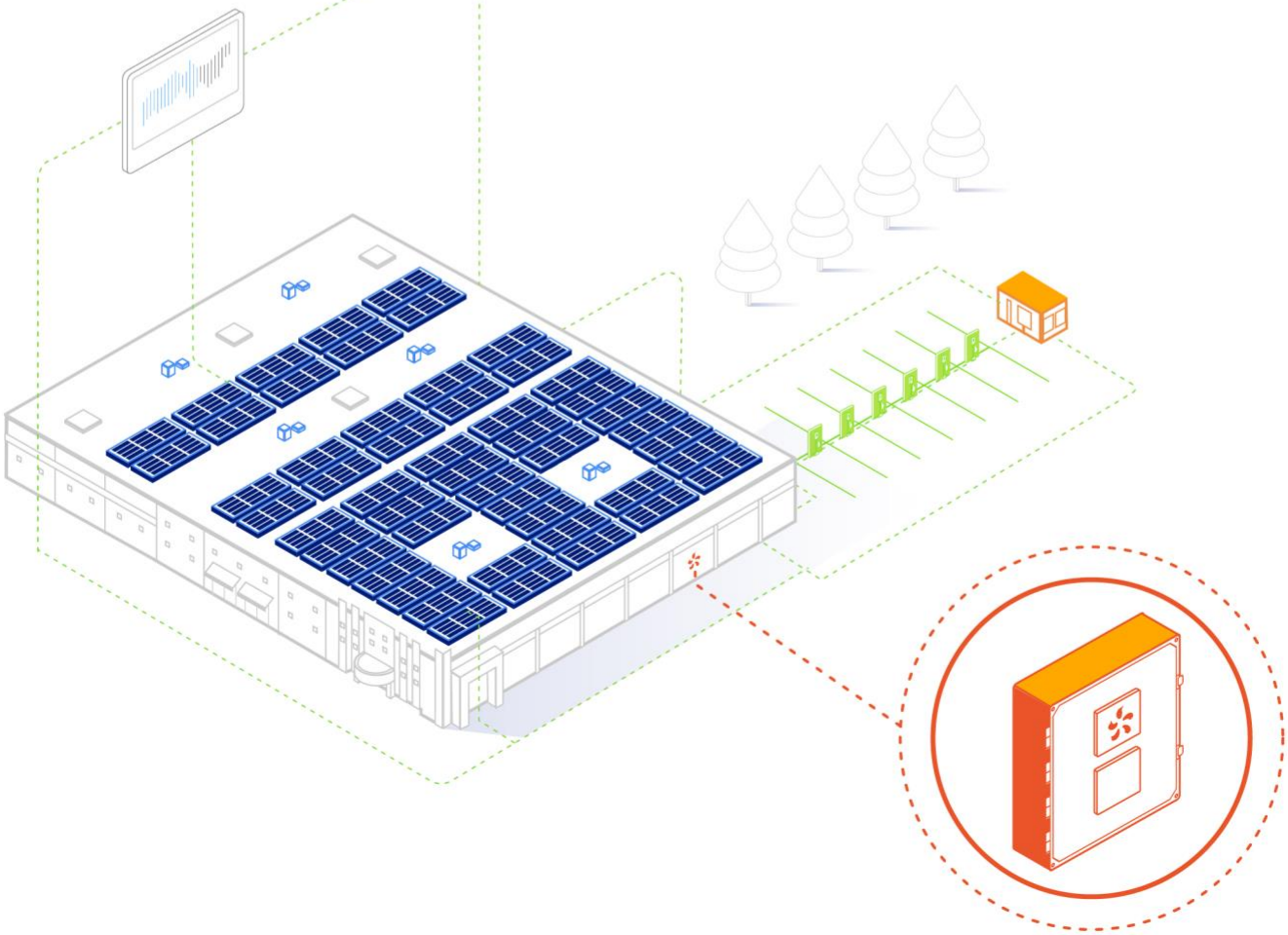
powerflex
EDF Renewables

PowerFlex nexus™ core

Installation Guide



Nexus Core Installation Guide

Revision 3.2.10

PRODUCT SPECIFICATIONS

All specifications and descriptions contained in this document are verified to be accurate at the time of printing. However, because continuous improvement is a goal at PowerFlex, we reserve the right to make product modifications at any time. To communicate any inaccuracies or omissions in this manual, send an e-mail to: site-support@powerflex.com.

SAFETY CONCERNS

This guide contains important instructions for the PowerFlex Nexus™ Core enclosure that must be followed during installation and maintenance. Special symbols are used throughout the guide:

	**Warning:** Indicates a hazardous situation that could result in injury or death.
	**Risk of electric shock:** Indicates components or a procedure that risks electric shock or injury.
	**Caution:** Indicates a hazardous situation that could result in minor injury equipment damage.
Note	**Note:** A best practice alert, tip, or technique that results in successful results.

Getting technical assistance

For assistance with Nexus Core installation or commissioning, please contact PowerFlex support at site-support@powerflex.com, or **833-4-PWRFLX,** during the hours of 9 am to 5 pm (PST).

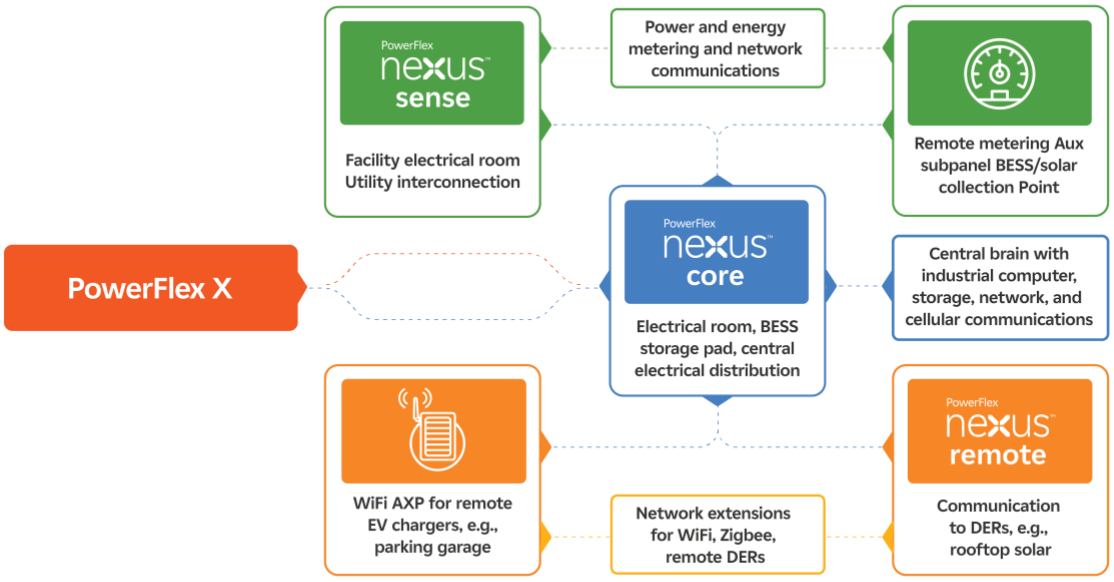
Contents

Getting Started

Welcome to the PowerFlex Nexus family of products

PowerFlex Nexus™ is a proprietary hardware and software system that enables real-time insights and intelligent control of onsite *distributed energy resources* (DERs). This flexible platform is designed to seamlessly integrate and adapt to energy demands and provides the ability to integrate with solar *photovoltaic systems* (PV), *battery energy storage systems* (BESS), and *electric vehicle* (EV) charging equipment. Key features include the following:

- State-of-the-art optimization and control of your energy assets
- Data acquisition and telemetry, enabling remote asset management through **PowerFlex X**™
- Power and energy metering for numerous single-phase and/or three-phase loads
- Cybersecure *Internet of Things* (IoT) connectivity to the cloud



By leveraging the **PowerFlex X** family of technology products, **Nexus Core** acts as the central brain of the Nexus platform. PowerFlex grid-edge and cloud-based energy management system ensures reliable and high-quality dynamic optimization for your site's EV chargers and BESS operation.

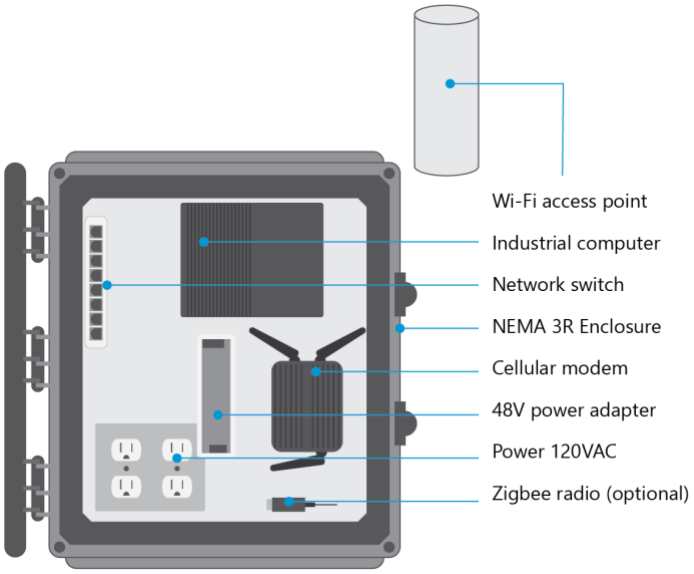
Nexus Core communicates directly with DERs or intermediary controllers through wired and/or wireless network communications. This can be done with a variety of mediums and protocols, to ensure flexibility of applications in distant or hard-to-reach locations.

Power and energy metering data are collected via **Nexus Sense**, which contains a revenue-grade meter with support for multiple single-phase and/or three-phase loads. Nexus Sense can be configured to log power and energy data locally and in the cloud, so that you can be sure that you'll have the data you need for reporting and tracking performance of your assets.

Note: Every PowerFlex installation requires a single Nexus Core. Additional Nexus Sense and Nexus Remote units can be added to a project as needed for the application.

An overview of PowerFlex Nexus Core

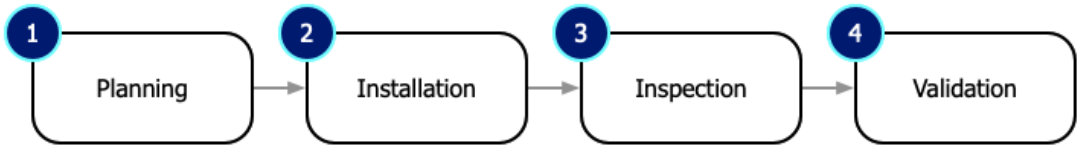
Nexus Core acts as the central brain where energy optimization and ***Adaptive Load Management***® (ALM) functions are executed and dispatched to the DERs. Nexus Core contains a powerful central computer for optimization and logging capabilities. It also contains network communication including an Ethernet switch. Nexus Core supports Zigbee® 3.0 and Wi-Fi/OCPP communications to EV chargers and other IoT devices:



Features	Options
Industrial computer: Provides optimization, load management, communication coordination, and data historian services **Networking:** 8-port Ethernet switch (with 4 ports for PoE), Zigbee radio (optional) **Modem:** Robust cellular 4G/LTE modem with integral Wi-Fi access point	Serial RS232/RS485 communications interface Optical single fiber communications interface External transformer for 208VAC, 240VAC, 277/480VAC, or higher voltage installations External UPS for critical applications

How to use this guide

To complete the installation of a Nexus Core enclosure, you'll need to follow these steps:



1. **Planning:** Download the FastField Forms (FFF) app to collect site information, inspect the Nexus Core's box contents, and gather tools.
2. **Installation:** Mount the Nexus Core enclosure and connect wiring as required at your site.
3. **Inspection:** Record site information in the app and start the commissioning process.
4. **Validation:** Energize Nexus Core, DERs, and confirm that everything is up and running.

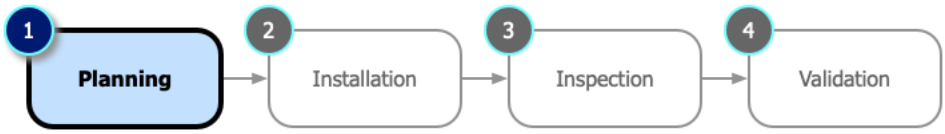
Although these steps appear to be a sequence of steps, some activities may be performed in parallel (or in a slightly different order). To further assist in Nexus Core installation, refer to the following information in this guide:

- Troubleshooting and FAQ
- Checklist of things to do during the installation
- Technical specifications

To ensure quality work, each step should be verified **before proceeding** to the next step.

Setting up Nexus Core

Step 1: Planning



To plan for a Nexus Core installation, you will:

- Investigate cellular signal and Internet connectivity
- Download and log into the FFF app
- Make sure that power and connectivity is available at the installation site
- What is in the Nexus Core box?
- Identify the tools necessary to bring onsite for the installation

For most installations, getting a Nexus Core installed and energized should only take a few hours and can be performed by one technician. However, the timeframe to complete an installation can vary due to elements outside of your control (ex: energization may require an electrical inspection).

Test the cellular signal and Internet connectivity

For PowerFlex Nexus—specifically Nexus Core—to operate effectively, the system requires sufficient data connectivity bandwidth. A cellular modem is included with Nexus, which can use any major cellular carrier. Otherwise, a local *Internet service provider* (ISP) or existing *local area network* (LAN) can be utilized.

To evaluate the cellular signal

Cellular signals are electromagnetic waves that propagate from cellular base stations, also known as cell towers, which are strategically positioned to cover specific geographic areas. Each cell tower serves as a central hub for transmitting and receiving signals to and from mobile cellular devices. Cellular signals travel in straight lines, reflecting off obstacles and sometimes experiencing signal degradation due to distance, interference, and physical barriers.

Cellular *Internet of Things* (IoT) connectivity has become an essential component of distributed energy resources. In order for these types of systems to function properly, incoming cellular signal power and quality must be adequate. To evaluate the health of the cellular signal in your proposed install location, please consider the following:

- Utilize a cellular signal meter designed for cellular site surveys
- Ensure that your test equipment is in good condition and with no damage
- If possible, choose a location for testing and installation that is within sight of a cell tower
- Confirm which cellular carrier provides sufficient cellular health in the proposed installation location

For more information on cellular signal concepts and cellular testing guidance, email us at site-support@powerflex.com.

Connecting to an ISP via a customer LAN

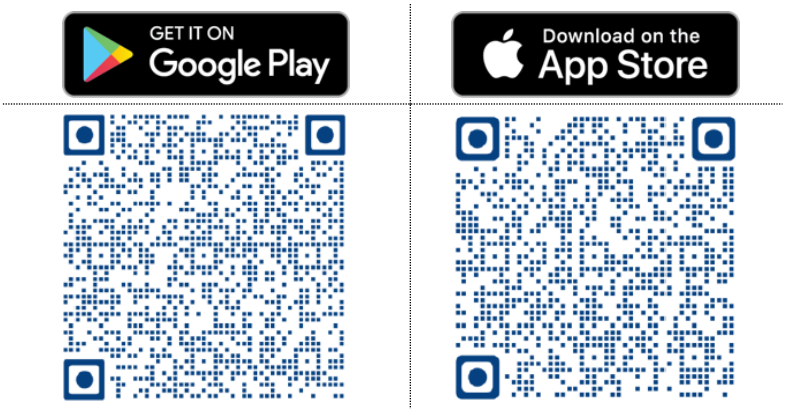
PowerFlex Nexus can optionally utilize a LAN connection to the Internet. To do this, an Ethernet cable from the LAN can be connected to the WAN port of the Nexus cellular router. If the LAN connection limits any inbound or outbound data traffic with a firewall, then the firewall must be configured to allow traffic for Nexus Core. For more information on firewall policies for connecting PowerFlex Nexus to a customer LAN, email site-support@powerflex.com.

Set up your PowerFlex Forms account

PowerFlex Forms is a custom-configured implementation of the FastField Forms (FFF) mobile app. The FFF app provides a convenient way for an installer to collect site information and photographs of the installation. This benefits both PowerFlex support and installers with a historical record for each installation. The FFF app also is used to update site installation notes in the future.

The FFF mobile app can be downloaded onto a Google or Apple phone (or tablet). If the installer doesn't have the app already installed and an account setup, do the following:

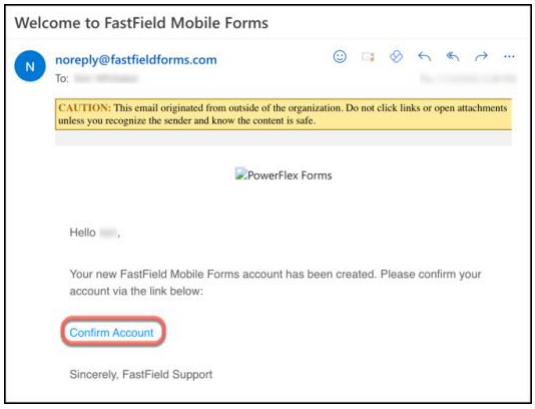
1. Download the FFF app by tapping the Google Play or App Store button or taking a photo of the appropriate QR code for your phone:



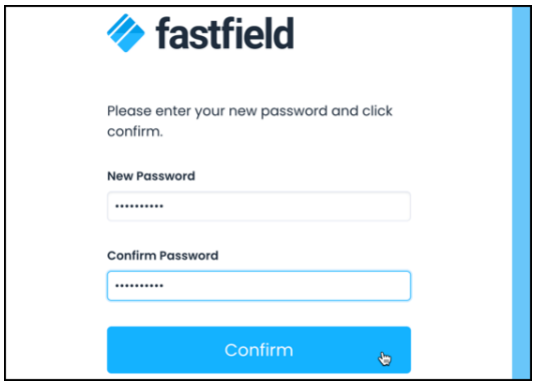
2. If the installer doesn't have an existing PowerFlex FFF account, the installer needs to request one once the app has been downloaded and installed. E-mail PowerFlex at site-support@powerFlex.com and include the installer's first and last name in the e-mail body.

Note: Include a different contact e-mail address for the account setup if it isn't the one used in the request e-mail.

3. You will receive an e-mail containing instructions for logging into your account within three business days. An e-mail from fastfieldforms.com will request that you verify your PowerFlex Forms account. Click **Confirm Account**.

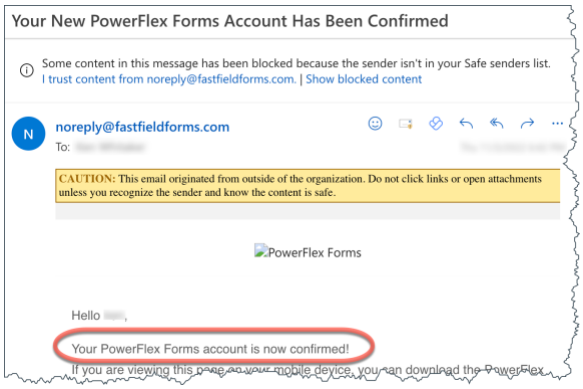


You will then be directed to a web page to create a new password. Re-enter to confirm your password and click **Confirm**:



Note: Write down the password in a safe place or, better yet, allow facial recognition for logging in.

Click **OK** on the confirmation web page (not shown). This results in an account confirmation e-mail sent to the installer (don't forget to add the sender to your safe senders list, if you receive a warning or the e-mail is not received):

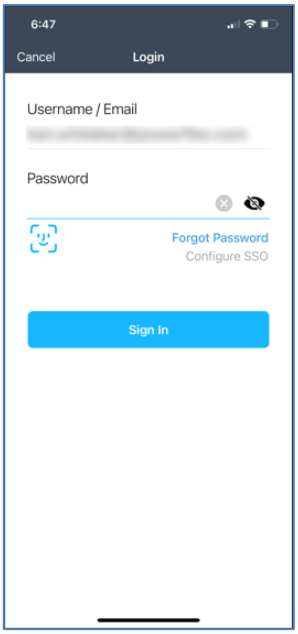


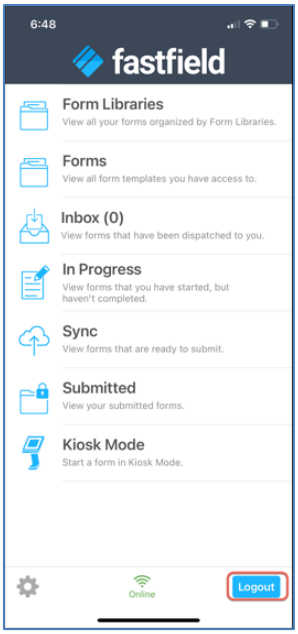
Log into the FastField Forms app

Run the FFF app on your phone and enter in your credentials (e-mail address and password).

Tap **Sign in** (L) and after a short period of time, the main PowerFlex FastField Forms screen will be displayed.

If you aren't ready to use FFF, tap **Logout** (R) to quit the app for now.





The importance of the FFF app

Filling out the PowerFlex Forms app is a requirement for a successful installation. The app makes it easy to capture equipment serial numbers, descriptions, locations, and photographs that are needed by PowerFlex support.

The app is typically used during inspection (step 3), but the *earlier* that site and installation information is recorded with the app, the *better*!

Availability of services at the site

There are several critical site services that need to be confirmed by the installer:

1. **Cellular signal strength:** Confirm with your PowerFlex site representative that cellular signal has been tested in the area where you plan to install Nexus Core. Without adequate cellular signal strength and quality, the Nexus Core will need to be relocated. Alternatively, a wired connection to local Internet Service Provider (ISP) can be used.
2. **Power:** Review the project design diagrams and confirm that necessary power connections are available for the installation.
3. **Enclosure for the site:** Each enclosure is unique and comes with a unique identifier number. Your PowerFlex representative should confirm that your unique enclosure matches with its intended location.
4. **Site safety:** Conduct a *job hazard assessment* (JHA) to ensure a safe working environment.

What's in the box

The Nexus Core comes preassembled for for your specific installation:

The enclosure is 18.9" H x 16.8" W x 11.3" D (480.06 x 426.72 x 287.02 mm) and weighs about 31.5 lbs (14 kg).

The supply power requirement is single-phase 120VAC at 500W peak power, with NEC-compliant wiring, and typically uses a 20A (or 15A) breaker.

Note: Additional technical details about the Nexus Core can be found in the "Technical Specifications" section at the end of this guide.

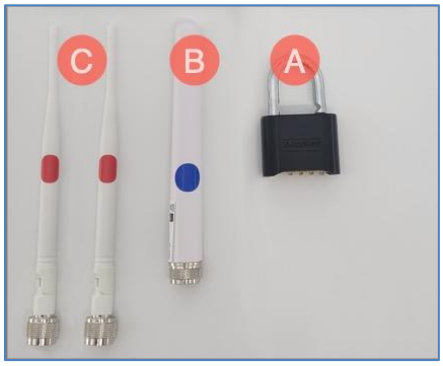
Optional (not shown): To accommodate a different power source (ex: 208VAC, 240VAC, or 277VAC), a control transformer may be required to be installed separately. This should be defined explicitly on the project's single-line diagram.

1. Open the latches on the side of the Nexus Core enclosure. Everything should be preassembled and firmly in place. There is an accessories package taped to the inside of the enclosure:

Note: The Wi-Fi access point is also included in the box (not shown).

2. Remove the tape and take out the accessories package.

3. Unpack the contents from the accessories package:



	Qty	Description
A	1	Combination lock
B	1	Zigbee or Wi-Fi antenna (optional)
C	2	LTE cellular antennas

What you'll need

You'll need these tools to install the Nexus Core enclosure:

- Personal protective equipment (PPE) for low voltage electrical work (class 00 recommended)
- #2 Phillips flathead and #2 square screwdrivers
- RJ45 crimping tool
- RJ45 connectors
- #14 fork or ring terminal connectors (other sizes may be specified)
- Crimping tool used for electrical wiring
- A portable label maker for labelling wires, conductors, breakers, and other parts
- Multimeter that measures AC voltage and continuity
- Smartphone (either Google phone or Apple iPhone) to complete the site inspection form

Depending on your Nexus Core installation, you may need one or more of the following (not provided):

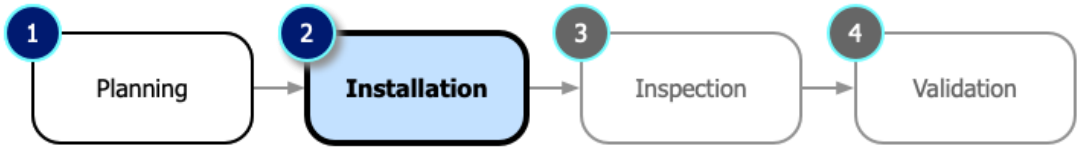
- Commercial-grade RF meter to verify cellular service presence, if not done by the project manager
- Hammer drill with appropriately sized bits
- Impact driver
- Hole saw
- ½ inch (or 5/16 inch) rigid or flex conduit for power and data cables
- ¼ inch fasteners and anchors rated for at least 35 lbs
- Cat6 Ethernet wiring (if not installed in a conduit, it must be armored/outdoor rated cable)

Before proceeding to the next step …

1. Make sure that the Nexus Core accessories package isn't missing any parts.
2. You have downloaded the FFF app and have successfully logged in.
3. Gather all the tools you'll need for the site installation.
4. Don't forget to use our checklist to check off tasks during installation.
5. For information about installing other Nexus products, refer to *Nexus Sense Installation Guide* and *Nexus Remote Serial Installation Guide*.

To ensure quality work, each step should be verified ***before proceeding*** to the next step.

Step 2: Installation



To install Nexus Core, you will:

- Mount the enclosure at the site
- Connect power and communications
- Learn about the internal Nexus Core subsystems
- Energize the power to all Nexus Core subsystems

Mount the Nexus Core

⚠ Install the Nexus Core at a location that isn't subject to harsh weather conditions or exposure to direct sun. In locations where ambient temperatures are above 104°F, consider mounting the Nexus in the shade to avoid overheating. For temperatures below 32°F, mount indoors to avoid freezing conditions.

The Nexus Core enclosure should be mounted to an upright surface at eye level to provide easy access and servicing. The enclosure must be installed at least 4 feet above the ground with at least 1 foot of clearance above and below it. The enclosure must also be at least 4 to 5 feet away from transformers. The enclosure has integrated top and bottom brackets for easy mounting:

Wall	Unistrut	Pedestal
Using the outer openings on the mounting bracket, use 1.5-inch (or 2-inch) concrete anchors for a firm installation to the wall:  **Note:** Use concrete anchors rated that support at least 35 lbs. To mount on wallboard, make sure that both mounting brackets are securely attached to the studs.	Fasten the corners of the mounting bracket onto the Unistrut:  **Note:** Make sure that both upper and lower mounting brackets are utilized.	Attach a Unistrut onto the pedestal pole and fasten the corners of the mounting bracket to the Unistrut:  **Note:** Make sure that both upper and lower mounting brackets are utilized.

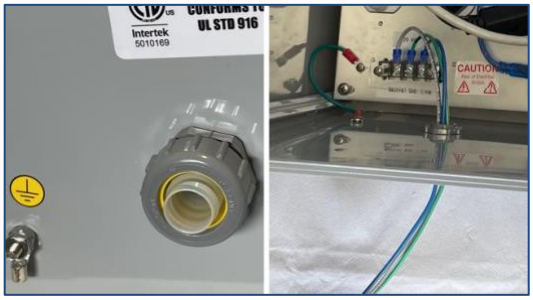
Connect power and communications

For most installations, connecting power and installing wireless communications is straightforward and shouldn't take very long. Power and antennas are installed at the bottom of the enclosure in one of two configurations: without Zigbee (L) and with Zigbee (R):

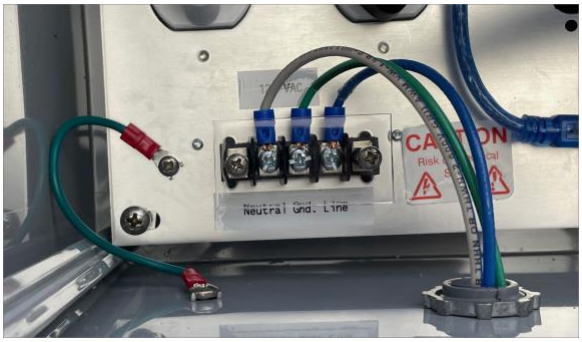
⚠ No side or top penetrations are allowed on the enclosure; all penetrations must be on the bottom.

1. **Ground bond (optional):** If required by the *national electrical code* (NEC), securely connect a ground bond to the enclosure:

2. **Power:** Connect a 120VAC power cable through the ½-inch liquid flex connector. Unscrew the pre-installed liquid type connector (L) and pull the power through the opening inside the enclosure. Remove the plastic strip before connecting the #14 AWG fork or ring terminal connectors from the power conductors to the terminal strips (R):



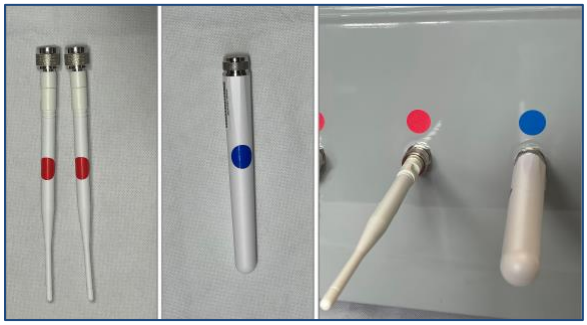
Connect the 120VAC as N-G-L (Neutral-Ground-Line) cables to the terminal strip inside the enclosure:



⚠ #14 fork or ring terminal connectors are required for connecting power to the terminal strips.

The enclosure can support a maximum of 500W, so ensure that conductors and overcurrent protective devices are sized correctly. The appropriate power coverings should be used (ex: conduit or heavy-duty cable outer sheathing).

3 **Wi-Fi Ethernet cable**	An Ethernet cable is connected to the PoE port of the network switch and to the external Wi-Fi access point (not shown).
4 **4G LTE** 5 **Zigbee (optional) antennas**	The two thin 4G LTE cellular antennas have a red label (L) and the optional Zigbee antenna has a blue label (M). Install and hand-tighten the antennas matching the color labels with the connectors at the bottom of the enclosure (R).



An overview of power and communications subsystems

There may be instances where your Nexus Core components are slightly different than a typical installation. You may need to know what is “inside the box” if a cable slips out. Inside the Nexus Core enclosure are several subsystems:

⚠ By inspecting inside of the enclosure, re-insert any cables that may have slipped out during transit.

Subsystem	Description
A	The *industrial computer* controls the interactions with the PowerFlex cloud services, DERs, and any other connected Nexus devices (like Nexus Remote and Nexus Sense). The power adapter (to the left of the computer) supplies DC power to the computer and is plugged into one of the AC outlets. In some configurations (see photo), the computer’s power cable may be shared with the cellular modem’s power cable.
B	The *network switch* provides Ethernet access from peripheral devices to the core processing LAN. It comes connected with a 48V power adapter (located on the DIN rail to the left of the cellular modem). For *Power over Ethernet* (PoE) connections, install the Ethernet cable into one of the ports marked with a lightning bolt symbol (ports 1 to 4). Check with PowerFlex support to determine how many Nexus Remote/Sense units can be supported when powered by 48V PSU (the NDR-120-48 is pre-mounted on the rail).

Subsystem	Description
C	The *4G LTE cellular modem* is used for connecting the Nexus Core to the PowerFlex cloud. The modem also has a Wi-Fi access point, which enables remote communications to DERs and EV chargers. The 4G LTE cellular modem is connected to two cellular antennas (labeled with red circle labels on the underside of the enclosure). In some configurations (see photo), the modem's power cable is shared with the computer's power cable.
D	The 48V power supply unit (NDR-120-48) is pre-mounted on the din rail and powers the network switch. It is critical to maintaining connectivity from Nexus Core to the "outside world."
E	The optional *Zigbee Coordinator* is used to connect with EV chargers and is connected to the Zigbee antenna (marked with a blue label on the underside of the enclosure). The Zigbee coordinator is connected to the built-in USB port on the computer. If there are PoE ports available, two additional Zigbee coordinators can be connected with KVM transmitters linked back to the network switch. No external power supply is required.

A circuitry protection system (not shown) is located behind the back metal plate.

Although infrequent, some configurations rely on wired Internet from the site's Internet service provider (ISP) or to connect the Nexus Core to Nexus Sense or Nexus Remote:

- Drill a conduit opening in the bottom of the enclosure to run an Ethernet cable (not supplied) to the switch.
- Connect a Cat6 cable from port 7 on the network switch into the Ethernet LAN port on the computer.
- Connect a Cat6 cable from port 8 on the network switch into the LAN port on the modem.
- Insert the Cat6 cable from the ISP into the network switch.

⚠ A directory identifying the controlled devices and circuits should be posted on the managed electrical panel to ensure compliance with national electric code standards. The panel should be labeled as remotely controlled by an energy management system.

Energize power to Nexus Core

Once installation and necessary connections to Nexus have been completed, energize the Nexus Core with an appropriate 120VAC source. There is no power indication on the outside of the enclosure, so you'll have to open the cover to inspect inside. The installer must verify that the following components in the enclosure are powered up by performing a quick inspection that all light indicators are on.

Note: Nexus Core is not fully operational until successfully validated and commissioned. At this point, DERs should be energized (not described in this guide).

⚠ Energizing any system on site is to be done by qualified electrical personnel only.

To verify power is supplied to all subsystems shown under the heading An overview of power and communications subsystems, make sure the following subsystems are energized:

A **Industrial computer and power supply**
At the top of the industrial computer's power supply displays a green LED light and a flashing red LED when the HDD is active:

The computer's power adapter should display a green LED power indicator:

At the bottom, the green LED power indicator for each Ethernet port indicates an active connection and a flashing red LED when data is being transferred:

⚠ If any of these indicators are not functioning correctly, investigate the incoming connections and those in Nexus Core to ensure they are properly terminated, powered, and not damaged.

B **Network switch**
Just above the Ethernet ports, the power light indicator should be lit in a blue color (highlighted to the left of the ports). For outbound Ethernet connections that provides PoE, the cable must be connected to a terminal marked with a lightning bolt: ⚡+.

PoE connections show amber and green LEDs. Green LEDs are used for standard RJ45 port connections.

C **4G LTE cellular modem**
The modem power light indicators should be green with blue signal-strength bars:

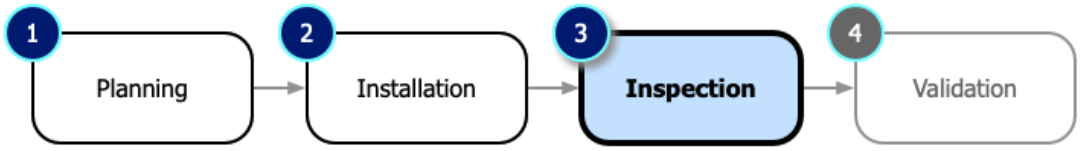
D **48V power supply**
The green LED should be displayed when power is applied.

E **Zigbee Coordinator (optional)**
The Zigbee Coordinator should display a red-light indicator.
Note: This may be a good time to check that the USB cable is firmly connected to the computer and that the antenna cable (pink) is connected to the Zigbee antenna mount. If more than one Zigbee coordinator is used, make sure the Ethernet connection between the KVM(s) and network switch is secure along with the antenna cable(s).

Before proceeding to the next step ...

1. Confirm that the Nexus enclosure is securely mounted.
2. Perform a quick verification that all cables inside the enclosure are fully connected.
3. Ensure you have attached power, communications, and ground bond to the enclosure.
4. Verify that the system has been energized.
5. For outdoor installations, make sure that all external connections are properly sealed to avoid water infiltration.

Step 3: Inspection

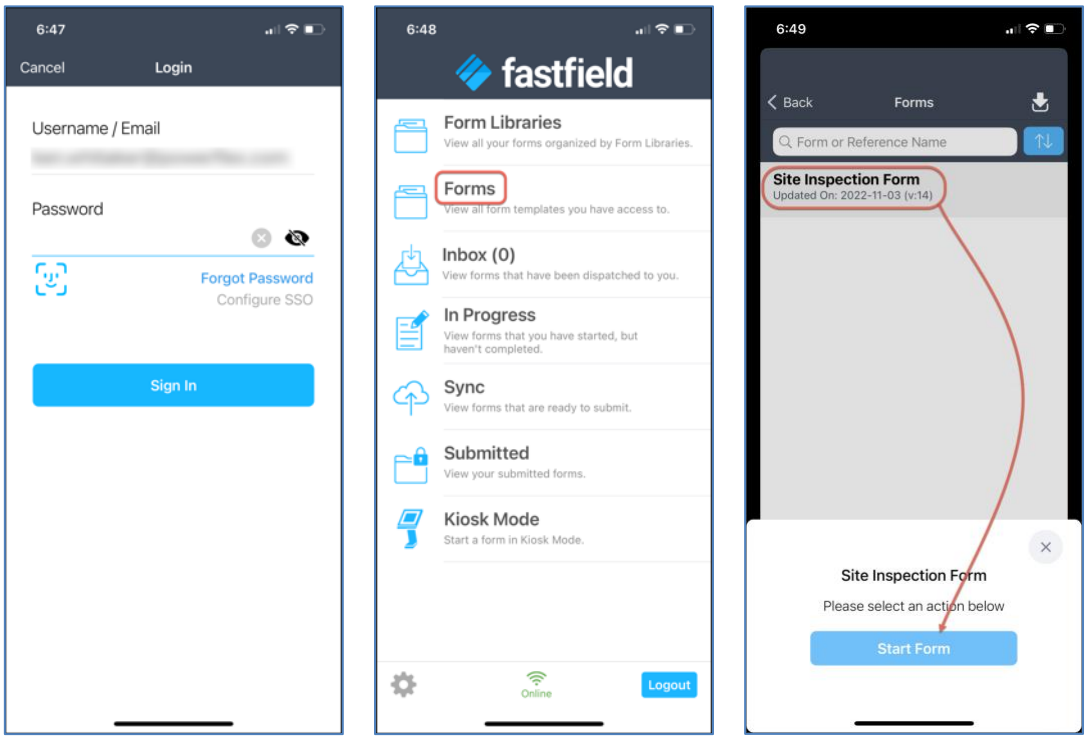


To perform a Nexus Core inspection, you will need to:

- Know how to use the FFF app
- Gather information with the FFF app
- Submit the site inspection form to PowerFlex

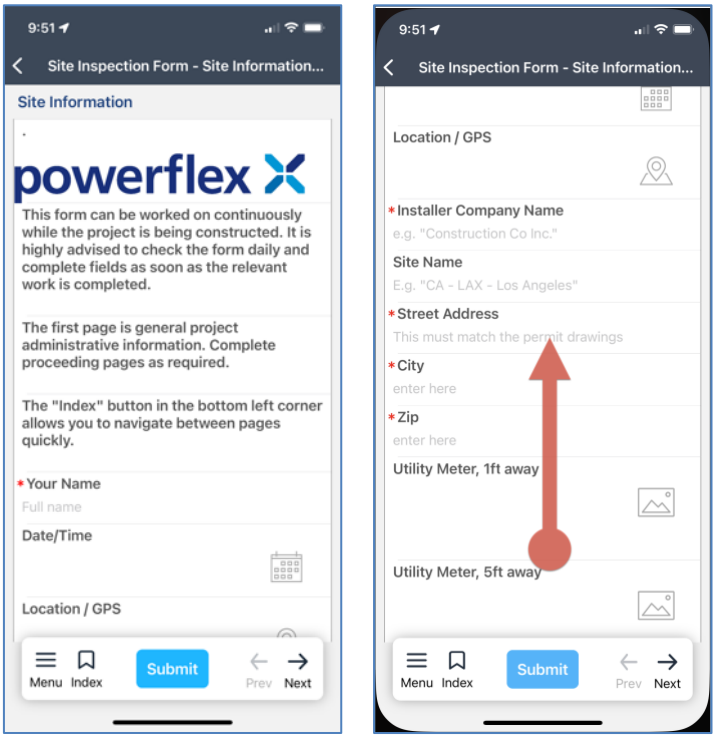
Using the FFF app

The FastField Forms (FFF) mobile app has been customized for PowerFlex installers to gather important installation information and photographs. PowerFlex support requires installation information from the installer before performing the final validation step. Log in (L) to your account, tap **Forms** (M), and select the **Site Inspection Form** (R). A popup window requests you proceed with filling out the form. Tap the **Start Form** button:



Note: Screens captured are shown on iOS which operates near identically on Google phones and on tablets (like the iPad).

The first page of the site inspection form contains general information (L). If the form contains more information than can fit on a single screen, flick the screen up (R) to see more.



Note: If asked to Allow "FastField" to use your location? In iOS, tap Allow While Using App (or Allow Once).

Some specific things the installer should know when using the app:

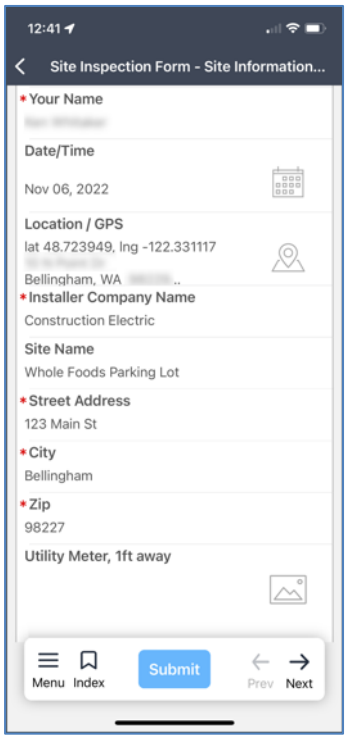
- You will be asked to enter in text information, select options, attach location coordinates, and take photos.
- Depending on your answers to **Yes**/**No** prompts on the form's first page, additional information applicable to your project will be requested.
- Fields with asterisks (*****) are required and must be filled out (ex: **Your Name** and **Installer Company Name**).
- The **Menu** command lets you review form completeness, enter notes, and bring up your phone's map to find directions.
- The **Index** command is a convenient way to navigate to specific screens in the site information form. (The index acts like a table of contents.)
- Tapping **Prev** and **Next** navigates to additional screens in the site inspection form.
- Once you have completed the form, tap **Submit**.

The site inspection form collects critical site information as well as verifies proper site setup.

The following pages walk you through the basics of using the app. Although every screen and site information won't be described, you'll soon get the hang of it.

Gather installation information with FFF

Once logged into the app and with the forms screen open, fill in general information:



Reminder: Make sure that all fields beginning with ***** are completed.

Enter in **Your Name**, tap the calendar symbol to select the current **Date/Time**.

Your phone can detect the exact installation location by tapping the location marker to the right.

Use the **Installer Company Name** that is recognized by PowerFlex representatives and support.

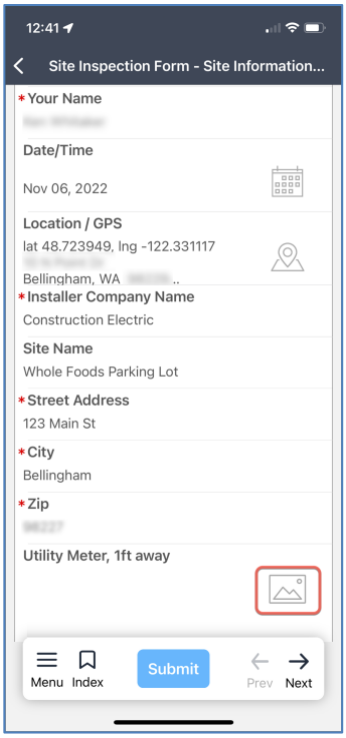
Enter the **Site Name**, **Street Address**, **City**, and **Zip** where the installation is located. This should match the address on the permit drawings.

To advance to another subform, tap **Next** and to return to the previous, tap **Prev**. Once you have filled out everything, tap **Submit**. (Learn more about form completion here: Submit the site inspection form.)

Site photos are used to record the installation and are invaluable for support:

Tap (the mountain symbol) under **Utility Meter, 1ft away** (L) and take a photo of the meter (M).

Tap **... More** at the bottom to retake the photo or return back to the form by tapping **Done** (R).



A thumbnail of the photo is shown on the site inspection form.

Show the **Utility Meter, 5ft away** and the **General Site Photos (multiple)** options. (You may have to flick the screen up to see it.)

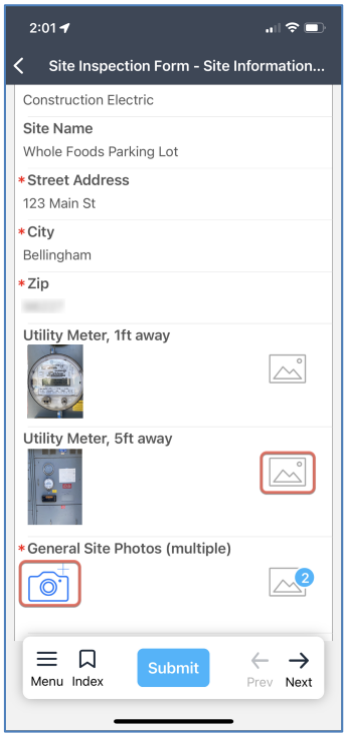
To retake a photo, tap the thumbnail or mountain symbol.

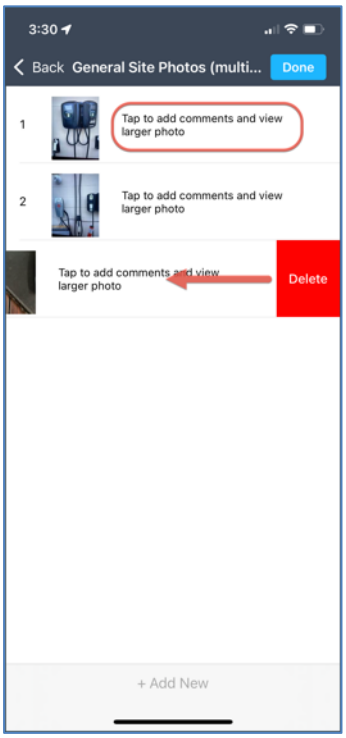
Like the first photo, take the second photo of the utility meter (this time 5 feet away) and tap **Done**. The thumbnail is updated.

For the general site photos, PowerFlex strongly recommends taking several photos. Tap the camera+ symbol (instead of the mountain) to take one or more photos.

When you've completed taking pictures of the site, tap **Done**.

To re-examine multiple photos, tap the mountain, the small number **2** symbol (in this example) indicates that there are currently two photos.



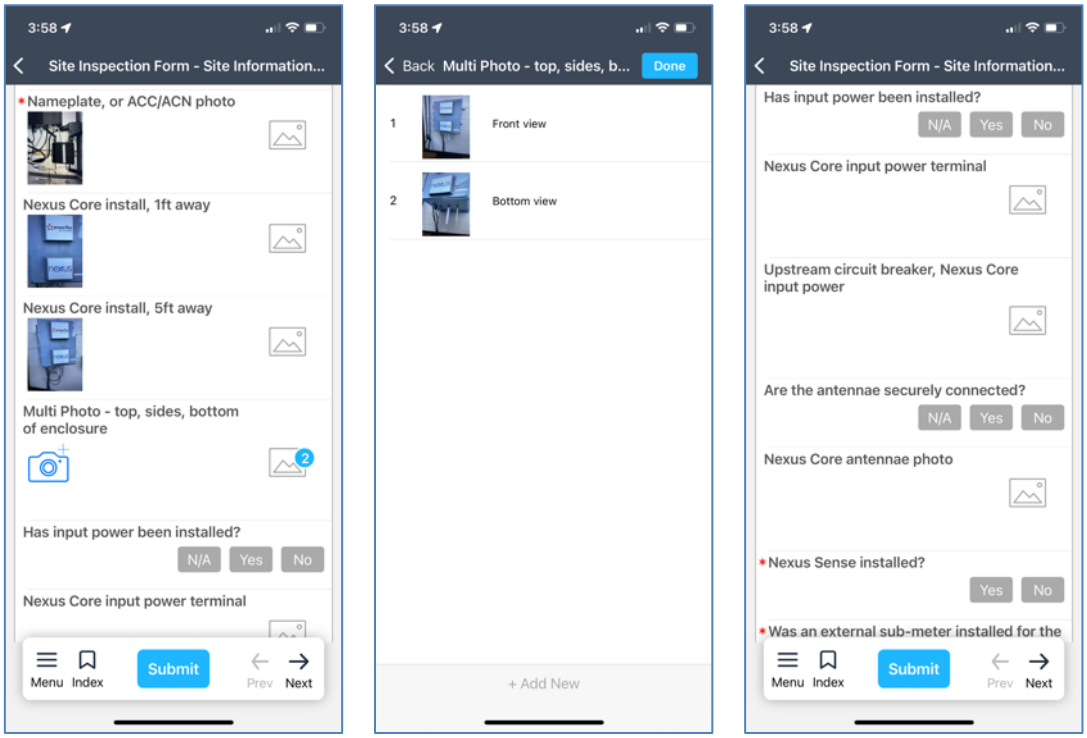


There are several actions you can take to manage site photos:

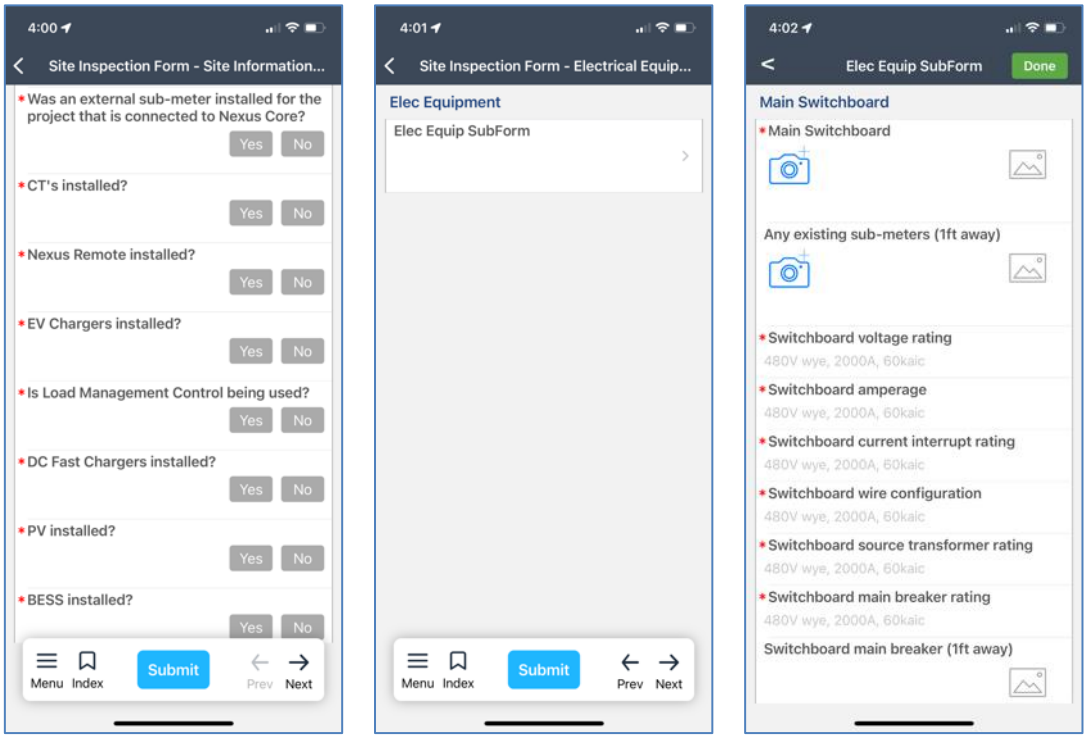
- To retake a photo, tap directly on the thumbnail and tap **More** at the bottom of the screen. (Pinch outward to zoom in.)
- To add a note, tap on the text to the right and tap **Notes** at the bottom of the screen. Enter in the text.
- To take more photos, tap **+ Add New**. While adding a third photo, the installer's foot was accidentally taken. The foot photo needs to be removed! To delete it, swipe the thumbnail to the left and tap **Delete** (shown in the screen capture to the left).
- PowerFlex support recommends taking three to five photos of the general site.
- When enough photos of the site have been taken, tap **Done**.

Back on the main form screen, take a photo of the Nexus nameplate label or of the white label starting with **PF-** on the cellular modem inside the enclosure. If the label isn't clear, enter it as a note.

Take a variety of photos of the Nexus Core enclosure (L and M). Press **Done** to return to the form (R):



Respond to the additional questions and take photos on the main site inspection form. The **Yes** and **No** questions help describe key subsystems for each installation (L). After the final question (**BESS installed?)**, tap **Next** to fill out the electrical equipment (M) and the remaining subforms (R):



Special notes:

Navigating to subforms: Don't forget to use the **Index** menu at the bottom panel in the site inspection form. Examples include Nexus Sense, external meter, Nexus Remote, managed electric panel, EV charging station, electrical equipment, BESS, and so on.

The panel form: One of the most important subforms has to do with the electrical breaker box (or boxes) used for the site. In case of emergencies, upgrades, or maintenance, which breaker is used for which equipment (ex: EV charging stations, Nexus Core, and so on) needs to be clearly captured: photos and notes. So, make sure that each circuit breaker is correctly identified and legibly marked on the label sheet in the inside cover of the box.

Identification of equipment: Capturing serial numbers is vital with the installation. XBee or QR scans are typically used by the app. As you frame the camera border over a QR code in front of an EV charger, for example, the QR information will be automatically recognized and recorded.

If a QR code is not automatically recognized by the app, take a photo of it instead.

Entering multi-station information: Any time an additional EV station is added, the station information (panel, spot name/number, and circuit) is assumed to be the same as the previous EV station. Make the necessary changes and continue adding more stations.

As you work with the app, the information entered is retained as you go—even if you logout without submitting the site information. The app saves the information locally on the phone and won't lose any of your information—even if Internet connectivity is lost.

There may be times where you have started several site inspections but there is only one of them that will be completed. In the screen to the right, there are two inspections. We want to continue with the first one and discard the second one. Flick the second form title to the left and tap **Delete.**

To continue where you left off, bring up the main **Fastfield Forms** screen and tap **In Progress**. To continue with the inspection, tap the **Site Inspection Form** ("Whole Foods Parking Lot" example above).

Submit the site inspection form

Once you believe that all the information has been collected in the site inspection form, tap the **Submit** button at the bottom of the app's screen.

Note: If there are any errors (or missing information), you will be prompted with a warning. Don't forget to use the Index button to jump to a specific subform.

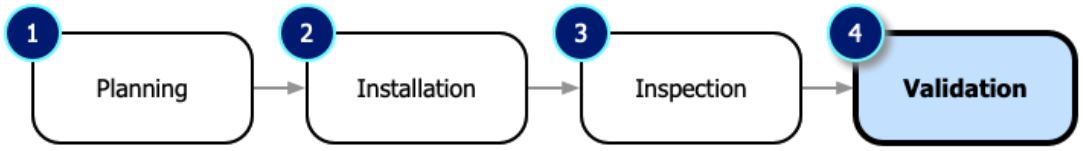
After the site inspection form has been submitted, allow for three days while PowerFlex support processes your form submission and commissions the Nexus Core software. You will be notified by an e-mail that either installation can proceed to final validation (step 4) or that there are issues that need to be mitigated.

Before proceeding to the next step …

This is what you have performed:

1. The Nexus enclosure has been securely mounted.
2. Power and connectivity have been set up.
3. The app has captured all the required site information.
4. The site inspection form has been submitted to PowerFlex.

Step 4: Validation



To validate a Nexus Core installation, you will:

- Confirm end-to-end operation
- Securely lock Nexus Core enclosure

Verify end-to-end operation

The PowerFlex network is **not operational or functional** until the Nexus Core is fully commissioned and approved by PowerFlex site support.

Once the Nexus Core has been installed, wired, energized, and has confirmed to be setup correctly, the installation will be ready for PowerFlex engineers to run remote diagnostics. Please contact PowerFlex site support (or your PowerFlex representative).

e-mail: site-support@powerFlex.com, phone: **833-4-PWRFLX**

Locking the enclosure

After installation, lock the enclosure with the provided combination lock. Close the enclosure front door (your unit may have a different warning label as shown in the inset). The lock combination is preset for each site. After securing the latches on the side of the enclosure to the cover, insert the lock in the padlock eye in either latch hook:

⚠ To avoid any security issues or unauthorized access with Nexus Core, never leave the enclosure unlocked.

Installation checklist

Done	Task
Step 1: Planning	
☐	Download the Fast Field Forms (FFF) app and request a PowerFlex forms account
☐	Confirm PowerFlex forms account to use the FFF app, create a password
☐	Verify availability of services at the site:
☐	▪ Cellular service (or Ethernet)
☐	▪ Suitable power (120VAC, 20A) is available
☐	▪ Enclosure specific to the site has been verified
☐	▪ Conduct a job hazard assessment (JHA)
☐	Unbox the Nexus enclosures and verify everything is included
☐	Gather all the required tools before going onsite for the installation
Step 2: Installation	
☐	Install the Nexus enclosures securely to a wall, Unistrut, or pedestal
☐	Attach power, communications, and ground bond to the enclosures
☐	Energize power to the Nexus Core
☐	Ensure all external connections are properly sealed to not allow moisture into the enclosure
Step 3: Inspection	
☐	Gather information from the site using the FFF app, complete and submit
☐	Contact PowerFlex site support (e-mail: site-support@powerFlex.com, phone: **833-4-PWRFLX)** to confirm that Nexus is ready for commissioning
Step 4: Validation	
☐	Inspect power light and comm indicators for devices inside the Nexus Core enclosure
☐	Work with PowerFlex site support to confirm that Nexus is functioning correctly
☐	Securely lock the Nexus Core enclosure

Troubleshooting/FAQ

Issue (or what if this happens)	Answer
None of the power lights are on in the Nexus enclosure.	Make sure that the wires are plugged in properly and pass the tug test. Use a continuity tester to verify that all cables pass the continuity test.
The power indicators are all on, but PowerFlex doesn't recognize that the system is online.	Check that both antennas are properly fastened to their respective terminals.
What if I don't have 120VAC?	The Nexus Core requires 120VAC. Contact your PowerFlex representative for the best alternatives to acquire the appropriate transformer.
What's FFF?	FFF stands for FastField Forms (also called FastField Mobile Forms) and is an app that has configured specifically to collect Nexus site installation information.
Can I turn on EV chargers before completing commissioning?	PowerFlex is not liable for the behavior of any unconfigured chargers. Depending on the charger type, it may provide an unlimited, non-managed free energy pre-configuration.

Note: Always contact PowerFlex support if you have any questions.

Maintenance and Warranty

All maintenance and troubleshooting should only be performed by qualified personnel. Nexus hardware products are designed to require minimal maintenance. All maintenance should be performed with power to the cabinet turned off. Shutting down power to Nexus hardware affects site operations, and site administrators should be contacted before this maintenance is performed. The following should be performed annually to ensure optimal safety, longevity, and performance:

- Visually inspect the enclosure.
- Remove the metal screen from the enclosure. Use a mild dish soap and, if needed, a soft-bristle brush, soft scrub pad, or cloth to help dislodge stubborn dirt. When clean, rinse the screen, and when dry, re-install the screen.
- Clean cabinet if necessary, using 70% isopropyl alcohol.

The PowerFlex Nexus Limited Warranty applies to Nexus Enclosures. The limited warranty period starts on the date of initial installation and initial power-up of the Nexus component and lasts for three (3) years (the "Warranty Period"). A claim under this Limited Warranty must be submitted by or on behalf of the end user who acquired and put the Nexus into use for the first time or by a subsequent owner of the Nexus who provides proof of ownership. This Limited Warranty covers defects in materials and workmanship of the PowerFlex Nexus Components set forth above. For this Limited Warranty to apply, your PowerFlex Nexus must meet the following criteria: (i) it was purchased from PowerFlex or a PowerFlex certified installer in the United States of America; (ii) it has one of the part numbers referenced above; and (iii) it is installed in the United States of America. For concerns or questions about PowerFlex-certified installers, please contact PowerFlex. Please see the complete **Nexus Product Limited Warranty** for more information.

Appendix A: Technical Specifications

Enclosure	
Material	Fiberglass
Color	Gray
Dimensions	18.9" H x 16.8" W x 11.3" D (480.06 x 426.72 x 287.02 mm)
Rating	NEMA 3R/IP24
Temperature	Minimum: 32°F (0°C) Maximum: 104°F (40°C) Dual 18W thermostat-controlled fan
Weight	Max 31.5 lbs (14 kg)
Power	120VAC, up to 282W

Modem	
Type	Dual 4G LTE modem
Cellular parameters	1 GbE, 1 FE (LAN/WAN switchable)
Providers	AT&T®, Verizon®, T-Mobile® Generation: 4G Unsupported bands: band 30 (2300 MHz), band 41 (TDD 2500 MHz) RSRP: > -103dBm RSR: > -12dB SINR: > 1dB

Network switch	
Ports	(4) GbE 802.3at PoE+ ports (4) GbE RJ45 ports
PoE supply	52W total (30W port maximum)

Communications	
Ethernet	1 GbE, 1 FE (LAN/WAN switchable)
Wi-Fi[1] (external WAP)	Outdoor range: 75 ft (maximum with clear line of sight) Indoor range: 50 ft (maximum)
Zigbee 3.0	150 ft (distance between Nexus Core and Zigbee-enabled EV chargers), 75 ft (distance between Zigbee-enabled EV chargers)
Others	OCPP 1.6J

Safety compliance	
Standards	UL 916:2015 Ed. 5 CSA 22.2#205:2017 Ed. 3

[1] To establish connectivity, an external WAP is typically mounted near EV chargers away from the Nexus Core enclosure.

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