Baker Hughes

FusionPro™ Intelligent Production Drive

Quick Start Guide

Legal Information

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Third Party Trademarks

Mark	Company
MOXA®	Registered trademark of Moxa Inc.

Revision History					
Rev.	**PR**	**Amendment Detail**	**Reviewer**	**Approver**	**Effective Date**
Current Revision					
A	105606	Initial Release	Plitt, Sheldon; Dowhower, Matt; Burkhart, Damon	Hillshafer, Jeremy W	1 Oct 2024
Three Previous Revisions					

Table of Contents

Before you begin…

Why a Quick Start Guide (QSG)?

Thank you for purchasing a Baker Hughes FusionPro™ Variable Speed Drive (Drive).

This QSG provides you with the minimum information about your purchase to safely and quickly perform the most common tasks required to begin producing with an ESP System.

What you will not see in this guide are any detailed explanations of how things operate or any instructions on tasks that require an authorized electrical worker to perform them. The QSG is intended for the qualified end user only. If you are looking for that type of information, then you must review the companion documents to this QSG.

Companion documents to this QSG are the following three manuals:

- FusionPro™ Operations Manual
- FusionPro™ System Controller Manual
- FusionPro™ Troubleshooting Manual

The above manuals are available digitally on any hand-held device or computer by scanning the QR code in the Reference Information section of this guide.

Safety & Security

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Be aware of...

Hazards associated with the equipment

⚠ DANGER

HAZARD OF ELECTRICAL SHOCK OR BURN

- Ensure Earth ground is properly bonded prior to any contact with this equipment.

- Only qualified personnel are allowed to open and service this equipment.

- Arc-Flash Hazard: Never apply power or operate the equipment with doors or covers open.

- Serious or fatal electrical shock may result from failure to isolate the incoming power from the drive's electrical power source.

- Always Lock-Out/Tag-Out (LOTO) all incoming power at the source/utility before opening the enclosure to create a safe work condition (per NFPA 70E Article 120). Be aware there may be multiple power sources present. Verify the absence of voltage by wearing the proper safety equipment equivalent to Hazard Risk Category 2 garments and high-voltage safety gloves.

- Allow at least 5 minutes for bus capacitors to discharge or until the voltage is less than 50V prior to opening the enclosure.

- This equipment may contain SCADA or telemetry connections causing automatic starting. To prevent unexpected starts, always Lock-Out/Tag-Out (LOTO) equipment before servicing.

- Connected downhole motor may generate back-fed voltage. Once all drive's incoming power is removed, isolate downhole motor power potential at the vented junction box prior to servicing.

NOTICE

This system is equipped with a Wi-Fi access point that provides the ability to monitor data and configure settings via remote devices within the Wi-Fi range.

If the Wi-Fi functionality is enabled, the SSID and Wi-Fi password MUST be changed from default settings to ensure system security and prevent unauthorized access.
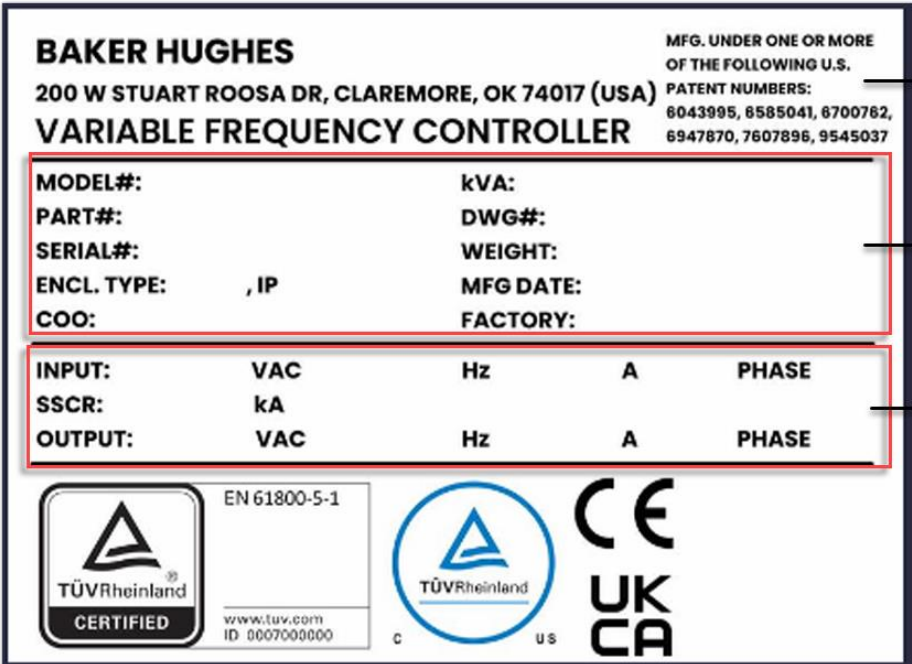
General Safety Best Practices

- FusionPro™ uses potentially lethal voltages. Only competent qualified personnel are permitted to install, maintain, or perform repair services.

- Any work requiring access inside the enclosure must be performed with the power off. Users must understand all the hazards, use proper Lock-Out/Tag-Out (LOTO) procedures and Personal Protective Equipment (PPE) to ensure personnel safety. For more details, refer to NFPA 70E Article 120.

- The installation must follow all local and national electrical codes and regulations.

- Any unauthorized modifications not provided, installed, or approved by Baker Hughes may result in the following:

    - injury or death

    - serious property or environmental impact

    - damage or failure of the equipment

    - voiding the unit certification

    - voiding the product warranty

- Baker Hughes is not responsible for any unauthorized use of the equipment; such use may impede physical and software protections provided by the equipment.

General Information

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General Information

Nameplate Information

1 VSD Nameplate

2 VSD Physical Properties

3 VSD Electrical Ratings

FusionPro™ – Outside View

FusionPro™ VSD
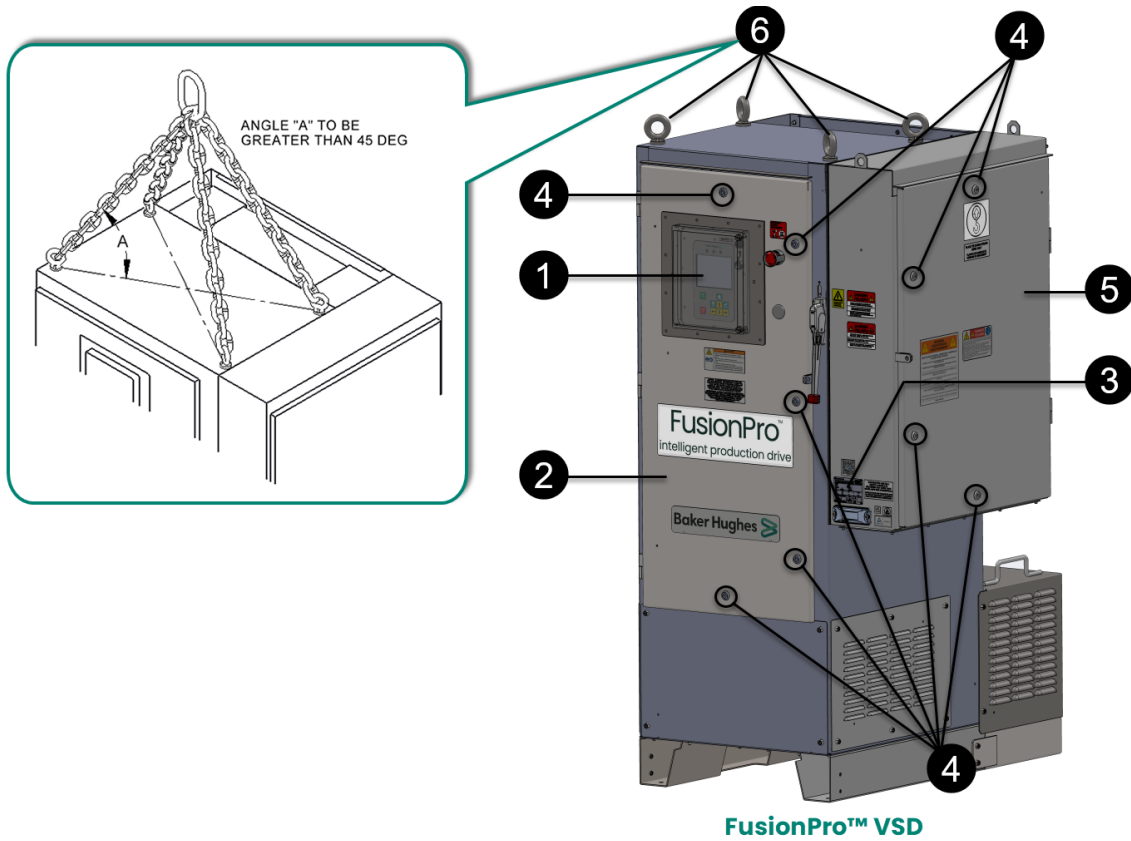
1 Navigation Display & Control Interface

2 VSD Front Door

3 Nameplate

4 Rotolocks

5 Junction Box Door

Note: In order for the main cabinet and the junction box to be sealed, all the Rotolocks must be turned in the clockwise direction.

6 Hoisting / Strapping Points

Note: All hoisting and strapping of the VSD for shipment to be done using the Hoisting / Strapping points only. Refer to the FusionPro™ Operations Manual for more information.

Operational Clearance

FusionPro™ is equipped with weatherproof enclosure (NEMA 4, IP56), and is suitable for outdoor installations in non-classified/nonhazardous locations. Allow a minimum of 48 in. (1.22 m) clearance in the front and the rear of the enclosure for servicing and air flow requirements. Never install the drive close to heat generating sources such as transformers or other drives. It is necessary to have an unrestricted supply of cooling air (55ºC/131ºF maximum) to the cooling fan(s) mounted to the back of the enclosure. Ensure adequate distance is alloted on the sides of the enclosure for proper ventilation and opening of the junction box door. See FusionPro™ Operations Manual for more details.
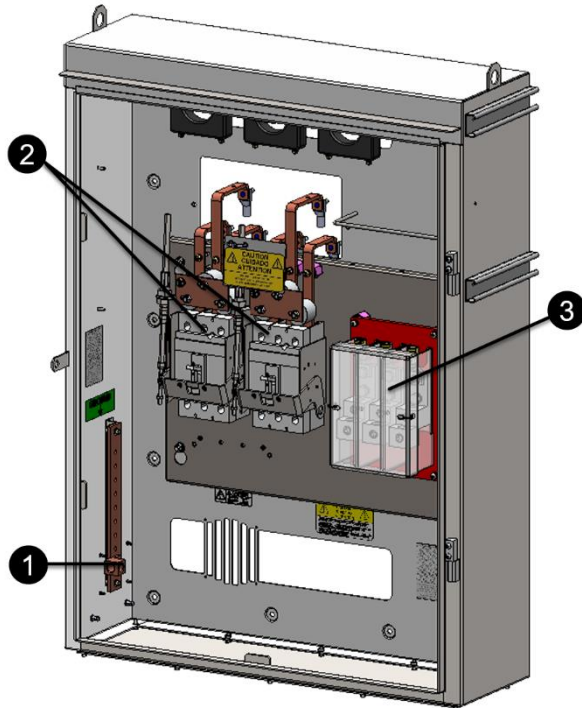
FusionPro™ Controls
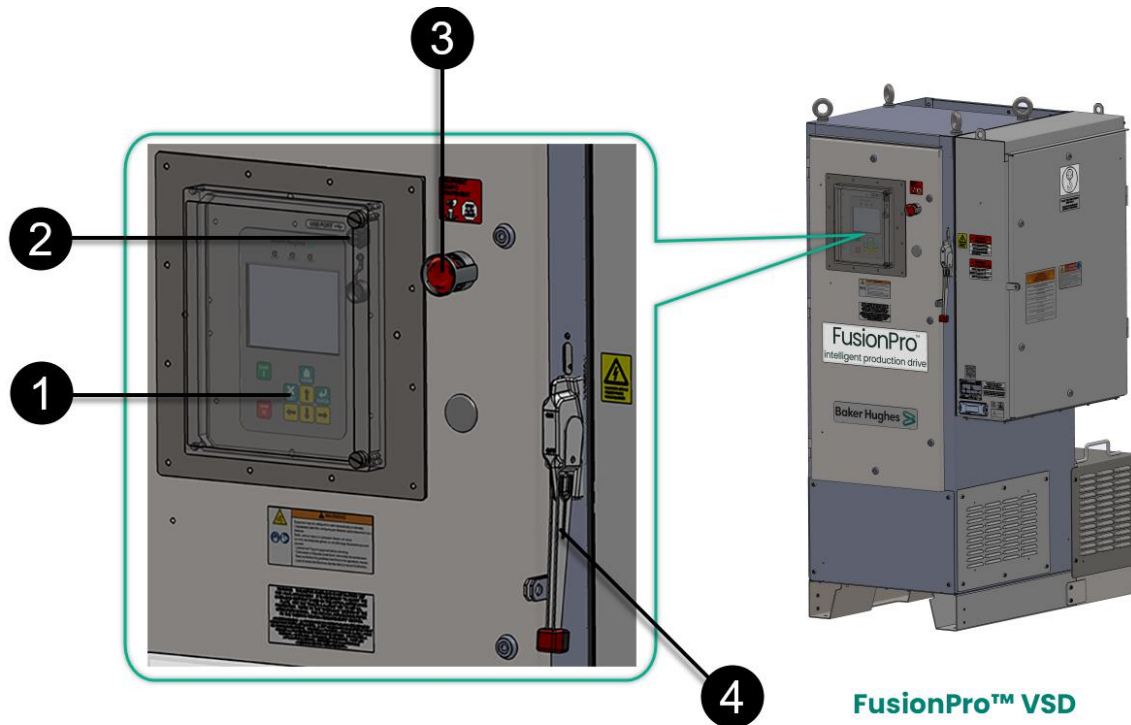
FusionPro™ VSD

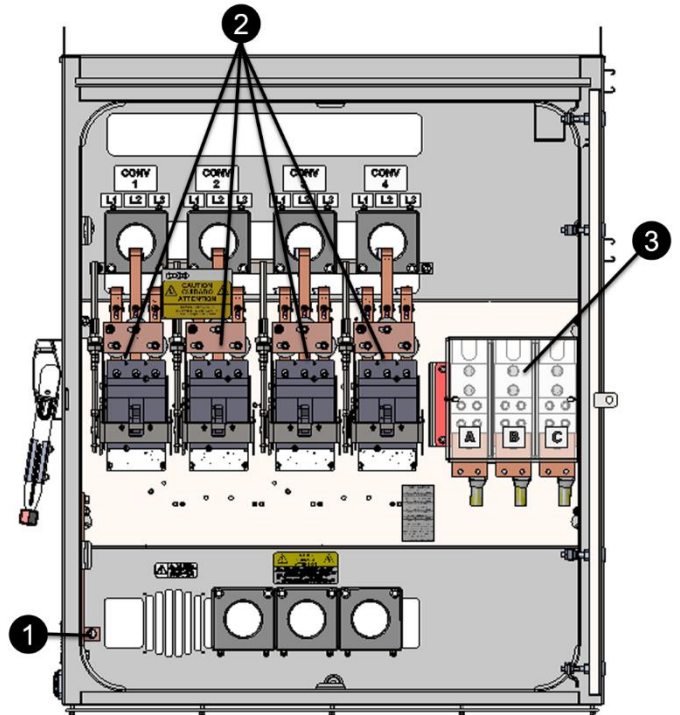|			
1	Navigation Display & Control Interface	**2**	USB Port
3	Equipment Stop	**4**	Power ON/OFF

FusionPro™ – Inside View
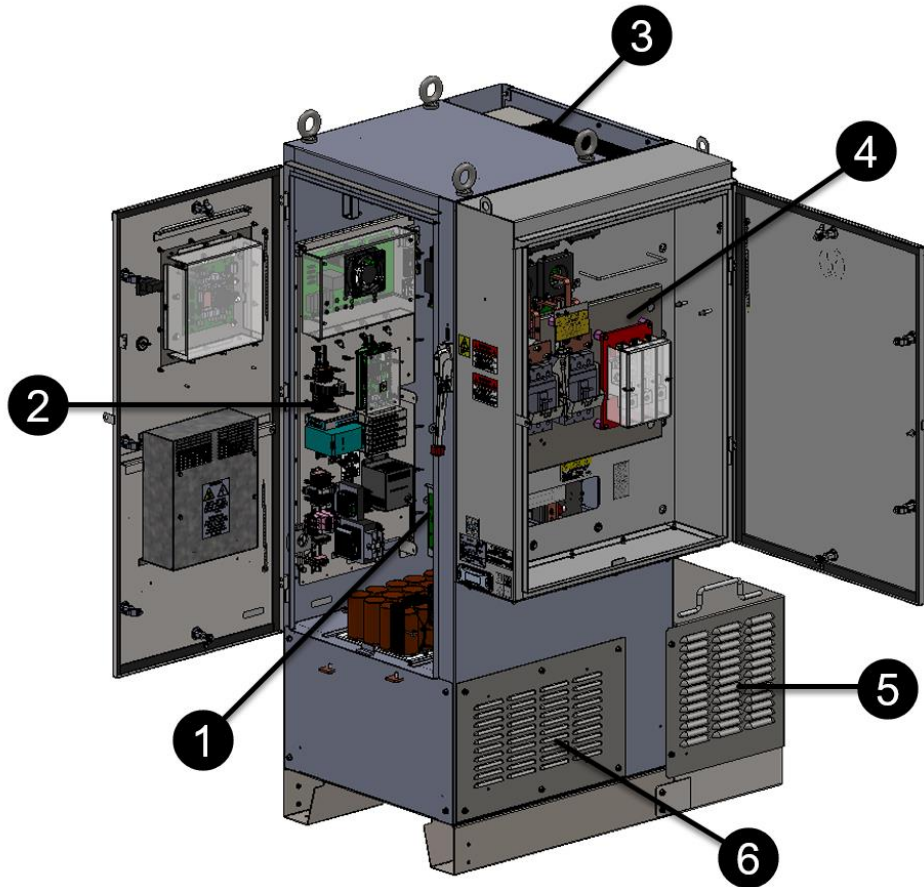
1 Main Cabinet

2 Customer Interface Panel (CIP)

3 Heat Exchanger Plenum

4 Power Junction Box

5 SWF Louver

6 DCL Louver

Field Connections

VSD Model 2000 - Input/Output Connection Points
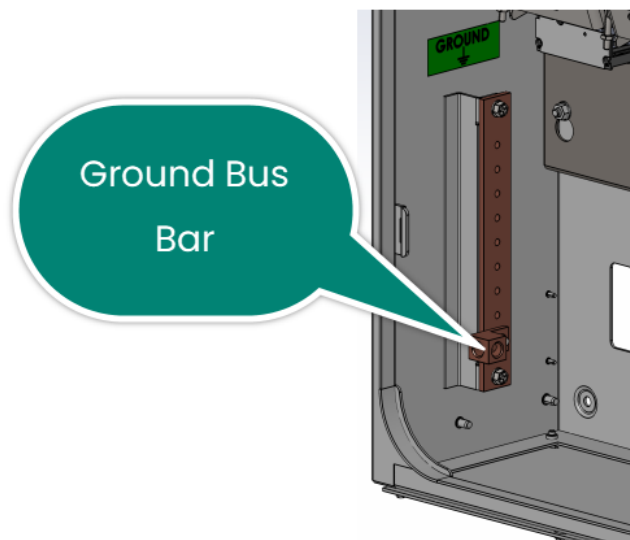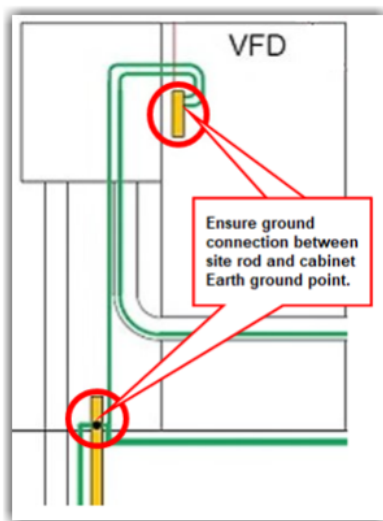

VSD Model 4000 - Input/Output Connection Points

1. GND BAR
2. Input
3. Output

Hardware (How do I...)
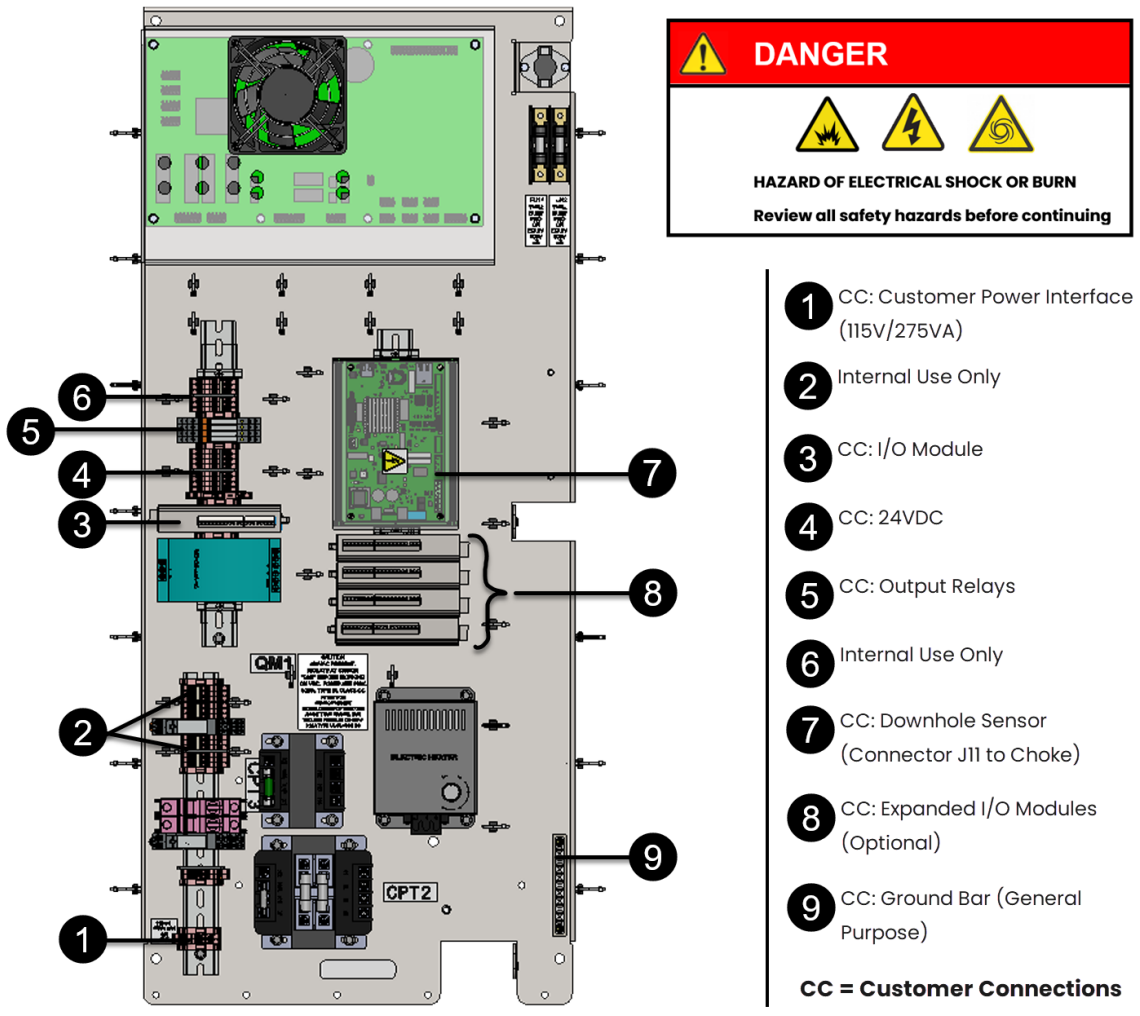
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How do I...

Make sure the equipment is grounded

1. Open junction box on the left side of the cabinet.

2. Visually verify that the Earth ground wire is bolted to the ground bus bar.

Connections at the Customer Interface Panel

1. Do not make connections at interface points that are not specified for customer use.

2. Use only wires and cables that are rated for the voltage class and current requirements of the related circuit. Insulation must be at a minimum 90ºC and flame rated.

3. Route wires and cables carefully to prevent mis-matched insulation ratings. It may be necessary to double insulate low-voltage wire and cable with 600V class tubing sleeves.

4. Wiring that exits the enclosure shall use glands or fixtures that maintain NEMA-4 integrity.

I/O Module and Customer Interface Connections

DANGER

HAZARD OF ELECTRICAL SHOCK OR BURN

Review all safety hazards before continuing
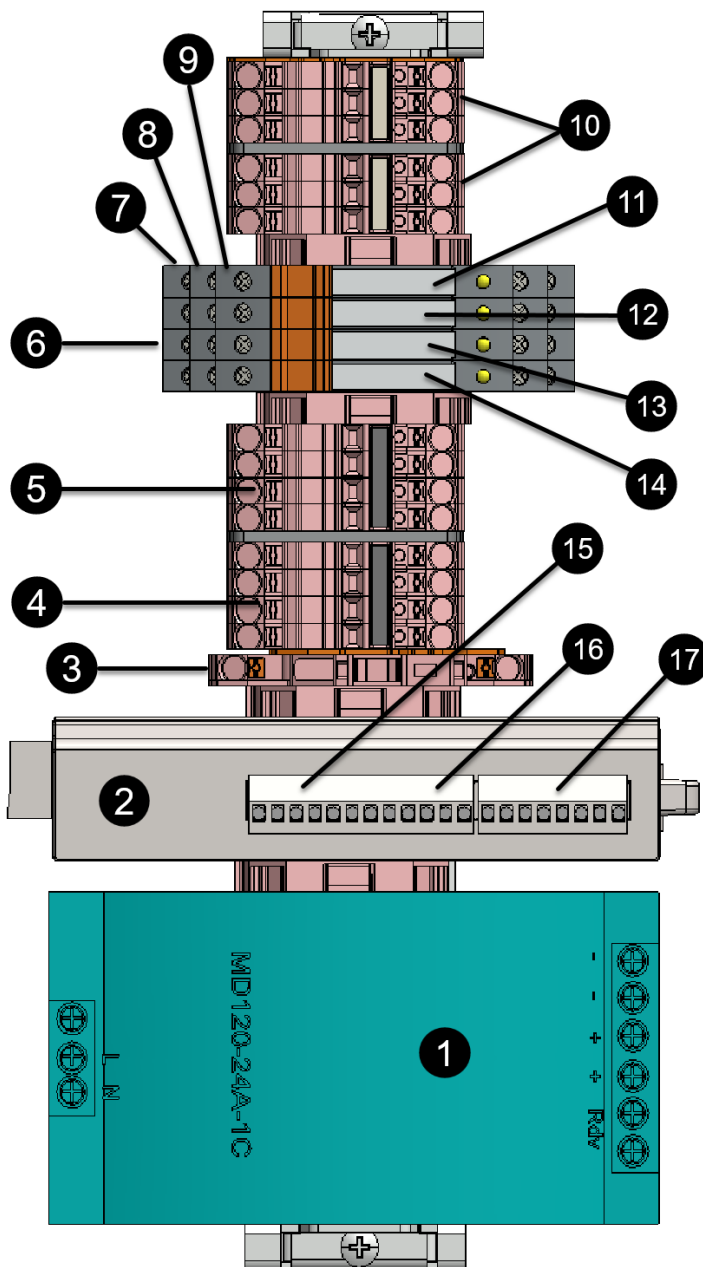
1 PS2 (24V/5A)

2 MX1 (E1242)

3 FU20 (4A/250V, C48109 [Mersen #GDG-4])

4 CC: TB23 A-D (24V-)

5 CC: TB24 A-D (24V+)

6 CC: Digital Output (DRY 250V/6A)

7 CC: RLY Connection - 11 (COM)

8 CC: RLY Connection - 14 (NO)

9 CC: RLY Connection - 12 (NC)

10 For Internal Use Only

11 RLY24

12 RLY23

13 RLY22

14 RLY21

15 Digital Output (To RLY21-RLY24) (PINS 16-20)

16 CC: Digital Input (PINS 9-13)

17 CC: Analog Input (PINS 1-8)

CC = Customer Connections
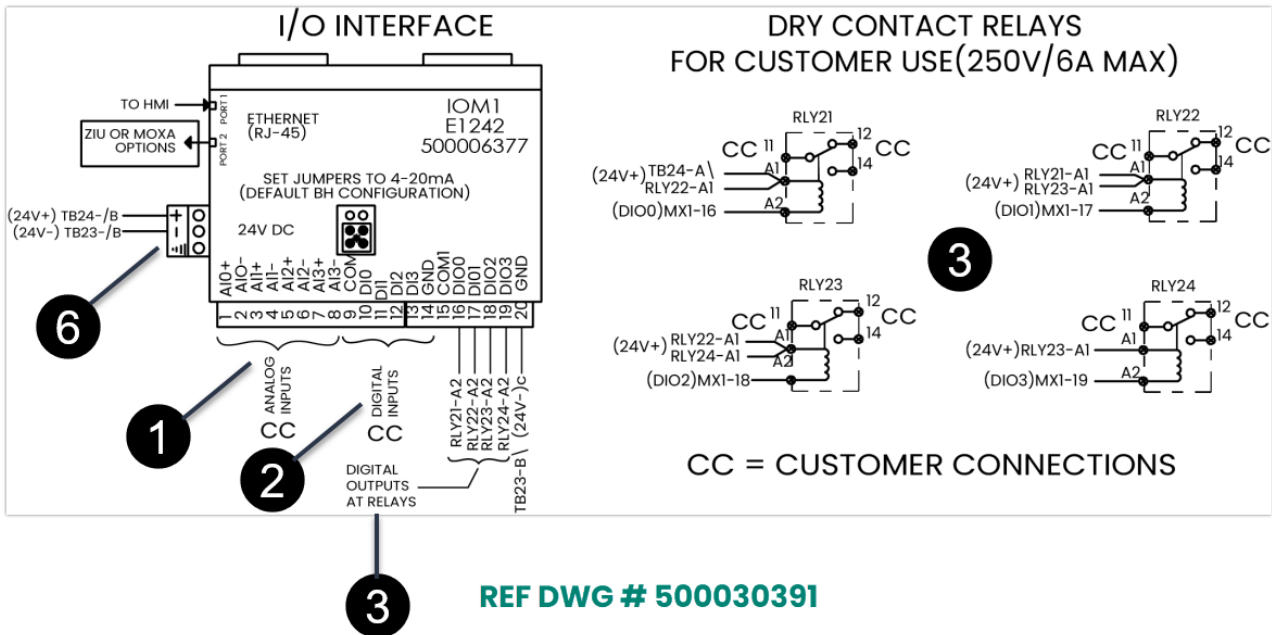
DANGER

HAZARD OF ELECTRICAL SHOCK OR BURN

Review all safety hazards before continuing

Continue...

REF DWG # 500030391

1 Install devices for analog input directly to Moxa module at paired inputs located at terminals 1 through 8.

2 Install devices for digital input directly to Moxa module at inputs located at terminals 10 through 14, using terminal 14 as the common connection for each input.

3 Install devices for digital output to relays 21 through 24 at common terminal 11 to NC terminal 12 or NO terminal 14.

4 Recommended torque for Moxa terminals is 3.0 lb-in (0.34 N-m).

5 Recommended torque for relay terminals is 4.9 lb-in (0.55 N-m).

6 24Vdc power is available at terminal blocks TB23(-) and TB24(+). Do not exceed 2A load.

Note: Refer to the FusionPro™ Operations Manual for recommended enclosure penetration, wire size / type details, etc.

Connect a Zenith gauge to the drive
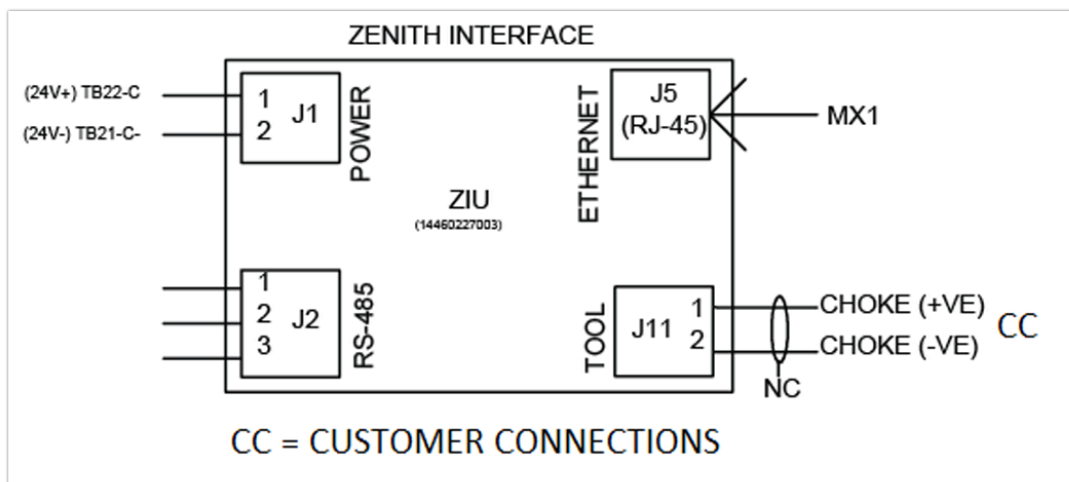
REF DWG # 500030391

1 Route appropriate cable from Zenith Choke to ZIU-PCBA, avoid cable routing near motor-power and low-voltage-control wires of the VSD.

2 Install the sensor / choke positive connection to J11-1 of the ZIU-PCBA.

3 Install the sensor / choke negative connection to J11-2 of the ZIU-PCBA.

4 The cable's shield should be bonded to ground near the choke, not inside the drive.

Note: Refer to the FusionPro™ Operations Manual for recommended enclosure penetration, wire size / type details, etc.

# Connect External Devices to FusionPro™ Communication Interfaces
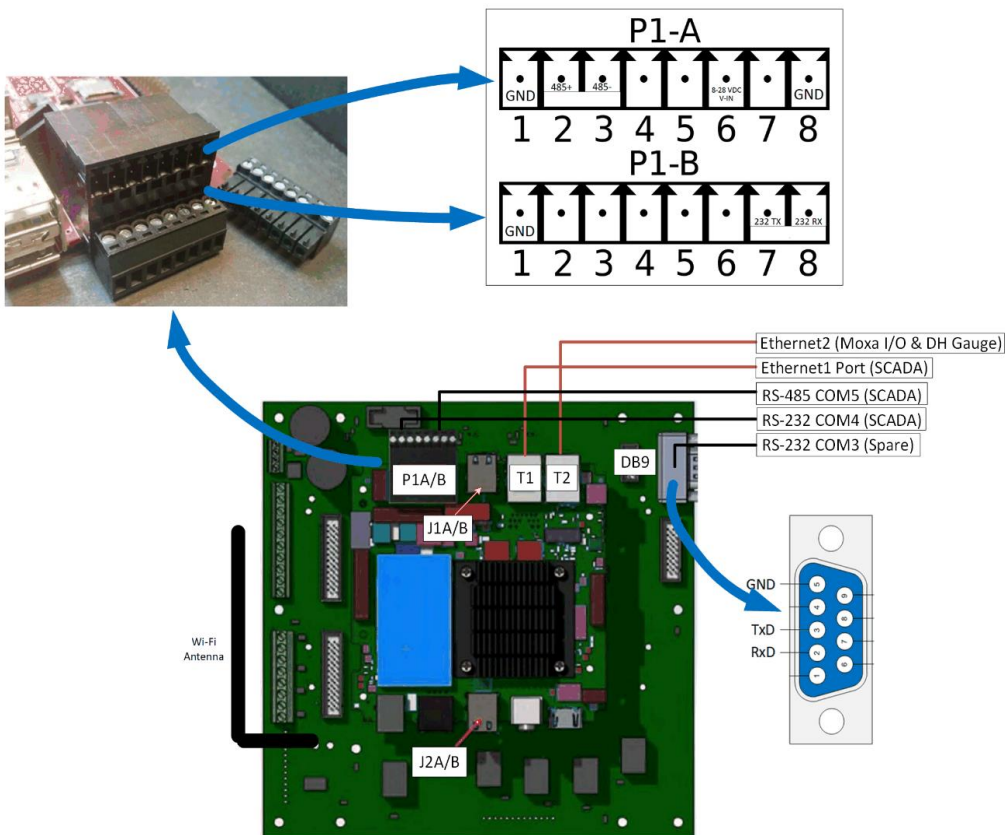
1. The RJ-45 jack at **T1** can be used for Ethernet communications with the HMI.

2. The screw-terminal connections at **P1A/B** can be used to make:
   (a). RS485 connections: [RS485- to P1A-3]; [RS485+ to P1A-2]
   (b). RS232 connections: [Dig_Gnd to P1B-1]; [RS232_RXD to P1B-8]; [RS232_TXD to P1B-7]
   (c). Recommended torque for P1 terminals is 3.0 lb-in (0.34 N-m).

3. **J2A/B** is the USB interface, and one port is cabled to the connector on the outer surface of the HMI. This port is used to download and upload the FusionPro™ information to the HMI.

4. Always route communications wires away from other circuits to avoid crosstalk and interference from electromagnetic noise.

Software (I want to...)

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I want to…

Navigate the display
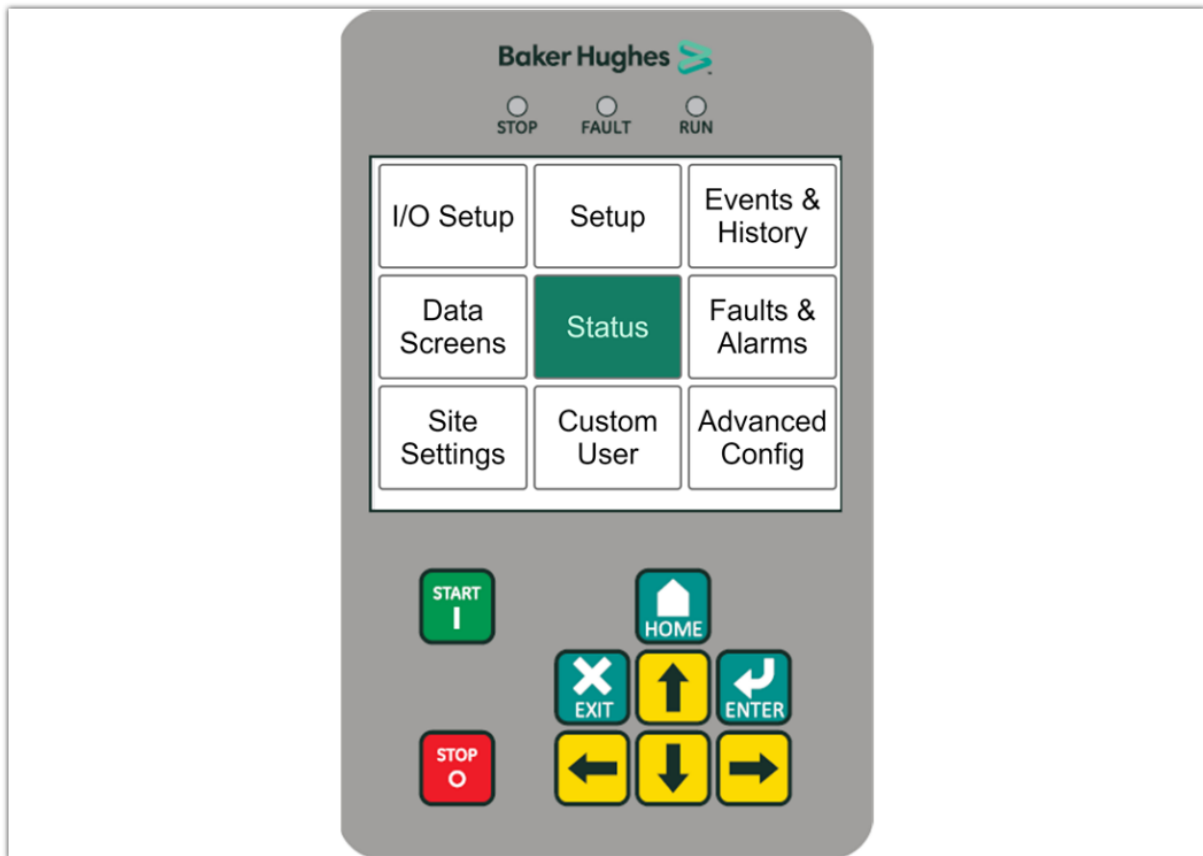
HOME - return to the **Main** menu (Gang-of-Nine) in the menu system

ENTER - select and option to enter edit mode on an editable parameter
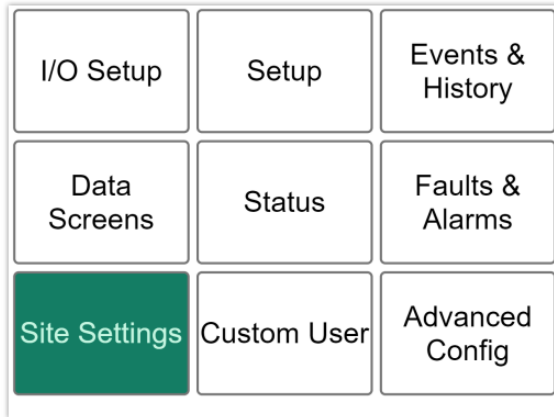
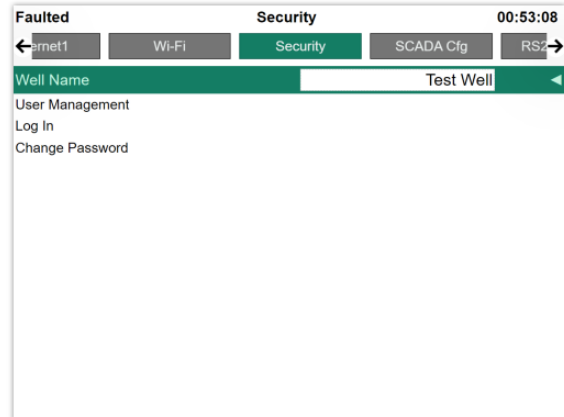**START** - advance the motor to the next Start state

STOP - stop the motor

EXIT - back out of edit mode or screen entry

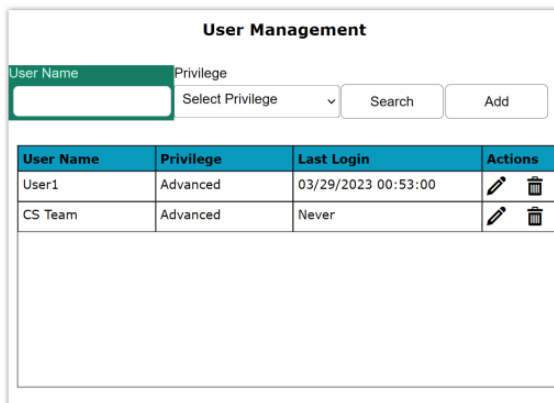Up, Down, Left, and Right - arrow keys for cursor movement
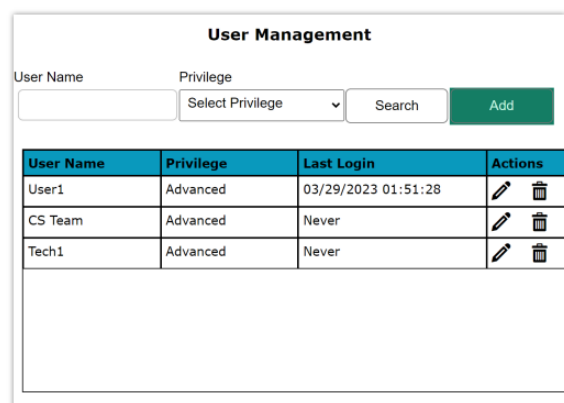
Set Up a New User Profile

I/O Setup	Setup	Events & History
Data Screens	Status	Faults & Alarms
Site Settings	Custom User	Advanced Config

1 Select **Site Settings**.

Faulted   Security   00:53:08

| ←ernet1 | Wi-Fi | Security | SCADA Cfg | RS2→ |

Well Name .... Test Well ◄
User Management
Log In
Change Password

2
1. Select Security.
2. Add Well Name.
3. Click **User Management**.

User Management

User Name [ ]   Privilege [Select Privilege ▾]   [Search]   [Add]

User Name	Privilege	Last Login	Actions
User1	Advanced	03/29/2023 00:53:00	✏ 🗑
CS Team	Advanced	Never	✏ 🗑

3
1. Scroll the cursor to 'Add'.

2. Fill in the Username,
Password, and Privilege
information.
Note: Password to be 8
characters containing letters
and/or numbers.
3. Press 'Add User'.

User Management

User Name [ ]   Privilege [Select Privilege ▾]   [Search]   [Add]

User Name	Privilege	Last Login	Actions
User1	Advanced	03/29/2023 01:51:28	✏ 🗑
CS Team	Advanced	Never	✏ 🗑
Tech1	Advanced	Never	✏ 🗑

4
1. New user will appear in the
list.
2. Delete User1. Make sure that
new user is added first. **Do not
forget the password**.

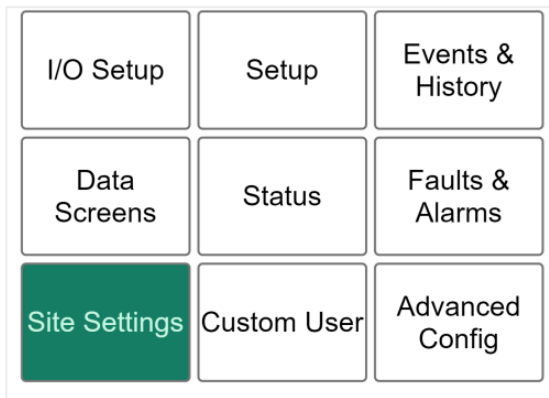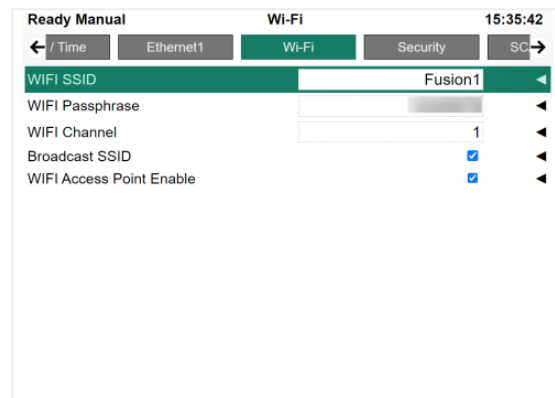# Set Up Wi-Fi 📶

NOTICE
This system is equipped with a Wi-Fi access point that provides the ability to monitor data and configure settings via remote devices within the Wi-Fi range. If the Wi-Fi functionality is enabled, the SSID and Wi-Fi password MUST be changed from default settings to ensure system security and prevent unauthorized access.

| I/O Setup	Setup	Events & History
Data Screens	Status	Faults & Alarms
Site Settings	Custom User	Advanced Config

1 Select **Site Settings**.

Ready Manual	Wi-Fi	15:35:42
← / Time	Ethernet1	Wi-Fi	Security	SC →

WIFI SSID	Fusion1	◄
WIFI Passphrase		◄
WIFI Channel	1	◄
Broadcast SSID	☑	◄
WIFI Access Point Enable	☑	◄

2
1. Select Wi-Fi tab.
2. Edit WIFI SSID.
3. Edit WIFI Passphrase.
4. Change WIFI Channel as needed.
Note: Passphrase length must be at least 8 characters.
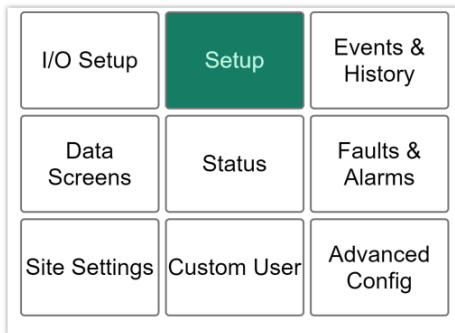
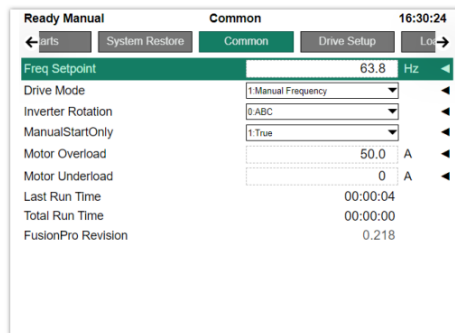# Set Up Time and Zone
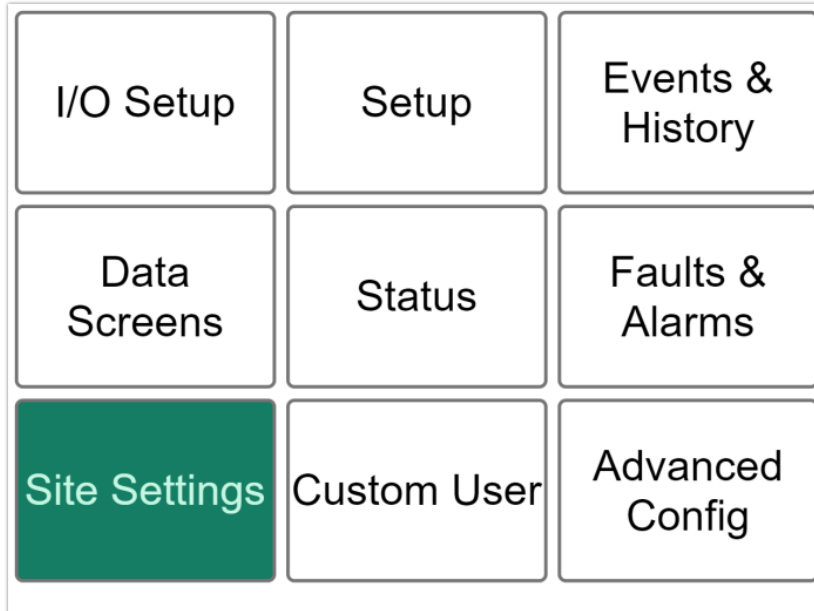
1 Selected **Site Settings**.
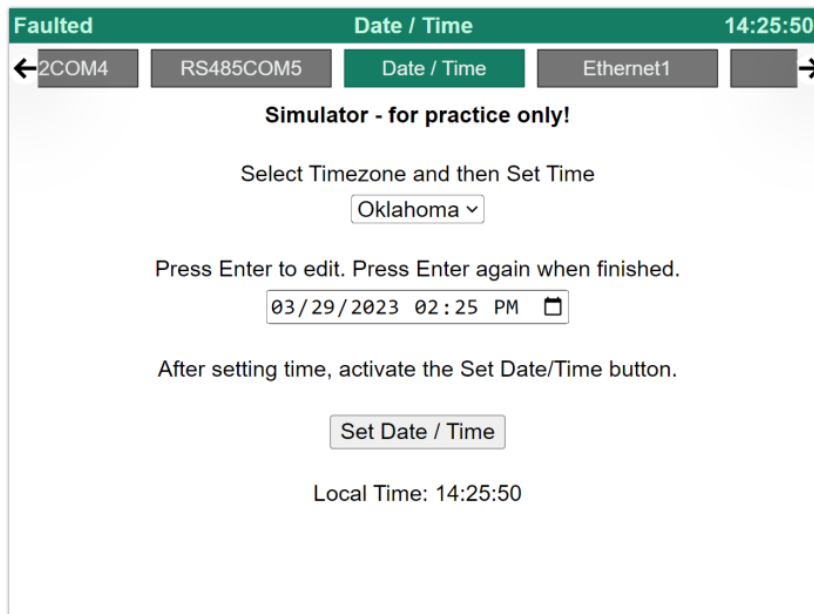
2 1. Select Date / Time tab.

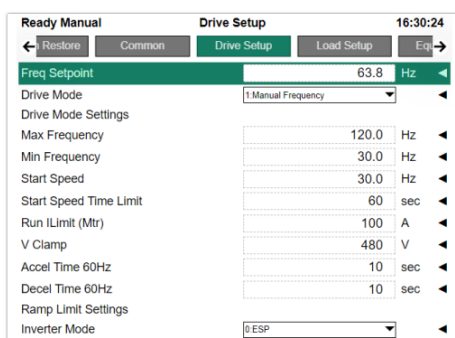2. To set date and time, follow instructions on the screen.
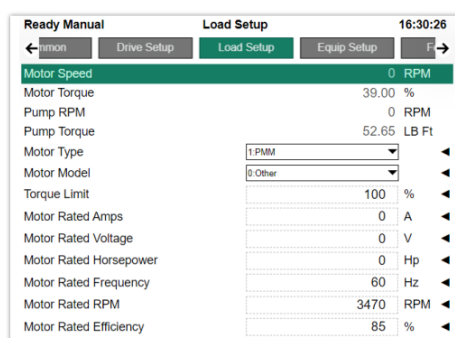
Perform a Basic Set-Up

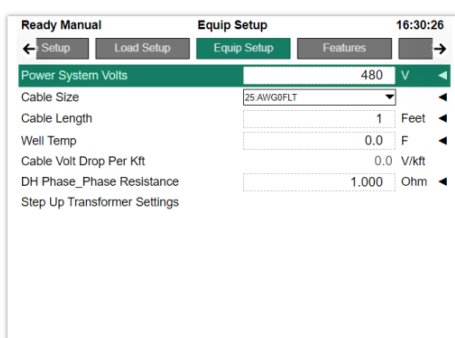

1 Select **Setup**.

2 1. Select Common tab.

2. Update parameters as necessary.

3 1. Select Drive Setup tab.
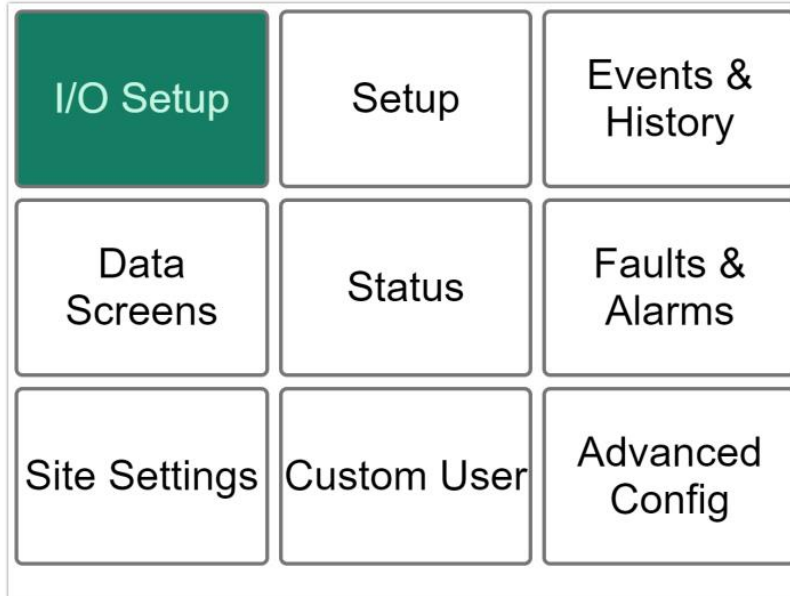
2. Update parameters as necessary.

4 1. Select Load Setup tab.

2. Add Torque Limit.

3. Add Motor Rated Amps.

4. Add Motor Mag Current.

5. Add Motor Rated Voltage.

6. Add Motor Rated Horsepower.
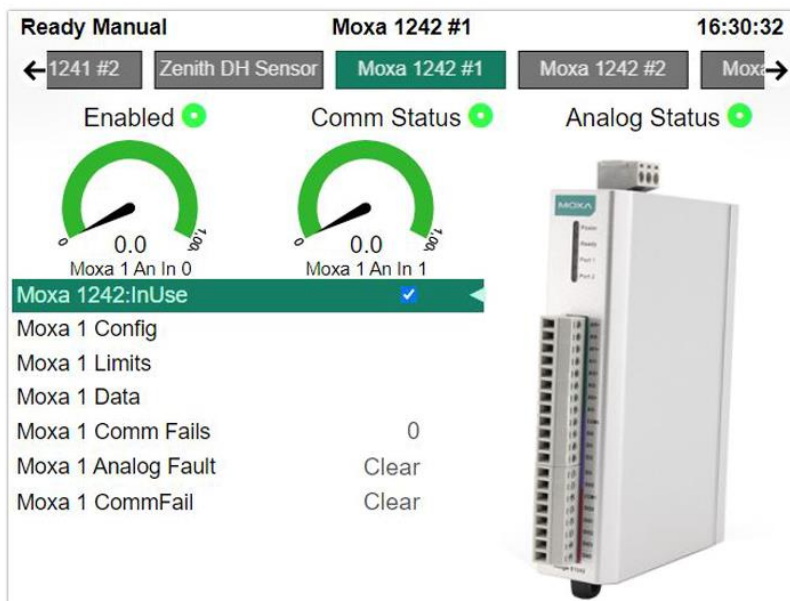
7. Add Motor Rated RPM.

5 1. Select Equip Setup tab.

2. Select Cable Size.

3. Add Cable Length.

4. Add Well Temp.

5. Add Step Up Transformer parameters.

Note: Refer to the FusionPro™ System Controller Manual for detailed instructions on how to perform a basic set-up.
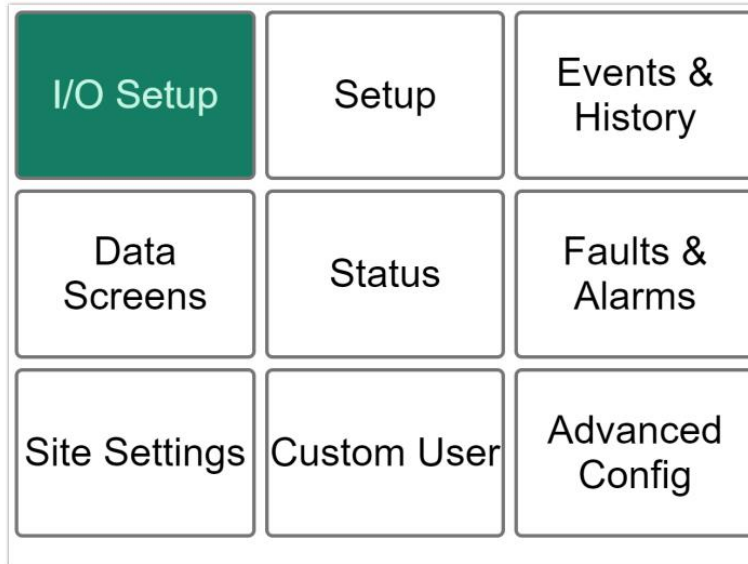
Set-up I/O module

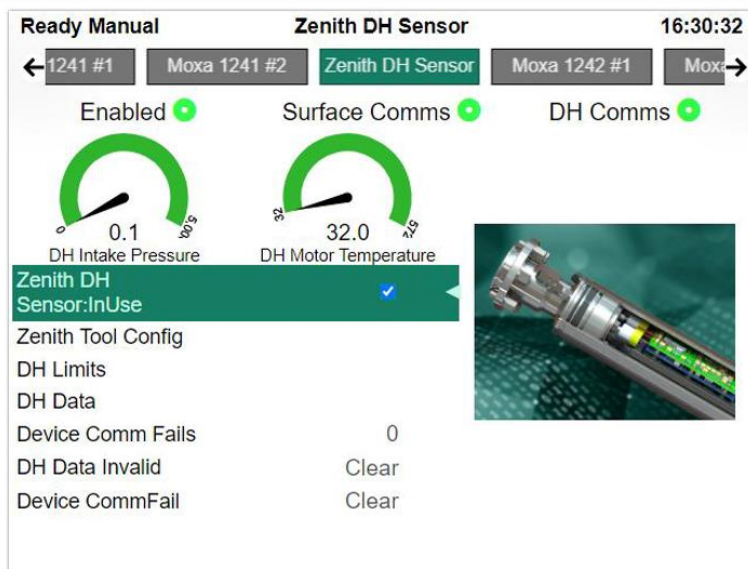| I/O Setup	Setup	Events & History
Data Screens	Status	Faults & Alarms
Site Settings	Custom User	Advanced Config

1 Select **I/O Setup**.

2 1. Make sure that 'Moxa 1242:InUse' parameter is checked.

2. Make sure that Enabled, Comm Status, and Analog Status LEDs show green.
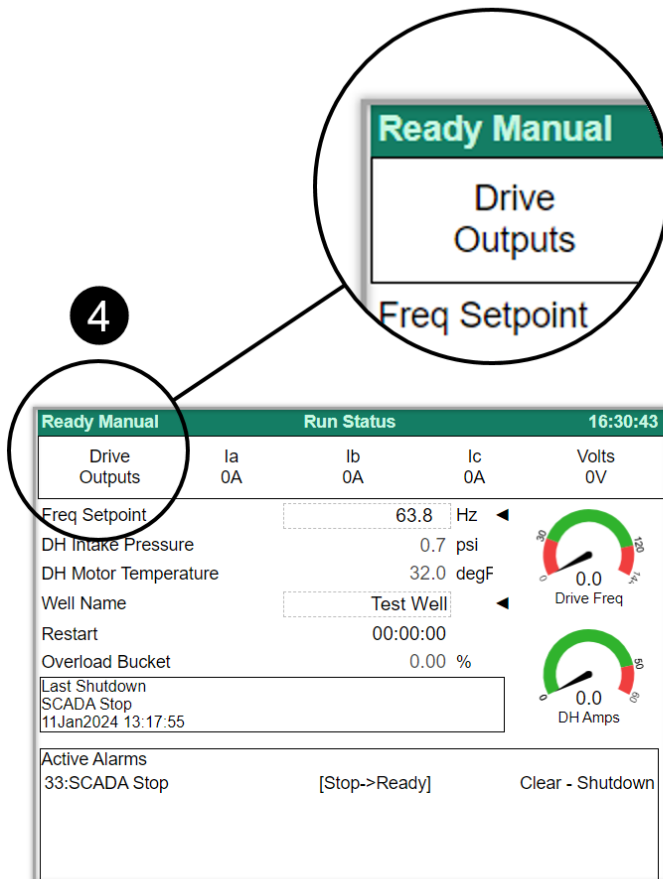
Set-up a Zenith DH Sensor

1 Select **I/O Setup**.

2 1. Make sure that 'Zenith DH Sensor:InUse' parameter is checked.

2. Make sure that Enabled, Surface Comms, and DH Comms LEDs show green.

Note: If setting up other than Zenith, refer to the FusionPro™ System Controller Manual for details.

# Make Sure the Drive is Ready to Start

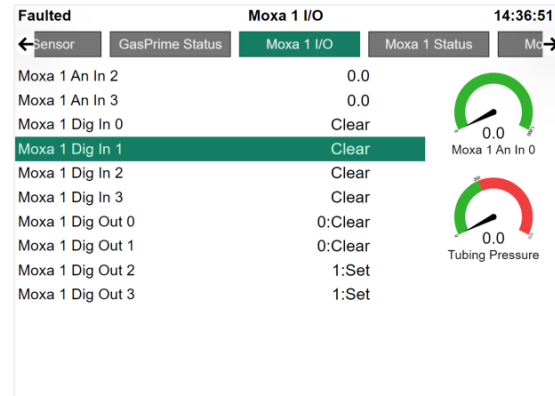**Before starting the drive, make sure:**

1 Drive Ground is connected.

2 All doors are locked.

3 Switch handle is in the Closed (ON) position.

4 Top status bar on the Run Status screen displays **Ready Manual**.

Note: Refer to the FusionPro™ System Controller Manual to clear any faults or for more advanced setup.
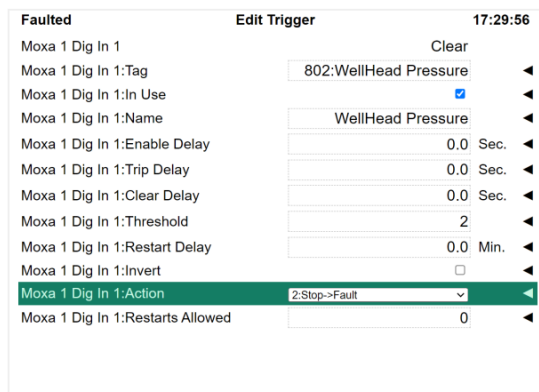
# Set-up a digital input to create a drive alarm
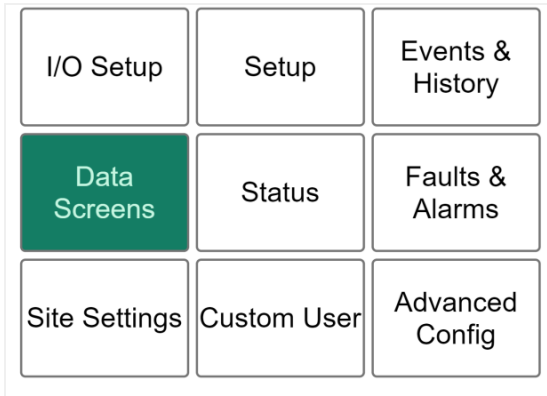
1 Select **Data Screens**.

2
1. Select Moxa 1 I/O tab.
2. Select Moxa 1 Dig In 1 parameter and press *Enter*.
3. The screen that opens will allow complete configuration of this digital input.

3
1. Select the Name parameter and press *Enter*. Use the pop-up keyboard to delete the default name and add new name "WellHead Pressure".
2. Select Action parameter and press *Enter*. Select Stop->Fault from the drop-down list.
3. Edit the Enable Delay and Trip Delay parameters to add delays if needed.
4. Make sure that the In Use parameter is checked to enable this digital input.
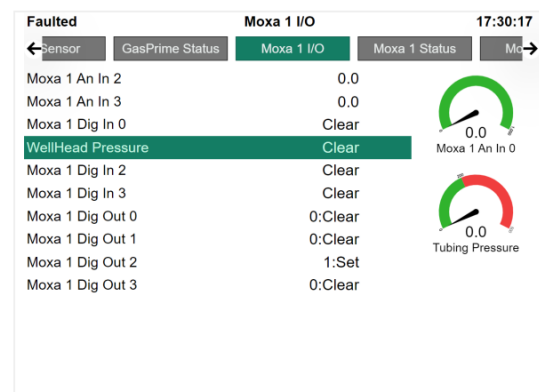
4 This Moxa 1 Digital Input is now configured for use in the drive. When the status of the digital input changes, the display wil show "Set".
If the drive is running, it will stop on a WellHead Pressure alarm.

Reference Information

Scan the below QR code to access the following FusionPro™ manuals:

- FusionPro™ Operations Manual (500031032)
- FusionPro™ System Controller Manual (500024500)

500023263

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