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EXPERION PKS

Universal Process Cabinet Planning, Installation, and Service Guide

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ABOUT THIS GUIDE

This document describes how to plan, install, and service the Universal Process Cabinet (UPC).

1.1 Scope

This document only describes planning, installing, and servicing of the Universal Process Cabinet (UPC). For more information about the installation and configuration of Series C components, see the respective Series C component documents.

1.2 Prerequisite skills

This guide is primarily intended for engineers, system administrators, and other technical staff who will be responsible for planning, installing, and administering the Honeywell Universal Process Cabinet (UPC). It is therefore assumed that a reader of this document possesses a high degree of technical knowledge and a familiarity with Series C components and Process Control systems.

1.3 Revision history

Revision	Date	Description
A	April 2020	Initial release of document
B	January 2021	Addition of Intrinsically Safe components

1.4 Related documents

Document	Description
Series C Series I/O User's Guide (EPDOC-X126)	Provides information about installing, configuring, and troubleshooting the Universal Input/Output (UIO-2) module
Control Hardware Planning Guide (EPDOC-XX23)	Provides information about installing, configuring, and troubleshooting the power supply
Experion Site Planning Guide (EPDOC-X135)	Provides information about preparing facilities for the installation of your Experion system equipment before its delivery
Experion Series-C Platform Specification (EP03-520)	Provides technical and specification information for all the supported devices
HAZLOC Addendum (51156760)	Provides information about all HAZLOC certifications

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UPC Fuse Reference Guide	Provides detailed information about replacing fuses
CN100 Hardware Planning and Installation Guide (EPDOC-X630)	Provides information about how to install and use the CN100 Controller
Universal Marshalling solution (50149738-001)	Provides information about SCA hardware comprising of both adapters and FTAs
Installation and User's Guide for Signal Conditioning Adaptors (SCA) (50149738- 001)	Provides information about how to install and use SCAs
Hazloc manual for Signal Conditioning Adaptors (SCA) (50149737-001)	Provides hazardous location rules and requirements when using SCAs
Alarm Module for UPC and USC (EPDOCX659- en-A)	Provides information about how to use the alarm module for UPC, FC-TALARM01

1.5 Terms and acronyms

The following table lists the various acronyms used in this document.

AI	Analog Input
AO	Analog Output
DI	Digital Input
DO	Digital Output
ESD	Emergency Shutdown
FOE SM	Fiber Optic Extender - Single Mode
FTA	Field Termination Assembly
HazLoc	Hazardous Location
HIVE	High Integrity Virtual Environment
HPN	Honeywell Part Number
IO	Input/Output
IOA	Input/Output Accessory
IOL	Input Output Link
IOM	Input/Output Module
IOTA	Input/Output Termination Assembly
IS	Intrinsically Safe
LC	Lucent Connector
LLAI	Low Level Analog Input
MM	Multi Mode
NEMA	National Electrical Manufacturers Association
Non-IS	Non-Intrinsically Safe
ORU	Optimal Replaceable Units
PCA	Panel-mounted Carrier Assembly
PE	Protective Earth
SC	Standard Connector
SCA	Signal Conditioning Adapter
SM	Single Mode

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SS	Stainless Steel
STT	Smart Temperature Transmitter
TPC	TotalPlant Configurator
UIO-2	Universal Input/Output 2
UPC	Universal Process Cabinet
USCA	Universal Signal Conditioning Assembly
VIPER	Phoenix Contact VIP Series I/O Terminations

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OVERVIEW OF UPC

The Universal Process Cabinet (UPC) allows the Series-C Universal I/O-2 and/or LLAI to be installed in a remote location. The UPC protects I/O equipment, power supplies, Fiber Optic Extenders (FOEs), and Terminal Block assemblies remotely located from the Experion C300. The UPC has an Ingress Protection rating of IP66.

These cabinets are provided with a removable gland plate. To maintain the IP66-rating of the cabinet, appropriate-sized holes for cable entries are required to conform with the rules and regulations of the local authority by utilizing, for example, IP66-rated conduit fittings or cable glands. The 316L SS cabinet is supplied with 316L SS brackets.

When all the assemblies are mounted in the SS UPC enclosure and the doors are closed and securely locked, then the system meets the GX (Harsh) operating conditions. Class GX is a severity level according to "ANSI/ISA-S71.04-1985; Environmental Conditions for Process Measurement and Control Systems: Airborne Contaminants. "

The following table lists the part numbers of each component installed in the UPC, depending on options selected in the configuration.

2.1   UPC Components

The following table lists the part numbers of each component installed in the UPC, depending on options selected in the configuration.

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Part Number	Description
50154983-001	Cabinet, SS 316L, 1.3M
50154751-001	1.3M Back Plate - Power
50154751-002	1.3M Back Plate - Comm
50154751-003	1.3M Back Plate - IO
FC-PSUNI2424	Power Supply, ATDI, 600W
51198685-100	Power Supply, ATDI
51454235-100	Power Supply, ATDI, Power Shelf
51202676-300	Power Supply, ATDI, Mounting Bracket
50151665-001	Power Supply, QUINT 4+ AC/DC
50165610-001	Power Supply, QUINT 4+ DC/DC
CC-USCA01	Assembly, Integrated FTA, USCA
CC-UPTA01	Module, Pass Thru, UPTA
CC-UDOR01	Module, Pass Thru, UPTA, LV DO Relay, UDOR
CC-UDIR01	Module, Pass Thru, UPTA, LV DI Relay, UDIR
50159943-003	USCA 24V DC Terminal Block
50159943-004	Field Power 24V DC Terminal Block
CC-IION01	CN100 I/0 Networking & Control Module
50154761-001	CN100 SFP Module - Single Mode
50154762-001	CN100 SFP Module - Multi Mode
CC-TION13	CN100 IOTA - Din Rail Mount
CC-INAM01	CN100 Network Adapter Module
STT650-T2-0-B-CH0-13SA-00	STT650 Module DC
FC-MCAR-03	Panel Carrier Assembly, 36"
CC- TUI041	UIO2 IOTA Redundant
CC-TUI031	UIO2 IOTA Non-redundant
CC-PUI031	UIO2 Module
50159943-001	DC Distribution Terminal Block
51202694 -100	AC Terminal Block, 49 Amps
CC-TA I L51	LLAI 9-inch IOTA
CC -PA I L51	LLAI Process Module
51121566-100	Ground Bar Assembly, Safety
51121566-101	Instrument Ground Bar
51121566-102	Shield Ground Bar
ICF 1150I-SSCT-HPSC	Fiber Optic Transceiver, Isolated
ICF 1150I-MSTT-HPSC	Fiber Optic Transceiver, Isolated, Multimode
4600135	Ethernet Switch, CC, MOXA PN: EDS-305-S-SC-T (HPS-C)
4600120	Ethernet Switch, CC, MOXA PN: EDS-305-M-SC-T (HPS-C)
51509541-001	Patch Panel

Part Number	Description
51509541-002	Patch Panel, Mounting Bracket[1]
51202616-100	Bracket Power Supply
4602955	ESD Bonding Point
51121 566-101	Ground Bar Assembly, Shield
51202684-200	Field Terminal Block, (Weidmuller)
00	Cable Assembly, 32 Points, 16 Channels
51202789-900	MOXA FOE IOL, Interface Cable
FC-TALARM01	Alarm Module
51121576-104	Reed Switch, Contact Form A, SPST
51454240-202	1 IOLINK Cable Assembly, Pair
51454240-302	1 IOLINK Cable Assembly, Pair
51454988-100	VIPER Terminal Assembly, Feed-through Modules
51454988-200	VIPER Terminal Assembly, Analog Protection Modules
2908452	1 TO 1 Modules, Model OA RPSS- 1 - 1 /HART/EX
2906599	IOA AI/AO/BFI/DS/0.5A/EX
2906600	IOA D I /DO/BF I /DS/I.OA/EX
2910153	IOA RE L 24V DO/BF I /3.0A/EX
2910155	IOA REL 24V DI/BF I/I.OA/EX
2910154	IOA REL 120V DO/BF I/3.0A/EX
2910157	IOA REL 1 20V DI/BF I/ I.OA/EX
2910421	IOA REL 230V DO/BF I/N0/3.0A /EX
2910422	IOA REL 230V DO/BF I/NC/3.0A/EX
2910423	IOA REL 230V DI/1.OA/EX
50159956-001	USCA Ground Block
CC-SICC-1011-LR05	Cable, Mass Termination, 37 POS. SUB-D, 0.5m CC-SICC-1011-LR05
CC-SICC-1011-LR10	Cable, Mass Termination, 37 POS. SUB-D, 1.0m CC-SICC-1011-LR10
CC-MCC003	Filler Panel, 3 INCH, Experion
51202699-200	Cable Assembly, 1M Long, Weidmuller
51454989-005	VIPER Cable 0.5m
51454989-010	VIPER Cable 1.0m

Part numbers of UPC components

Notes:

1. Corning Fiber Optic Patch Panel part number is SPH-01P

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2.2 UPC Benefits

Following are some of the benefits of UPC:

- Easy to configure and mount; in addition, helps eliminate marshalling cabinet.

- Accommodates more input/output modules in a single Remote Instrument Enclosure (RIE).

- Available for standard layouts; that is, the components are pre-configured in the cabinet thereby reducing the engineering, testing and commissioning effort involved in customizing the cabinets.

- Allows the displacement of other controller and PLC components and hence allows a complete view of the process environment.

In Greenfield projects, the UPC can deliver a faster and more efficient startup and minimize the time spent on site. In Brownfield projects, the UPC can be mounted remotely in the field, thus avoiding central control rooms that are already full or are very difficult to maintain due to years of incremental changes.

2.3   UPC Configuration Options

The following are some of the features of UPC:

- IP66 316L stainless steel cabinets

- Hazardous Location (HAZLOC) approvals

- Maximum of 96 redundant points which can be a combination of Intrinsically Safe (IS) and non-IS points:

    - 64 IS and 32 Non-IS, or

    - 32 IS and 64 Non-IS, or

    - 96 IS, or

    - 96 non-IS

- CN100 supporting Experion PKS IO HIVE and optional Control Solver License

- Extended temperature ranges of -40°C minimum, +55°C maximum with no external cooling or heating. Refer to "About heat dissipation in the cabinet" in the Planning section for further information regarding temperature ranges and configuration allowances.

- Document holder on the inside of the door

- This product can provide power and communication to an external Field Device Access Point

- This product supports FOE "leapfrogging" to enable cabinet-to-cabinet connection

- This product supports redundant AC mains power

- This product supports AC power "daisy chaining" from cabinet to cabinet, up to 3 cabinets total

UPC hardware is configured based on the user's functional needs.

Power Supply Options:

- ATDI Power Supply: 51198685-100, 20A

- ATDI Power Supply: FC-PSUNI2424, 25A

- Phoenix Contact Power Supply: Quint 4+, 20A

IO Link Options:

- Experion PKS IO HIVE: CN100 Ethernet, Single Mode or Multi Mode Fiber

- Ser-C Serial IO Link: Single mode or Multi Mode Fiber Optic Extenders

Marshalling Options:

- Directly on IOTA: Not Additional hardware required

- Universal Marshalling: CC-USCA01 with Signal Conditioning Adapters

- VIPER Marshalling: VIPER Terminal Assembly with Input/Output Accessories

- Weidmuller: Field Termination Assembly

The certified permissible configurations of the UPC are shown in the table below, with default CSA IEC Ex Class1 Div 2/ ATEX Zone 2 Certification.

Cabinet Identifier: ABC-DEF-GHJKLM-NP-QR

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Functions	Options	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R
Cabinet Type	Process	P															
Cabinet Material	SS 316, IP66 rated		S														
Ambinet Temperature Range	Max +40 deg C without fan			A													
	Max +55 deg C with fan			B													
Communications - IO HIVE[1]	No CN100				N												
	Non Red CN100 - SM SFP				H												
	Red CN100 - SM SFP				R												
	Non Red CN100 - MM SFP				M												
	Red CN100 - MM SFP				T												
	Non Red CN100				A												
	Red CN100				B												
Communications - I/O Link with Fiber Optic Extender[1]	Single Mode X 2					S											
	Single Mode X 4					T											
	Multi Mode X 2					M											
	Multi Mode X 4					N											
	None					O											
Wireless Integration	FDAP Single Mode						S										
	FDAP Multi Mode						M										
	None						O										
Field Termination Assembly	Universal Marashalling - GIIS(0-6) and Non GIIS(0-6)							N##[2]									
	Universal Marashalling -GI Only (0-6)							G#									
	Weidmuller							M									
	VIPER Feed Through							F									

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Functions	Options	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R
	No Treatment							X									
Wire Routing	Tie Brackets								N								
	Panduit								P								
Universal IO Count	No UIO-2									0							
	32 UIO-2 Channels									3							
	64 UIO-2 Channels									6							
	96 UIO-2 Channels									9							
UIO-2 Redundancy	Redundant										R						
	Non Redundant										N						
	LLAI Only										L						
LLAI Count	Count - From 0 to 8 IOMs											0 to 8					
STT650	Count - From 0 to 1 modules												0 or 1				
Power Supply	Quint 4+ - 20 Amps													Q			
	ATDI - 25 Amps													A			
	ATDI - 20 Amps													R			
	D = 20A DC/DC QUINT 4+ Supply													D			
Power Supply Redundancy															R		
Marine	Lloyd's Certification															M	
	None															N	
CN100 Control Solver License	No Control																0
	240 IO License																2
	800 IO License																8

Configuration Options

Notes:

1. A UPC can either be connected over IO HIVE or Conventional IO Link with FOE. These are mutually exclusive options.

2. ## represents number of UM 16 Channel assemblies. Mutually exclusive range 1st #: 0 to 6 IS and 2nd #: 0 to 6 Non-IS PassThrough.

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2.4　UPC system layout and specifications

The UIO-2 or LLAI modules, power system, Fiber Optic Extenders, and other components are installed in a single-access cabinet as displayed in following figures, which depict cabinets with no marshalling, with optional SCA terminal block assembly, optional Weidmuller terminal block assembly, and optional VIPER terminal block assembly.
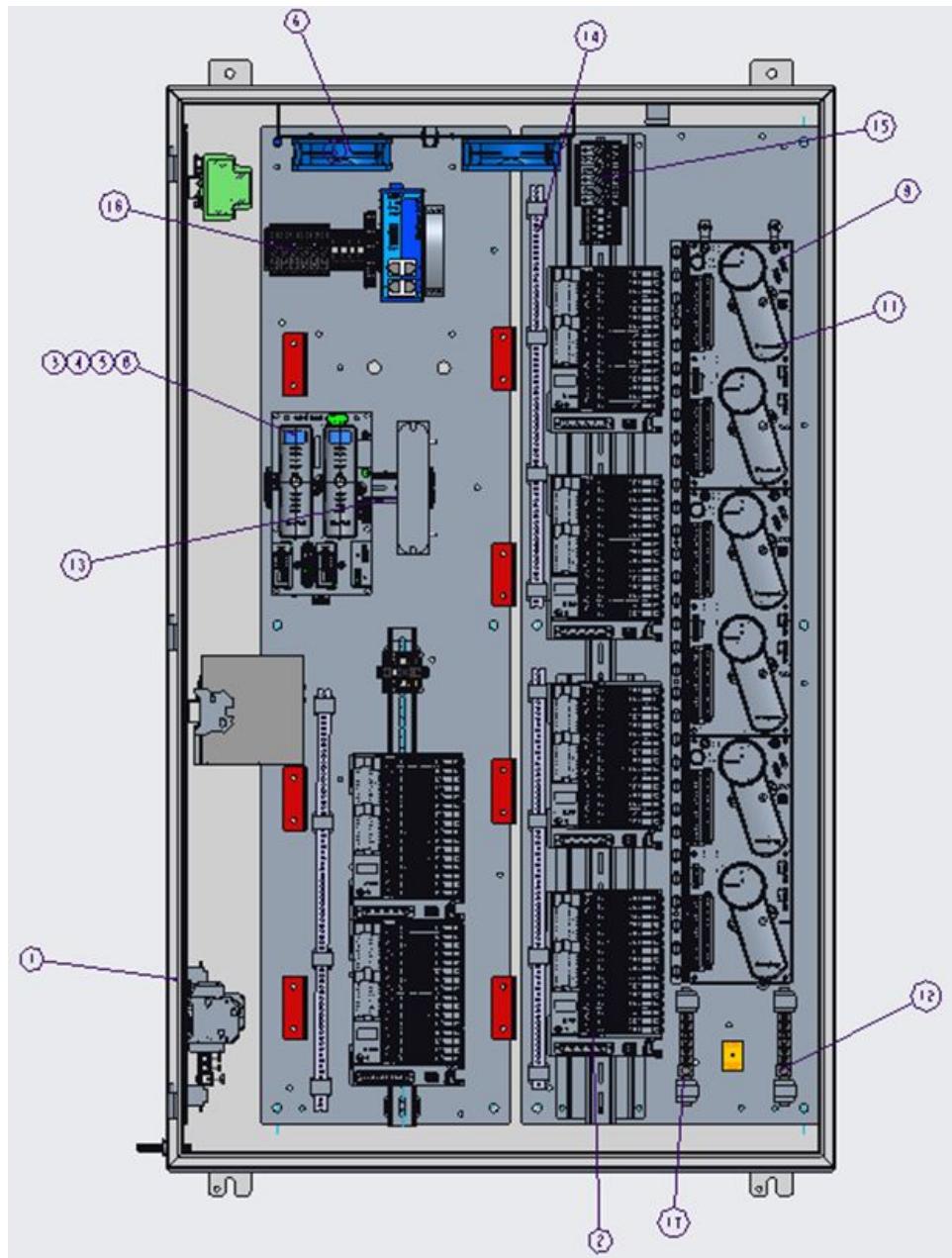

Figure 2.1 UPC layout with universal marshalling

ITEM	PART NUMBER	DESCRIPTION
1	50154983-001	CABINET, SS 316L, 1.3M
2	CC-USCA01	ASSEMBLY, INTEGRATED FTA, USCA
3	CC-IION01	CN100 CONTROL & I/0 MODULE
4	50154761-001	CN100 SFP MODULE - SINGLE MODE
5	50154762-001	CN 100 SFP MODULE - MULTI MODE
6	51454248-100	FAN ASSEMBLY
7	CC-TION13	CN100 IOTA – Din Rail Mount (NOT SHOWN)
8	CC-INAM01	CN 100 NETWORK ADAPTER MODULE
9	CC-TUIO41	UIO2 IOTA REDUNDANT
10	CC-TUIO31	UIO2 IOTA NON REDUNDANT (NOT SHOWN)
11	CC-PUI031	UIO2 MODULE
12	51121566-101	GROUND BAR
13	51509541-001	PATCH PANEL
14	51221566-103	SHIELD GROUND BAR
15	50159943-003	USCA 24V DC TERMINAL BLOCK
16	50159943-004	FIELD POWER 24V DC TERMINAL BLOCK
17	51121566-101	INSTRUMENT GROUND BAR

Key to parts locations in layout

2.4.1   Size of the enclosure

The size of the enclosure is 1300mm (51.2in.) high x 800mm (31.5in.) wide x 400mm (15.8in.) deep.

2.4.2   Weight

The enclosure weight varies depending on the mounted equipment. For reference, the weight of a cabinet that is loaded with a typical equipment configuration is approximately 136.4 kg (300 lbs).

2.4.3   Labels

The UPC System Label is mounted on the outside of the cabinet door, specifying all certifications, product identification, and serial data. The UPC Warning Label is also mounted on the outside of the door. The UPC Fuse Label is mounted on the inside of the door for aid in fuse maintenance.

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2.5   Cabinet Temperature Limits and Heat Dissipation

Ambient temperature range in the cabinet is a minimum of -40°C to a maximum of +55°C.

Current limit ranges from 10 A to 16 A.

A detailed breakdown of loading allowances per configuration and output temperatures can be found in the Hazloc manual.

The table below shows maximum output currents for various power supply types.

Power Supply Type	Temperature Range	Output Current Limits[1]	Internal Fans	Power Dissipation Limits
QUINT4-PS/1AC/24DC/20/+ or QUINT4-PS/24DC/24DC/20/SC/+	-40°C min, +40°C max	20A[2] max	no	80W
	-20°C to +50°C…+55°C	16A-20A[2] max	yes	70W to 80W max
	-20°C to +55°C	4A	yes	101.04W
51454235-100 w/ 51198685-100 or FC-PSUNI2424	-20°C to +50°C…+55°C	10A-16A max	yes	30W to 50W max
	-40°C min, +40°C max	16A max	no	50W

Temperature limits of UPC systems (Maximum range)

Notes:

1. Refer to Hazloc manual 51156760 for further details regarding loading limits per configurations.

2. For power supply redundancy consideration, limit the output current to 15.5A to ensure one power supply can support the full output load at maximum rating ambient conditions.

> **NOTE**
> The following SCA Barriers & Isolators are not available for this configuration: CC-UGAI01, CC-UAIA01, CC-UGAO01, CC-UAOA01.

2.6 Supported power system

The UPC is configured with one of the following AC/DC redundant power supply systems.

Power supply system	Part Number	Description
ATDI power shelf	51198685-100 (2x)	Power module
	51454235-100 (1x)	Two PSU Chassis
Phoenix Contact AC/DC	50151665-001 (2x)	QUINT 4+ Power supply
Phoenix Contact DC/DC	50165610-001 (2x)	QUINT4+ Power Supply
ATDI	FC-PSUNI2424 (2x)	POWER SUPPLY, 600W

Supported power module and Two PSU Chassis
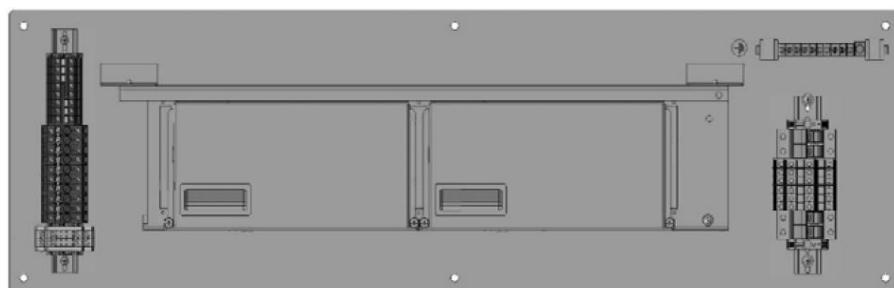
> **ATTENTION**
> The following options are not available for the power supply system:
>
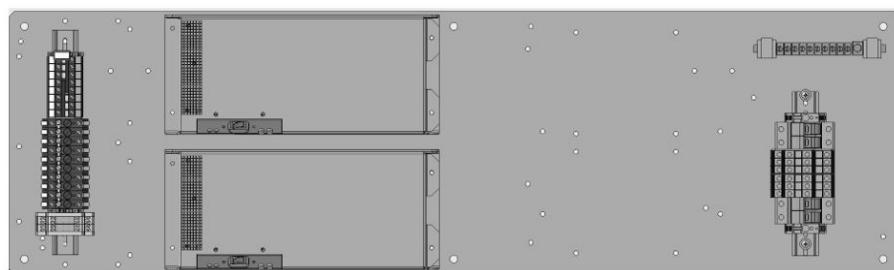> - Cabinet level battery backup unit
> - External +24VDC support for UPC

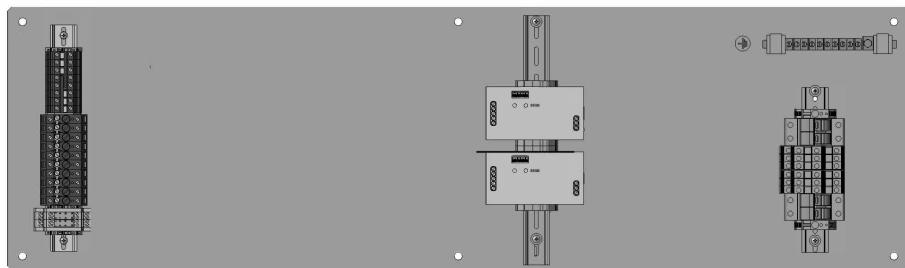For more information about the power supply, see AC Input Requirements.
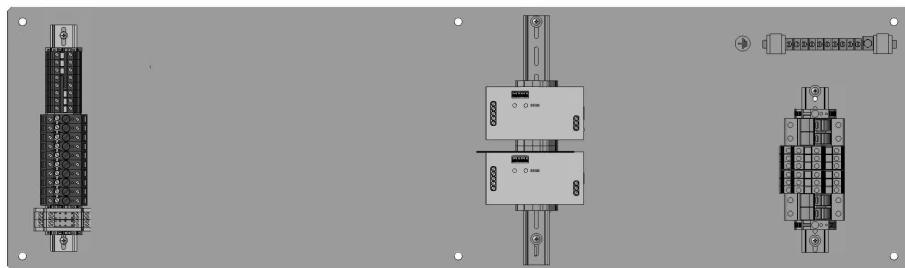
2.6.1 Backplates Power Supplies

Back Plate for ATDI power shelf

Back Plate for ATDI 600W power supply

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Back Plate for Phoenix Contact AC/DC Power Supply

Back Plate for Phoenix Contact DC/DC Power Supply

2.7   IO Link Communication

The Universal I/O modules are connected to a pair of C300 controllers over Honeywell's I/O Link serial communication bus. In the conventional I/O Link design, a Fiber Optic extender is used to convert the I/O communication to fiber optic signal. With the introduction of Experion PKS IO HIVE, the UIO at the individual channel level can be communicated to multiple controllers over Experion FTE network. Both the conventional I/O Link and Experion PKS IO HIVE options are explained in the subsequent sections.
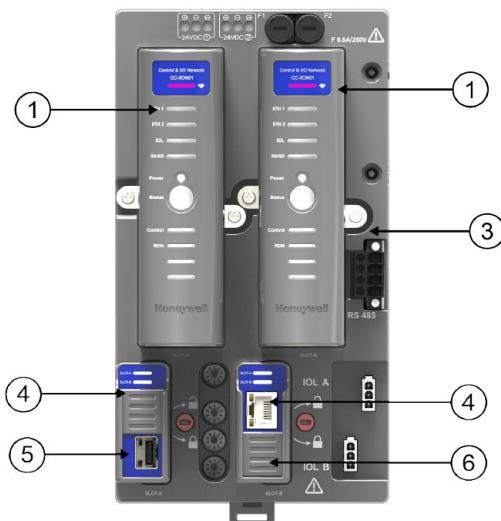
2.7.1   Experion PKS IO HIVE - CN100 (CC-IION01) module

The CN100 is a single module that plugs into an Input Output Terminal Assembly (IOTA). The module functions include a control and IO processor, one I/O Link interface, redundancy functions, and FTE interfaces. CN100 enables Honeywell's Experion PKS to flexibly assign the Series C I/O channels across multiple C300 controllers. Ethernet interface is built into the controller and supports redundant FTE communications. The primary and the secondary modules mount on a common IOTA and the redundant module pair synchronizes over backplane.

The redundant controller consists of two CN100 modules, two Network Adapter Modules (NAMs) and an IOTA. The IOTA holds the modules, NAM and connection for IO link and RS485. The IOTA contains only passive devices and connectors.

Key Features:

- Built-in control firewall.

- Supports up to 1280 IO channels or 40 Series C modules through I/O Link communications.

- Acts an Experion PKS IO HIVE Enabler.

- IO are decoupled from a dedicated controller and can be assigned to 20 different pairs of Controllers.

- Integrated media converters: Fiber Optic Single Mode - 10 KMs, Multi Mode – 2 KMs and Copper media – 100 mtrs.

Redundant CN100 Controller (DINRAIL) Front View

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Item	Model Number	Description
1	CC-IION01	I/O NETWORKING & CONTROL MODULE
2	CC-TION13	I/O NETWORKING & CONTROL IOTA - DIN RAIL
3	CC-INAM01	NETWORK ADAPTER MODULE
4	50154761-001	Single Mode Small Form Factor Pluggable
5	50154762-002	Multi Mode Small Form Factor Pluggable

Key to parts locations in layout

For installation instructions, see the *CN100 Controller Hardware Planning and Installation Guide, EPDOC-X630*.

> **NOTE**
> You cannot use additional MOXA fiber optic extenders when using the CN100.

Optional Features:

- By including an optional ControlSolver License, CN100 supports regulatory, logic, and sequence control. The CN100 supports peer to peer connection with all the Experion controllers including C300, UOC, ACE, and another CN100.

- Scalable based on IO capacity (240 point or 800 points) and supports control execution periods from 20 ms to 1 second.

2.7.2   Conventional I/O Link over Fiber Optic Extenders

A Fiber Optic I/O Link Extender (FOE) is available within the UPC to extend the wire-based I/O link back to the Series C control system location. The Fiber Optic I/O Link Extender is available as a Single Mode and Multi Mode FOE module.
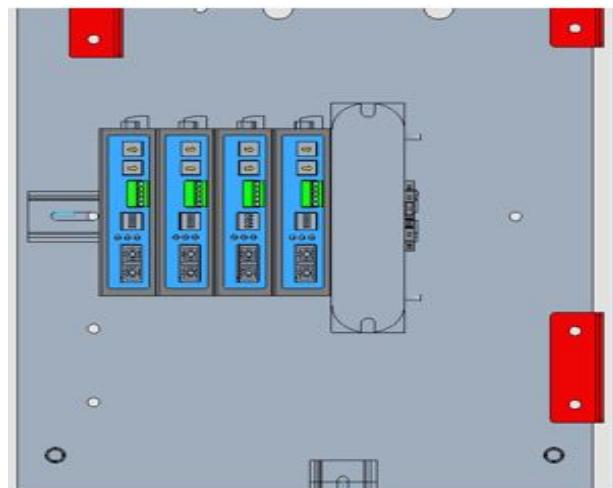
The MOXA Ethernet Switch EDS-305-S-SC-T (single-mode) and EDS-305-M-SC-T (multimode) provides a dedicated path of communication between field device access. It is used for communication only to a field device access point (FDAP) and the Experion server.

> **ATTENTION**
> Within the UPC, the exact layout of the FOE modules differs from the FOE modules that are located in the Series C control system location.
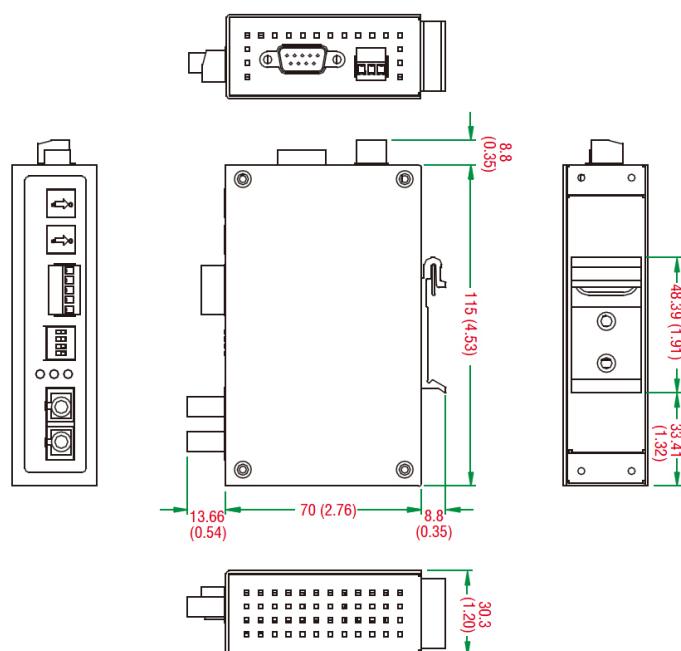
Unlike the modules mounted in the Series C cabinet, the FOEs are not mounted to the IOTAs. This approach frees up two 6 inches positions of valuable space on the PCAs. The FOE modules clip to a DIN rail and are laterally secured by end brackets. The following figure illustrates the FOE module in the UPC, (For Single Mode ICF-1150I-S- SC-T (HPS-C); for Multi Mode ICF-1150I-M-ST-T (HPS-C)).

Please refer to the Connecting the FOE Cable for more information on layout and use.

Location of FOE module (door and cabling not shown for simplicity)

Unit: mm (inch)
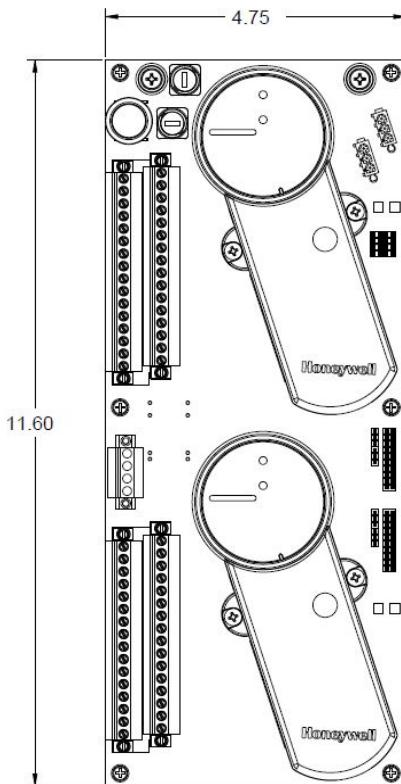

MOXA FOE Module Detail

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2.8 Supported Input Output Module

The UPC supports both redundant and non-redundant Universal Input/Output (UIO-2) IOTAs/modules. For redundancy, two modules are mounted on one redundant IOTA. Non-redundant is a single module on the non-redundant IOTA (not shown). I/O modules are mounted to their respective IOTAs. However, the IOTA sizes vary for both redundant and non-redundant modules. The following table lists the supported I/O modules/IOTAs and their specifications.

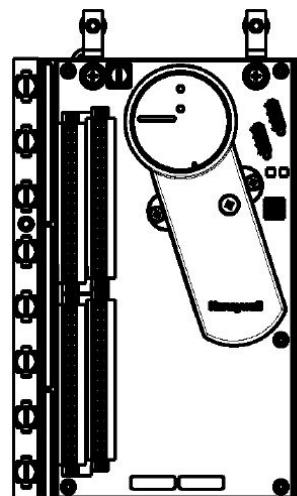| I/O	IOTA	Module Description	Points	Size
CC-PUIO31		Universal IO-2 Module Assembly	32	
	CC-TUIO41	UIO-2 IOTA, Redundant	32	12 in (305 mm)
	CC-TUIO31	UIO-2 IOTA, Non-Redundant	32	9 in (229 mm)
CC-PAIL51		LLAI Module Assembly	16	
	CC-TAIL51	LLAI IOTA Non-Redundant	16	9 in (229 mm)

IOM and IOTA specifications

The following figure displays two UIO-2 modules and the UIO-2 IOTA, redundant mounted on a PCA.

Universal Input/Output Modules and UIO-2 IOTA, redundant

Up to 96 UIO channels and 128 LLAI can be supported. See the figure below. For more information, see IOM/IOTA selection.

LLAI module and IOTA

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2.9 Cabinet Usage and Certifications

2.9.1 Enclosure

Stainless steel cabinet, (HPN: 50154983-001) is fabricated from 316L. It is a rectangular- shaped enclosure with front access only and a door hinge on the left-hand side. The door is sealed by a foamed in gasket and is secured by six cam locks that require a special tool for access. The SS enclosure has an Ingress Protection rating of IP66. There are four studs on the outside of the door, on both painted and stainless steel cabinets. These studs are used for customer nameplate mounting. For dimensions and general location, see Views of the UPC enclosure.

2.9.2 Outdoor Usage of UPC

Only the 316 stainless steel cabinet (50154983-001) has been independently certified as IP66 and can be used outdoors. When mounted outdoors, the UPC must be protected from direct sunlight exposure with a sun shield. All cable glands or conduit connections must be IP66 certified.

2.9.3 Hazardous locations certifications and agency approvals

The agency approvals for the UPC are listed here.

- cCSAus
- ATEX
- IECEx

For further information regarding Hazloc certification and regulatory agency requirements, refer to the UPC Hazardous Location Manual (51156760).

2.9.4 CE Conformity

The UPC is in conformity with the protection requirements of the following European Council Directives:

- 2014/24/EU, the Explosive Atmospheres (ATEX) Directive
- 2014/30/EU, the Electromagnetic Compatibility (EMC) Directive.
- 2014/35/EU, the Low Voltage Directive (LVD).
- 2011/65/EU RoHS

In conformity with the ATEX directive, the CE mark on the certification nameplate is adjacent to the EC Type Examination Certificate number.

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PLANNING OF UPC

The UPC is provided with mounting brackets welded onto the enclosure 50154983-001 and are fabricated from 316L SS for outdoor applications.

Power and signal cable entry into the cabinet must be provided through the gland plate in the bottom. After determining the number of holes, their locations, and the compliant fittings, cut the cable entry holes into the gland plate. Use IP66 minimum rated fittings for the SS cabinet to maintain IP66 integrity for outdoor applications.

3.1   Planning guidelines for UPC

The following guidelines must be adhered before installing the UPC.

3.1.1   Transport the UPC

The UPC must be transported in an enclosed shock-mounted air ride van. Precautions must be taken not to exceed vibration sinusoidal loads of 0.5 Gs. It must be transported in a horizontal position strapped to a wooden skid and not stack on top of each other.

3.1.2   Weather protection

When installing the UPC outside where it is exposed to natural elements, a sun shield or rain canopy is mandatory. The shield must totally protect the unit from direct sunlight.

3.1.3   Clearance space

The UPC shall be mounted in a manner which ensures that the exposure to ambient temperature remains the same on all surfaces of the cabinet. Extra care should be taken when mounting the cabinet close to structures and heat producing surfaces. Do not place any items on top of the UPC or obstruct free air flow around the UPC in any way.

3.1.4   Field servicing

Field servicing of the UPC during rain/or high humidity must be avoided. If unavoidable, precautions must be taken not to wet the interior of the UPC. When servicing is complete, the interior walls of the UPC must be wiped with a dry cloth before closing and latching the door.

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3.2 Torque requirements

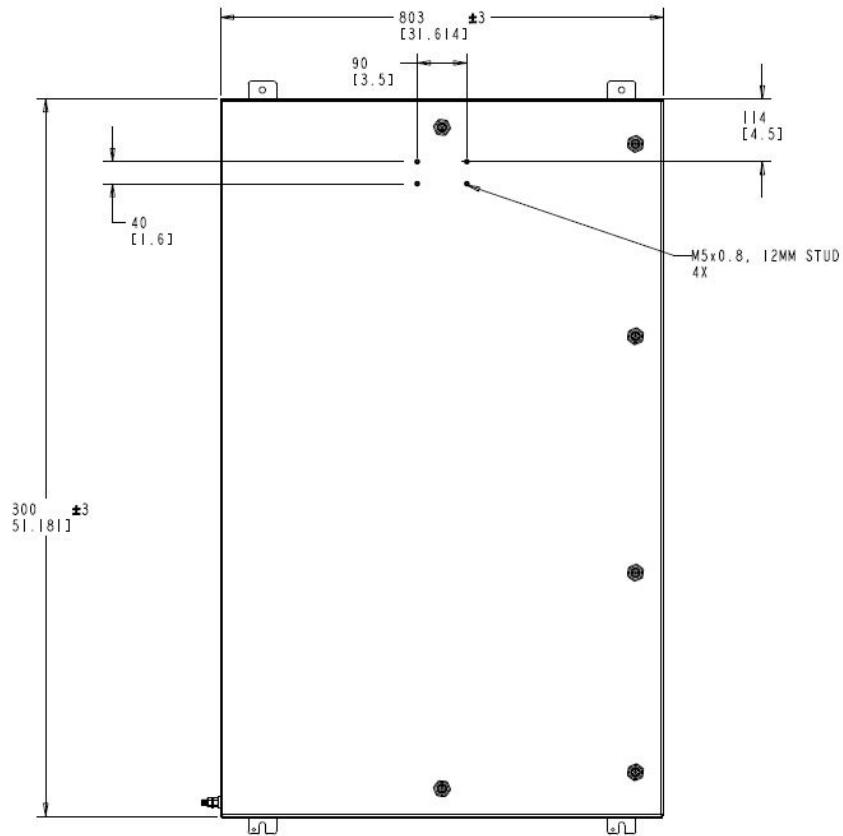The following table lists the torque requirements for each component of the UPC.

HPN	Description	Components	Torque value
51202685-100	Field 24Vdc Terminal Block	Fused terminal	1.5 to 1.8 Nm
		Feed-through terminal	1.5 to 1.69 Nm
51202684-100	Field Terminal Blocks	Feed-through terminal	0.5 to 0.6 Nm
		Test-disconnect terminal	0.5 to 0.6 Nm
	DC Mains Terminal Block	Feed-through terminal, Single-tier	1.5 to 2.4 Nm
51202694-100	AC Mains Terminal Block	Feed-through terminal, Double-tier	1.5 to 2.4 Nm
51121566-100 and 51121566-101	Earth Bar Assembly	10mm x 16mm x 24mm (WxHxD) Clamping yoke	2.6 Nm (min)
		14mm x 18mm x 34mm (WxHxD) Clamping yoke	4.5 Nm (min)
	Instrument Field Earth Bar		2 to 3 Nm
51506273-301, -303, - 305, -307, -216	IOTA Terminal Block	PCB Plug in Connector	0.5 Nm
51454988-100	VIPER Terminal Block Assembly	Field IO Terminal	0.5 Nm (min) to 0.6 Nm (max)
CC-USCA01 or CC-UGIA01	Universal Signal Conditioning Assembly CC-USCA01 or CC-UGIA01 Field Wiring Terminals	Field IO Terminal	0.4 Nm

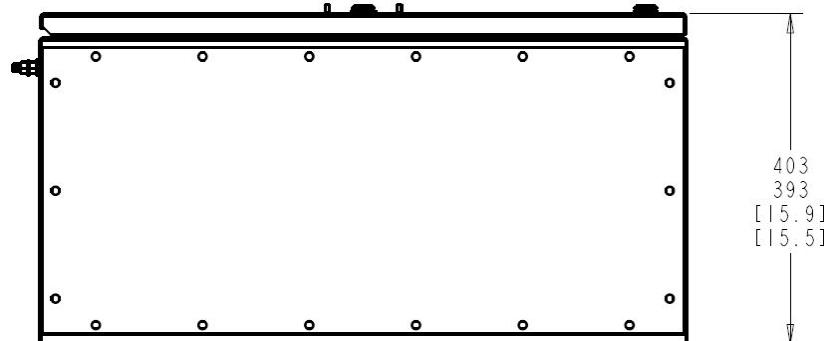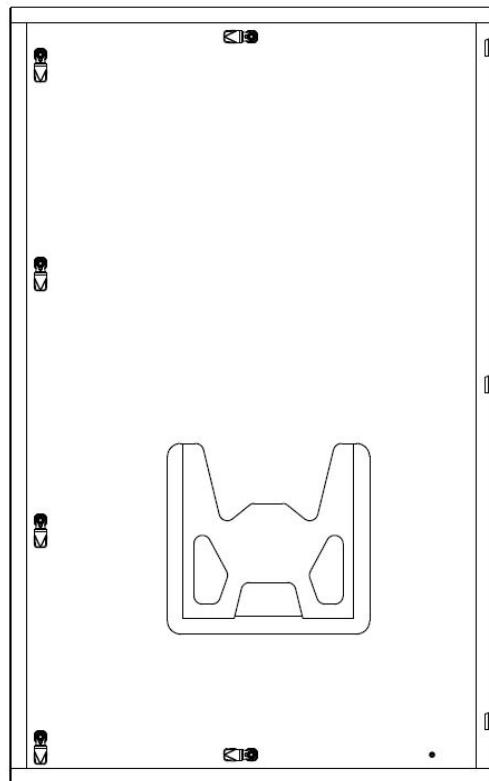**Component Torque Requirements**

3.3   Views of the UPC Enclosure

The following figures illustrate the front, bottom, and inside views of the stainless steel enclosure (HPN: 50154983-001).

Front view of enclosure

Bottom view

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Inside view of UPC door

3.4 Hardware Installed in the UPC

The following hardware is configurable and quantities will vary based on the cabinet configuration chosen.

- Panel-mounted Carrier Assembly (PCA)
- Power supply options
- Single Mode and Multi Mode FOE
- UIO IOTA
- UIO Module
- IOL interface cable
- Fiber optic cable
- LLAI module
- LLAI IOTA
- Marshalling – Field I/O Terminal Block Assembly
- SCA - Optional Signal Conditioning Adapters for Universal marshalling solution
- Fan Assembly (for internal air circulation only)
- Fiber Optic I/O Link Extender (FOE) module selection
- CN100 - I/O Networking & Control module
- STT650 - DIN rail mounted temperature transmitter
- IOM/IOTA selection
- Power, communication and I/O Back Plates
- IOL interface cable selection
- Blank gland plate for conduit and/or cable glands

3.4.1 Redundant power supply system

Refer to AC Power Requirements for more information about AC power operating limits.

3.4.2 Fiber Optic I/O Link Extender (FOE) module selection

Modules (Single Mode or Multi Mode) are selected during cabinet configuration. While connecting to remote Series-C I/O, FOEs are used at both the local and the remote sites. FOE modules are always installed in pairs, because Series-C I/O Links are redundant. One module connects to the "A" link and the other connects to the "B" link, with two independent fiber cables between every local and remote connection. One cable supports the "A" link and the other cable supports the "B" link. The Fiber Optic I/O Link Extender consists of two components.

- a Fiber-Optic-Extender Module (FOE Module)
- an IOL interface cable to connect the FOE module to the in-cabinet, wire-based I/O link

> **ATTENTION**
> Note that the connections between FOE and the components in the UPC are already established when the UPC ships from the factory.

Each optical cable minimally consists of two fibers, one for transmit and one for receive. Since the fibers are glass and the cost of additional fibers in a cable is small compared to cable replacement, a sufficient number of spares should be specified and included in the cables. The fibers must include SC/ST style connectors as applicable for either single mode/multi mode fiber optic extenders.

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Honeywell does not provide the fiber optic cable as a standard item for the system. Purchase and installation of the cable must be handled on an individual and unique basis for each application.

The FOE in the UPC only supports standard connections (SC/ST) fiber optics. The patch panel is used to make necessary adaptations.

3.4.3 IOM/IOTA selection

The IOM/IOTA module selection is dependent on the process that is being controlled and/or monitored. The required IOM/IOTAs are determined during cabinet configuration. The IOTA configurations available for the UPC are:

- CC-TUIO31 – UIO-2 (Universal Input Output) IOTA non-redundant
- CC-TUIO41 – UIO-2 (Universal Input Output) IOTA redundant
- CC-TAIL51 – LLAI IOTA

Each IOTA supports 32 channels of inputs/outputs for CC-TUIO31/CC-TUIO41 or 16 channels of inputs/outputs for CC-TAIL51. Up to three UIO-2 IOTAs or 8 LLAI IOTAs can be used in the UPC to

provide up to 96 points UIO-2 or 128 points LLAI. The redundant IOTA and the associated additional UIO IOM can be used to provide greater availability and ease of upgrade on process.

3.4.4 IOL interface cable selection

The IOL interface cables are determined based on the FOE module and IOTA selection.

> **ATTENTION**
> All the cables are redundant and they are installed when the UPC is shipped from the factory.

3.4.5 Conduit and cable gland selection

The UPC includes a gland plate on the cabinet bottom. Cut outs are necessary on the gland plate to facilitate wiring into the cabinet.

> **ATTENTION**
> The gland plate must be removed to fabricate any custom holes and cut- outs. While designing the custom holes/cut-outs, ensure the following:
>
> - Avoid interference with the cabinet
> - Avoid encroaching the enclosure cut-out
>
> To maintain the IP66 rating of the Stainless Steel cabinet, 50154983-001, all cable entries into the enclosure must be provided through the gland plate by
>
> means of conduit fittings or gland fittings that are certified to maintain the cabinet rating per local rules and regulations.

3.5 Cabling

Cable and wire entries, as well as sealing plugs made of metal or cold impact-resistant plastic, can be used provided they are rated and installed to maintain the IP66 certification of the SS cabinet. The bottom of the cabinet is the only designated area for cable entry for the UPC. The maximum number of entries to avoid the weakening of the bottom of the cabinet and creating an unstable condition is listed in the following table.

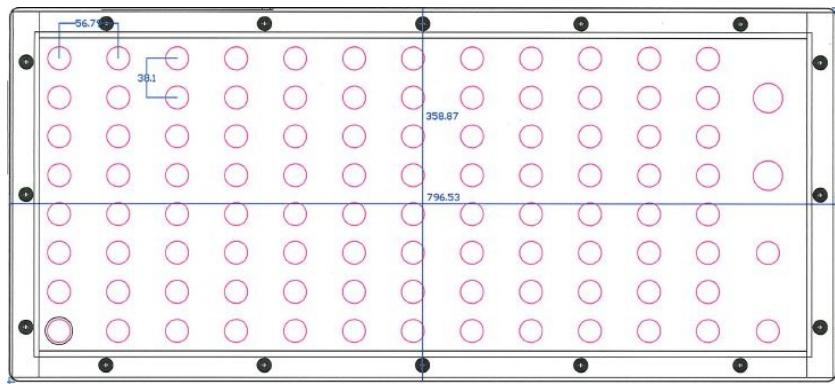| Size	Bottom
M40	30
M50	16
M63	14
M12	216
M16	161
M20	114
M25	80
M16	161
M20	114
M25	80
M32	48

Maximum entries for Stainless Steel enclosure cables

3.5.1 Guidelines for Creating Cable Entry

To maintain the IP66 rating of the Stainless Steel cabinet, 50154983-001, all cable entries into the enclosure must be provided through the gland plate by means of conduit fittings or gland fittings that are certified to maintain the cabinet rating per local rules and regulations. Consider the following guidelines while creating the cable entry in the enclosure.

- All cable and wire entries must be installed using a counter-nut.

- The number of possible standard cable glands decreases if strain relief or cable guards are used.

- A mixture of cable and wire entries is used.

- Unused openings for cable and wire entries must be closed with plastic or metal plugs that maintain the IP66-rating of the SS enclosure.

- The cable and wire entries must be installed so that self-loosening is prevented and permanent sealing of the cable and wire entry locations is guaranteed.

- The distances between the cable entries should be chosen so that a torque wrench can be used for tightening the cable and wire entries and the box nuts.

- The tightening torques must be observed for the installation of the cable and wire entries per the manufacturer's requirements.

- A sample placement for gland plate hole punching is shown below with M20 glands for signal cables and M25 (quantity: 2 shown below) for power supply connections:

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Sample placement for gland plate hole punching
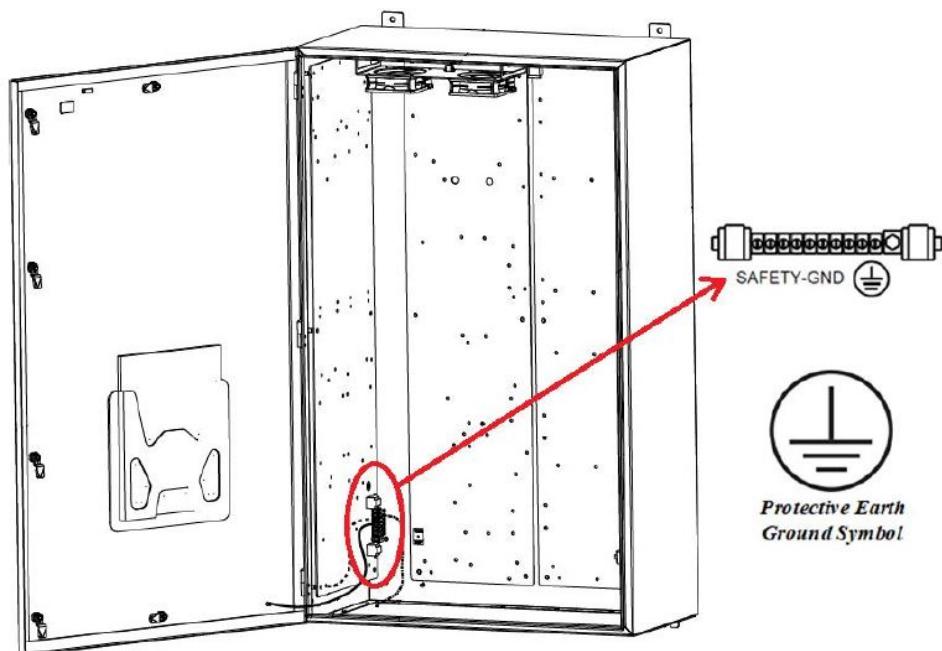
Input and Field Wiring Separations

> **ATTENTION**
> To maintain intrinsically safe "ic" field wiring, connections must be segregated from all other cabinet wiring. Equipment shall be installed in accordance with the requirements of the National Electrical Code (NEC), ANSI/NFPA 70, or the Canadian Electrical Code (CEC), C22.1.

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3.6   Power, earthing, and bonding requirements

3.6.1   Protective earth (PE)

The UPC is equipped with a labeled Protective Earth Ground identified as SAFETY-GND. For personnel protection, the protective earth ground conductor must be connected to the protected earth ground terminal prior to connecting the Mains wiring. The protective earth ground conductor must be a 10AWG minimum for AC Mains applications. The figure below illustrates where to connect the protected earth ground conductor.

Protected earth ground conductor

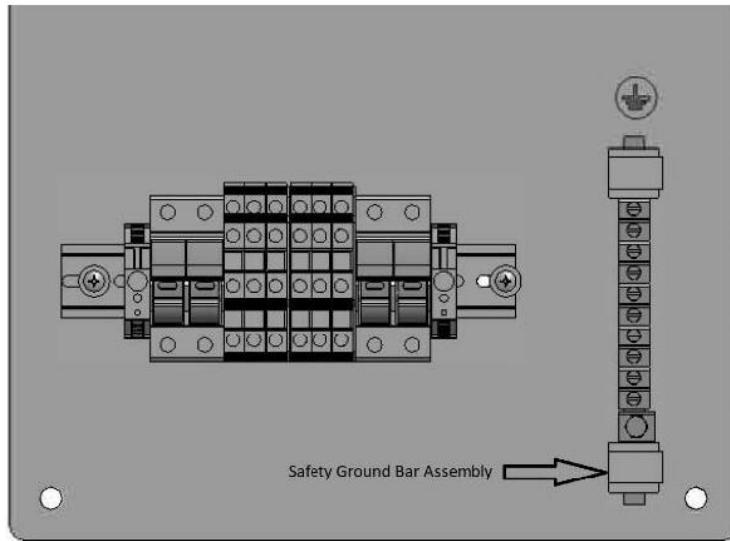### 3.6.2   CE Conformity for EMC Compliance

For EMC compliance, attach a 4AWG (25 mm2) wire from the PE bar in the UPC to an equipotential earth (such as a stake in the ground) with a maximum length of 5 meters.

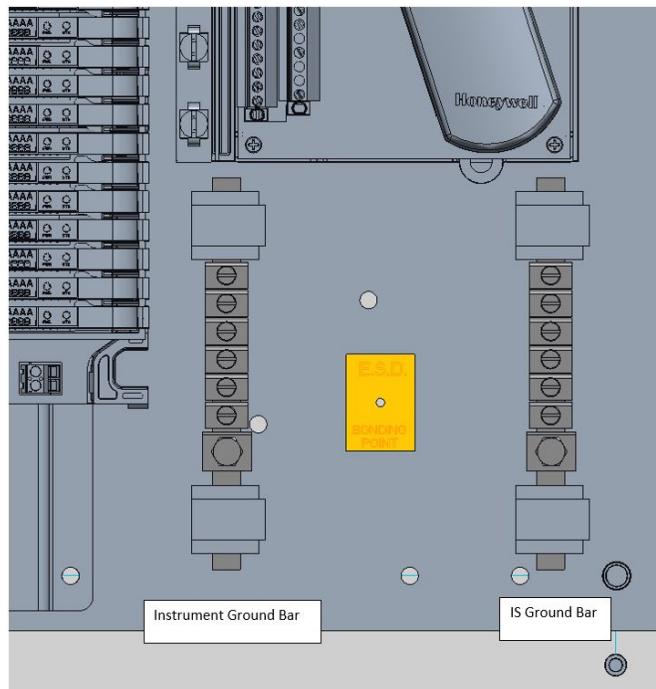### 3.6.3   Shield/Screen earth bar

The UPC is provided with a standard shield/screen earth bar located in the lower right hand corner of the cabinet. The earth bar is pre-wired to the PE bar with 10AWG (4.0 mm2) wire. If the shield/screen earth bar is to be connected to an earth other than the PE bar, then disconnect the wire that connects the PE bar to the Shield/screen earth bar.
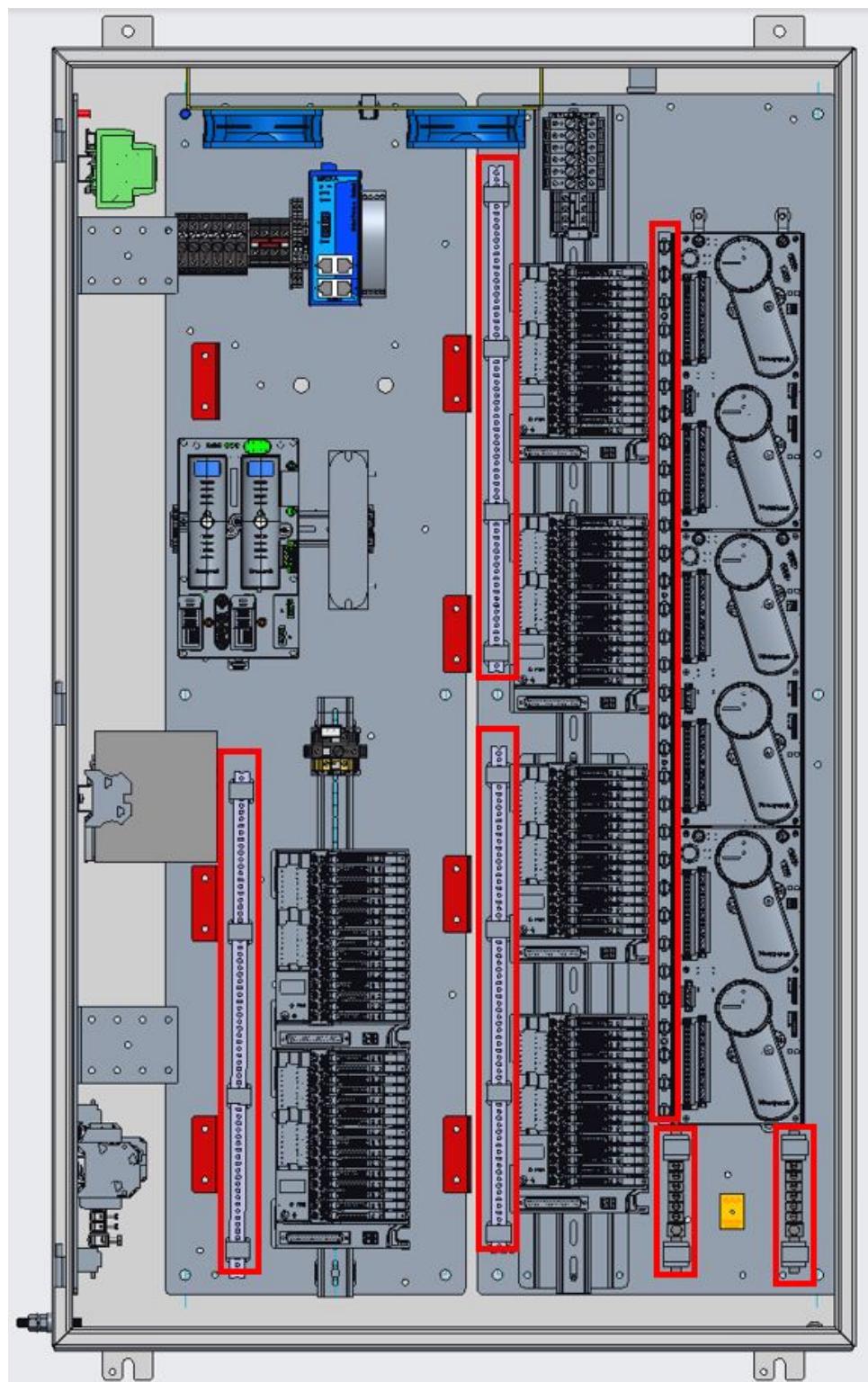
> **NOTE**
> You can remove jumper wire that connects shield ground bar to safety ground bar, if you want to separate ground reference for field IO shield wires.

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PE bar with connections for PE and EMC compliance on power supply backplates

Shield bar power supply IO backplates

Shield ground landing points

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> **NOTE**
> Both Viper Marshalling and Weidmuller Field Termination Assembly offer shield terminals on their assemblies.

3.6.4   AC power requirements

Nominal operating limits

Nominal operating limits defines the range of operating conditions within which the system is designed to operate and for which operating influences are stated. Performance characteristics listed in the "AC power operating limits" table are maintained while operating in this state. For more information, see ANSA/ISA D 51.1 Process Instrumentation Terminology.

Maximum operating limits

Maximum operating limits define the range of conditions to which the system may be subjected without permanent damage to the equipment. In general, performance characteristics are not guaranteed in this state. Stated Operating Band characteristics are restored when returning to the Operating Band specifications without damage to the equipment. For more information, see ANSA/ISA D 51.1 Process Instrumentation Terminology.

> **ATTENTION**
> Disconnection of the external supply to the system shall be accomplished through an appropriately rated circuit breaker, rated for 100% continuous load.

The following tables list AC power requirements for the UPC depending on power backplate assembly configured.

AC power	Nominal operating limits[1]
AC input voltage range (VAC, rms)	100V AC min, 240V AC max
Input frequency (Hz)	47 Hz min, 63 Hz max
RMS input current (A)	10A per supply line

AC power operating limits per power supply ATDI 600W

AC power	Nominal operating limits[1]
AC input voltage range (VAC, rms)	100V AC min, 240V AC max
Input frequency (Hz)	47 Hz min, 63 Hz max
RMS input current (A)	10A per supply line

AC power operating limits per power supply ATDI Power Shelf

AC power	Nominal operating limits[1]
AC input voltage range (VAC, rms)	110V AC min, 240V AC max
Input frequency (Hz)	50 Hz min, 60 Hz max
RMS input current (A)	10A per supply line

AC power operating limits per power supply Quint 4+

Notes (Tables 8a, 8b, 8c):

1. Reference the Hazloc manual for further details regarding operating limits, including maximum operating limits.
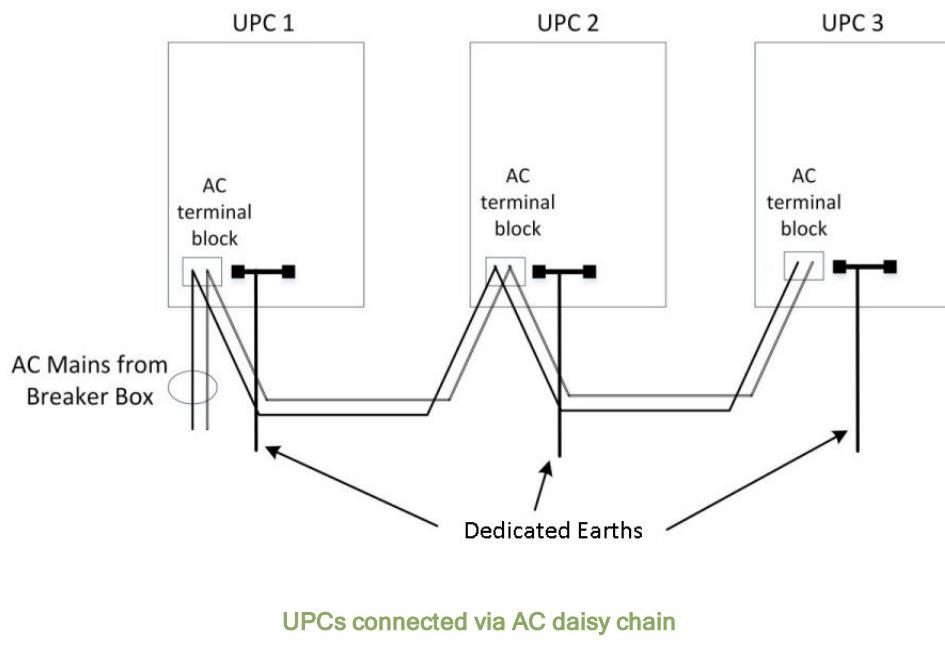
3.6.5   AC Input Requirements

The redundant AC main wiring (AC1 and AC2) must be connected in the terminal block (TB2) that is located in the lower left hand corner of the cabinet. In case of a non- redundant power supply, only one AC main wiring needs to be connected or AC1.

The terminal block (TB2) can accept the wire sizes from 22 to 10 AWG (0.5-4.0 mm2). In addition, the TB2 has a second row of screw terminals to allow for "daisy chaining" of AC power. With AC mains wiring connected to the TB2, the second set of screw terminals is used to power up a second UPC.

The "daisy chain" configuration can be repeated for a maximum total of three UPC's. See the previous figure, "Safety bar with connections for PE and EMC compliance" for the location of the AC terminal block.

In the following figure, "Dedicated Earths" refers to both EMC earth and Protective Earth.

UPCs connected via AC daisy chain

Daisy Chain General Rules

The AC input power lines to the power system must be protected by an exterior, appropriately-sized circuit breaker. (Same note from the Guidelines for Installing UPC section).

> **ATTENTION**
> Disconnection of the external supply to the system shall be accomplished through an appropriately rated circuit breaker. The circuit breaker shall not exceed 30A. When utilizing a 30A breaker, the breaker shall be rated 100 percentage for continuous load.

Up to three (3) total UPC units may be daisy chained together. Recommended minimum wire size is 14 AWG.

The maximum wire size that can be used for AC mains power is 10 AWG.

The wire size for the AC mains will depend on a few factors, such as load current per UPC, ambient temperature, and the distance from the breaker box to the UPC. This may limit the number of daisy chained UPC's to fewer than three.

No special parts are required for daisy chaining. The AC terminal block in the UPC is supplied with two tiered terminals for two connections per wire.

Each UPC unit must have its own dedicated earth wire connection as specified in Power, earthing and bonding requirements above.

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INSTALLATION - 35 -

The Universal Process Cabinet (UPC) arrives from the factory fully assembled and configured. For the installation, operations, test, and maintenance of the UPC, proper procedures must be observed.

4.1 Guidelines for Installing UPC

For proper storage, installation and operation, see Section 2.6, Cabinet Temperature Limits.

4.1.1 External Power Source

For a fully redundant system, two independent power sources must provide power to the power system in the enclosure. The AC input power lines to the power system must be protected by an exterior, appropriately-sized circuit breaker.

4.1.2 Installation Location

Choose an installation location for the UPC that prevents any damage. UPCs installed on support frameworks must be protected from falling over. Appropriate precautions must be undertaken to accommodate the weight of the UPC during initial installation onto the support structure. The UPC must be mounted onto a support structure having a load capacity of 1200 lbs. All fastening holes must be given fastening screws.

4.1.3 Ambient temperature

For proper storage, installation and operation, see Cabinet Temperature Limits.

4.1.4 Conduit Fittings and Cable Glands

A conduit fitting or some type of sealed transit device that is appropriately labeled for cabinet protection/ certification level must be used for the entry into the enclosure of the AC power cable (s), DC power cables (if present), fiber optic cables, coaxial cables, and field wiring. See Views of the UPC Enclosure for front and bottom views of the gland plate and Guidelines for creating cable entry.

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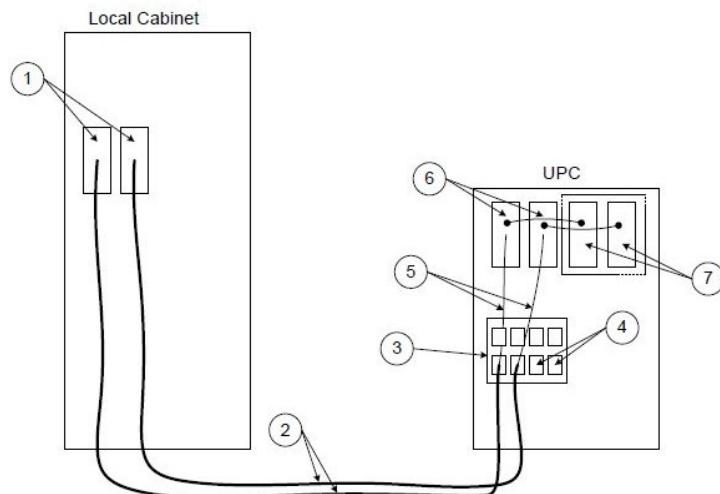
4.2   Connecting FOE Cable

The FOE provides an I/O link interface between the UPCs. The UPCs can communicate with the controller through one or two redundant sets of either single mode or multi mode FOEs.

Redundant fiber optic cables must be used to connect each UPC, which contains the remote I/Os and the controller.
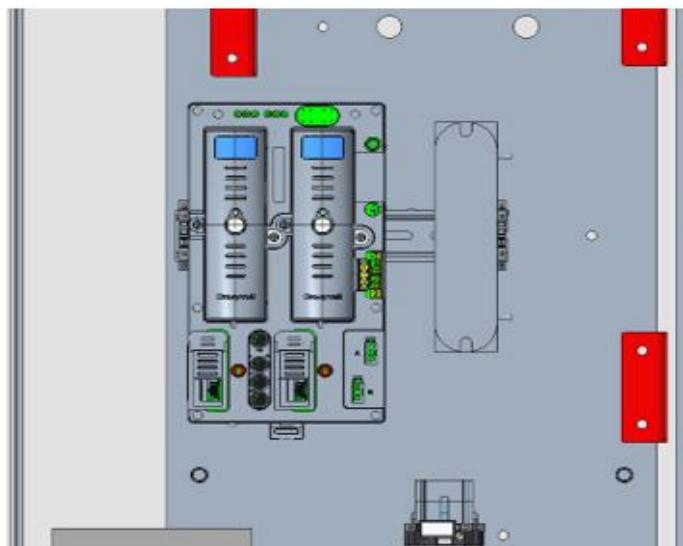
The UPC is provided with one 14-port patch panel by default. As an option, a Corning patch panel can also be installed on the same Din rail that the FOEs are installed. A fiber optic cable (or multiple fiber optic cables) is connected to the appropriate connector on the patch panel for up to 10 km distance (single mode only). The patch panel can accommodate different types of connectors depending on the type of fiber optic cables that are used.

There are three common types of fiber connectors available:

- LC
- ST (The Multi Mode MOXA supports ST connector types)
- SC (This is the only supported input to single mode MOXA)

1. MOXA ICF-1150I-S-SC-T (HPS-C) FOE with SC Fiber Optic Port (Redundant)

2. Fiber Optic Cables with SC and LC Connectors (up to 10 km long)

3. Corning Patch Panel

4. Adapter – SC, ST, LC

5. Fiber Optic Patch Cable with LC and SC Connectors (FJ2-LCUSCUL-01)

6. MOXA ICF-1150I-M-ST-T (HPS-C) FOE with ST Fiber Optic Port (Redundant)

7. Optional MOXA ICF-1150I-S-SC-T (HPS-C) FOE for Leap-frogging

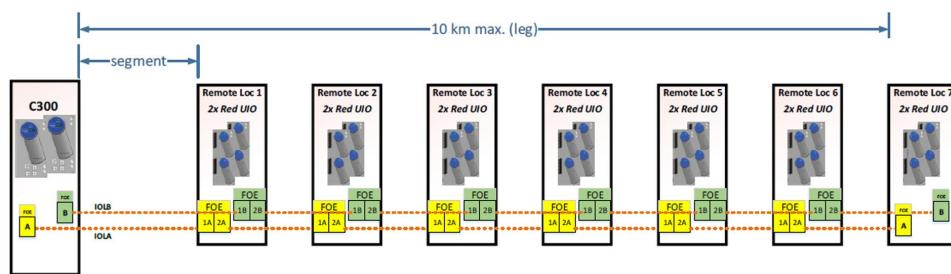Corning Fiber Optic Patch Panel

4.2.1 Connecting multiple UPCs to a Pair of C300s over I/O Link

Multiple UPCs can be connected to C300 via Fiber Optic I/O Link. There are three recommended options:

- Leap Frog (Daisy Chain) Topology
- Star Topology
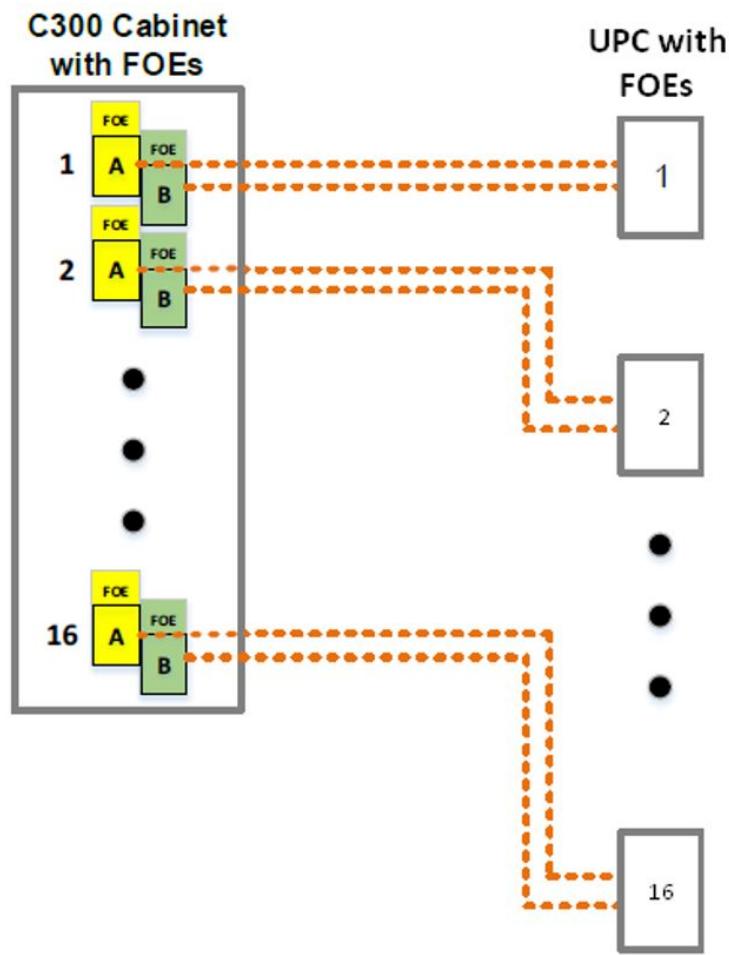- Combination of Star and Leap Frog (Daisy Chain) Topology

Leap Frog (Daisy Chain) Topology

A maximum of seven remote locations per leg can be connected in a linear manner with C300s and IOMs. An example with remote Universal Process Cabinets (UPC) is illustrated below. In the remote cabinets, FOE pairs (1A, 1B) and (2A, 2B) convert the A and B I/O Link signals between optical and electrical for connection to the UIOs. These FOE pairs transport data to and from the neighboring remote cabinets via fiber optic cables. Single-mode fiber optic cable can be run a maximum length of 10 Km. Multimode fiber optic cable can be run for 2Km maximum.
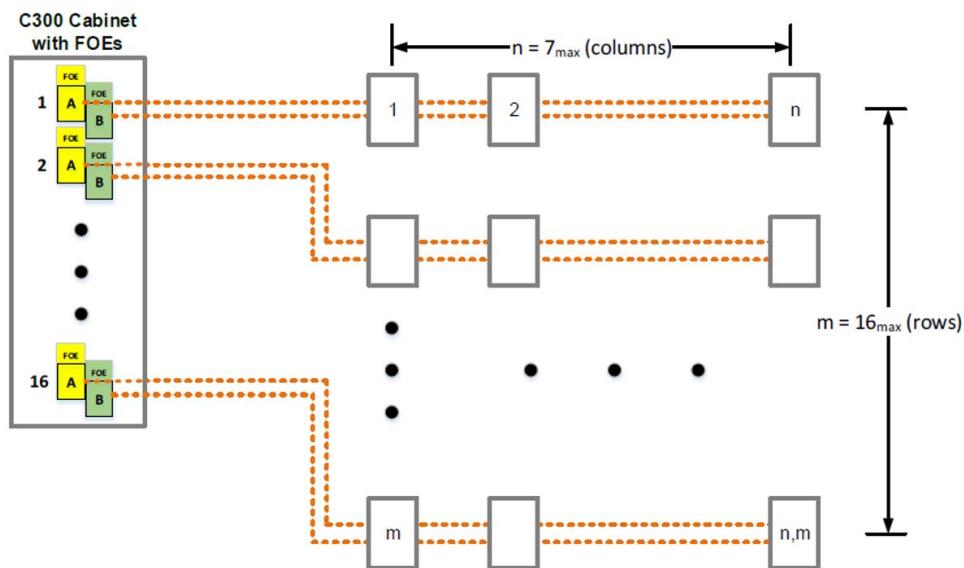

Star Topology

A maximum of 16 FOE units can be connected in parallel (Star formation) with C300 controllers. Single-mode fiber optic cable can be run a maximum length of 10 Km. Multimode fiber optic cable can be run for 2 Km per each length.
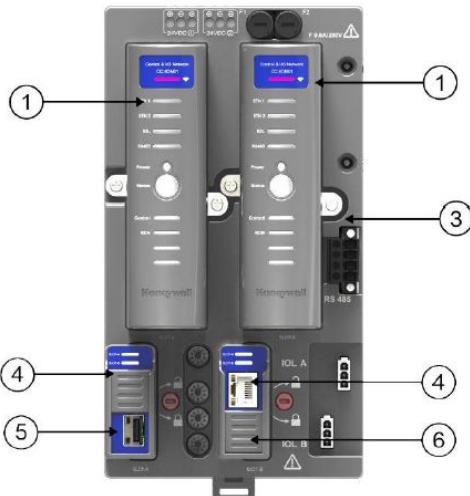
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Combination of Star and Daisy Chain

A combination of star and daisy chain can be created to form an m x n matrix as shown in figure below. The values for m and n are 16 (Star) and 7 (Leap Frog), respectively. The number of columns (cabinets) per row can vary, so that each row does not have to contain the same number of columns as another row. One IO Link can have a maximum practical limit of 40 addresses.

4.2.2   Connecting_CN100

The CN100 Platform comes with a redundant controller option. The controller can be expanded with the same CN100 Platform I/O Modules or connect with Series C IOM by IOLINK. Depending on software support, other form factor I/O modules along with Wireless I/O are supported. See the images and table below for the CN100 Platform Hardware.

CN100 Platform Hardware

Item	Model Number	Description
1	CC-IION01	I/O NETWORKING & CONTROL MODULE
3	CC-TION13	I/O NETWORKING & CONTROL IOTA - DIN RAIL
4	CC-INAM01	NETWORK ADAPTER MODULE
5	50154761	SPF - Single mode 20Km
6	50154762	SPF - Multi mode 2Km

Key to parts locations

> **NOTE**
> For more information about the CN100 controller module, refer to *EPDOC-X630-en-R516, CN100 Controller Hardware Planning and Installation Guide*.
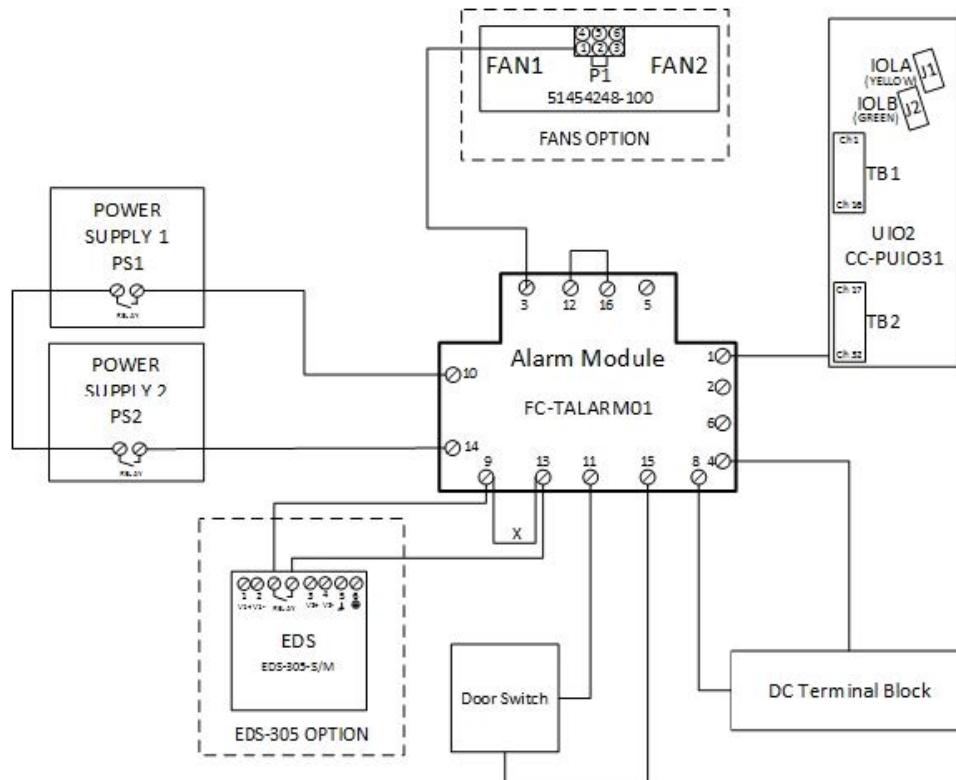
The network cable from the CC-INAM01 module is connected to the Corning Fiber Optic Patch Panel (SPH-01P).

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4.3 Alarm Circuit Wiring

The FC-TALARM01 alarm module The UPC comes from the factory with an alarm circuit pre-wired to channel 32 of the upper (first) UIO module.

The alarm module converts four Normally Closed contacts into a single analog signal. An application function(block) is required to convert this analog signal back into an alarm strategy to indicate the status of the alarms selected.

Sample alarm module circuit

For a pictorial representation of more typical alarm circuit configurations, wiring rules, technical data and a detailed description, see Alarm Module for UPC and USC.
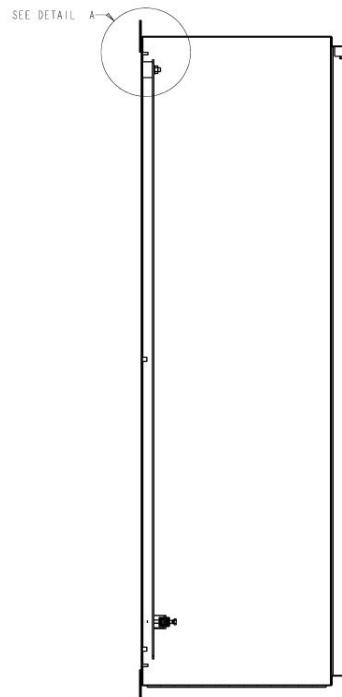
The actual alarm circuit present in your cabinet will depend on whether one or two power supplies are present, and whether or not the fan assembly is present.

Customers have the option to remove alarms. This will make channel 32 available for other I/O purposes.
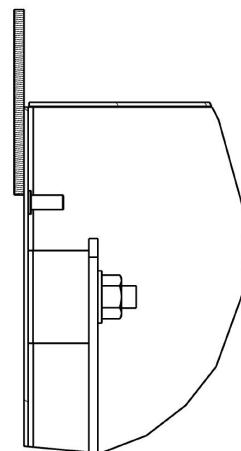
4.4   Mounting Bracket Hardware

The UPC is shipped with 4 mounting brackets that are welded onto four corners of the back of the cabinet. To ensure proper securement to the end structure be sure to utilize a M10 x 1.5 mm bolt size with a A2-70 grading on each corner when mounting.
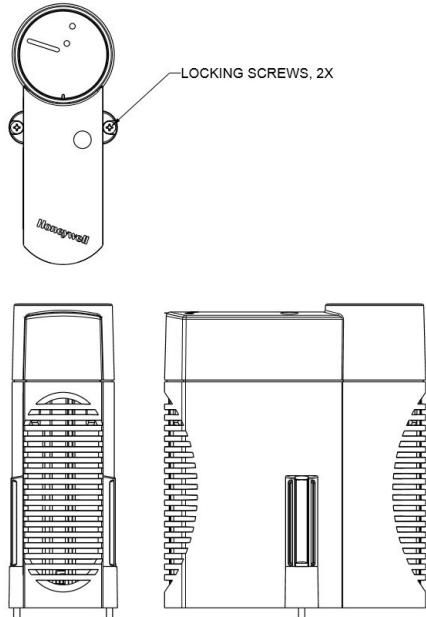

Location of Mounting Bracket

Detail A of Mounting Bracket

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4.5   Removal and Installation of UIO-2, LLAI and CN100 modules

This section describes the procedures for removing and installing a UIO-2, LLAI and CN100 module. See the figure below for relevant details.

Module handling

4.5.1   Removal of a UIO-2 and LLAI modules

1. On the IOTA, set the applicable switch (POWER 1 or POWER 2) to OFF. The Power LED (green) must go off.

2. Completely loosen the two locking screws.

3. Remove the module from the IOTA.

4.5.2   Installation of a UIO-2 and LLAI modules

1. On the IOTA, make sure that the applicable switch (POWER 1 or POWER 2) is set to OFF.

2. Hold the module in the correct position on the IOTA and carefully push it down on the corresponding connectors.

3. Tighten the two locking screws to 1.3 Nm or 12 in. Lbs. On the IOTA, set the applicable switch (POWER 1 or POWER 2) to ON. The Power LED (green) must go on.

> **NOTE**
> The plastic center screws are shipped with replacement modules but can be discarded prior to assembly.
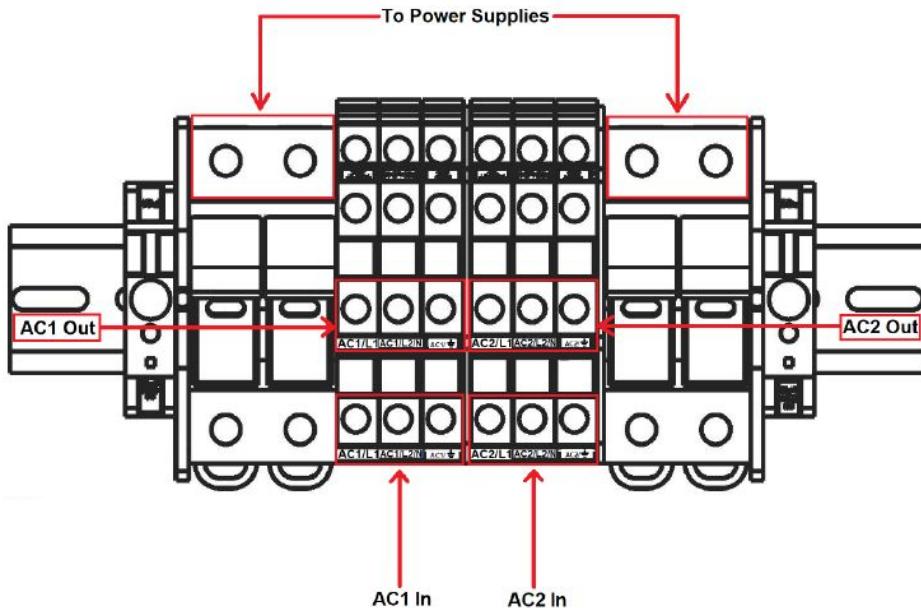
4.5.3   Removal of CN100 module

In a system with redundant CN100 controllers, when the primary controller fails, the backup controller takes over. And the original one becomes the secondary Network Adapter Module (NAM). The secondary NAM should be replaced.

For detailed instructions on how to remove a CN100 module, see the *CN100 Controller Hardware Planning and Installation Guide*.

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4.6 AC Terminal Block Connections

This figure shows the proper connections for the AC terminal block (51202694-100). Refer to Section 3.5.2 in "Planning of UPC" for detailed AC input requirements.

AC Terminal Block 51202694-100 (TB2)

Installation note: Input AC wire gauge must be sized accordingly to handle 10A (Amperes), wire gauge shall not exceed 10AWG (6mm2).

4.7   Removing 24VDC from the VIPER Terminal Block Assembly Base

> **CAUTION**
> Do not remove 24VDC from the VIPER terminal block assembly base unless the area is determined to be Non-Hazardous.

Removing the fuse to disconnect 24VDC:

1. Determine which VIPER terminal block assembly base requires the removal of 24VDC.
2. Match the reference designator of the VIPER terminal block assembly base to the applicable fuse holder in the 24VDC distribution block.
3. Lift the applicable fuse holder to expose the fuse.
4. Remove the fuse from the fuse holder.

Reconnecting 24VDC to a VIPER terminal block assembly base:

1. Determine which VIPER terminal block assembly requires 24VDC to be reconnected.
2. Match the reference designator of the VIPER terminal block assembly base to the applicable fuse holder.
3. Determine the proper fuse rating per the supplied Fuse Label (51156389).
4. Install the properly rated fuse and return the fuse holder to the closed position.

> **NOTE**
> Refer to HazLoc Manual, Special Conditions for Safe Use, regarding what conditions would require the removal of 24VDC.

4.7.1   Relocating 24VDC When Using VIPER IOA RPSS-I-I/HART/EX:

> **CAUTION**
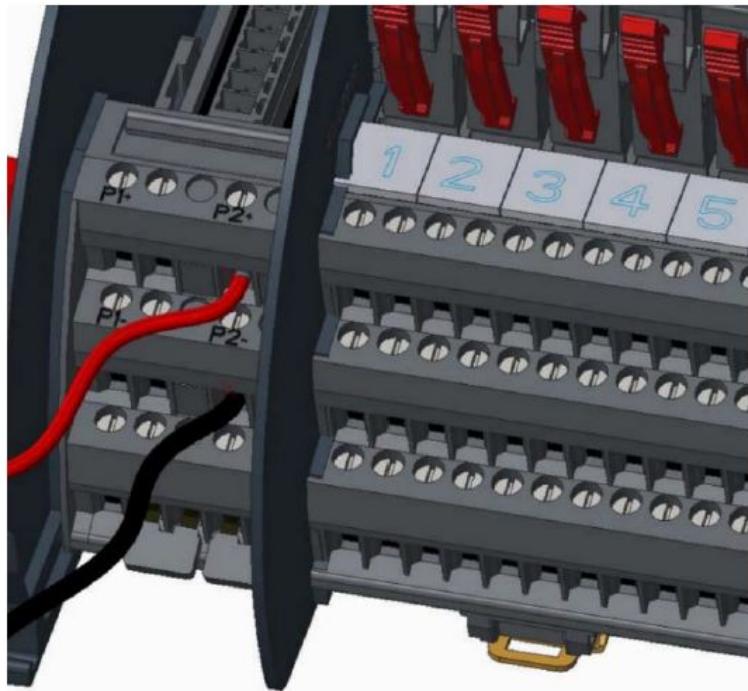> Do not remove 24VDC from the VIPER terminal block unless the area is determined to be Non-Hazardous.

When using IOA RPSS-I-I/HART/EX, 24VDC is required for terminal P2 of the VIPER Terminal Block Assembly Base (51454988). By default, 24VDC connections are provided within the UPC 96pt configuration when VIPER is installed. Follow the instructions below to relocate the default 24VDC connection to the appropriate P2 terminal on the installed VIPER Terminal Block Assembly Base.

Instructions for relocating 24VDC to terminal P2:

1. VIPER Terminal Block Assemblies with 24VDC connected to terminal P1.
2. Determine which VIPER terminal block assembly base will support IOA RPSS-I-I/HART/EX.
3. To safely disconnect 24VDC, remove the applicable fuse per section "Removing 24vdc from the

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viper terminal block assembly base (51454988)."

4. Disconnect 24VDC from terminal P1 and relocate to terminal P2, as shown in the image below.

5. Install the properly rated fuse per the supplied Fuse label (51156389) and return the fuse holder to the closed position to establish the 24VDC connection.
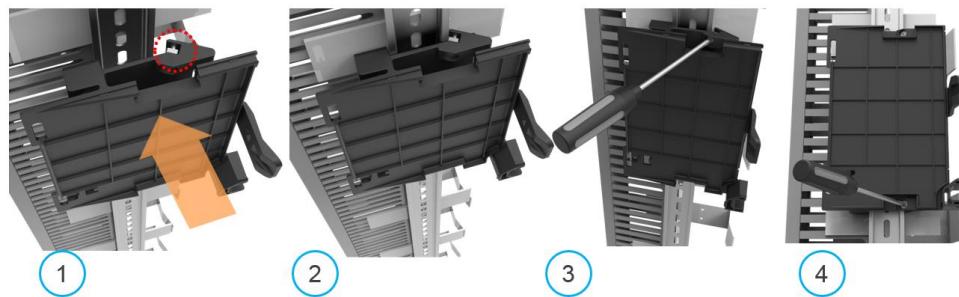

24VDC connection to terminal P2 on the VIPER terminal block assembly base (51454988)

4.8   Universal Signal Conditioning Assembly, FTA Removal and Installation

4.8.1   Mounting FTA Base to DIN Rail

The FTA base is provided with captive screws at the top and bottom which engages the vertical edge of DIN rail preventing the base from sliding. Make sure the nuts are loose before snapping the FTA base on to DIN rail. Once the base is properly positioned on the DIN rail. The captive screws can be tightened to secure the base firmly to the DIN rail. The graphic below explains the mounting sequence for FTA base.
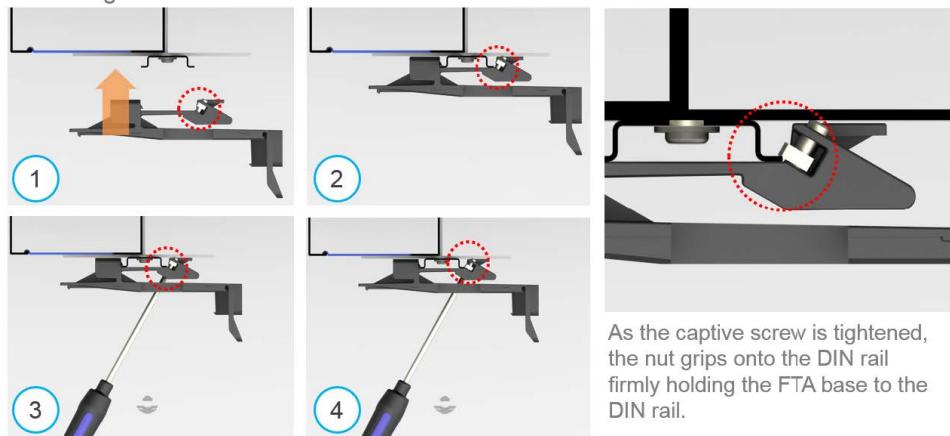
FTA Base mounting to DIN rail

1   2   3   4

Ensure the nuts are loose and align the FTA base to the DIN rail

Tighten the top and the bottom screw to hold the FTA base onto the DIN rail.
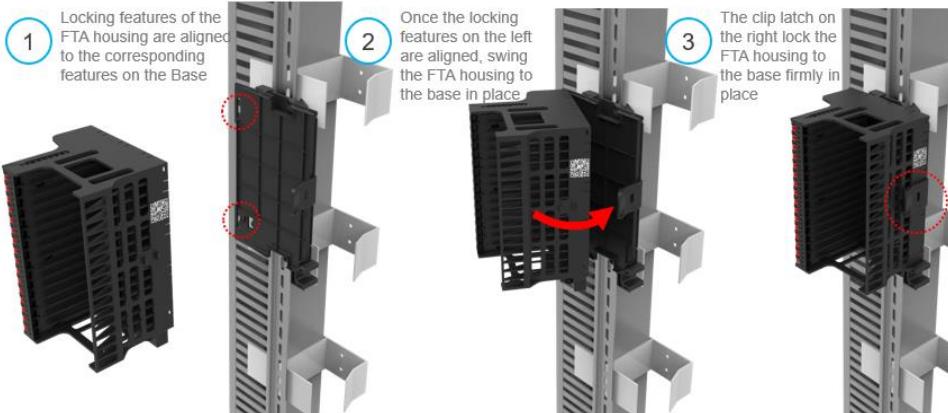
Mounting FTA Base to DIN rail

1   2   3   4

As the captive screw is tightened, the nut grips onto the DIN rail firmly holding the FTA base to the DIN rail.

4.8.2   Mounting FTA housing to the Base

Securing FTA housing to the base is screwless operation.

The sequence is detailed in the following diagram. The features provided on the housing need to be aligned with the base before snapping the right side of the housing.

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Mounting FTA housing to the Base

1 Locking features of the FTA housing are aligned to the corresponding features on the Base

2 Once the locking features on the left are aligned, swing the FTA housing to the base in place

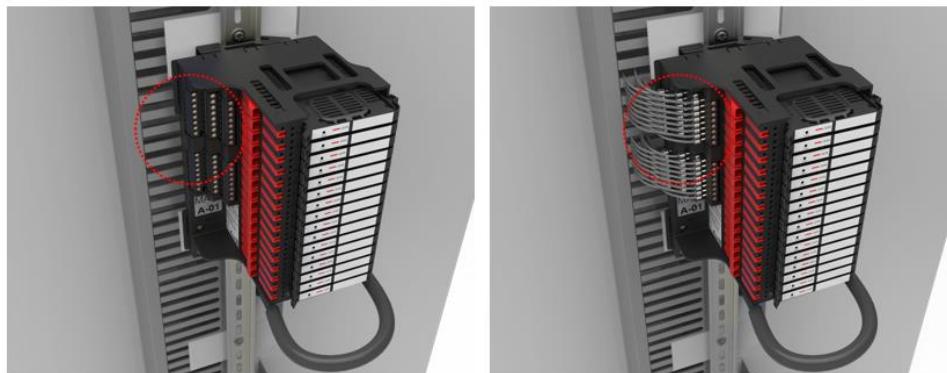3 The clip latch on the right lock the FTA housing to the base firmly in place

Snap generates a robust click sound indicating that the latching operation.

Removal of this FTA housing must be performed in reverse sequence where the snaps need to be unlatched as the first step and disengage the housing from the base as next step.

Recommended to use a screw driver to disengage the snaps in the case of a 3-column assembly where the spacing between FTA columns are less. In the case of 1 or 2 column assembly in a cabinet opening the snap by hands is also an option.
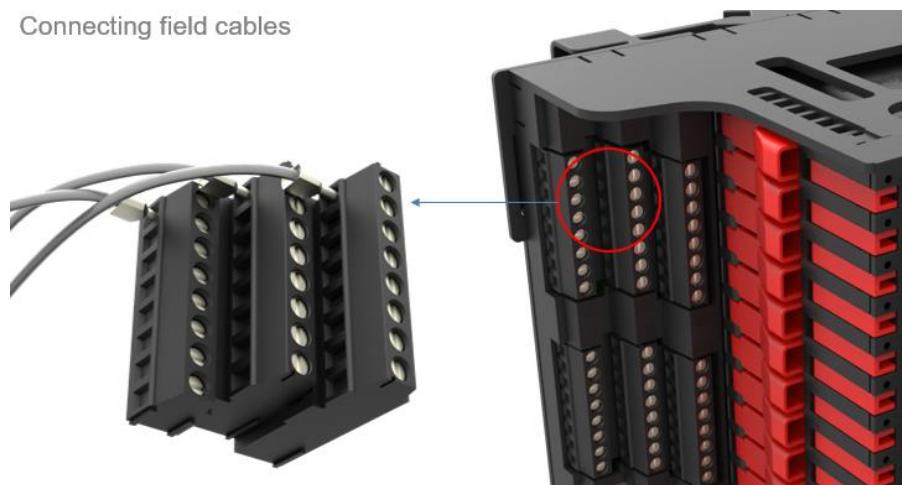
4.8.3 Connecting the field wires

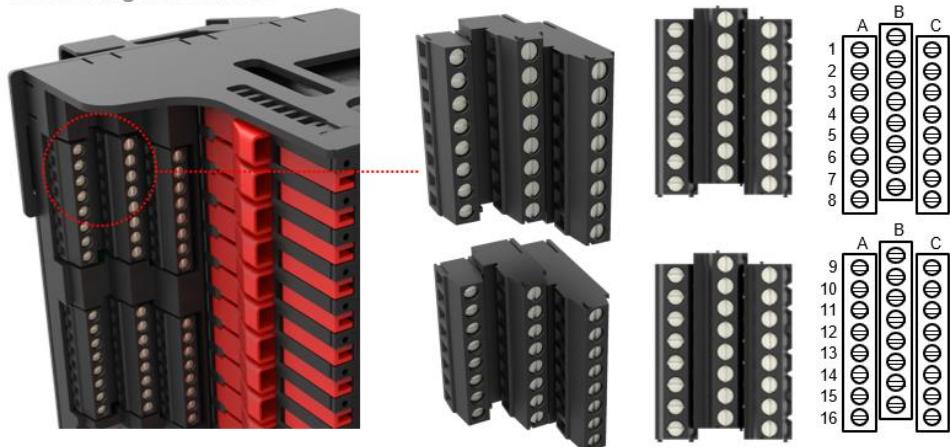Connecting field cables

Field cables housed in the duct behind are to be connected to the terminals

Connecting field cables
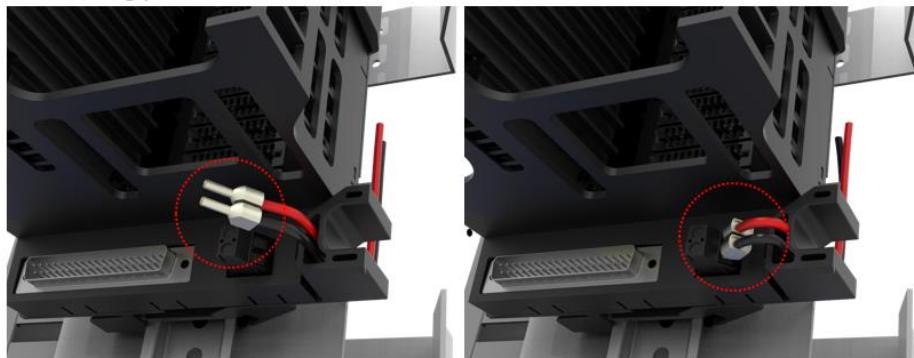
Connecting field cables

Recommended cable routing option for field cables are shown.

The graphics provided here is specifically for a 3-column assembly where the field side cable ducts are behind the FTA assembly.

In the case of 1 and 2 column assembly the cable ducts will be on the sides of FTA where traditional cable routing practices can be followed.

4.8.4 Connecting power

Connecting power

Power cables run down from the top of the cabinet behind the base on the right. Bring the wires to the front through the cable management feature and make connection with the power terminal.
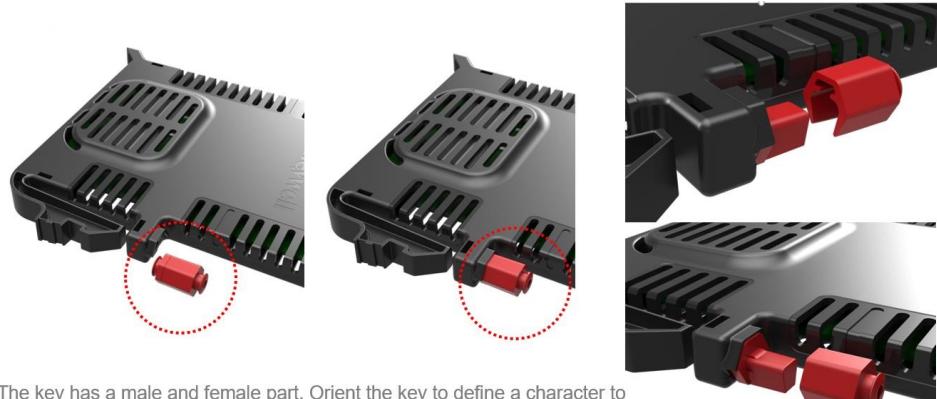
Connecting power

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Connecting MTC cable

MTC cables are brought in through the bottom of the cabinet and are secured behind the base on the I-brackets. These cables are bent and looped across the front and the plug is secured with the inbuilt screws tightened with a screwdriver. The cable is secured with cable ties onto the cable manager feature on the base.

Recommended cable mounting and routing for Power cables and the MTC cable is provided above. FTA housing is provided with features to route and fasten both power cable as well as MTC cable. DB37 connector on MTC cable need to be secured to FTA base with 2 screws provided on either side of the connector bending and routing of MTC cable shall be done as indicated in the figures.

4.8.5   Adapter module

The key has a male and female part. Orient the key to define a character to the slot and fix the male part into the module. Ensure the female part is in place when fixing the adaptor module into the designated slot in the FTA.
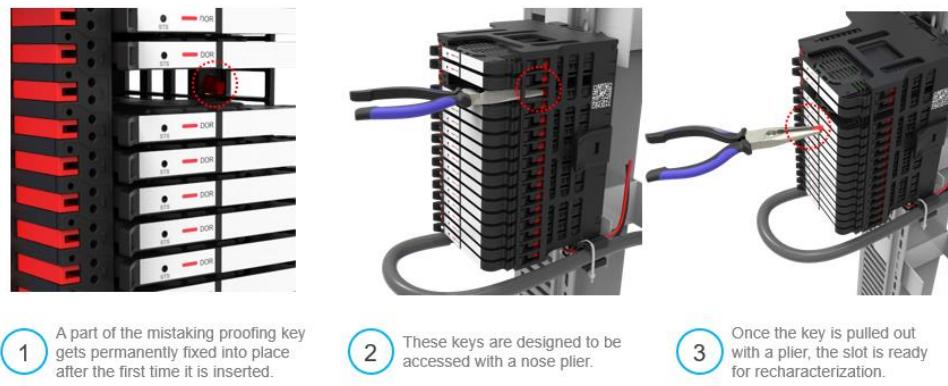
A set of keys with matching pattern can provide 6 combinations. Key pairs with different patterns will be used to provide more combinations.

Mistake-proofing keys are not provided in Pass Through Adapter, PTA.

KEY TYPE No.	1	2	3	4	5	6
50144592 KEY VIEW IN ASSEMBLY						
DESCRIPTION	0° ALIGNMENT	60° ALIGNMENT	120° ALIGNMENT	180° ALIGNMENT	240° ALIGNMENT	300° ALIGNEMNT

DETAIL A

6	51156753-100	TC/RTD MODULE
5	51156597-100	ANALOG OUTPUT MODULE
4	51156595-100	DIGITAL I/O MODULE
3	51156593-100	ANALOG INPUT MODULE
2	51156596-276	LOW VOLTAGE RELAY-DI
1	51156596-176	LOW VOLTAGE RELAY-DO
KEY TYPE No.	MODULE PART NUMBER	MODULE DESCRIPTION

4.8.6   Accessing key

Accessing mistake proofing key from the FTA housing

1. A part of the mistaking proofing key gets permanently fixed into place after the first time it is inserted.

2. These keys are designed to be accessed with a nose plier.

3. Once the key is pulled out with a plier, the slot is ready for recharacterization.

All channels of a factory fresh USCA FTA will be neutral and there will not be any key assembled to any slots of FTA. The keys got 2 parts – male & female. Both the male part and female part will be assembled together on to the module when shipped out from factory.
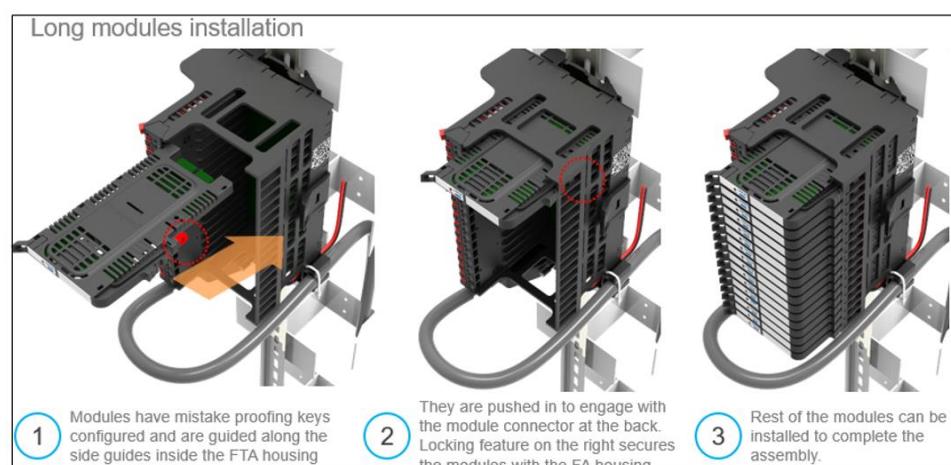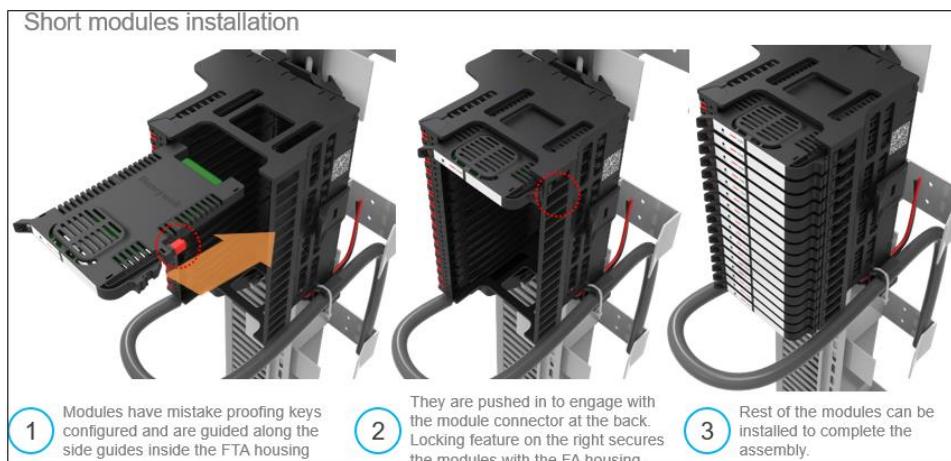
Modules can be plugged in to any slots of a factory fresh FTA. While plugging a module first time in to a given slot, the male part of the key will get locked on to the FTA base and female part of the key will stay with the module assembly.

Keying of a slot in FTA happens when a module is plugged into each slot first time. When a module is inserted and removed for the first time, male part of the key assembly will get snapped in to FTA housing and this slot will be reserved for only respective module personality.

An already keyed slot for an IO type can be brought back to a neutral slot by removing the male part of the key from the FTA housing.

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4.8.7   Module installation

Short modules installation

1. Modules have mistake proofing keys configured and are guided along the side guides inside the FTA housing
2. They are pushed in to engage with the module connector at the back. Locking feature on the right secures the modules with the FA housing.
3. Rest of the modules can be installed to complete the assembly.

Long modules installation

1. Modules have mistake proofing keys configured and are guided along the side guides inside the FTA housing
2. They are pushed in to engage with the module connector at the back. Locking feature on the right secures the modules with the FA housing.
3. Rest of the modules can be installed to complete the assembly.

Modules can be plugged in to USCA FTA slots and tactile feedback indicates proper insertion of the modules.

For more information about SCS handling and technical details, see the *Installation and User's Guide for Signal Conditioning Adaptors (SCA) [50149738-001]*

4.9   Non-incendive Field wiring and Intrinsically Safe Field wiring of UPC

Refer to *UPC Hazloc Manual (51156760)* for information pertaining to Nonincendive Field wiring and Intrinsically Safe Field Wiring allowances.

4.9.1   Warnings and Special Conditions of Use

Refer to *UPC Hazloc Manual (51156760)* for information pertaining to Warnings and special conditions of use.

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4.10 Universal Marshalling Option

Universal Marshalling Solution delivers standardized marshalling for central and distributed installations using signal conditioning assemblies. The signal conditioning assemblies handle 16 I/Os including disconnect, fusing as default, and when needed signal conditioning adapters (SCA) including isolation, intrinsic safety, relay, and other functions can be plugged in optionally. The SCA supports flexible wiring configurations without the need for custom wiring.

Part Number	Description
CC-USCA01	Universal Signal Conditioning Assembly, non-Intrinsically Safe Base
CC-UPTA01 Universal Pass Through Adapter	Universal Pass Through Adapter
CC-UDIR01	Digital Input Relay Adapter
CC-UDOR01	Digital Output Relay Adapter
CC-ULLI01	Universal Low Level Input Adapter
CC-UAIA01	Universal Analog Input Isolator
CC-UAOA01	Universal Analog Output Isolator
CC-UDXA01	Universal Digital Input/Output Isolator
CC-UGAI01	Universal Analog Input Barrier, Intrinsically Safe Base
CC-UGAO01	Universal Analog Output Barrier
CC-UGDA01	Universal Digital Input/Output Barrier

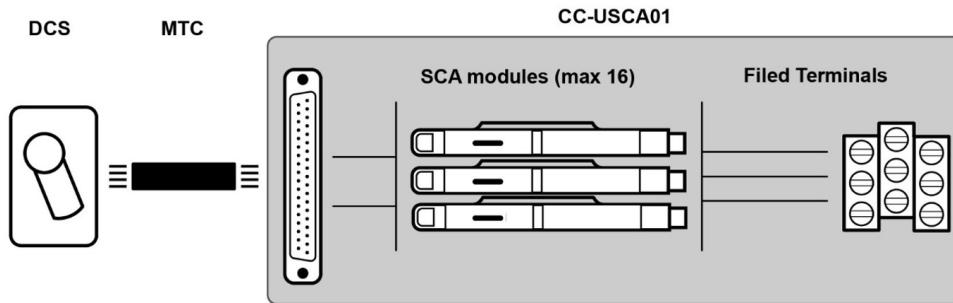Universal Marshalling Assemblies and Adapter Modules

This section is an introduction to the USCA and its adapters that can be used in the UPC. For details including technical specifications, see the *EP03-800-520-V01, Universal Marshalling Solution*.

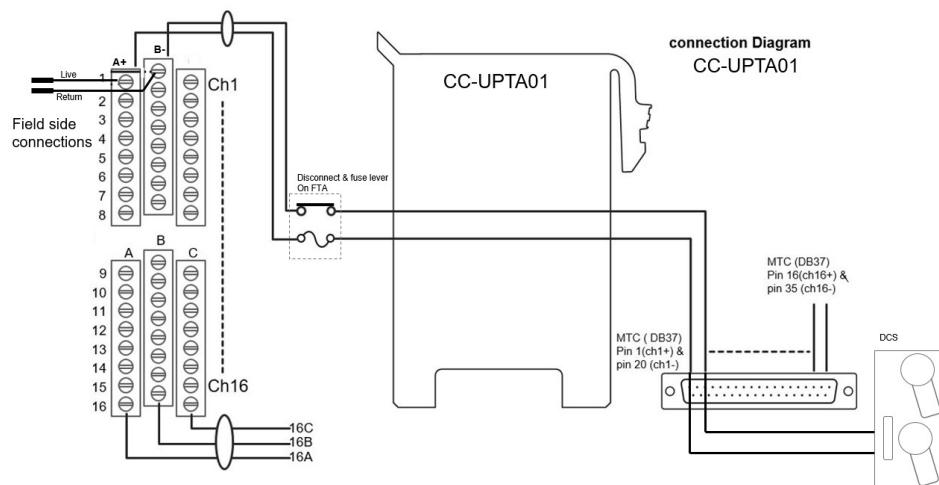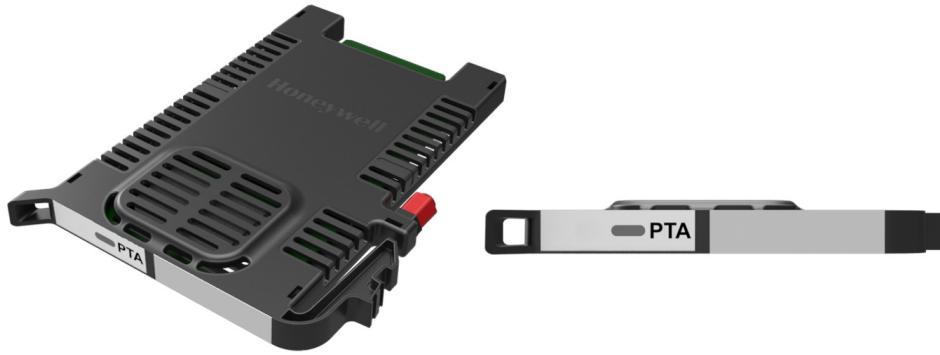## 4.10.1 Universal Signal Conditioning Assembly CC-USCA01

Universal Signal conditioning assembly is a DIN rail mounted integrated back plane which can host 16 compatible signal conditioning modules to provide suitable field side connection for the respective channels. USCA integrates with DCS through a single mass termination cable (MTC) and provides 3 dedicated screw terminals for each of the channels for field side cabling. USCA is equipped with built in fuse and disconnect for the field side interface.
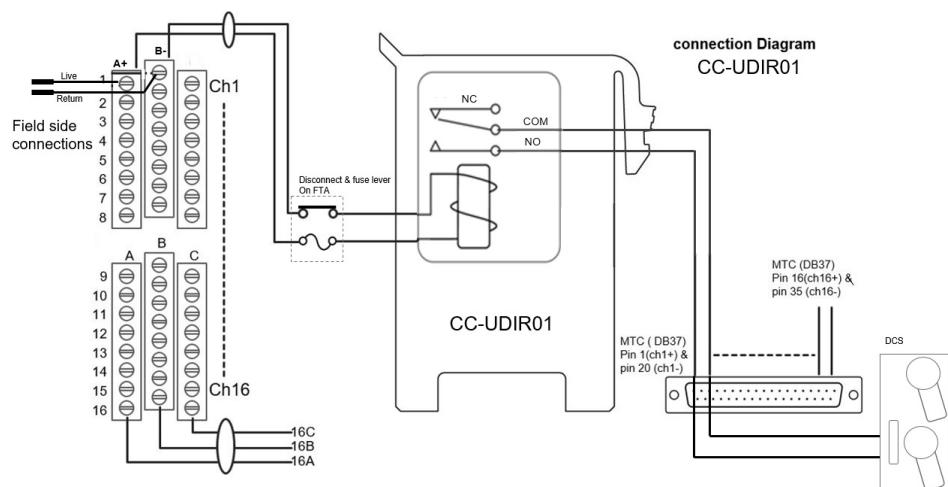
4.10.2 Universal Pass Through Adapter CC-UPTA01

CC-UPTA01 is a single channel pass through module which allows direct connectivity between DCS field terminals (both live & return) and the field device. This module does not require external power to operate and are suitable to operate with CC-USCA01.
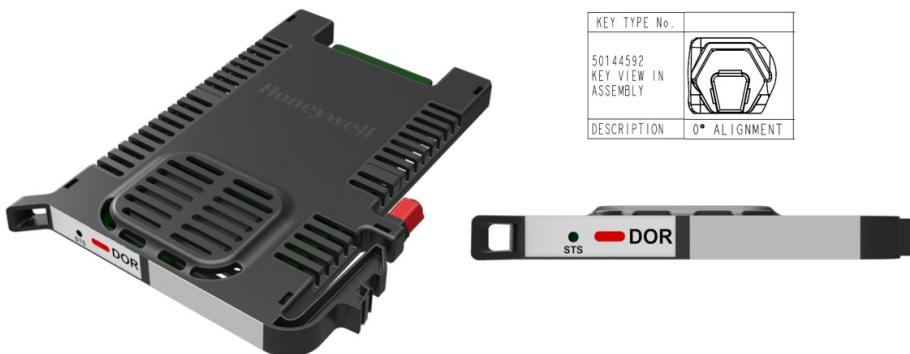

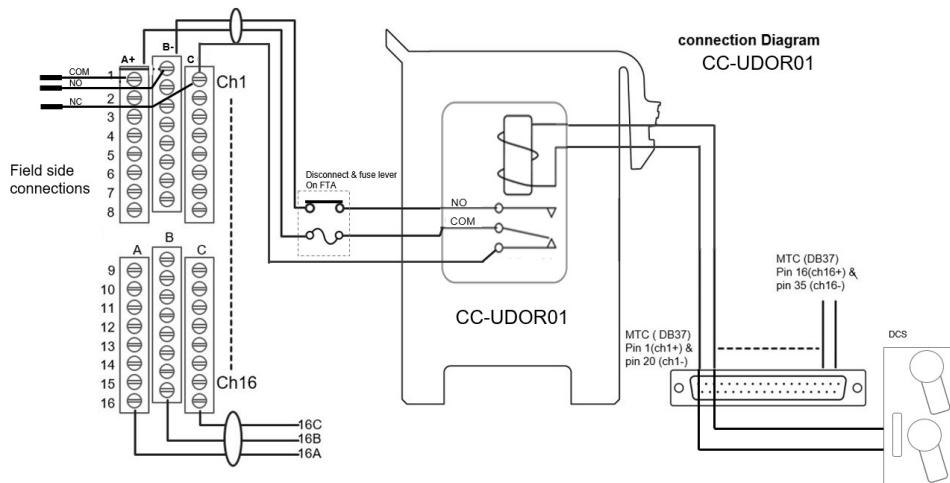## 4.10.3 Universal Digital Input Relay Adapter CC-UDIR01

CC-UDIR01 is a single channel relay input adapter for low voltage applications. Coil side of the relay interfaces with the field device and the contact side gets connected to DCS. This module does not require external power to operate and suitable to operate with CC-USCA01.

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4.10.4 Universal Digital Output Relay Adapter CC-UDOR01

CC-UDOR01 is a single channel relay output module for low voltage applications. Contact side of the relay interfaces with the field device and the coil side gets connected to DCS. This module does not require external power to operate and suitable to operate with CC-USCA01.
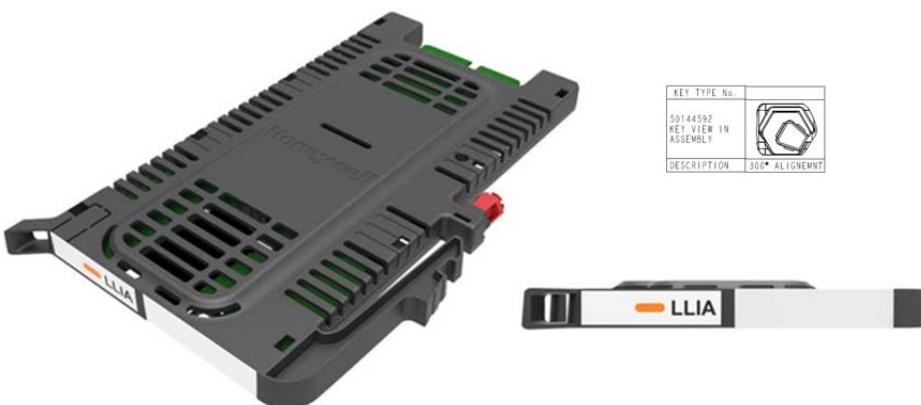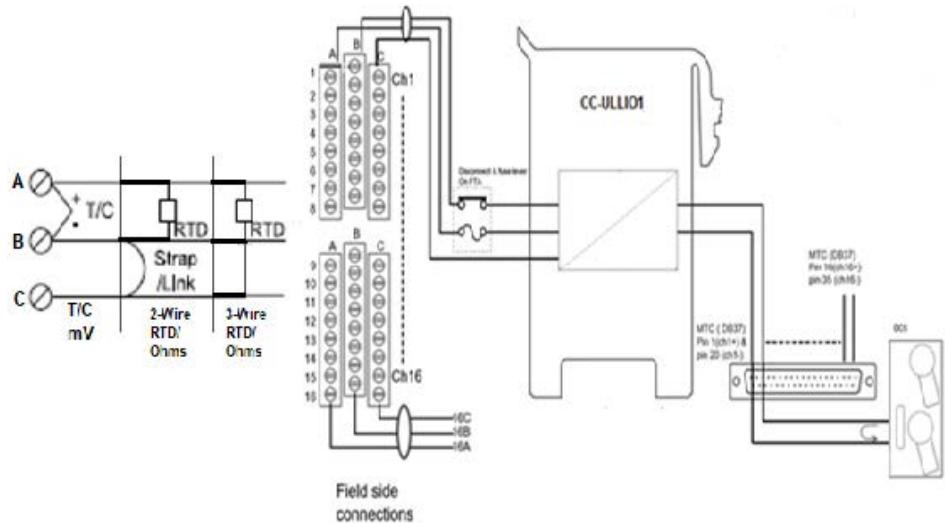
4.10.5 Low Level Input Adapter CC-ULLI01

CC-ULLI01 is a single channel low level analog input module which supports universal input measurement mainly, Thermocouple, Millivolts ,RTD and OHMS and provides 4-20mA output proportional to the measured variable.
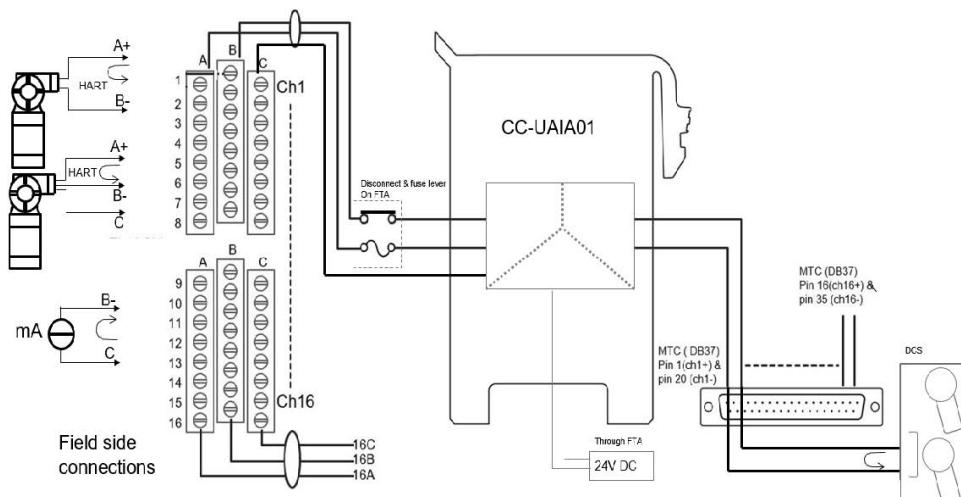
The adapter module supports 3 input terminals that can be configured either as 2Wire/ 3Wire RTD /Ohms Or TC/ mV inputs. CC-ULLI01 offers a galvanic isolation between Field side and Control side and suitable for use with CC-USCA01. The adapter has in built cold junction compensation for Thermocouple measurements and provides comprehensive diagnostics for TC/RTD sensors. The measurement and configuration of the adapter is supported from Experion.
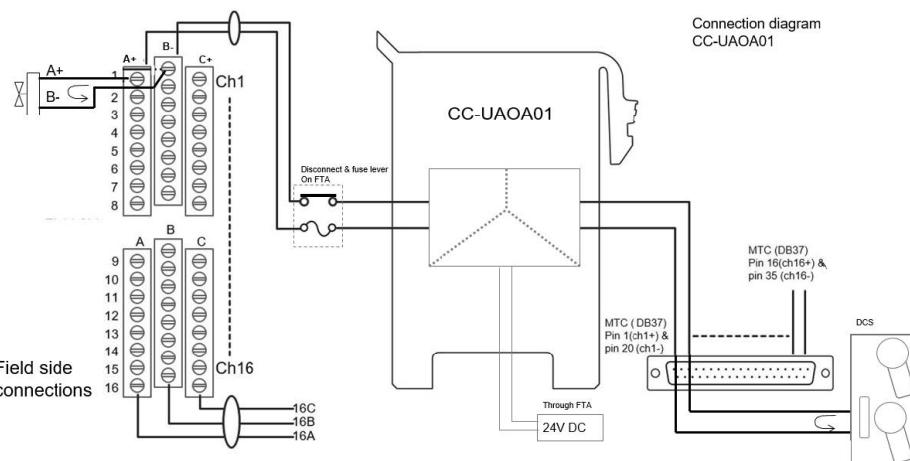
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4.10.6   Universal Analog Input Isolator CC-UAIA01

CC-UAIA01 is a single channel Galvanically Isolated Analog Input module which is suitable for use with CCUSCA01. This module supports 4-20mA and HART. CC-UAIA01 offers 3 way isolation, fault transparency for field side open wire conditions and reverse polarity protection.

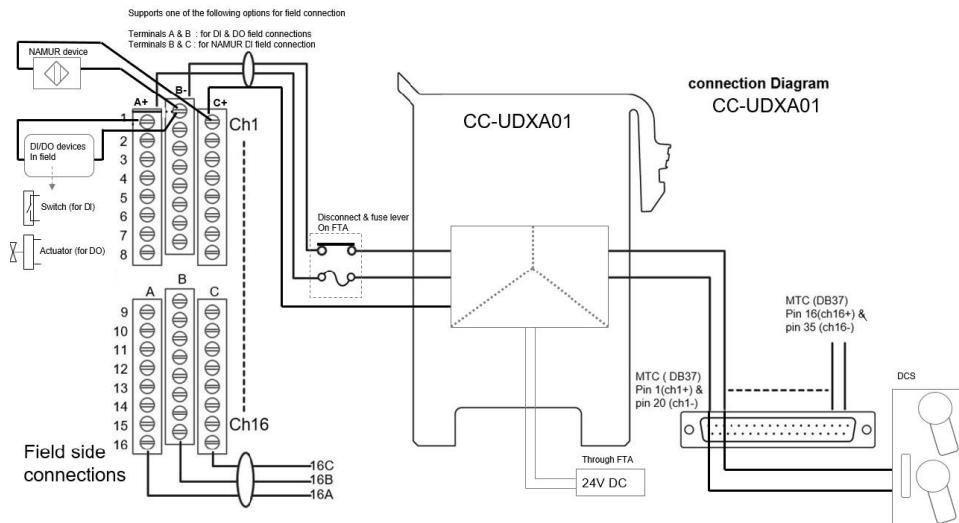## 4.10.7 Universal Analog Output Isolator CC-UAOA01

CC-UAOA01 is a single channel Galvanically Isolated Analog Output module which is suitable for use with CCUSCA01. This module supports 4-20mA and HART. CC-UAOA01 offers 3 way isolation, fault transparency for field side open wire conditions and reverse polarity protection.

4.10.8 Universal Digital Input/output Isolator - CC-UDXA01

CC-UDXA01 is a single channel Digital Input Output galvanic Isolator module which is suitable to use with CCUSCA0. CC-UDXA01 modules are self- configuring and work seamlessly with both Digital Input and Digital Output devices. No additional configuration is required to switch between Digital Inputs and Digital Outputs. CC-UDXA01 also supports NAMUR Digital Inputs. CC-UDXA01 offers 3-way isolation, fault transparency for field side open wire conditions reverse polarity protection and is provided with field status and power indication LEDs.

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4.10.9   Universal Analog Input Barrier CC-UGAI01

CC-UGAI01 is a single channel Galvanically Isolated Analog Input Barrier module which is suitable for use with CCUGIA0. This module supports 4-20mA and HART. CC-UGAI01 offers 3 way isolation, fault transparency for field side open wire conditions and reverse polarity protection.

4.10.10   Universal Analog Output Barrier CC-UGAO01

CC-UGAO01 is a single channel Galvanically Isolated Analog Output Barrier module which is suitable for use with CCUGIA0. This module supports 4-20mA and HART. CC-UGAO01 offers 3 way isolation, fault transparency for field side open wire conditions and reverse polarity protection.

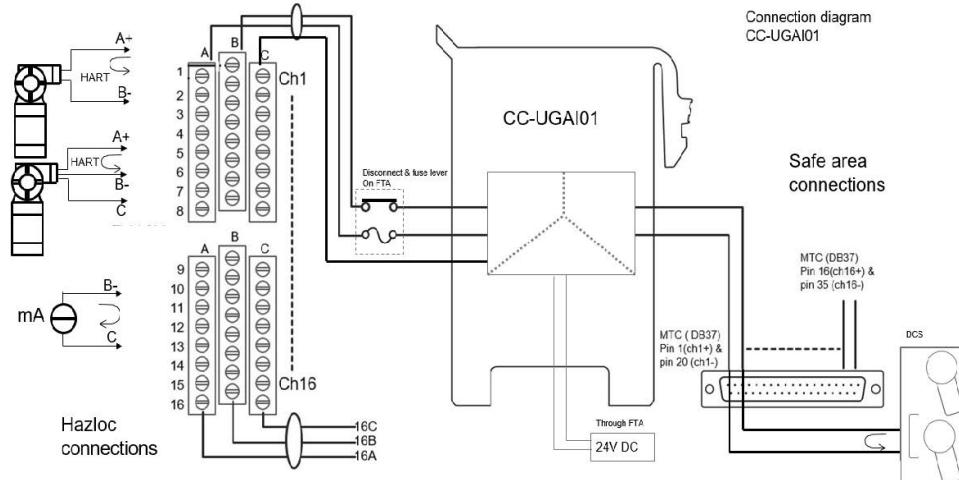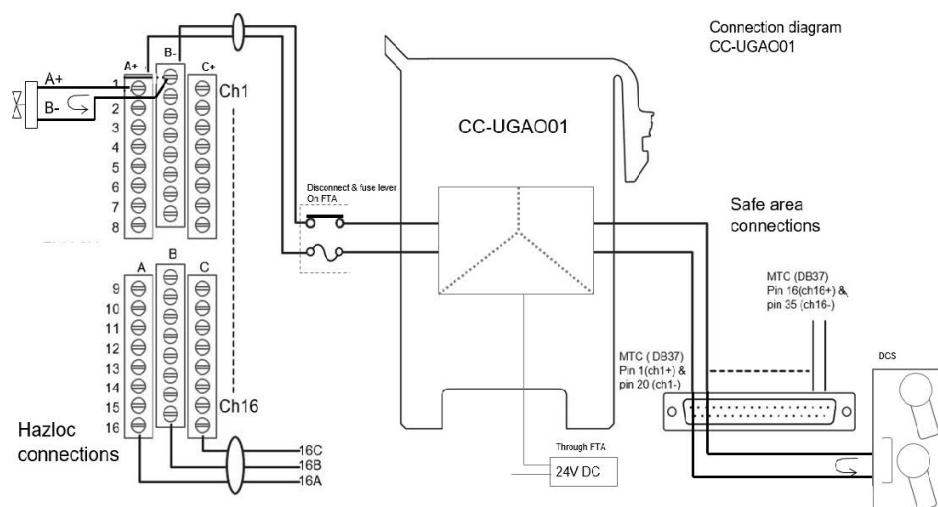## 4.10.11   Universal Digital Input/output Barrier - CC-UGDA01

CC-UGDA01 is a single channel Galvanically Isolated & Intrinsically safe Digital Input Output Barrier module which is suitable for use with CC-UGIA01. CC-UGDA01 modules are self -configuring and work seamlessly with both Digital Input and Digital Output devices. No additional configuration is required to switch between Digital Inputs and Digital Outputs. CC-UGDA01 also supports NAMUR Digital Inputs. CC-UGDA01 offers 3-way isolation, fault transparency for 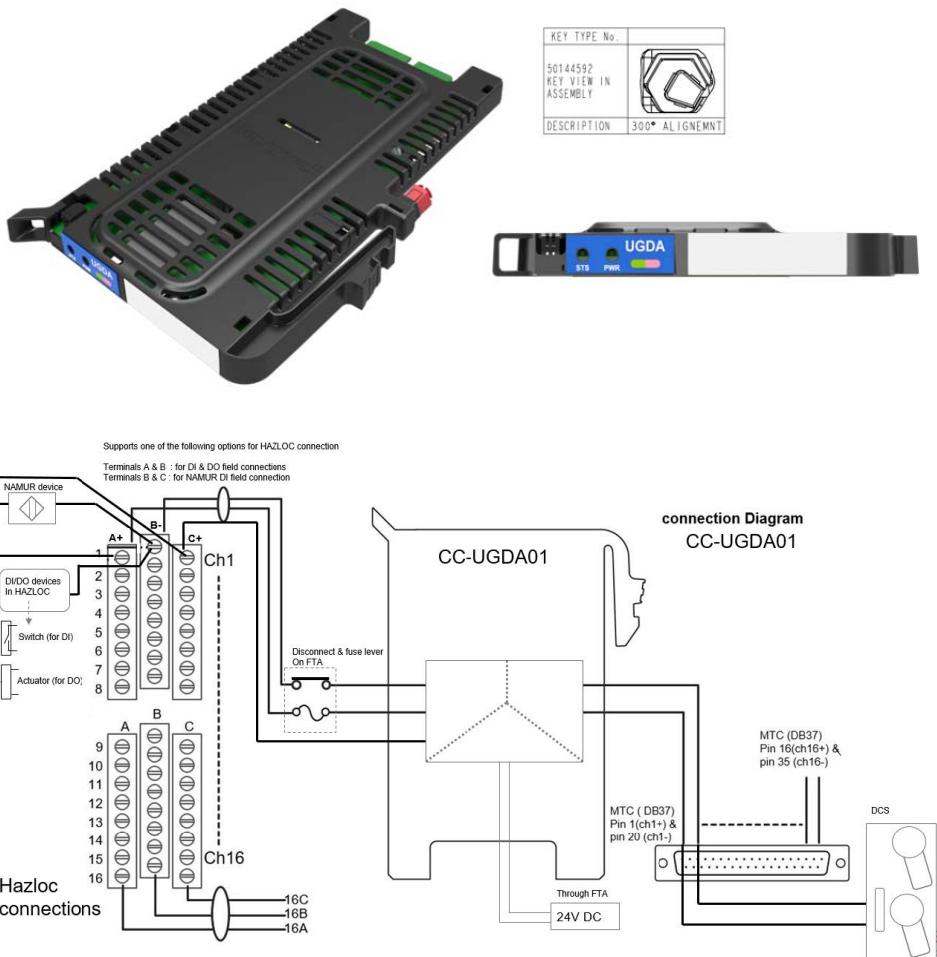field side open wire conditions, reverse polarity protection and is provided with field status and power indication LEDs.

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4.11   VIPER

VIPER is an optional Field Terminal Assembly (FTA) marshalling solution from Phoenix Contact that reduces wire complexity and implementation costs. Each VIPER module features 3 isolated power buses and 8 configurable channel I/O with 6 points per channel (A,B,C,D,SHC,SHF).

For further information, go to:
https://www.phoenixcontact.com/online/portal/us?1dmy&urile=wcm:path:/usen/web/home.

Model Number	Description	Part Number	Package Slip
IOA FEED-THRU/EX	Feed-Through Terminal Module	2906598	3546
IOA AI/AO/BFI/DS/0.5A/EX	Analog Protection Module	2906599	3590
IOA DI/DO/BFI/DS/1.0A/EX	Digital Protection Module	2906600	3591
IOA RPSS-I-I/HART/EX	Power/input isolation amplifier	2908452	3760
IOA REL 24V DO/BFI/3.0A/EX	24V DO Relay	2910153	3791
IOA REL 24V DI/BFI/1.0A/EX	24V DI Relay	2910155	3793
IOA REL 120V DO/BFI/3.0A/EX	120V DO Relay	2910154	3792
IOA REL 120V DI/1.0A/EX	120V DI Relay	2910157	3794
IOA REL 230V DO/BFI/NO/3.0A/EX	230V DO NO Relay	2910421	3796
IOA REL 203V DO/BFI/NC/3.0A/EX	230V DO NC Relay	2910422	3796
IOA REL 230V DI/1.0A/EX	230V DI Relay	2910423	3797

Phoenix Contact Part Numbers

VIPER FTAs

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High-level view

As an option, the UPC can be installed with a VIPER Terminal Block (51454988-100 and 51454988-200) to support not only field wire marshalling but to also provide a physical way to disconnect individual field wires to support various tasks, including signal measuring or disconnecting the IO signal from the UIO prior to the removal of any field wires.

4.11.1 IOA Options

With the VIPER terminal block assembly, each channel can be configured with various IOA to support specific field device needs. Currently the UPC supports 11 different IOA options, which are detail in the following sections.

4.11.2 Feed Thru IOA – IOA FEED-THRU/EX

The Feed Thru IOA is a passive 1:1 device supporting 2-wire AI, AO, DI and DO field signal types. Each channel has a max field terminal rating of 1A maximum.

Feed Thru IOA - IOA FEED-THRU/EX

IOA Schematic

Analog/Digital field wiring template

Technical data

Max. permissible current per branch: 1A

4.11.3 Analog Protection module – IOA AI/AO/BFI/DS/0.5A/EX

The Analog Protection module supports AI or AO 2-wire, 3-wire and 4-wire field devices. Features of this device include a 0.5A fuse, fuse blown indication, a field disconnect and signal test points. Bused power for 3-wire and 4-wire devices is available when 24VDC is connected to terminal P1+/P1-. Each channel has a max field terminal rating of 0.5A.

Analog Protection module - IOA AI/AO/BFI/DS/0.5A/EX

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IOA Schematic

Analog 2-wire loop power						Signal Channel n	
P1+			P2+			nA	nC
						+	
P1-			P2-			nB	nD
						-	
PE	SHC		PE	SHF		SHC	SHF

Analog 3-wire module powered						Signal Channel n	
P1+			P2+			nA	nC
+						+	D+
P1-			P2-			nB	nD
-						-	
PE	SHC		PE	SHF		SHC	SHF

Analog 4-wire module powered						Signal Channel *n*	
P1+		P2+				*n*A	*n*C
+						+	D+
P1-		P2-				*n*B	*n*D
-						-	D-
PE	SHC	PE	SHF			SHC	SHF

Analog field wiring templates:

(Note: D+ and D- represent device power)

Technical data

Max. permissible current per branch: 0.5A (fuse limited)

4.11.4 Digital Protection module - IOA DI/DO/BFI/DS/1.0A/EX

The Digital Protection module supports DI or DO 2-wire, 3-wire and 4-wire field devices. Features of this device include a 1A fuse, fuse blown indication, a field disconnect and test points. Bused power for 3-wire and 4-wire devices is available when 24VDC is connected to terminal P1+/P1-. Each channel has a max field terminal rating of 1A.
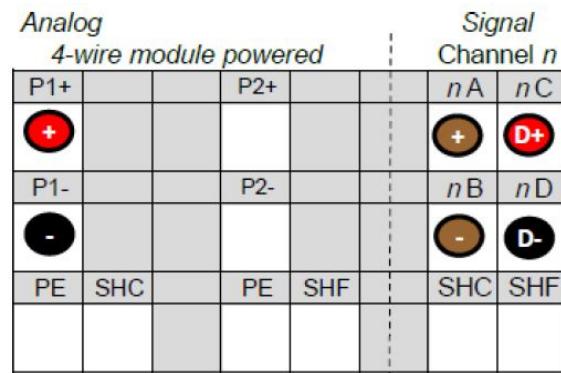

Digital Protection module - IOA DI/DO/BFI/DS/1.0A/EX

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IOA Schematic

Technical data

Max. permissible current per branch: 1A (fuse limited)

4.11.5   I to I HART-transparent IOA - IOA RPSS-I-I/HART/EX

The I to I HART-transparent IOA is a three-way repeater power supply with plug-in technology. The IOA supports both input or output signals (0(4)...20mA) for 2-wire and 3- wire devices. The I to I HART IOA is also capable of supporting 4-wire devices if the field device power is provided separately by the end user only since this IOA is not capable of directly supporting 4-wire devices.

> **NOTE**
> 24VDC power is required on terminals P2+/P2- for the I to I HART IOA to properly function.

I to I HART-transparent IOA - IOA RPSS-I-I/HART/EX

IOA Schematic

Field wiring templates:

Signal conditioning connections:

1. PWR Out +
2. In I -
3. In I +

Analog field wiring templates

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Power						Signal	
P1+			P2+			nA	nC
			+			1	
P1-			P2-			nB	nD
			-			2	
PE	SHC		PE	SHF		SHC	SHF

Signal conditioning - 2-wire I to-I, HART

Power						Signal	
P1+			P2+			nA	nC
			+			1	3
P1-			P2-			nB	nD
			-				2
PE	SHC		PE	SHF		SHC	SHF

Signal conditioning - 3-wire I to-I, HART

Power						Signal	
P1+			P2+			nA	nC
			+				3
P1-			P2-			nB	nD
			-				2
PE	SHC		PE	SHF		SHC	SHF

Signal conditioning - 4-wire I to-I, HART

Max. permissible current per branch	24mA (short circuit protected)
Functional 24VDC Power Required	Terminal P2+/P2-
Status Display	Green LED (supply voltage)
HART function	Yes

Technical Data

4.11.6 24VDC Digital Output Relay - IOA REL 24V DO/BFI/3.0A/EX

The 24VDC digital output relay provides a 3A fuse, fuse blow indication and selectable NO/NC contact. 24VDC contact power can be supplied either by the field or bused intermarshalled) when 24VDC is connected directly to terminal P1+/P1-. Each channel currently has a max field terminal rating of 1A.

24VDC Digital Output Relay - IOA REL 24V DO/BFI/3.0A/EX

IOA Schematic

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24 V digital output

Field powered / Signal Channel n

P1+			P2+			n A	n C
						+	
P1-			P2-			n B	n D
						-	
PE	SHC		PE	SHF		SHC	SHF

Module powered (intermarshalled): / Signal Channel n

P1+			P2+			n A	n C
+						Jumper	
P1-			P2-			n B	n D
-						+	-
PE	SHC		PE	SHF		SHC	SHF

Digital Output field wiring templates

Max. permissible current per branch	1A
Operating voltage display	Yellow LED
Maximum switching voltage	230V

Technical Data

ATTENTION

It is also important to note that the power section of the VIPER base cannot be used if the intent of the installation is to support Non- Incendive and Intrinsically Safe 'ic' field wiring (except when using IOA RPSS-I-I/HART/EX).
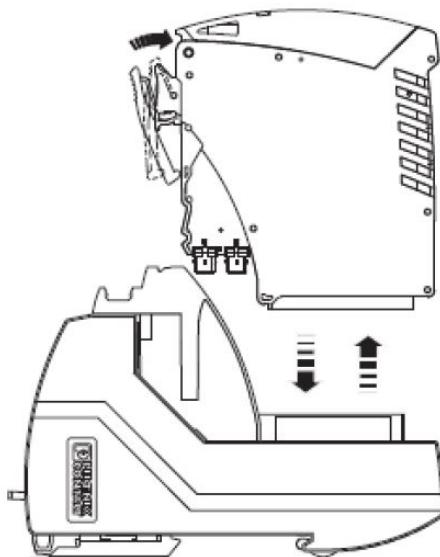

ATTENTION

For information about the fuse removal procedure, see Section 5.1 Fuse Replacement.

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4.12 Instructions for Removing or Installing VIPER terminal block assembly

(For use in 1.2m x 0.8m x 0.3m (H x W x D) Cabinets: HPN 51454260-100 & 51454265- 100)

4.12.1 IOA Installation

IOA Installation and Removal

1. Align the IOA…/EX plug with the desired slot on the VIPER terminal block assembly base.

2. Push the plug into the slot on the base. Ensure that the orange latch snaps wn over the catch on the base securing the plug in place.

4.12.2 IOA Removal

1. Grasp the IOA…/EX module, with one finger on the orange latch, and squeeze the latch to release it.

2. Pull the module straight out from the base. An indentation will be felt as the internal connections are separated.

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4.13   Weidmuller Field Terminal Assembly

Weidmuller Field Terminal

Weidmuller Test Disconnect Terminal

The optional Weidmuller field terminal assembly is a marshalling alternative to VIPER. It has the following properties:

- Passive Feed Through Assembly for 2 wire connections
- Disconnect for each channel (1 point has disconnect)
- Terminals for connecting wire shields
- Channels are numbered
- Mass Termination Cable from Field Termination Assembly to IOTA.
- For 3 or 4 wire connections: TB1 has 24VDC fused connections available.

> **ATTENTION**
> Digital Outputs are not covered under Nonincendive field wiring / Intrinsically Safe 'ic' field wiring

allowances.

CAUTION
Nonincendive field wiring / Intrinsically Safe field wiring is not supported on terminal block assemblies (VIPER or Weidmuller) with 24VDC connected. To use this field wiring strategy, one must remove the fuse in the 24VDC Terminal Block. For More information on how to remove the fuse, or connecting Nonincendive / Intrinsically Safe field Wiring refer to the *Hazloc Manual 51156760*.

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SERVICE AND MAINTENANCE CONSIDERATIONS

CAUTION
Service and maintenance shall only be performed by service personnel with the knowledge of associated risks inherent with servicing and maintaining live electrical equipment.

5.1 Prescribed Service Conditions – Hazardous Atmosphere

Refer to *Hazloc Manual (51156399)* for prescribed service conditions in a hazardous atmosphere.

ESD point

ATTENTION
Once the area is determined to be Non-Hazardous, maintenance and service activities can be performed by service personnel with the knowledge of associated risks inherent with servicing and maintaining live electrical equipment. These service and maintenance activities include, but not limited to, the replacement of electronic modules, power supplies, fuses and field wiring.

ATTENTION
Service and maintenance personnel must connect to the ESD Bonding point, located below the

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Safety Bar on the lower left of the UPC, for grounding against static charge buildup during maintenance procedures such as changing out UIO IOMs.

CAUTION
Be aware of static buildup when wiping polymeric materials in the UPC.

5.2 Installation declarations

ATTENTION
Equipment shall be installed in accordance with the requirements of the National Electrical Code (NEC), ANSI/NFPA 70, or the Canadian Electric Code (CEC), C22.1.

Electrostatic discharge can damage integrated circuits or semiconductors if you touch connector pins or tracks on a printed wiring board.

- Touch a grounded object to discharge static potential.
- Wear an approved wrist-strap grounding device.
- Do not touch the wire connector or connector pins.
- Do not touch circuit components.
- If available, use a static safe workstation.
- When not in use, keep the components in its static shield box or bag.

5.3 Fuse replacement

Replacement fuses are provided for fuses that control the following components:

- MOXA Mode Fiber Optic Extender (part of HPN 51202674-101)
- Redundant and non-redundant IOTA (CC-TUIO41/CC-TUIO31)
- Fan Assembly (HPN 51454248-100)

Always replace the fuse with the appropriate fuse from the table below. Fuse data is also labeled inside the cabinet door. For more information about the fuses, see *"UPC Fuse Reference Guide."* All fuses should meet local agency approval requirements.

Fuse Type	Location	Voltage	Current
Type F	Fiber Optic Converter	250V	750mA
Type F	24V DC Terminal Block	250V	5A
Type T	FAN and FC-TALARM01	250V	375A
Type T	AC Terminal Block	600V	10A
Type F	FDAP TERMINAL BLOCK	250V	375A
Type T	DC MAINS TERMINAL BLOCK	300V DC	30A

Fuse Data

Phoenix Contact Order No. 2905276 Website www.phoenixcontact.com

ATTENTION

Fuses should be removed or replaced only in a non-hazardous atmosphere.

Do not remove or replace the fuse when the UPC is energized.

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5.4 Optimal replaceable units

This subsection identifies the assemblies that may be required for maintenance during the life of the UPC.

Part Number	Description
CC-TUIO41	Universal I/O-2 IOTA, Redundant
CC-TUIO31	Universal I/O-2 IOTA, Non-Redundant
CC-PUIO31	Universal I/O-2 Module
CC-TAIL51	LLAI IOTA
CC-PAIL51	LLAI Module
FC-PSUNI2424	POWER SUPPLY, ATDI, 600W
51198685-100	POWER SUPPLY, ATDI
51454235-100	POWER SUPPLY, ATDI, POWER SHELF
51202676-300	POWER SUPPLY, ATDI, MOUNTING BRACKET
50151665-001	POWER SUPPLY, QUINT 4+ AC/DC
ICF-1150I-S-SC-T	MOXA Single Mode Fiber Optic Extender, extended temp, isolated
ICF-1150I-MSTT-HPSC	MOXA Multi Mode Fiber Optic Transceiver, isolated
51454248-100	Fan Assembly
SPH-01P	Corning Patch Panel
CC-USCA01	Universal Signal Conditioning Assembly
CC-UPTA01 Universal Pass Through Adapter	Universal Pass Through Adapter
CC-UDIR01	Digital Input Relay Adapter
CC-UDOR01	Digital Output Relay Adapter
CC-ULLI01	Universal Low Level Input Adapter
CC-UAIA01	Universal Analog Input Isolator
CC-UAOA01	Universal Analog Output Isolator
CC-UDXA01	Universal Digital Input/Output Isolator
CC-UGAI01	Universal Analog Input Barrier
CC-UGAO01	Universal Analog Output Barrier
CC-UGDA01	Universal Digital Input/Output Barrier

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How to report a security vulnerability

For the purpose of submission, a security vulnerability is defined as a software defect or weakness that can be exploited to reduce the operational or security capabilities of the software.

Honeywell investigates all reports of security vulnerabilities affecting Honeywell products and services.

To report a potential security vulnerability against any Honeywell product, please follow the instructions at:

https://honeywell.com/pages/vulnerabilityreporting.aspx

Submit the requested information to Honeywell using one of the following methods:

- Send an email to security@honeywell.com.

  or

- Contact your local Honeywell Process Solutions Customer Contact Center (CCC) or Honeywell Technical Assistance Center (TAC) listed in the "Support" section of this document.

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Support

If you have any technical questions, please contact your local Honeywell office or the HPS Technical Support Center. Visit HoneywellProcess.com and select "Contact Us" for country-specific Customer Contact Numbers.

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