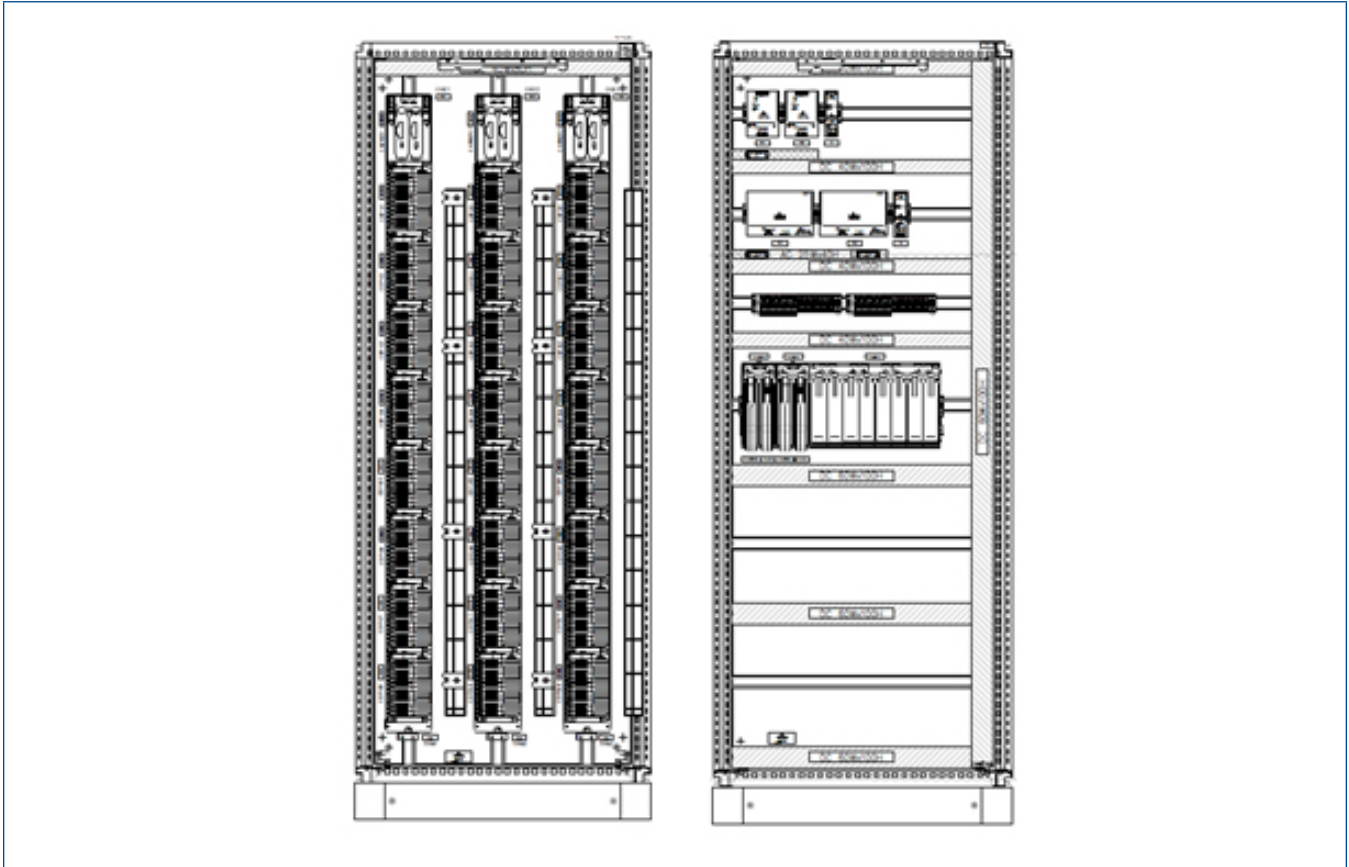


# DeltaV™ CTO CIOC CHARM Cabinets

## (US/Canadian Standards)



- Delivers Electronic Marshalling enabled by CHARMs technology or controller cabinet for CHARM system
- Fast delivery
- Reduced system footprint
- Significantly reduce cabinet design engineering
- Fully documented package

### Introduction

The DeltaV™ Configure to Order (CTO) Cabinets provide a predesigned solution for DeltaV CHARM I/O system, assembled in industry standard cabinets, ready to be installed on-site and connected to the field I/O.

These cabinets are designed to meet CSA personal safety requirements to help facilitate site installation and inspection. They seamlessly integrate into the overall hardware solution of your DeltaV project.

## Benefits

**Standardized Cabinet designs:** The CTO cabinets deliver the full benefits of electronic marshalling. These cabinets meet recommended installation practices of the DeltaV system and each is tested before shipping. The flexibility of DeltaV CHARM I/O 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.

**Fast delivery:** Standard cabinets are available with short lead times when ordered for direct shipment to site.

**Reduced system footprint:** Equipment room footprint is reduced by eliminating the traditional marshalling cabinets with cross wiring to traditional I/O cards.

**Significantly reduce cabinet design engineering:** The CHARM I/O cabinets use DeltaV Electronic Marshalling, which allows any channel to be assigned to any one of four controllers. This eliminates the task of rationalizing I/O to specific controllers and preserves I/O flexibility to handle late changes to the system.

**Fully documented package:** Each cabinet is supplied with full documentation showing internal lay-out, bill of materials and internal wiring. Drawings can be incorporated into the project drawing package.

## Product Description

The CTO CIOC CHARM Cabinets offering comprises a range of Pre-engineered solutions based on industry accepted standard cabinet / enclosures, preinstalled with CHARM I/O or DeltaV controllers and related equipment, ready to be installed in an equipment room and connected to process field instrumentation or CHARM I/O.

The cabinets are typical, free-standing enclosures intended for floor mounting in equipment room areas, where temperature and humidity are controlled within the requirements for computer/electronic equipment. They come ready to receive incoming 24 VDC power or available plant AC power. All internal wiring to power distribution components and grounding conductors has been tested at the factory.

Before delivery, each cabinet undergoes a full in-house inspection, to assure that it is fully operational before shipping directly to site. Electronic Marshalling eliminates the need for any internal cross wiring and I/O rationalization there is typically no need for FAT at a staging facility.

The CTO controller cabinets are designed to house your controllers, device net, vim, serial and fieldbus I/O.

The CTO CHARM cabinets support all available low voltage CHARM I/O types with 24 VDC busfed field power. The standard cabinets are designed for bottom / top cable entry options.

The CTO cabinets are ordered by selecting a base enclosure model, on top of which one or more predefined options are configured to meet specific project needs.

Base enclosure models are available:

- For different cabinet sizes / entry (Front Access or Front and Rear access).
- For different power distribution needs: DC powered or AC powered.
- NA (US/Canada) design standards and regulations Configurable options examples: type of CHARMs (IS or non-IS), type of controllers, type of I/O cards, side panels, cabinet light, nameplate engraving and injected power.

All cabinets come with following equipment installed:

- Primary and secondary 24VDC power distribution for CHARM I/O Cards and field instrumentation
- Wire ducts or wire basket
- Grounding bars
- Wiring plan pocket
- Emerson Name Plate Holder and blank name plate insert
- DeltaV equipment based on your configuration (and priced separately): including CHARM I/O carriers, base plates, standard terminal block, address plugs and terminals

*The CHARM I/O cards and CHARMs are not included and are to be ordered separately.*

*The required number of (redundant) CHARM I/O cards and CHARM modules depends on the actual number and types of I/O that will be wired into the cabinet.*

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

## Overview of CIOC/Controller Cabinets – Base Models (US/Canadian Standards)

Base Model Number	Description	No. of CHARM IO	Incoming Power Requirements (Pri. and Sec.)	Permitted Location
NA-CAB-800F-252-AC-CIOC	AC Powered PAS CHARM Cabinet for 252 CHARM I/O; Front Access	252	120V AC	Safe Area US/CANADA
NA-CAB-800FR-504-AC-CIOC	AC Powered PAS CHARMS Cabinet for 504 CHARM I/O; Front and Rear Access	504	120V AC	Safe Area US/CANADA
NA-CAB-800F-288-DC-CIOC	DC Powered PAS CHARMS Cabinet for 288 CHARM I/O; Front Access	288	24V DC	Safe Area US/CANADA
NA-CAB-800FR-576-DC-CIOC	DC Powered PAS CHARMS Cabinet for 576 CHARM I/O; Front and Rear Access	576	24V DC	Safe Area US/CANADA
NA-CAB-800FR-AC-CNTR-288	AC Powered Controller Cabinet; Front and Rear Access; 288 CHARM I/O in Rear	288	120V AC	Safe Area US/CANADA
NA-CAB-800F-AC-CNTR	AC Powered Controller Cabinet; Front Access	N/A	120V AC	Safe Area US/CANADA
NA-CAB-800FR-AC-CNTR	AC Powered Controller Cabinet; Front and Rear Access	N/A	120V AC	Safe Area US/CANADA

### Overview of CIOC/Controller Cabinets.

The CTO base model reference for cabinets uses the following naming convention: “**NA-CAB-XXXYY-ZZZ-IP-DDDD**”, Where:

- **NA** = US/Canada Design Standards and Regulations
- **XXX** = Cabinet width (mm), e.g. “800”
- **YY** = “F” for Front only access (600 mm deep), “FR” for Front and Rear access (800 mm deep)
- **ZZZ** = Maximum I/O's count in this CTO
- **IP** = AC/DC Incoming Power, DC=24VDC or AC=120VAC
- **DDDD** = Short description of content and purpose

## Overview of CIOC/Controller Base Model and Available Configurable Option

<b>LEGENDS:</b> <ul style="list-style-type: none"> <li>● Default option setting</li> <li>○ Configure to option setting (Different from Default)</li> <li>NA Option setting not possible for Base Enclosure Model</li> </ul>			Base Model		NA-CAB-800F-252-AC-CIOC	NA-CAB-800FR-504-AC-CIOC	NA-CAB-800F-288-DC-CIOC	NA-CAB-800FR-576-DC-CIOC	NA-CAB-800FR-AC-CNTR-288	NA-CAB-800F-AC-CNTR	NA-CAB-800FR-AC-CNTR
					NA-CAB-800F-252-AC-CIOC	NA-CAB-800FR-504-AC-CIOC	NA-CAB-800F-288-DC-CIOC	NA-CAB-800FR-576-DC-CIOC	NA-CAB-800FR-AC-CNTR-288	NA-CAB-800F-AC-CNTR	NA-CAB-800FR-AC-CNTR
Enclosure Options			Option Setting								
Enclosure Material	M	1.1	Painted Carbon Steel 800F	●	NA	●	NA		●	NA	
		2.1	Painted Carbon Steel 800FR	NA	●	NA	●	●	NA	●	
		13.8	SS316 800F	○	NA	○	NA		○	NA	
		14.3	SS316 800FR	NA	○	NA	○	○	NA	○	
Cable Entry	E	1.1	Bottom, Undrilled	●	●	●	●	●	●	●	
		1.2	Bottom, Undrilled, Cable Clamp Rail 800F	○	NA	○	NA		○	NA	
		1.3	Bottom, Undrilled, Cable Clamp Rail 800FR	NA	○	NA	○	○	NA	○	
		4.1	Top, Undrilled	○	○	○	○	○	○	○	
Utility Socket	R	1.1	No	●	●	NA		●	●	●	
		2.1	Yes	○	○	NA		○	○	○	
Enclosure Light	L	1.1	No	○	○	○	○	○	○	○	○
		2.1	Light with motion Sensor AC F	●	NA		NA		●	NA	
		2.2	Light with motion Sensor DC F		NA	●	NA			NA	
		3.1	Light with motion Sensor AC FR	NA	●	NA		●	NA	●	
		3.2	Light with motion Sensor DC FR		NA		●	NA		NA	
Temperature Monitoring*	T	1.1	No	○	○	○	○	○	○	○	○
		2.1	Thermostat	●	●	●	●	●	●	●	●
		3.1	Thermocouple wiring with CHARM	○	○	○	○	○	NA		
Door Fans**	F	1.1	No	○	○	○	○	○	○	○	○
		2.1	Thermostat Controlled AC F	●	NA	NA	NA		●	NA	
		2.2	Thermostat Controlled DC F		NA	●	NA			NA	
		3.1	Thermostat Controlled AC FR	NA	●	NA	NA	●	NA	●	
		3.2	Thermostat Controlled DC FR		NA	NA	●	NA		NA	

<b>LEGENDS:</b> <ul style="list-style-type: none"> <li>● Default option setting</li> <li>○ Configure to option setting (Different from Default)</li> </ul> <b>NA</b> Option setting not possible for Base Enclosure Model			<b>Base Model</b>		NA-CAB-800F-252-AC-CIOC	NA-CAB-800FR-504-AC-CIOC	NA-CAB-800F-288-DC-CIOC	NA-CAB-800FR-576-DC-CIOC	NA-CAB-800FR-AC-CNTR-288	NA-CAB-800F-AC-CNTR	NA-CAB-800FR-AC-CNTR
					Enclosure Options			Option Setting			
<b>Surge Protection Device</b>	S	1.1	No	●	●	NA		●	●	●	
		2.1	Yes F	○	NA	NA		NA	○	NA	
		2.2	Yes FR	NA	○	NA		○	NA	○	
<b>CIOC Injected Power Distribution</b>	IJ	1.1	No	○	○	○	○	○	○	○	
		2.1	24VDC - 6 Circuit	NA				●	●	●	
		2.5	24VDC - 24 Circuit	●	●	●	●	NA			
		2.7	2 x 24 Circuit	NA			○	NA			
<b>CIOC Network</b>	N	1.1	Copper	●	●	●	●	●	●	●	
		3.1	Multi Mode FO Adapter (1xSC, 50/125)	○	○	○	○	○	NA		
		5.1	Single Mode FO Adapter (1xSC, 9/125)	○	○	○	○	○	NA		
		7.2	NW Switch - 6xRJ45, 2xSC	○	○	○	○	○	○	○	
		7.3	NW Switch - 8xRJ45	○	○	○	○	○	○	○	
<b>Certification</b>	C	1.1	None	●	●	●	●	●	●	●	
		3.1	Custom CSA; Ordinary Location	○	○	○	○	○	○	○	

\*Temperature monitoring using "Thermocouple wiring with CHARM" option is available only for CHARMs cabinet.

\*\*Door fan option is possible only with Painted Carbon Steel cabinet. This option is not applicable for SS316 cabinet.

Controller and network switches for controller cabinets are to be added as per project requirement.

**I/O Type Selection:**

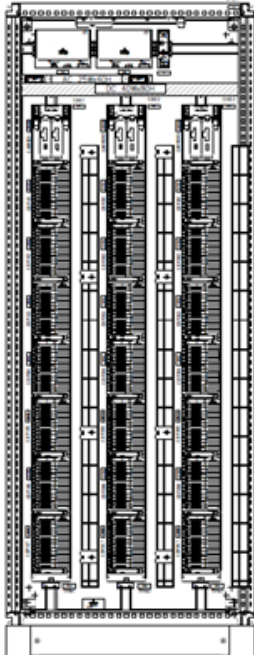
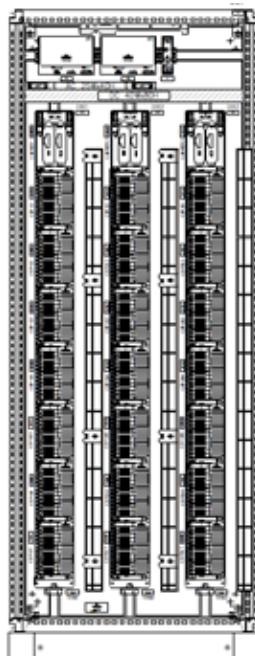
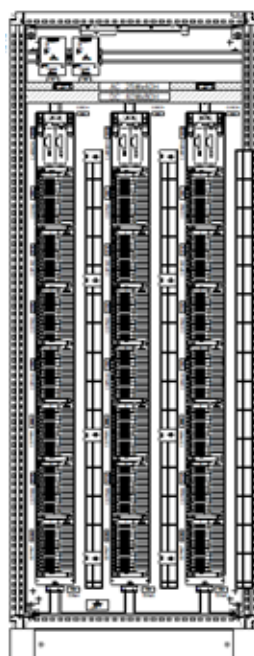
1. Selection for required qty of CIOC and CHARM Baseplates is possible for all DCS CHARM cabinets in CCT. Selection will be limited to max. installation possible in selected cabinet model.

2. Mixing of IS and non-IS CHARM baseplate is not possible in same column.

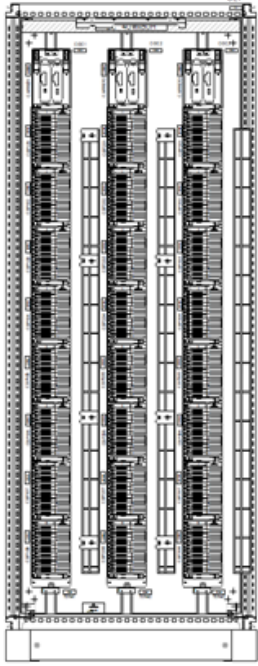

## General Specifications for CTO DCS Cabinets

General Specifications for CTO DCS Cabinets	
Dimensions for Carbon Steel Cabinet	Front Only Access - 800mm (W) x 600mm (D) x 2000mm (H) + 100mm Plinth Front Rear Access - 800mm (W) x 800mm (D) x 2000mm (H) + 100mm Plinth
Dimensions for SS316 Cabinet	Front Only Access - 800mm (W) x 600mm (D) x 2000mm (H) + 300mm (H) Floor Stand Front Rear Access - 800mm (W) x 800mm (D) x 2000mm (H) + 300mm (H) Floor Stand
Access	Front Access – Single solid door on front side, Front Rear Access – Single solid door on each side, Right hand hinged, 3-Point Latch with keylock
Protection Category	NEMA 12 / IP54 - for Carbon Steel Cabinet NEMA 4X / IP66 - for SS316 Cabinet
Approximate Weight	Front Only Cabinet ~200 kg Front Rear Cabinet ~300 kg
Color	Cabinet RAL7035, Plinth RAL7022 – for Carbon Steel Cabinet SS316 will be non-painted cabinet.
Door Fans**	Thermostat controlled – Set point 30°C (Applicable only for Carbon steel cabinet)
High Temperature Alarm	When using Thermostat for Cabinet High Temperature alarm (Recommended Set Point: 35°C)
Other	Galvanized mounting plate, grounding bars, wiring plan pocket, lifting eye bolts on top, removable gland plate
Environmental Specifications	Equipment/rack room installation (HVAC controlled), recommended ambient temperature 25°C
Certifications	Installation in Safe Area locations; Default Certification: None; Optional: CSA (US/Canada); Ordinary Location
Input Power	Primary and Secondary 120 VAC through disconnect switch
Power Supply Rating	2 X 40A
Internal Power Distribution	AC Distribution subassembly (mounted on left side). Fully redundant 24VDC distribution for CHARM I/O cards and bussed field power through fused terminals (mounted on right side).
CIOC Control Network	<ul style="list-style-type: none"> <li>■ Copper twisted pair: 10/100BASE-TX with RJ45 connectors; Full duplex operation up to 100m distance; to be connected to first CIOC carrier.</li> <li>■ Single Mode (9/125) or Multi Mode FO (50/125) connection with 1xSC adapter (1 for Primary NW &amp; 1 for Secondary NW)</li> <li>■ Copper CAT5e, din rail mount; 6xRJ45, 2xSC, NW Switch (1 for Primary NW &amp; 1 for Secondary NW)</li> <li>■ Copper CAT5e, din rail mount; 8xRJ45, NW Switch (1 for Primary NW &amp; 1 for Secondary NW)</li> </ul> <p>Daisy chained Primary and Secondary control network between all CIOC carriers is included.</p>

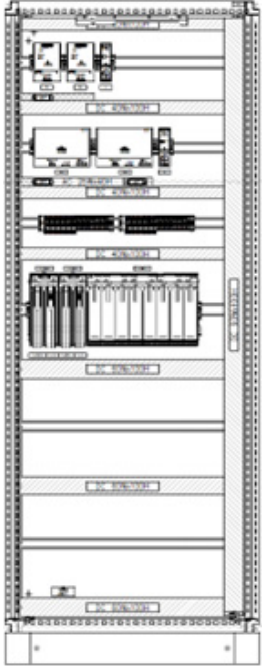
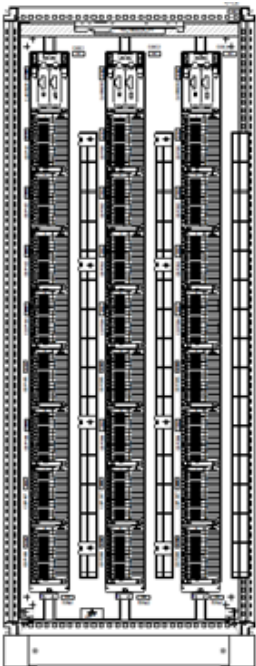
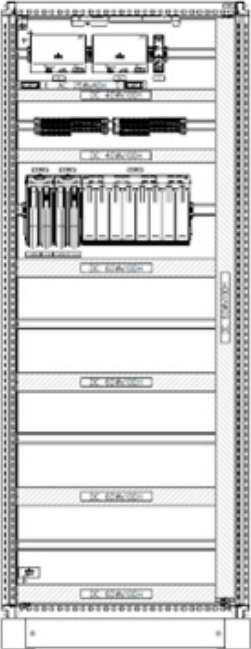
## CTO DCS Cabinets Internal General Arrangement

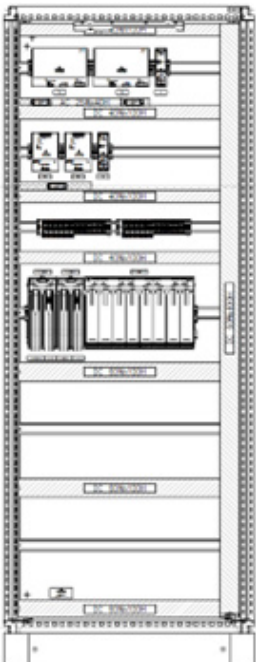
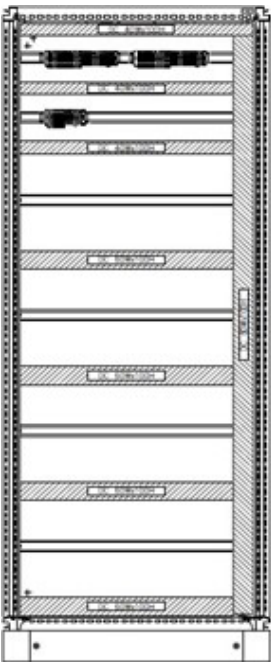
NA-CAB-800F-252-AC-CIOC	
<p style="text-align: center;">Front Internal View</p> 	<p style="text-align: center;"><b>NA-CAB-800F-252-AC-CIOC</b></p> <p>This CTO cabinet has space for:</p> <ul style="list-style-type: none"> <li>■ 3 x CIOC Carrier with redundant Copper Ethernet connectors</li> <li>■ Max. 21 nos. of Non-IS or IS CHARM Base plates as per user selection</li> </ul> <p>As per the selection of no. of CIOC Carriers and CBP, following DeltaV components will get added in BOM automatically:</p> <ul style="list-style-type: none"> <li>■ CHARM Address Plug</li> <li>■ CHARM standard terminal block</li> <li>■ CBP Terminator</li> <li>■ Base Plate Identifier Labels</li> <li>■ Channel Identifier Labels</li> </ul> <p><b><i>No active DeltaV components are included in the base model. All DeltaV active components need to be configured separately through the Emerson quoting tools.</i></b></p>
NA-CAB-800FR-504-AC-CIOC	
<p style="text-align: center;">Front Internal View</p> 	<p style="text-align: center;">Rear Internal View</p> 
<p style="text-align: center;"><b>NA-CAB-800FR-504-AC-CIOC</b></p> <p>This CTO cabinet has space for:</p> <ul style="list-style-type: none"> <li>■ 6 x CIOC Carrier with redundant Copper Ethernet connectors</li> <li>■ Max. 42 nos. of Non-IS or IS CHARM Base plates as per user selection</li> </ul> <p>As per the selection of no. of CIOC Carriers and CBP, following DeltaV components will get added in BOM automatically:</p> <ul style="list-style-type: none"> <li>■ CHARM Address Plug</li> <li>■ CHARM standard terminal block</li> <li>■ CBP Terminator</li> <li>■ Base Plate Identifier Labels</li> <li>■ Channel Identifier Labels</li> </ul> <p><b><i>No active DeltaV components are included in the base model. All DeltaV active components need to be configured separately through the Emerson quoting tools.</i></b></p>	



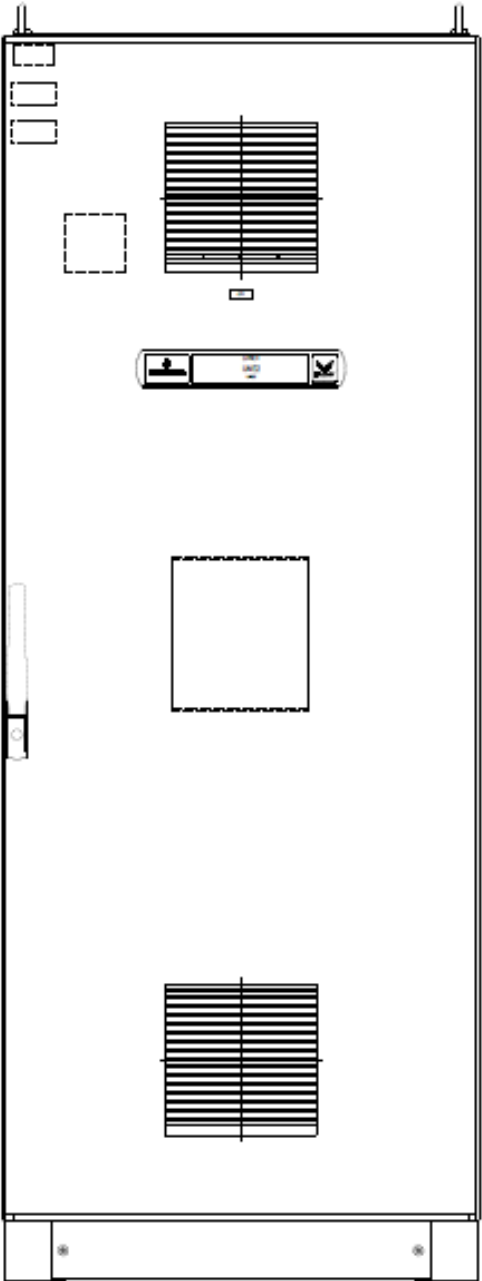
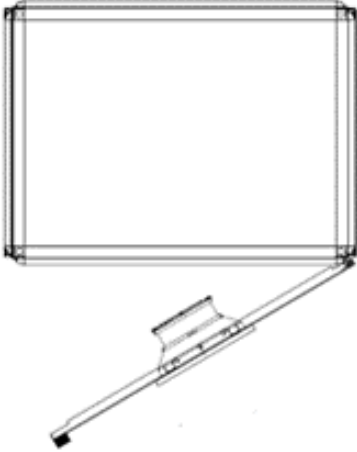
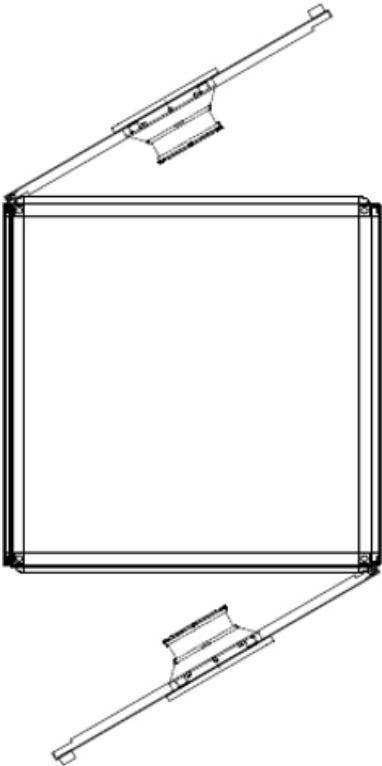
NA-CAB-800F-288-DC-CIOC	
<p style="text-align: center;">Front Internal View</p> 	<p style="text-align: center;"><b>NA-CAB-800F-288-DC-CIOC</b></p> <p>This CTO cabinet has space for:</p> <ul style="list-style-type: none"> <li>■ 3 x CIOC Carrier with redundant Copper Ethernet connectors</li> <li>■ Max. 24 nos. of Non-IS or IS CHARM Base plates as per user selection</li> </ul> <p>As per the selection of no. of CIOC Carriers and CBP, following DeltaV components will get added in BOM automatically:</p> <ul style="list-style-type: none"> <li>■ CHARM Address Plug</li> <li>■ CHARM Standard terminal block</li> <li>■ CBP Terminator</li> <li>■ Base Plate Identifier Labels</li> <li>■ Channel Identifier Labels</li> </ul> <p><b><i>No active DeltaV components are included in the base model. All DeltaV active components need to be configured separately through the Emerson quoting tools.</i></b></p>
NA-CAB-800FR-576-DC-CIOC	
<p style="display: flex; justify-content: space-around;"> <span>Front Internal View</span> <span>Rear Internal View</span> </p> 	<p style="text-align: center;"><b>NA-CAB-800FR-576-DC-CIOC</b></p> <p>This CTO cabinet has space for:</p> <ul style="list-style-type: none"> <li>■ 6 x CIOC Carrier with redundant Copper Ethernet connectors</li> <li>■ Max. 48 nos. of Non-IS or IS CHARM Base plates as per user selection</li> </ul> <p>As per the selection of no. of CIOC Carriers and CBP, following DeltaV components will get added in BOM automatically:</p> <ul style="list-style-type: none"> <li>■ CHARM Address Plug</li> <li>■ CHARM Standard terminal block</li> <li>■ CBP Terminator</li> <li>■ Base Plate Identifier Labels</li> <li>■ Channel Identifier Labels</li> </ul> <p><b><i>No active DeltaV components are included in the base model. All DeltaV active components need to be configured separately through the Emerson quoting tools.</i></b></p>



NA-CAB-800FR-AC-CNTR-288	
<p style="text-align: center;">Front Internal View</p> 	<p style="text-align: center;">Rear Internal View</p> 
<p><b>NA-CAB-800FR-AC-CNTR-288</b></p> <p>This CTO cabinet has space for:</p> <ul style="list-style-type: none"> <li>■ DCS Controllers</li> <li>■ 8 Wide Carriers</li> <li>■ 3 x CIOC Carrier with redundant Copper Ethernet connectors</li> <li>■ Max. 24 nos. of Non-IS or IS CHARM Base plates as per user selection</li> </ul> <p>As per the selection of no. of CIOC Carriers and CBP, following DeltaV components will get added in BOM automatically:</p> <ul style="list-style-type: none"> <li>■ CHARM Address Plug</li> <li>■ CHARM Standard terminal block</li> <li>■ CBP Terminator</li> <li>■ Base Plate Identifier Labels</li> <li>■ Channel Identifier Labels</li> </ul> <p><b><i>No active DeltaV components are included in the base model. All DeltaV active components need to be configured separately through the Emerson quoting tools.</i></b></p>	
NA-CAB-800F-AC-CNTR	
<p style="text-align: center;">Front Internal View</p> 	<p style="text-align: center;"><b>NA-CAB-800F-AC-CNTR</b></p> <p>This CTO cabinet has space for:</p> <ul style="list-style-type: none"> <li>■ DCS Controllers</li> <li>■ 4 Wide or 8 Wide Carriers</li> </ul> <p><b><i>No active DeltaV components are included in the base model. All DeltaV active components need to be configured separately through the Emerson quoting tools.</i></b></p>

NA-CAB-800FR-AC-CNTR		
Front Internal View	Rear Internal View	<b>NA-CAB-800FR-AC-CNTR</b>
		<p>This CTO cabinet has space for:</p> <ul style="list-style-type: none"><li>■ DCS Controller (Front)</li><li>■ DCS and SIS Controller (Rear)</li><li>■ 8 Wide Carriers</li></ul> <p><i>No active DeltaV components are included in the base model. All DeltaV active components need to be configured separately through the Emerson quoting tools.</i></p>

**External Views for Cabinets**

<p>External View for Front only and Front / Rear Cabinet</p>	<p>External Top View for Front only Cabinet</p>
	
	<p>External Top View for Front / Rear Cabinet</p>
	

## System Compatibility

The CTO CHARMs Cabinets are compatible with DeltaV v13.3.1 or later software.

CHARM I/O hardware requires:

- S-Series controllers with DeltaV v11.3.1 or later software.
- M-Series and PK controllers with DeltaV v14.3 or later software.

## Certifications

The CTO CHARMs Cabinet designs are designed to meet CSA personal safety and EMC requirements. The designs have been submitted for the following certifications:

- CSA Mark for US and Canada

For US/Canada Design Standards and Regulations, the cabinet default does not come with certification. The CSA Certification is optional.

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

## Ordering Process

CTO DCS CHARM Cabinets are pre-engineered solutions developed by Emerson's Project Management Office (PMO) and made available from Emerson Supply Chain.

Basically, follow the steps below to configure and order a CTO CIOC CHARM Cabinet:

1. Specify the CTO Cabinet 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 optioned CTOs.

2. Based on the cabinet options selections done in Cabinet configuration tool (CCT), you will then receive:

- A quotation for the fully assembled Cabinet.
- The detailed specification sheet matching your configuration, including the Bill of Materials.

3. Share the generated specification sheet from the Cabinet configuration tool (CCT) with iCenter St. Louis. Based on the selected options, iCenter will provide the drawing package (PDF or AutoCAD).
4. Approve the drawing package for construction.
5. Order the CTO Cabinet as per provided quotation and approved drawings.
6. The CTO Cabinet is assembled, factory tested and delivered to site. The delivery includes the as-built drawing package (in AutoCAD Electrical).

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 (iCenter St. Louis):

**[iCenterSTL.Quotes@Emerson.com](mailto:iCenterSTL.Quotes@Emerson.com)**

For Middle East, Asia Pacific and Africa iCenter:

**[rfq\\_icenter.nsk@Emerson.com](mailto:rfq_icenter.nsk@Emerson.com)**

## Project Customizations

**"...What if a CTO CHARM Cabinet is 90% what I need, but I really need my Cabinet to have..."**

For any 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 Factory Acceptance Test, 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.

## Related Products

- CHARM I/O Cards (CIOC2) must be ordered separately.
- Individual IO CHARM modules (including cabinet alarm CHARMs) must be ordered separately as per project requirement.

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