		FO	YES	-	12.48		95.84
		COPPER	NO	-	0		108.32
		COPPER	YES	-	7.68		100.64
EU-FE-48-AC-CIOC-SA	115	FO	NO	5amp	18.8	6.68	89.52
		FO	YES	10amp	36.48		71.84
		COPPER	NO	5amp	14		94.32
		COPPER	YES	10amp	31.68		76.64
EU-FE-48-AC-CIOC-HA	115	FO	NO	5amp	18.8	6.68	89.52
		FO	YES	10amp	36.48		71.84
		COPPER	NO	5amp	14		94.32
		COPPER	YES	10amp	31.68		76.64
EU-FE-96-AC-CIOC-SA	160	FO	NO	10amp	28.8	6.68	124.52
		FO	YES	20amp	50.48		102.84
		COPPER	NO	10amp	24		129.32
		COPPER	YES	20amp	45.68		107.64
EU-FE-96-AC-CIOC-HA	160	FO	NO	10amp	28.8	6.68	124.52
		FO	YES	20amp	50.48		102.84
		COPPER	NO	10amp	24		129.32
		COPPER	YES	20amp	45.68		107.64
EU-FE-96-DC-VLV-SA	160	FO	NO	-	4.8	6.68	148.52
		FO	YES	-	12.48		140.84
		COPPER	NO	-	0		153.32
		COPPER	YES	-	7.68		145.64
EU-FE-96-AC-VLV-SA	160	FO	NO	10amp	28.8	6.68	124.52
		FO	YES	20amp	50.48		102.84
		COPPER	NO	10amp	24		129.32
		COPPER	YES	20amp	45.68		107.64
EU-FE- D96-AC-CIOC-SA	115	FO	YES	20amp	50.48	16.73*	47.79
		FO	YES	20amp	45.68		51.27
		COPPER	YES	20amp	45.68		52.59

\* CIOC heat dissipation includes CHARM gateway Module heat dissipation value (STAR Gateway model considered here as it has higher dissipation).

CTO Enclosure Model	Maximum allowed heat dissipation for 55DegC Ambient	User Configurable Heat contributing options			Total Dissipation (A+B+C)	CIOC Heat Dissipation (W)	Maximum allowable heat load for CHARM HW
		A	B	C			
		Ethernet	Inj. Power	Power Supply			
EU-FE-48-DG-CIOC-HA	60	FO	NO	-	4.8	6.68	48.52
		COPPER	NO	-	0		53.32
EU-FE-48-DG-CIOC-HA	60	FO	NO	-	4.8	6.68	48.52
		COPPER	NO	-	0		53.32
EU-FE-48-AC-CIOC-SA	60	FO	NO	5amp	18.8	6.68	34.52
		COPPER	NO	5amp	14		39.32
EU-FE-48-AC-CIOC-HA	60	FO	NO	5amp	18.8	6.68	34.52
		COPPER	NO	5amp	14		39.32
EU-FE-96-AC-CIOC-SA	90	FO	NO	10amp	28.8	6.68	54.52
		COPPER	NO	10amp	24		59.32
EU-FE-96-AC-CIOC-HA	90	FO	NO	10amp	28.8	6.68	54.52
		COPPER	NO	10amp	24		59.32

### 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 , EN 61010-1
- ATEX
  - EN 60079-0, EN 60079-1, EN 60079-7
  - EN 60079-11, EN 60079-15, EN 60079-28
- IECEx
  - IEC 60079-0, IEC 60079-1
  - IEC 60079-7, IEC 60079-11
  - IEC 60079-15, IEC 60079-28

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

## 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**

**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

🌐 [www.emerson.com/deltav](http://www.emerson.com/deltav)

©2020, Emerson. All rights reserved.

The Emerson logo is a trademark and service mark of Emerson Electric Co. The DeltaV logo is a mark of one of the Emerson family of companies. All other marks are the property of their respective owners.

The contents of this publication are presented for informational purposes only, and while diligent efforts were made to ensure their accuracy, they are not to be construed as warranties or guarantees, express or implied, regarding the products or services described herein or their use or applicability. All sales are governed by our terms and conditions, which are available on request. We reserve the right to modify or improve the designs or specifications of our products at any time without notice.