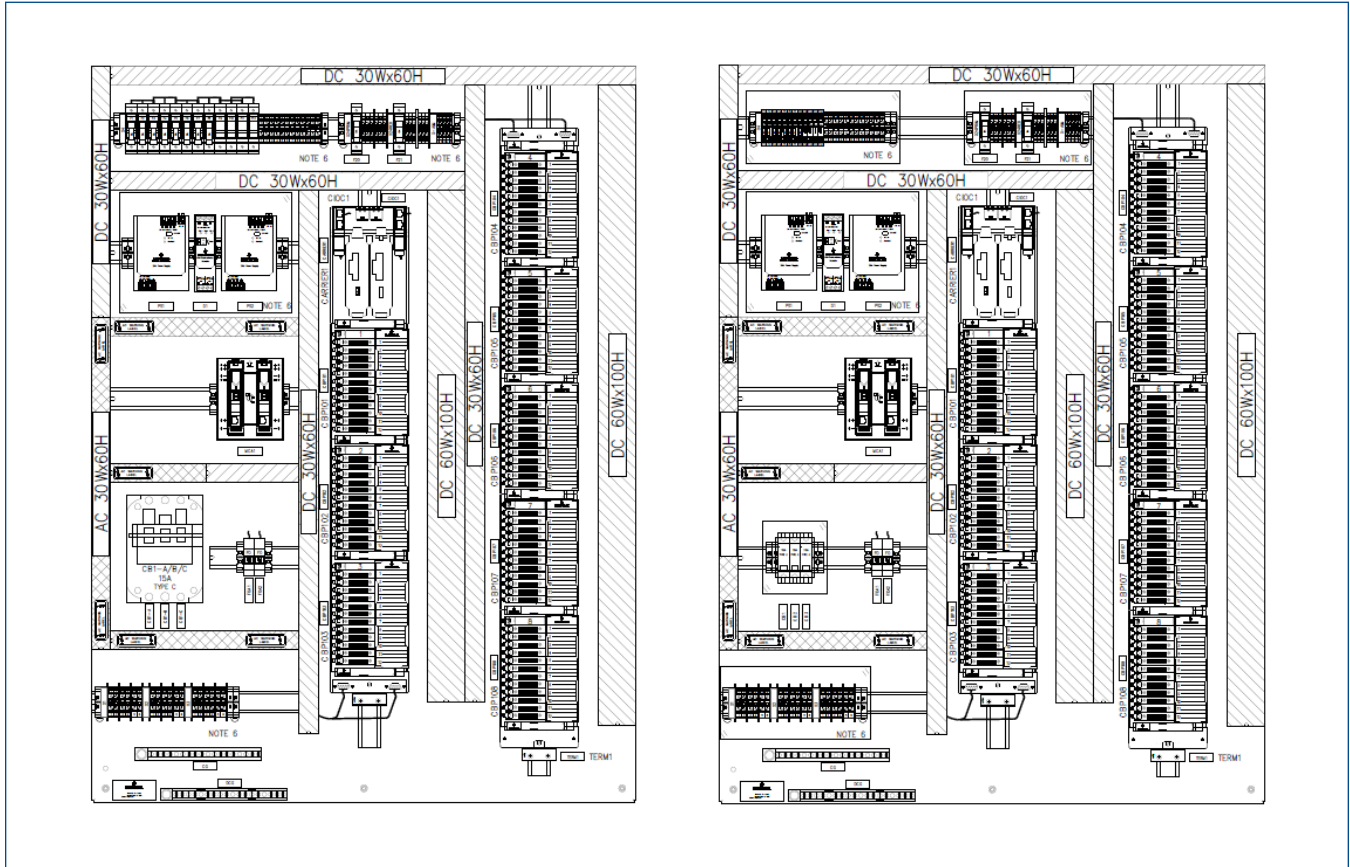


DeltaV™ CTO DCS Smart Junction Box (cCSAus Ordinary and Hazardous Locations)



DeltaV™ CTO DCS Smart Junction Box (SJB).

- 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 DCS Smart Junction Boxes provide an off-the-shelf solution for faster project execution and reduced installation costs. SJBs 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 SJBs are designed for hazardous areas and harsh environments, from extreme temperatures to corrosive gases.

Benefits

Delivers Electronic Marshalling Enabled by CHARMS Technology:

The CHARM SJBs 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 SJB. Save on home run multi-core cables, cable trays, associated engineering and documentations.

Significantly Reduce Cabinet Design Engineering:

The CTO DCS CHARM SJBs 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 SJB 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.

Product Description

The CTO CHARM SJB offering comprises a range of pre-engineered solutions based on industry standard, wall mounting SJBs that are available in AC-powered version with space up to 96 CHARM I/Os.

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 pre-wired and tested at the factory. Simply select the required DeltaV Electronic Marshalling equipment and the SJB 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 SJB 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 SJBs 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 SJBs are ordered by selecting a base enclosure model and required options to meet specific project needs.

A range of base enclosure models are available:

- I/O quantities: Up to 96 I/O's
- Distributed CHARM I/Os (combination of Max. 12 / 24 CHARMS inside SJB and external 12 CHARM I/O junction boxes – total I/O count 96).
- For different environmental requirements: Safe Area or Hazardous Area.

Each base SJB model is further explained in the coming sections.

Configurable options include the type of CHARMS (I.S. or non-IS), 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 required quantity of SJBs.
- Determine whether the SJB is required for a safe area or hazardous area installation.
- Plan the power distribution and installation of SJBs.
- 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.

DeltaV CTO DCS Smart Junction Box (SJB)

All SJBs 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
- Halogen-Free wire ducts
- Grounding bars for CG (Chassis Ground) and DC Reference Ground
- Name Plate
- Removable Gland Plate
- Breather: Brass Ni plated / SS316L. SJBs are designed for bottom entry for all cables (power, network, and I/O signals)

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

The CTOS SJB supports all available low voltage CHARM I/O types with 24V DC bussed field power and all available CHARM terminal blocks.

CHARM I/O Cards (CIOC2) and IO CHARMs are not included and are to be ordered separately.

CTO Options

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

- No. of Non-IS Baseplates – Can be selected from 0 to 8
- Type of Non-IS Baseplate assembly – Can be selected with 4 different types of CHARM terminals
- No. of IS Baseplates – Can be selected from 0 to 8
- CHARMS I/O Gateway Assembly – Can be selected from 2 different types of Networking topologies
- Non-IS and IS baseplates installation not possible in single column

- **Enclosure Material:** Stainless Steel SS304 or SS316L. Stainless steel provides protection for corrosive environments (category CSA 4X). SS316L provides superior corrosive protection and is typically applied in offshore applications (salt resistant)
- Pre-drilled bottom entry with cable 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 SJB identification information
- **24V DC Injected Power (Optional):** 12 fused circuits, prewired to all non-IS 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 & condensation management (Optional)
- Blue IS signals Field Cable ducts
- **CIOC Network:** 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 DCS Smart Junction Box and available options.

Overview of DeltaV™ CTO DCS Smart Junction Boxes (SJB) – Base Models

CTO Base Model No.	Description	No. of CHARM I/Os	Power Requirements (Pri. and Sec.)	Permitted Location
NA-FE-96-AC-CIOC-HA	AC Powered Smart Junction Box up to 96 CHARM I/O; For Class I, Div 2 Area	Up to 96	120V AC	Hazardous Area (US/Canada)
NA-FE-96-AC-CIOC-SA	AC Powered Smart Junction Box up to 96 CHARM I/O; For Safe Area	Up to 96	120V AC	Safe Area (US/Canada)

The CTO base model reference for Smart Junction Box uses the following naming convention: **NA-FE-96-YY-CIOC-ZZ**, where:

NA = US/Canada Design Standards and Regulations

FE = Smart Junction Box (SJB)

96 = Maximum I/O's count in the CTO model

YY = Incoming Power, AC: 120V AC

CIOC = Short description of content and purpose

ZZ = SA: for use in Safe Area, HA: for use in Hazardous Area (Class 1 Div 2; Class I, Zone 2)

Overview of CTO DCS SJB Base Models and Options for Safe Area & Hazardous Area

LEGENDS: • Default option setting - o Configure to option setting (Different from Default) NA Option setting not possible for SJB Base Model			SJB Base Model	NA-FE-96-AC-CIOC-HA	NA-FE-96-AC-CIOC-SA
SJB Options			SJB Options Setting	50°C	50°C
Enclosure Material	M	7.1	304 Stainless Steel with gland plate, Padlock Ready	•	•
		8.1	316L Stainless Steel with gland plate, Padlock Ready	o	o
Cable Entry	E	1.1	Bottom, Undrilled	•	•
		2.1	Bottom, Roxtec	o	o
		3.1	Bottom, Cable Gland	o	o
Temperature Monitoring	T	1.1	No	•	•
		2.3	Thermocouple wiring with CHARM – SA	NA	o
		3.2	Thermocouple wiring with CHARM – HA	o	NA
AC Surge Protection Device	S	1.1	No	•	•
		2.1	Yes	o	o
Heaters	H	1.1	No	•	•
		2.1	Single Heater (for condensation)	o	o
		4.1	Three Heaters	o	o
24VDC for injected power (Applicable only for Non-IS baseplates)	IJ	1.1	No	o	o
		2.4	24VDC – 12 Circuits – SA	NA	•
		3.2	24VDC – 12 Circuits – HA	•	NA
CIOC Network	N	1.1	Copper Ethernet	o	o
		3.1	Multi Mode FO Adapter (1xSC, 50/125)	•	•
		3.2	Multi Mode FO Splice Cassette (6xSC, 50/125)	o	o
		5.1	Single Mode FO Adapter (1xSC, 9/125)	o	o
		5.2	Single Mode FO Splice Cassette (6xSC, 9/125)	o	o
Certification	C	2.1	Standard CSA; Ordinary Location	NA	•
		2.2	Standard CSA; Class 1 Div. 2 Location	•	NA

CHARMS I/O Gateway Assembly

1. For distributed CHARM option, CHARM gateway selection "Yes / No" option is available under CHARM Flexibility menu.
2. When user selects "Yes" further selection will be available to select Ring type / Star type gateway connection. Accordingly required CHARM gateway module will be added to CCT BOM.
3. Selection of CHARM Gateway will reduce installable CHARM baseplate qty in SJB by 1.

I/O Type Selection

1. Selection for required type and qty of CHARM Baseplate is possible in CCT. Selection will be limited to max. installation possible in selected SJB model.
(With CHARM Gateway module max. 7 baseplates can be installed and without CHARM Gateway max. 8 baseplates can be installed inside SJB.)
2. Min. 1 CHARM Baseplate (IS / non-IS) selection is mandatory for connecting SJB's diagnostic alarms to the CHARMs CBP.
3. Mixing of IS and non-IS CHARMs is not possible in same column. Selected mix non-IS and IS CHARM Baseplate qty will be allocated to separate columns using extenders.
4. Non-IS CHARM Baseplate selection with other types of CHARM Terminal blocks combination is possible.
5. User can refer to "Help" button for notes provided in CCT for CHARM flexibility functionality.

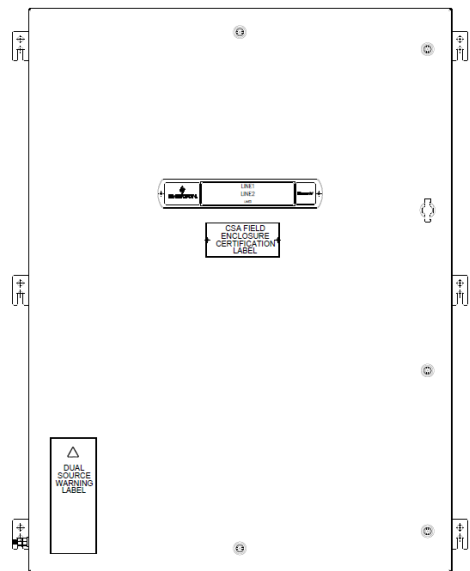
General Specifications for CTO CHARM SJB

General Specifications for CTO CHARM SJB	
Material (*)	Stainless Steel SS304 / SS316L, Enclosure Thickness 2mm, Mounting Plate Thickness 2.5mm
Dimensions	915mm (W) x 1220mm (H) x 475mm (D) (without eyebolts)
Access	Single door (Thickness 2mm), left hand hinged
Protection Category	Type NEMA 4X / IP 64 (Corrosive Environment)
Cable Entry (*)	Bottom, single gland plate (Thickness 3mm)
Name Plate	Outside Door: Laser engraved plastic
Weight	~165 kg (may vary as per hardware added by option selection)
Control Network (*)	Options available for Control Network: 1. Redundant Single Mode FO with Media Converter (Adapter / Splice Cassette) 2. Redundant Multi-Mode FO with Media Converter (Adapter / Splice Cassette) 3. Redundant Copper (RJ45) Fiber Optic Control Network Includes: ■ 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. ■ SC-LC FO patch cables, Multimode 50/125-micron core/ cladding diameters (OM2) or Single mode 9/125-micron cable.
Power Requirements – Internal Power Distribution	Primary and secondary 120 VAC power supply supplied from outside the SJB. Redundant 120 VAC distribution through power terminals, and circuit breakers. 24 VDC bulk power supplies full redundant (Primary and Secondary): ■ 2 x 10A (without injected Power) ■ 2 x 20A (with injected Power)
Diagnostic Alarm	Bulk Power supplies failure Alarm
CHARMS I/O Gateway Assembly	The selection is available for CHARM I/O Gateway Assembly with 2 different types of networking topologies (Star / Ring) in Redundant configuration of each type.
Supply Includes	Mounting plate, Halogen-Free wire ducts, external wall mounting brackets, door clamps, ground bars, external grounding bolt, drip edge, breather-drain.

(*) For available configurable options refer to respective base SJB model & options table.

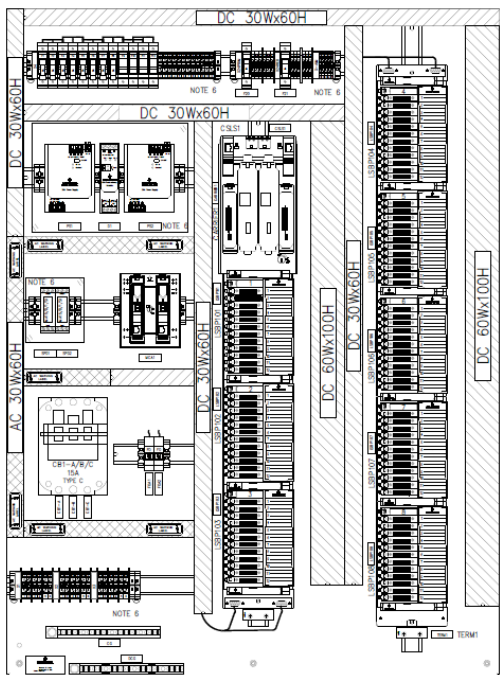
SJB General Arrangement

96 I/O SJB Outer General Arrangement



915mm (W) x 1220mm (H) x 475mm (D) (without eyebolts)

96 I/O Haz. area SJB Internal General Arrangement

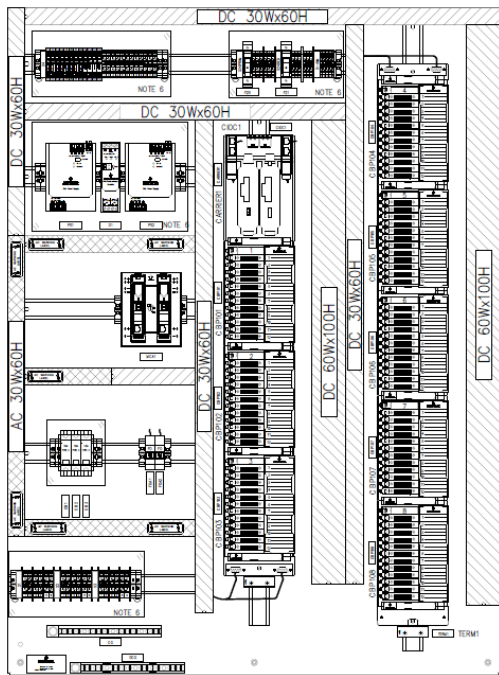


NA-FE-96-AC-CIOC-HA

These SJBs has space for:

- 1 x CHARM I/O Carrier with redundant Copper Ethernet connectors
- Max. 8 nos. Non-IS or IS CHARM Base Plate as per user selection
- 1 X CHARM I/O Gateway Assembly (optional)
- 24VDC Redundant Power distribution

96 I/O Safe Area SJB Internal General Arrangement



NA-FE-96-AC-CIOC-SA

These SJBs has space for:

- 1 x CHARM I/O Carrier with redundant Copper Ethernet connectors
- Max. 8 nos. Non-IS or IS CHARM Base Plate as per user selection
- 1 X CHARM I/O Gateway Assembly (optional)
- 24VDC Redundant Power distribution

Design Considerations

Power and Heat

The rated ambient temperature for each SJB model is listed in the table of Overview of SJB Base models and options. The maximum internal operating temperature for each SJB model is listed in the table below.

CTO SJB Model	Maximum Internal Operating Temperature
NA-FE-96-AC-CIOC-HA NA-FE-96-AC-CIOC-SA	60°C*

*Bulk Power supply will derate after 60°C.

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 CTO SJBs are configurable. The type of hardware configured and IO quantity which can be accommodated depends on ambient temperature and acceptable internal temperature rise within SJB.

For each SJB, a heat and power calculation must be done to assess whether internal temperature rise is acceptable for the IO quantity considered and configured options considered. Appropriate safety margin may be kept. A CTO Heat and Power calculation Template is available to assist this.

SJB Location

Direct sun light significantly impacts heat rise within the SJB. It is must to install the SJBs in a permanent shade to prevent them from being exposed to direct sunlight.

Humidity

SJBs are suitable for installation in environment with 5-95% relative humidity, Non-condensing.

System Compatibility

The CTO SJB comes with CIOC carrier with New Copper IOP which is supported in 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 CHARM SJBs are designed with components that meet or exceed the following certifications. Depending on the enclosure type (see specs):

- cCSAus Ordinary Locations
 - CAN/CSA C22.2 No. 61010-1
 - ANSI/UL 61010-1
- cCSAus Hazardous Locations
 - CAN/CSA C22.2 No. 60079-0
 - CAN/CSA C22.2 No. 60079-1
 - CAN/CSA C22.2 No. 60079-7
 - CAN/CSA C22.2 No. 60079-11
 - CAN/CSA C22.2 No. 60079-15
 - CSA C22.2 No. 213-M1987
 - ANSI/UL 60079-0
 - ANSI/UL 60079-1
 - ANSI/UL 60079-7
 - ANSI/UL 60079-11
 - ANSI/UL 60079-15
 - ANSI/ISA 12.12.01

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

Ordering Process

CTO CHARM SJBs are available for ordering via Emerson iCenters.

Basically, the following steps are followed to obtain a CHARM Smart Junction Box:

1. Specify the CHARM SJB by selecting the base model and the options required for the project.

A Configuration Tool (CCT) is available to aid in the selection of the right combination of options for CTO SJB.
2. Generate the specification sheet from the Cabinet Configuration Tool (CCT) and send this to your regional iCenter.
3. Based on the option selections, you will then receive a quotation for the fully assembled SJB.
4. From CCT, user will be able to download PDF drawing package for default options only. For non-default option selections, share the specification sheet with respective iCenter to receive the drawing as per selected options.
5. Approve the drawing package for construction.
6. Order the CTO CHARM SJB as per provided quotation and approved drawings.
7. The CTO CHARM SJB 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 iCenter:

For US/Canada (iCenter ST. Louis):
iCenterSTL.Quotes@Emerson.com

For China (iCenter Xian):
iCenter.XA@Emerson.com

Project Customizations

“...What if a CTO SJB is 90% what I need, but I really need my SJB 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 FAT, this can also be accommodated.

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

Related Products

Below listed are the required products in design and are to be ordered separately:

- CHARM I/O Cards (CIOC2)
- Individual I/O CHARMs (except for alarms) as per project requirement. The cost of installation and testing of CHARM modules is not included.

©2024, 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.

Contact Us

🌐 www.emerson.com/contactus