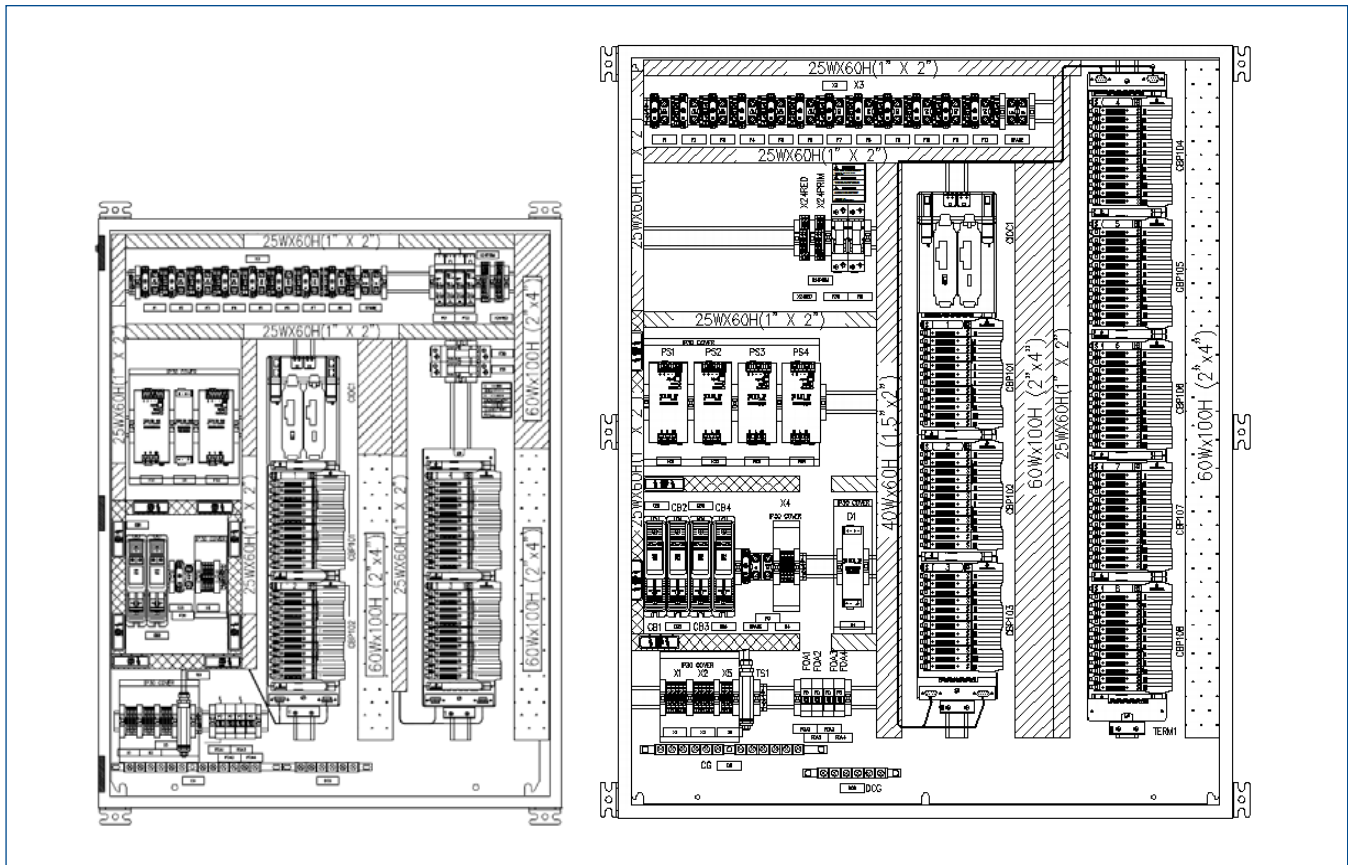


CTO CHARM Field Enclosures



CTO CHARM Field Enclosures.

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

Introduction

The DeltaV™ Configure To Order (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 (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 certifications (world areas): CE (Europe) and NEC/CEC (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 (Fiber Optic 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 24VDC Power to CHARM I/O Cards.
- AC power feeds with redundant AC/DC 24 VDC bulk power supplies.
 - or -
 - 24 VDC power distribution from remote.
- PVC wire ducts.
- Grounding bars for CG (Chassis Ground) and DC Ground.
- Reference.
- Name Plate.

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 24 VDC bussed field power.

CHARM I/O card carrier, CHARM I/O cards, CHARM terminal blocks and CHARMs are not included and are to be ordered separately.

Configure To Order 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) / 24IO (IS) + 24IO (Non-IS) / 96IO (Non-IS) / 96IO (IS) / 60IO (IS) + 36IO (Non-IS)
 - Actual CHARMs to be ordered separately
- Enclosure material: powder coated steel, stainless steel SS304 or SS316L
- Stainless steel provides protection for corrosive environments (category NEMA4X). SS316L provides superior corrosive protection and is typically applied in off-shore applications (salt resistant)
- Removable Gland Plate (5 mm)
- Pre-drilled bottom entry with polyamide wire glands for I/O (black or blue), power, communications and Ground cables. With standard drill pattern or custom predrilled as per drill pattern provided (with stop plugs)

- Name plate engraved with custom supplied cabinet identification information.
- 24 VDC power distribution for injected power or 4-wire transmitter power: 8 or 12 fused circuits, optionally prewired to selected channels or base plates. (includes a redundancy diode to bring primary and secondary power feeds to a common distribution).
- Bulk Power supply upgrade to 10A or 2* 10A (required when injected power distribution option is selected).
- Heater, for extreme low temperature installations.
- Blue marking for wire ducts.
- Breather: Brass Ni plated / SS316L.
- Ethernet: Fiber Optic / Copper.
- Warning label languages other than standard English, French, 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 provides 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
JB-48DC-CE	DC Powered Field Enclosure for 48 CHARM I/O; CE; Safe Area Locations.	48	24 VDC	Safe Area CE (Europe)
NA-FE-48-DC-CIOC-SA	DC Powered Field Enclosure for 48 CHARM I/O; FM Ordinary Locations.	48	24 VDC	Safe Area NEC/CEC Note 1
JB-48DC-HA-CE	DC Powered Field Enclosure for 48 CHARM I/O; CE; ATEX, Zone 2 Locations.	48	24 VDC	Hazardous Area ATEX Zone 2 (Europe)
NA-FE-48-DC-CIOC-HA	DC Powered Field Enclosure for 48 CHARM I/O; FM; Class I Division 2 Locations.	48	24 VDC	Hazardous Area NEC/CEC Class I, Div 2 (US/Can) Note 1
JB-48DC-PS-CE	AC Powered Field Enclosure for 48 CHARM I/O; CE; Safe Area Locations.	48	120/230 VAC	Safe Area CE (Europe)
NA-FE-48-AC-CIOC-SA	AC Powered Field Enclosure for 48 CHARM I/O; FM; Ordinary Locations.	48	120/230 VAC	Safe Area NEC/CEC Note 1
JB-48DC-PS-HA-CE	AC Powered Field Enclosure for 48 CHARM I/O; CE; ATEX, Zone 2 Locations.	48	120/230 VAC	Hazardous Area ATEX Zone 2 (Europe)
NA-FE-48-AC-CIOC-HA	AC Powered Field Enclosure for 48 CHARM I/O; FM; Class I Division 2 Locations.	48	120/230 VAC	Hazardous Area NEC/CEC Class I, Div 2 (US/Can) Note 1
JB-96DC-PS-CE	AC Powered Field Enclosure for 96 CHARM I/O; CE; Safe Area Locations.	96	120/230 VAC	Safe Area CE (Europe)
NA-FE-96-AC-CIOC-SA	AC Powered Field Enclosure for 96 CHARM I/O.	96	120/230 VAC	Safe Area NEC/CEC Note 1
JB-96DC-PS-HA-CE	AC Powered Field Enclosure for 96 CHARM I/O; CE; ATEX, Zone 2 Locations.	96	120/230 VAC	Hazardous Area ATEX Zone 2 (Europe)
NA-FE-96-AC-CIOC-HA	AC Powered Field Enclosure for 96 CHARM I/O.	96	120/230 VAC	NEC/CEC Class I, Div 2 (US/Can) Note 1

Overview of CHARM Field Enclosures.

The CTO base model reference for CHARM field enclosures uses following naming convention: "JB-ZZZZZZZ", where "ZZZZZZZ" is a short description of the content and purpose of the field enclosure. This description contains:

- **XXDC:** to indicate the enclosure accommodates XX CHARM terminals 24VDC I/O ("48DC" or "96DC").
- **PS:** when the enclosure has 24VDC bulk power supplies (AC powered).
- **HA:** when the enclosure can be installed in hazardous areas.
- **NA:** when the enclosure can be installed and used based on NEC/CEC Standards (US and Canada).
- **CE:** when the enclosure comes with CE certification.

Note 1: NA versions have been submitted for evaluation to FM (US/Canada).

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

Base Model			EUR					
			JB-48DC-CE	JB-48DC-HA-CE	JB-48DC-PS-CE	JB-48DC-PS-HA-CE	JB-96DC-PS-CE	JB-96DC-PS-HA-CE
# CHARM I/O			48CIO	48CIO	48CIO	48CIO	96CIO	96CIO
Certification / World Area (CE: Europe)			**	**	**	**	**	**
Power Input (AC: 230VAC)			DC	DC	AC	AC	AC	AC
Location (Safe Area, Hazardous Area)			Safe Area	Haz. Area	Safe Area	Haz. Area	Safe Area	Haz. Area
Enclosure Options								
Nameplate Engraving	A	1	No	•	•	•	•	•
		2	Yes	○	○	○	○	○
Type of CHARMS	B	1	48IO - NONIS	•	•	•	•	-
		2	48IO - IS	○	○	○	○	-
		3	24IO (IS) + 24IO (NONIS)	○	○	○	○	-
		4	96IO - NONIS	-	-	-	-	•
		5	96IO - IS	-	-	-	-	○
		6	60IO (IS) + 36IO (NONIS)	-	-	-	-	○
Enclosure Material	C	1	Powder coated steel	•	○	•	○	•
		2	Powder coated steel with gland plate	○	○	○	○	○
		3	Stainless steel SS304	○	•	○	•	○
		4	Stainless steel SS304 with gland plate	○	○	○	○	○
		5	Stainless steel SS316L	○	○	○	○	○
		6	Stainless steel SS316L with gland plate	○	○	○	○	○
Cable Entry	D	1	UNDRILLED	•	•	•	•	•
		2	STANDARD PREDRILLED WITH BLACK CABLE GLANDS	○	○	○	○	○
		3	STANDARD PREDRILLED WITH BLUE CABLE GLANDS FOR ALL IO CABLES	○	○	○	○	○
		4	STANDARD PREDRILLED WITH BLUE CABLE GLANDS FOR 24 IO CABLES	○	○	○	○	○
		5	CUSTOM PREDRILLED - NO CABLE GLANDS	○	○	○	○	○
Breather	E	1	Brass Ni plated	•	•	•	•	•
		2	SS316L	○	○	○	○	○
Power Supply Rating	F	1	5A	-	-	•	•	-
		2	10A	-	-	○	○	•
		3	20A	-	-	-	-	○
Ethernet - Safety Network	G	1	Fibre Optic	•	•	•	•	•
		2	Copper	○	○	○	○	○
24VDC for injected power	H	1	No	•	•	•	•	•
		2	8 circuit	○	○	○	○	-
		3	12 circuits	-	-	-	-	○
Heater	I	1	No	-	-	•	•	•
		2	Yes	-	-	○	○	○
Warning Label Languages	J	1	English - French - German	•	•	•	•	•
		2	English - French - Specific third language	○	○	○	○	○

- : Default option setting
- : Configure-To-Order option setting, different from default.
- Blank : Option setting not possible for the Base Enclosure Model.
- : Intentionally left blank to fill in your configuration choices.

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

Base Model				NA					
				NA-FE-48-DC-CIOC-SA	NA-FE-48-DC-CIOC-HA	NA-FE-48-AC-CIOC-SA	NA-FE-48-AC-CIOC-HA	NA-FE-96-AC-CIOC-SA	NA-FE-96-AC-CIOC-HA
# CHARM I/O				48CIOC	48CIOC	48CIOC	48CIOC	96CIOC	96CIOC
Certification / World Area (NA: US/CAN)				**	**	**	**	**	**
Power Input (AC: 120)				DC	DC	AC	AC	AC	AC
Location (Safe Area, Hazardous Area)				Safe Area	Haz. Area	Safe Area	Haz. Area	Safe Area	Haz. Area
Enclosure Options				Safe Area	Haz. Area	Safe Area	Haz. Area	Safe Area	Haz. Area
Nameplate Engraving	A	1	No	•	•	•	•	•	•
		2	Yes	○	○	○	○	○	○
Type of CHARMS	B	1	48IO - NONIS	•	•	•	•	-	-
		2	48IO - IS	○	○	○	○	-	-
		3	24IO (IS) + 24IO (NONIS)	○	○	○	○	-	-
		4	96IO - NONIS	-	-	-	-	•	•
		5	96IO - IS	-	-	-	-	○	○
		6	60IO (IS) + 36IO (NONIS)	-	-	-	-	○	○
Enclosure Material	C	1	powder coated steel	•	•	•	•	•	•
		2	stainless steel SS304	○	○	○	○	○	○
		3	stainless steel SS316L	○	○	○	○	○	○
Cable Entry	D	1	Undrilled	•	•	•	•	•	•
		2	With Gland Plate	○ ¹	○ ¹	○ ¹	○ ¹	○ ¹	○ ¹
		3	With Roxtec Glands	○ ^{1&2}	○ ^{1&2}	○ ^{1&2}	○ ^{1&2}	○ ^{1&2}	○ ^{1&2}
Power Supply Rating	E	1	5A	-	-	•	•	-	-
		2	10A	-	-	○	○	•	•
		3	20A	-	-	-	-	○	○
Ethernet - Safety Network	F	1	Fibre Optic	•	•	•	•	•	•
		2	Fibre Optic w / Splice Cassettes	○	○	○	○	○	○
		3	Copper	○	○	○	○	○	○
24VDC for injected power	G	1	No	•	•	•	•	•	•
		2	8 circuit	○	○	○	○	-	-
		3	12 circuits	-	-	-	-	○	○
Heater	H	1	No	-	-	•	•	•	•
		2	Yes	-	-	○	○	○	○
Warning Label Languages	I	1	English - French - Spanish	•	•	•	•	•	•
		2	English - French - Specific third language	○	○	○	○	○	○
Surge Protection Device	J	1	No	-	-	•	•	•	•
		2	Yes	-	-	○	○	○	○

• : Default option setting.

○ : Configure-To-Order option setting, different from default.

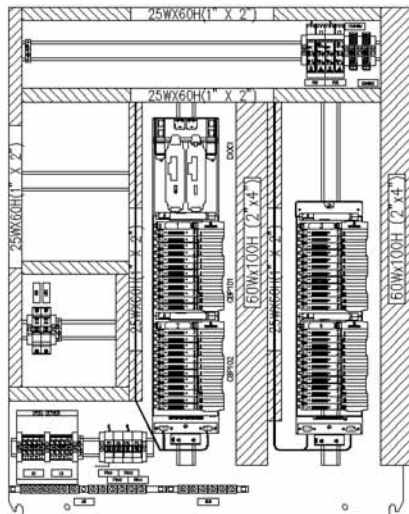
Blank : Option setting not possible for the Base Enclosure Model.

☐ : Intentionally left blank to fill in your configuration choices.

¹: Cannot combine options N1 & N2.

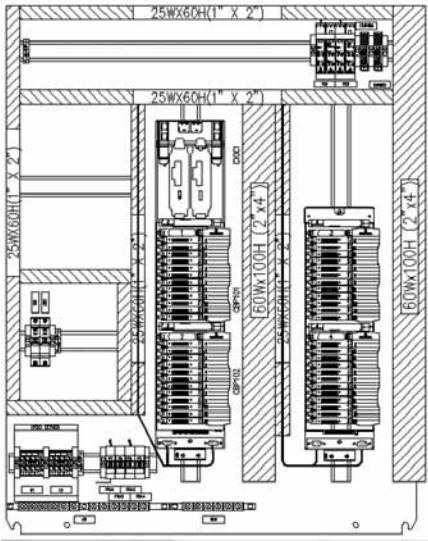
²: SS304 Roxtec on SS316L box to maintain NEMA 4X Rating. (For SS316L box only).

JB-48DC-CE	
Material (*)	Powder Coated Sheet Steel – 1.5mm. color RAL7035.
Dimensions	800mm (W) x 1000mm (H) x 300mm (D)
Access	Single door, left hand hinged.
Protection Category (*)	IP 66 – NEMA4
Cable Entry (*)	Bottom, Undrilled.
Name Plate (*)	Outside Door: laser engraved plastic.
Weight	~75 kg
Certifications	CE, installation in Safe Area Locations.
Power Requirements – Internal Power Distribution.	Primary and secondary 24VDC power to be supplied from outside the Field Enclosure. Includes full redundant (primary and secondary) 24VDC distribution over power terminals and circuit breakers.
Control Network (*)	Redundant fiber optic, 100BASE-FX, Multi Mode, SC sockets (2 spare SC sockets for up to 4 spare fibers). Fiber Optic control network: FO to Copper Network switches, SC adaptors + Fiber Optic patch cables, Multimode 50/125 micron core/cladding diameters (OM2).
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"> ■ 1 x CHARM I/O Carrier with redundant copper Ethernet connectors. ■ 4 x CHARM Base Plates and address plugs. ■ 48 x CHARM standard terminal blocks - Screw type. ■ Base Plate and Channel Identifier Labels. <p>No DeltaV equipment is included in the base model. All DeltaV equipment is to be specified separately through the Emerson quoting tools.</p>
Other	Mounting plate, PVC 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.

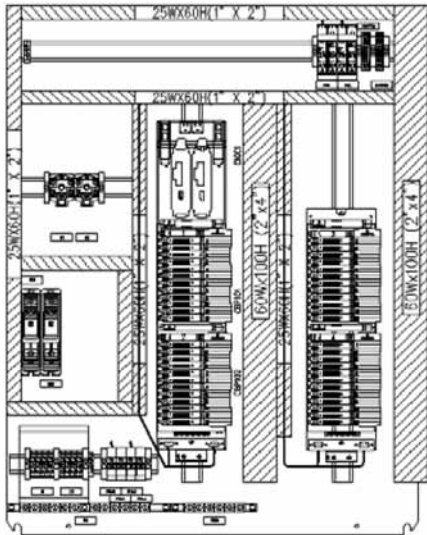
Specifications for JB-48DC-CE.

NA-FE-48-DC-CIOC-SA	
Material (*)	Powder Coated Sheet Steel – 1.5mm. color RAL7035.
Dimensions	914mm (W) x 1067mm (H) x 305mm (D)
Access	Single door, left hand hinged.
Protection Category (*)	IP 66 – NEMA4
Cable Entry (*)	Bottom, Undrilled.
Name Plate (*)	Outside Door: laser engraved plastic.
Weight	~75 kg
Certifications	Certification submitted for evaluation for Ordinary Locations, FM (US/Canada).
Power Requirements – Internal Power Distribution.	<p>Primary and secondary 24VDC power to be supplied from outside the Field Enclosure.</p> <p>Includes full redundant (primary and secondary) 24VDC distribution over power terminals and circuit breakers.</p>
Control Network (*)	<p>Redundant fiber optic, 100BASE-FX, Multi Mode, SC sockets (2 spare SC sockets for up to 4 spare fibers).</p> <p>Includes Fiber Optic control network: FO to Copper Network switches, SC adaptors + Fiber Optic patch cables, Multimode 50/125 micron core/cladding diameters (OM2).</p>
Example Layout and Installed DeltaV CHARM Equipment (*) <div style="text-align: center;">  </div>	<p>This field enclosure has space for 48 CHARM I/O channels, including:</p> <ul style="list-style-type: none"> ■ 1 x CHARM I/O Carrier with redundant copper Ethernet connectors. ■ 4 x CHARM Base Plates and address plugs. ■ 48 x CHARM standard terminal blocks - Screw type. ■ Base Plate and Channel Identifier Labels. <p>No DeltaV equipment is included in the base model. All DeltaV equipment is to be specified separately through the Emerson quoting tools.</p>
Other	Mounting plate, PVC 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.

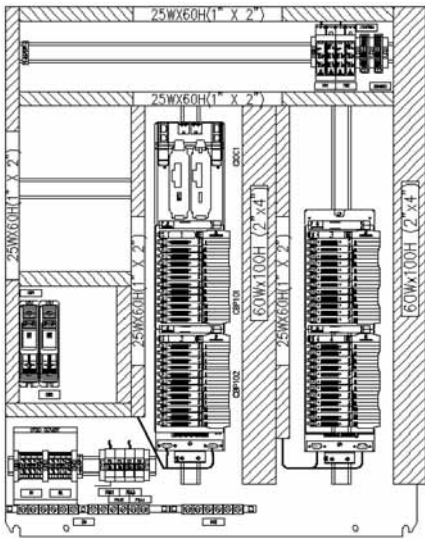
JB-48DC-HA-CE	
Material (*)	Stainless Steel SS304, 1.5 mm
Dimensions	800mm (W) x 1000mm (H) x 300mm (D)
Access	Single door, left hand hinged.
Protection Category (*)	IP 66 – NEMA4X (Corrosive Environment)
Cable Entry (*)	Bottom, Undrilled.
Name Plate (*)	Outside Door: laser engraved plastic
Weight	~75 kg
Certifications	CE, ATEX, Zone 2
Power Requirements – Internal Power Distribution	Primary and secondary 24VDC power to be supplied from outside the Field Enclosure. Includes full redundant (primary and secondary) 24VDC distribution over power terminals and circuit breakers.
Control Network (*)	Redundant fiber optic, 100BASE-FX, Multi Mode, SC sockets (2 spare SC sockets for up to 4 spare fibers). Includes Fiber Optic control network: FO to Copper Network switches, SC adaptors + Fiber Optic patch cables, Multimode 50/125 micron core/cladding diameters (OM2).
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"> ■ 1 x CHARM I/O Carrier with redundant copper Ethernet connectors. ■ 4 x CHARM Base Plates and address plugs. ■ 48 x CHARM standard terminal blocks - Screw type. ■ Base Plate and Channel Identifier Labels. <p>No DeltaV equipment is included in the base model. All DeltaV equipment is to be specified separately through the Emerson quoting tools.</p>
Other	Mounting plate, PVC 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.

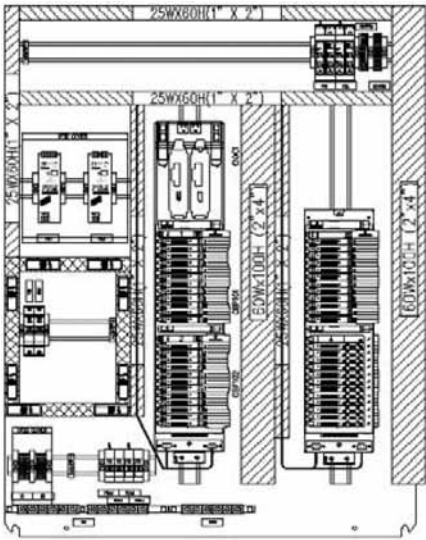
Specifications for JB-48DC-HA-CE.

NA-FE-48-DC-CIOC-HA	
Material (*)	Stainless Steel SS304, 1.5 mm
Dimensions	914mm (W) x 1067mm (H) x 305mm (D)
Access	Single door, left hand hinged.
Protection Category (*)	IP 66 – NEMA4X (Corrosive Environment)
Cable Entry (*)	Bottom, Undrilled.
Name Plate (*)	Outside Door: laser engraved plastic.
Weight	~75 kg
Certifications	Certification submitted for evaluation for Hazardous Locations, FM; Class I, Division 2 (US/Canada).
Power Requirements – Internal Power Distribution	Primary and secondary 24VDC power to be supplied from outside the Field Enclosure. Includes full redundant (primary and secondary) 24VDC distribution over power terminals and circuit breakers.
Control Network (*)	Redundant fiber optic, 100BASE-FX, Multi Mode, SC sockets (2 spare SC sockets for up to 4 spare fibers). Includes Fiber Optic control network: FO to Copper Network switches, SC adaptors + Fiber Optic patch cables, Multimode 50/125 micron core/cladding diameters (OM2).
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"> ■ 1 x CHARM I/O Carrier with redundant copper Ethernet connectors. ■ 4 x CHARM Base Plates and address plugs. ■ 48 x CHARM standard terminal blocks - Screw type. ■ Base Plate and Channel Identifier Labels. <p>No DeltaV equipment is included in the base model. All DeltaV equipment is to be specified separately through the Emerson quoting tools.</p>
Other	Mounting plate, PVC wire ducts, external wall mounting brackets, door clamps, ground bars, drip edge, breather-drain.



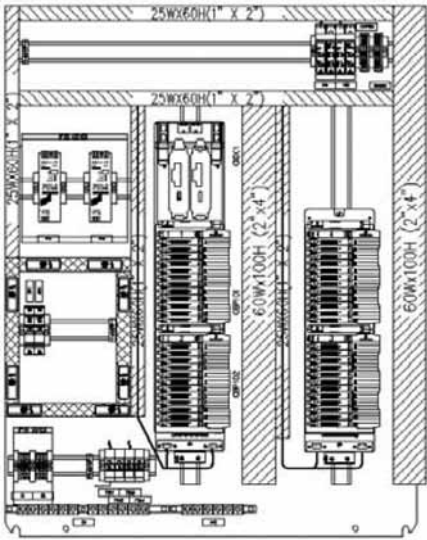
(*) Specifications given for the base model with default options. WIOC is optional. For other available configurations: see Overview of CTO Options.

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

JB-48DC-PS-CE	
Material (*)	Powder Coated Sheet Steel – 1.5mm. color RAL7035
Dimensions	800mm (W) x 1000mm (H) x 300mm (D)
Access	Single door, left hand hinged.
Protection Category (*)	IP 66 – NEMA4
Cable Entry (*)	Bottom, Undrilled.
Name Plate (*)	Outside Door: laser engraved plastic.
Weight	~80 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 over power terminals, circuit breakers. 24VDC bulk power supplies: 2 x 5A and full redundant (primary and secondary) 24VDC distribution.</p>
Control Network (*)	<p>Redundant fiber optic, 100BASE-FX, Multi Mode, SC sockets (2 spare SC sockets for up to 4 spare fibers).</p> <p>Includes Fiber Optic control network: FO to Copper Network switches, SC adaptors + Fiber Optic patch cables, Multimode 50/125 micron core/cladding diameters (OM2).</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"> ■ 1 x CHARM I/O Carrier with redundant copper Ethernet connectors. ■ 4 x CHARM Base Plates and address plugs. ■ 48 x CHARM standard terminal blocks - Screw type. ■ Base Plate and Channel Identifier Labels. <p>No DeltaV equipment is included in the base model. All DeltaV equipment is to be specified separately through the Emerson quoting tools.</p>
Other	Mounting plate, PVC wire ducts, external wall mounting brackets, door clamps, ground bars, external grounding bolt, drip edge, breather-drain.

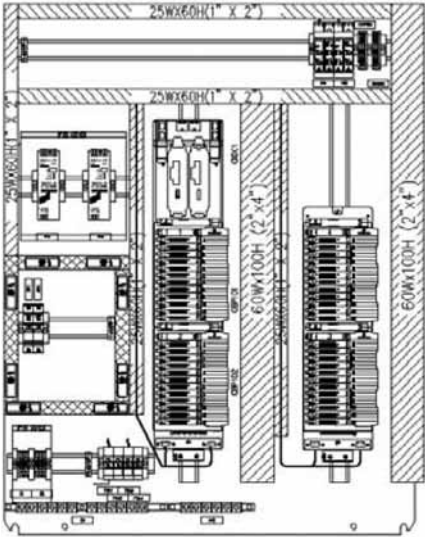
(*) Specifications given for the base model with default options. For other available configurations: see Overview of CTO Options.

Specifications for JB-48DC-PS-CE

NA-FE-48-AC-CIOC-SA	
Material (*)	Powder Coated Sheet Steel – 1.5mm. color RAL7035
Dimensions	914mm (W) x 1067mm (H) x 305mm (D)
Access	Single door, left hand hinged.
Protection Category (*)	IP 66 – NEMA4
Cable Entry (*)	Bottom, Undrilled.
Name Plate (*)	Outside Door: laser engraved plastic.
Weight	~80 kg
Certifications	Certification submitted for evaluation for Ordinary Locations, FM (US/Canada).
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 over power terminals, circuit breakers. 24VDC bulk power supplies: 2 x 5A and full redundant (primary and secondary) 24VDC distribution.</p>
Control Network (*)	<p>Redundant fiber optic, 100BASE-FX, Multi Mode, SC sockets (2 spare SC sockets for up to 4 spare fibers).</p> <p>Includes Fiber Optic control network: FO to Copper Network switches, SC adaptors + Fiber Optic patch cables, Multimode 50/125 micron core/cladding diameters (OM2).</p>
Example Layout and Installed DeltaV CHARM 	<p>This field enclosure has space for 48 CHARM I/O channels, including:</p> <ul style="list-style-type: none"> ■ 1 x CHARM I/O Carrier with redundant copper Ethernet connectors. ■ 4 x CHARM Base Plates and address plugs. ■ 48 x CHARM standard terminal blocks - Screw type. ■ Base Plate and Channel Identifier Labels. <p>No DeltaV equipment is included in the base model. All DeltaV equipment is to be specified separately through the Emerson quoting tools.</p>
Other	Mounting plate, PVC wire ducts, external wall mounting brackets, door clamps, ground bars, drip edge, breather-drain.

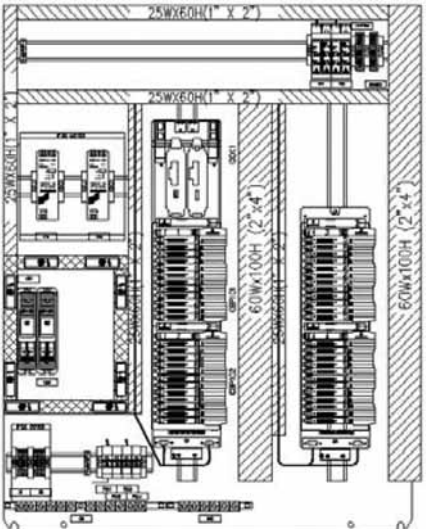
(*) Specifications given for the base model with default options. WIOC is optional. For other available configurations: see Overview of CTO Options.

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

JB-48DC-PS-HA-CE	
Material (*)	Stainless Steel SS304 1.5 mm
Dimensions	800mm (W) x 1000mm (H) x 300mm (D)
Access	Single door, left hand hinged.
Protection Category (*)	IP 66 – NEMA4X (Corrosive Environment)
Cable Entry (*)	Bottom, Undrilled.
Name Plate (*)	Outside Door: laser engraved plastic.
Weight	~80 kg
Certifications	CE, ATEX, Zone 2
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 over power terminals, circuit breakers. 24VDC bulk power supplies: 2 x 5A and full redundant (primary and secondary) 24VDC distribution.</p>
Control Network (*)	<p>Redundant fiber optic, 100BASE-FX, Multi Mode, SC sockets (2 spare SC sockets for up to 4 spare fibers).</p> <p>Includes Fiber Optic control network: FO to Copper Network switches, SC adaptors + Fiber Optic patch cables, Multimode 50/125 micron core/cladding diameters (OM2).</p>
Example Layout and Installed DeltaV CHARM 	<p>This field enclosure has space for 48 CHARM I/O channels, including:</p> <ul style="list-style-type: none"> ■ 1 x CHARM I/O Carrier with redundant copper Ethernet connectors. ■ 4 x CHARM Base Plates and address plugs. ■ 48 x CHARM standard terminal blocks - Screw type. ■ Base Plate and Channel Identifier Labels. <p>No DeltaV equipment is included in the base model. All DeltaV equipment is to be specified separately through the Emerson quoting tools.</p>
Other	Mounting plate, PVC wire ducts, external wall mounting brackets, door clamps, ground bars, external grounding bolt, drip edge, breather-drain.

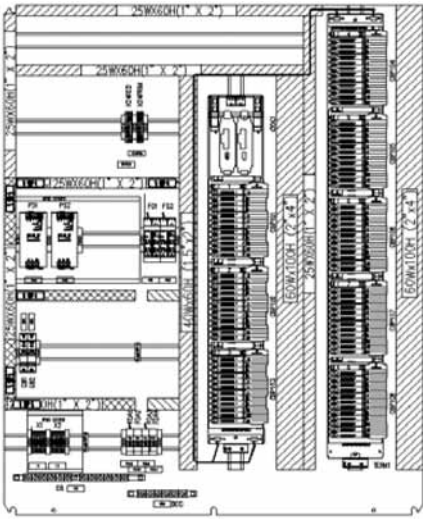
(*) Specifications given for the base model with default options. WIOC is optional. For other available configurations: see Overview of CTO Options.

Specifications for JB-48DC-PS-HA-CE.

NA-FE-48-AC-CIOC-HA	
Material (*)	Stainless Steel SS304 1.5 mm
Dimensions	914mm (W) x 1067mm (H) x 305mm (D)
Access	Single door, left hand hinged.
Protection Category (*)	IP 66 – NEMA4X (Corrosive Environment)
Cable Entry (*)	Bottom, Undrilled.
Name Plate (*)	Outside Door: laser engraved plastic.
Weight	~80 kg
Certifications	Certification submitted for evaluation for Hazardous Locations, FM; Class I, Division 2 (US/Canada).
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 over power terminals, circuit breakers. 24VDC bulk power supplies: 2 x 5A and full redundant (primary and secondary) 24VDC distribution.</p>
Control Network (*)	<p>Redundant fiber optic, 100BASE-FX, Multi Mode, SC sockets (2 spare SC sockets for up to 4 spare fibers).</p> <p>Includes Fiber Optic control network: FO to Copper Network switches, SC adaptors + Fiber Optic patch cables, Multimode 50/125 micron core/cladding diameters (OM2).</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"> ■ 1 x CHARM I/O Carrier with redundant copper Ethernet connectors. ■ 4 x CHARM Base Plates and address plugs. ■ 48 x CHARM standard terminal blocks - Screw type. ■ Base Plate and Channel Identifier Labels. <p>No DeltaV equipment is included in the base model. All DeltaV equipment is to be specified separately through the Emerson quoting tools.</p>
Other	Mounting plate, PVC wire ducts, external wall mounting brackets, door clamps, ground bars, drip edge, breather-drain.

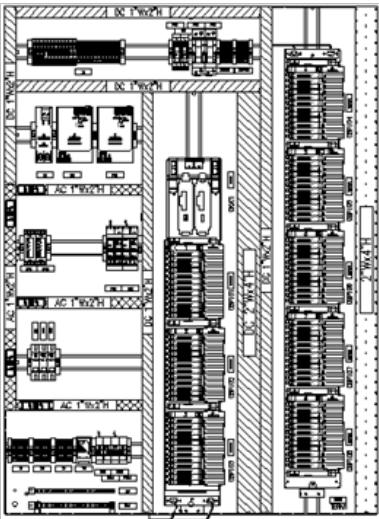
(*) Specifications given for the base model with default options. For other available configurations: see Overview of CTO Options.

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

JB-96DC-PS-CE	
Material (*)	Powder Coated Sheet Steel – 1.5mm. color RAL7035
Dimensions	965mm (W) x 1194mm (H) x 400mm (D)
Access	Single door, left hand hinged.
Protection Category (*)	IP 66 – NEMA4
Cable Entry (*)	Bottom, Undrilled.
Name Plate (*)	Outside Door: laser engraved plastic.
Weight	~120 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 over power terminals, circuit breakers. 24VDC bulk power supplies: 2 x 10A and full redundant (primary and secondary) 24VDC distribution.</p>
Control Network (*)	<p>Redundant fiber optic, 100BASE-FX, Multi Mode, SC sockets (2 spare SC sockets for up to 4 spare fibers).</p> <p>Includes Fiber Optic control network: FO to Copper Network switches, SC adaptors + Fiber Optic patch cables, Multimode 50/125 micron core/cladding diameters (OM2).</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"> ■ 1 x CHARM I/O Carrier with redundant copper Ethernet connectors. ■ 4 x CHARM Base Plates and address plugs. ■ 96 x CHARM standard terminal blocks - Screw type. ■ Base Plate and Channel Identifier Labels. <p>No DeltaV equipment is included in the base model. All DeltaV equipment is to be specified separately through the Emerson quoting tools.</p>
Other	Mounting plate, PVC wire ducts, external wall mounting brackets, door clamps, ground bars, external grounding bolt, drip edge, breather-drain.

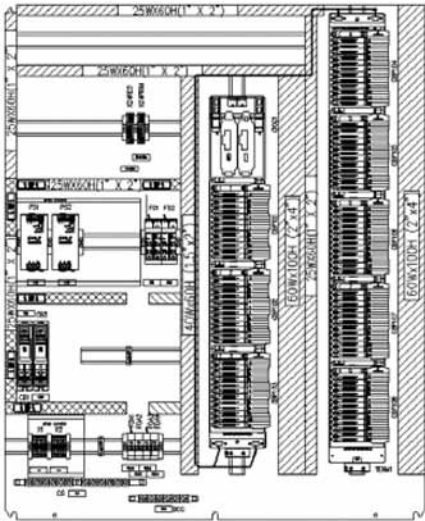
(*) Specifications given for the base model with default options. For other available configurations: see Overview of CTO Options.

Specifications for JB-96DC-PS-CE.

NA-FE-96-AC-CIOC-SA	
Material (*)	Powder Coated Sheet Steel – 1.5mm. color RAL7035
Dimensions	914 mm (W) x 1219mm (H) x 457 mm (D)
Access	Single door, left hand hinged.
Protection Category (*)	IP 66 – NEMA4
Cable Entry (*)	Bottom, Undrilled.
Name Plate (*)	Outside Door: laser engraved plastic.
Weight	~120 kg
Certifications	Certification submitted for evaluation for Ordinary Locations, FM (US/Canada).
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 over power terminals, circuit breakers. 24VDC bulk power supplies: 2 x 10A and full redundant (primary and secondary) 24VDC distribution.</p>
Control Network (*)	<p>Redundant fiber optic, 100BASE-FX, Multi Mode, SC sockets (2 spare SC sockets for up to 4 spare fibers).</p> <p>Includes Fiber Optic control network: FO to Copper Network switches, SC adaptors + Fiber Optic patch cables, Multimode 50/125 micron core/cladding diameters (OM2).</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"> ■ 1 x CHARM I/O Carrier with redundant copper Ethernet connectors. ■ 8 x CHARM Base Plates and address plugs. ■ 96 x CHARM standard terminal blocks - Screw type. ■ Base Plate and Channel Identifier Labels. <p>No DeltaV equipment is included in the base model. All DeltaV equipment is to be specified separately through the Emerson quoting tools.</p>
Other	Mounting plate, PVC wire ducts, external wall mounting brackets, door clamps, ground bars, external grounding bolt, drip edge, breather-drain.

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

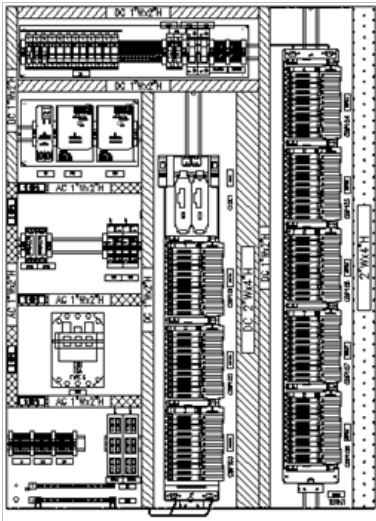
Specifications for NA-FE-96-AC-CIOC-SA.

JB-96DC-PS-HA-CE	
Material (*)	Stainless Steel SS304, 1.5 mm
Dimensions	965mm (W) x 1194mm (H) x 400mm (D)
Access	Single door, left hand hinged.
Protection Category (*)	IP 66 – NEMA4X (Corrosive Environment)
Cable Entry (*)	Bottom, Undrilled.
Name Plate (*)	Outside Door: laser engraved plastic.
Weight	~120 kg
Certifications	CE, ATEX, Zone 2
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 over power terminals, circuit breakers. 24VDC bulk power supplies: 2 x 10A and full redundant (primary and secondary) 24VDC distribution.</p>
Control Network (*)	<p>Redundant fiber optic, 100BASE-FX, Multi Mode, SC sockets (2 spare SC sockets for up to 4 spare fibers).</p> <p>Includes Fiber Optic control network: FO to Copper Network switches, SC adaptors + Fiber Optic patch cables, Multimode 50/125 micron core/cladding diameters (OM2).</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"> ■ 1 x CHARM I/O Carrier with redundant copper Ethernet connectors. ■ 8 x CHARM Base Plates and address plugs. ■ 96 x CHARM standard terminal blocks - Screw type. ■ Base Plate and Channel Identifier Labels. <p>No DeltaV equipment is included in the base model. All DeltaV equipment is to be specified separately through the Emerson quoting tools.</p>
Other	Mounting plate, PVC 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 JB-96DC-PS-HA-CE.

NA-FE-96-AC-CIOC-HA	
Material (*)	Stainless Steel SS304, 1.5 mm
Dimensions	914 mm (W) x 1219mm (H) x 457 mm (D)
Access	Single door, left hand hinged.
Protection Category (*)	IP 66 – NEMA4X (Corrosive Environment)
Cable Entry (*)	Bottom, Undrilled.
Name Plate (*)	Outside Door: laser engraved plastic.
Weight	~120 kg
Certifications	Certification submitted for evaluation for Hazardous Locations, FM; Class I, Division 2 (US/Canada).
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 over power terminals, circuit breakers. 24VDC bulk power supplies: 2 x 10A and full redundant (primary and secondary) 24VDC distribution.</p>
Control Network (*)	<p>Redundant fiber optic, 100BASE-FX, Multi Mode, SC sockets (2 spare SC sockets for up to 4 spare fibers).</p> <p>Includes Fiber Optic control network: FO to Copper Network switches, SC adaptors + Fiber Optic patch cables, Multimode 50/125 micron core/cladding diameters (OM2).</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"> ■ 1 x CHARM I/O Carrier with redundant copper Ethernet connectors. ■ 8 x CHARM Base Plates and address plugs. ■ 96 x CHARM standard terminal blocks - Screw type. ■ Base Plate and Channel Identifier Labels. <p>No DeltaV equipment is included in the base model. All DeltaV equipment is to be specified separately through the Emerson quoting tools.</p>
Other	<p>Mounting plate, PVC 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 default options. For other available configurations: see Overview of CTO Options.

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

Design Considerations

Environmental Specifications

The CTO CHARM Field Enclosures are verified for typical heat load, to cover most use cases. The table below specifies the ambient temperature limits and the impact of CTO options: 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 “Max. Internal Heat Dissipation Allowed”.

It is advised to calculate the heat dissipation 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.

Enclosure	Humidity Spec.	Ambient Temperature		Max. Internal Heat Dissipation Allowed Watts	Ethernet	Injected Power	AC to DC Power Supply Amps @ 24VDC	Max. Allowable Total Heat Dissipation Value Margin (Only for CHARM Modules) Watts
		Min. °C	Max. °C					
JB-48DC-CE	5-95% R.H. N.C.	-40	55	40	FO	NO	N/A	21.3
					FO	YES, 4 AMPS/8 CKTS	N/A	18.2
					COPPER	NO	N/A	33.3
					COPPER	YES, 4 AMPS/8 CKTS	N/A	30.2
NA-FE-48-DC-CIOC-SA	5-95% R.H. N.C.	-40	55	40	FO	NO	N/A	21.3
					FO	YES, 4 AMPS/8 CKTS	N/A	18.2
					COPPER	NO	N/A	33.3
					COPPER	YES, 4 AMPS/8 CKTS	N/A	30.2
JB-48DC-HA-CE	5-95% R.H. N.C.	-20	50	40	FO	NO	N/A	21.3
					FO	YES, 4 AMPS/8 CKTS	N/A	18.2
					COPPER	NO	N/A	33.3
					COPPER	YES, 4 AMPS/8 CKTS	N/A	30.2
NA-FE-48-DC-CIOC-HA	5-95% R.H. N.C.	-20	50	88	FO	NO	N/A	69.3
					FO	YES, 4 AMPS/8 CKTS	N/A	66.2
					COPPER	NO	N/A	81.3
						YES, 4 AMPS/8 CKTS	N/A	78.2

Enclosure	Humidity Spec.	Ambient Temperature		Max. Internal Heat Dissipation Allowed Watts				Max. Allowable Total Heat Dissipation Value Margin (Only for CHARM Modules) Watts
		Min. °C	Max. °C		Ethernet	Injected Power	AC to DC Power Supply Amps @ 24VDC	
JB-48DC-PS-CE	5-95% R.H. N.C. Note 3	-25	50	72	FO	NO	5 Amps	39.9
					FO	NO	10 Amps	32.1
					FO	YES, 4 AMPS/8 CKTS	10 Amps	29.0
					COPPER	NO	5 Amps	51.9
					COPPER	NO	10 Amps	44.1
					COPPER	YES, 4 AMPS/8 CKTS	10 Amps	41.0
NA-FE-48-AC-CIOC-SA	5-95% R.H. N.C. Note 3	-25	50	88	FO	NO	5 Amps	55.9
					FO	NO	10 Amps	48.1
					FO	YES, 4 AMPS/8 CKTS	10 Amps	45.0
					COPPER	NO	5 Amps	67.9
					COPPER	NO	10 Amps	60.1
					COPPER	YES, 4 AMPS/8 CKTS	10 Amps	57.0
JB-48DC-PS-HA-CE	5-95% R.H. N.C. Note 3	-20	45	72	FO	NO	5 Amps	39.9
					FO	NO	10 Amps	32.1
					FO	YES, 4 AMPS/8 CKTS	10 Amps	29.0
					COPPER	NO	5 Amps	51.9
					COPPER	NO	10 Amps	44.1
					COPPER	YES, 4 AMPS/8 CKTS	10 Amps	41.0
NA-FE-48-AC-CIOC-HA	5-95% R.H. N.C. Note 3	-20	50	88	FO	NO	5 Amps	55.9
					FO	NO	10 Amps	48.1
					FO	YES, 4 AMPS/8 CKTS	10 Amps	45.0
					COPPER	NO	5 Amps	67.9
					COPPER	NO	10 Amps	60.1
					COPPER	YES, 4 AMPS/8 CKTS	10 Amps	47.0

Enclosure	Humidity Spec.	Ambient Temperature		Max. Internal Heat Dissipation Allowed Watts				Max. Allowable Total Heat Dissipation Value Margin (Only for CHARM Modules) Watts
		Min. °C	Max. °C		Ethernet	Injected Power	AC to DC Power Supply Amps @ 24VDC	
JB-96DC-PS-CE	5-95% R.H. N.C.	-25	55	80	FO	NO	10 Amps	40.1
					COPPER	NO	10 Amps	52.1
		Note 3	50	135	FO	YES, 8 AMPS/12 CKTS	20 Amps	67.4
					COPPER	YES, 8 AMPS/12 CKTS	20 Amps	79.4
NA-FE-96-AC-CIOC-SA	5-95% R.H. N.C.	-25	55	80	FO	NO	10 Amps	40.1
					COPPER	NO	10 Amps	52.1
		Note 3	50	150	FO	YES, 8 AMPS/12 CKTS	20 Amps	107.4
					COPPER	YES, 8 AMPS/12 CKTS	20 Amps	119.4
JB-96DC-PS-HA-CE	5-95% R.H. N.C.	-20	50	110	FO	NO	10 Amps	70.1
					COPPER	NO	10 Amps	82.1
		Note 3	50	110	FO	YES, 8 AMPS/12 CKTS	20 Amps	42.4
					COPPER	YES, 8 AMPS/12 CKTS	20 Amps	54.4
NA-FE-96-AC-CIOC-HA	5-95% R.H. N.C.	-20	50	150	FO	NO	10 Amps	110.1
					COPPER	NO	10 Amps	122.1
		Note 3	50	150	FO	YES, 8 AMPS/12 CKTS	20 Amps	82.4
					COPPER	YES, 8 AMPS/12 CKTS	20 Amps	94.4

NOTES:

1. The maximum heat dissipation values in above table are worst case: assuming a maximum load of the power supplies. Power supply loading is maxed at 80% rating.
2. Minimum temperature rating will change to -25°C for injected power option.
3. Minimum temperature rating will change to -40°C and humidity specification changes to 90% R.H. N.C. with heater option selected.

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 Enclosures 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 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.

System Compatibility

Configure To Order Field Enclosures are compatible with DeltaV version 11.3.1 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 Mark: conformity to the relevant European directives, including EMC directive
- CE Mark for ATEX, Zone 2
- NEC/CEC
- NEC/CEC Class I, Div 2

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?

Configure To Order CHARM Field Enclosures are pre-engineered solutions developed by Emerson's Project Management Office (PMO) and made available from Emerson Supply Chain. Basically, 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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