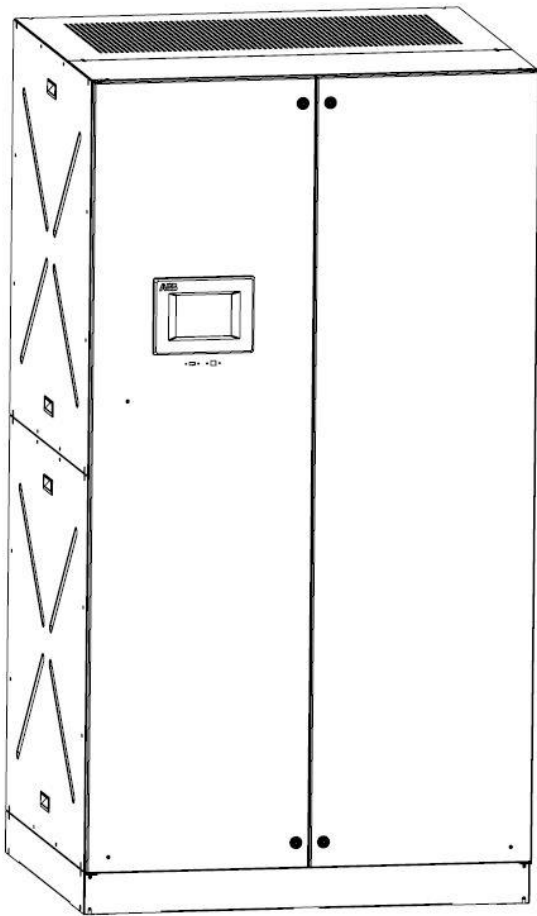

INSTALLATION GUIDE

TruFit™ Power Distribution Unit 50 – 300kVA



TruFit PDU
50 – 300 kVA

Dear Customer,

We thank you for selecting our products and are pleased to count you amongst our very valued customers at **ABB**.

We trust that the use of the **TruFit Power Distribution Unit**, developed and produced to the highest standards of quality, will give you complete satisfaction.

Please read carefully the Installation Guide, which contains all the necessary information and describes all you need to know about the installation of the PDU.

Thank you for choosing **ABB**!



Start-up and commissioning!

An ABB Global Services Field Engineer must perform start-up and commissioning of the PDU.

Please contact ABB Service Center at least two weeks prior to schedule start-up and commissioning at 1-800-292-3739.

The Company

We are an established world force in the design and manufacture of power electronics and power protection equipment.

As a part of ABB, a world leader in electrical technology, we offer customers application expertise, service and support worldwide. We are committed to teamwork, high quality manufacturing, advanced technology and unrivalled service and support.

The quality, accuracy and performance ABB's products result from over 100 years of experience, combined with a continuous program of innovative design and development to incorporate the latest technology.

Quality control

To ensure that we meet our responsibilities and obligations to our customers, our people, our partners, our suppliers and to our shareholders, we are committed to deliver on-time and on-quality products, systems and services that meet or exceed our customers' expectations.

For more information

Further publications for the TruFit Power Distribution Unit and accessories are available for download from https://electrification.us.abb.com/products/power-distribution-systems/trufit_pdu or by scanning the QR code below.



Contacting ABB for support

To contact ABB for general information, call 800-238-5000 or preventative and remedial services in the United States, call 800-292-3739. ABB offers a complete range of start-up services, repair services, preventive maintenance plans and service contracts.

For repair or maintenance service outside the 48 contiguous United States, contact ABB, if available in your area. Please provide the following information for customer service when you contact the ABB service center:

Equipment
Part number
Serial number
Voltage rating
Current rating
Purchase date
Installation date
Location

To get important information on all equipment warranties, please contact the ABB service center or request service follow-up or by scanning the QR code below.



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1 Important safety instructions

1.1 Using this manual

TruFit Power Distribution Unit, henceforth referred as PDU, is a high-energy device. The following safety instructions must be observed when working with the device. Refer to the unit's nameplate for the specific model designation and operating parameters.







This manual is provided to aid the user in the installation, operation, and maintenance of the PDU, manufactured by ABB. Read and understand the procedures described to ensure trouble-free installation and operation. Read through each procedure before beginning the procedure. Perform only those procedures that apply to the PDU cabinet being installed or operated.





This unit is equipped with ABB's PowerView monitoring system. Instructions regarding monitoring can be found in manual 94-1100-00002861. The reader is expected to know the fundamentals of electricity, wiring, electrical components and electrical schematic symbols.

Read all safety and operating instructions before operating the PDU. Adhere to all warnings on the unit and in this manual.

1.1.1 List of symbols

These symbols may appear on your PDU or on labels inside the PDU. Most international safety agents accept them. Everyone in your organization who works with your system should understand the meaning of these symbols:

	<p>SAFETY ALERT SYMBOL</p> <p>This is the safety alert symbol. It is used to alert you to potential physical injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.</p>
	<p>DANGER</p> <p>Indicates a hazardous situation which, if not avoided, will result in death or serious injury.</p>
	<p>WARNING</p> <p>Indicates a hazardous situation which, if not avoided, could result in death or serious injury.</p>
	<p>CAUTION</p> <p>Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.</p>
	<p>NOTICE</p> <p>Is used to address situations not related to physical injury but could result in property damage.</p>
	<p>ELECTRICAL HAZARD SYMBOL</p> <p>Indicates the presence of an electrical hazard.</p>

	<p>ARC FLASH HAZARD SYMBOL Indicates the presence of an arc flash hazard.</p>
	<p>IMPORTANT INFORMATION SYMBOL This symbol indicates operator tips and/or important information for the use of the product. This symbol is not used to indicate information regarding potential hazards or property damage.</p>
	<p>RECYCLE SYMBOL</p>
	<p>DO NOT DISCARD SYMBOL Indicates that you should not discard waste electrical or electronic equipment (WEEE) in the trash. For proper disposal, contact your local recycling/reuse or hazardous waste center.</p>

1.2 Safety rules

Save these instructions!

The power distribution unit operates with high currents and voltages. The properly installed system is grounded to earth and IP 20 rated against electrical shock and foreign objects when all dead fronts are in place. Installation and service must be performed by a manufacturer's qualified technicians or a certified service partner.

General

- Move the PDU in an upright position in its original package to the final destination room.
To lift the cabinets, use a forklift or lifting belts with spreader bars.
- Check for sufficient floor and elevator loading capacity.
- Check the integrity of the PDU equipment carefully.
If you notice visible damage, do not install or start the PDU.
Contact your ABB Service Center immediately.
- **WARNING! RISK OF ELECTRICAL SHOCK!**
Do not remove covers, there are no user serviceable parts inside.
This should be performed by qualified service personnel.
- This PDU contains potentially hazardous voltages.
- End user must follow applicable regional occupational safety codes/regulations during installation, operation and equipment maintenance. This may require additional field marking or labelling defining appropriate level of PPE (Personal Protection Equipment) to reduce the risk of Arc-flash related injuries.
Contact our ABB Service Center for product specific information.

Installation

- This PDU must be installed and connected only by trained personnel.
- Verify accurately during Commissioning and Maintenance of the PDU, for the following:
Damaged components, squeezed wires and cables, or not correctly inserted plugs.
- After removing the sidewalls of the PDU, make sure that all earth connections when reassembling, are correctly reattached.
- This PDU is intended for use in a controlled indoor environment free of conductive contaminants and protected against animal intrusion.
- **WARNING! HIGH LEAKAGE CURRENT TO GROUND:**
Ground connection is essential before connecting to AC input!
Switching OFF the Unit does not isolate the PDU from the Utility.
- Do not install the PDU in an excessively humid environment or near water.
- Avoid spilling liquids on or dropping any foreign object into the PDU.
- The Unit must be placed in a sufficiently ventilated area; the ambient temperature should not exceed 104°F (40°C).
- It is important that air can move freely around and through the Unit. Do not block the air vents.
- Avoid locations in direct sunlight or near heat sources.

Storage

- Store the PDU in a dry location; storage temperature must be within -13°F (-25°C) to 131°F (+55°C).

1.3 Safety precautions

The PDU contains hazardous voltages, and hazardous voltages are present regardless of the mode of operation. Before making any connection(s) to the PDU, ensure that any/all power sources are de-energized and locked out.

As lethal voltages are present within the PDU during all modes of operation, maintenance shall only be performed by authorized service personnel.

ABB neither recommends nor knowingly sells this product for use with life support applications or other FDA designed critical applications.

All wiring should be performed by qualified electricians and in the accordance with local and national electrical safety codes. Before placing the unit into service, a thorough inspection and supervised start-up should be performed by a qualified service technician.

This PDU is designed for operation from a three (3) phase, three (3) wire power source. Refer to the unit's nameplate for the specific model designation, operating voltage, and input power configuration. Input over-current protection is to be supplied by the user in accordance with nameplate ratings, in applications where the PDU has no main breaker.

1.4 Safety considerations

The TruFit PDU is designed for commercial applications and should be handled with appropriate care, following these guidelines:

- Keep surroundings clean and free from excess moisture.
- Do not operate the PDU system close to gas or electric heat sources.
- The system is not intended for outdoor use.
- The operating environment should be maintained within the parameters stated in the manual.
- Keep the cabinet doors closed and locked to ensure proper cooling airflow and to protect personnel from dangerous voltages inside the unit.

CAUTION

Only authorized service personnel should perform maintenance on or service the PDU system.

If service or routine maintenance is required:

- Ensure all power is disconnected before performing maintenance.
- Ensure the area around the PDU is clean and uncluttered.
- Observe all DANGER, CAUTION and WARNING notices affixed to the inside and outside of the equipment.

WARNING

To provide sufficient isolation protection when working upstream of the PDU, open the respective source feeder breakers contained within the PDU. Prescribing to this maintenance method reduces the risk of electric shock due to backfeed.

2 Environment

2.1 Recycling instructions

**Note!**

This product has been designed to respect the environment, using materials and components respecting eco-design rules.

It does not contain CFCs (Carbon Fluor Clorid) or HCFCs (Halogen Carbon Fluor Clorid).

**Packing material recycling!**

ABB, in compliance with environment protection, uses only environmentally friendly material at the end of its service life, must be recovered conforming to the local applicable regulations.

PDU packing materials must be recycled in compliance with all applicable regulations.

**Recycling at the end of service life!**

ABB, in compliance with environment protection recommends to the User that the PDU equipment, at the end of its service life, must be recovered conforming to the local applicable regulations.

**Battery disposal!**

Leads contained in the Batteries is a dangerous substance for the environment, therefore it must be correctly recycled by specialized companies.

3 Layout

3.1 Layout TruFit PDU 50 – 300kVA



Figure 3.1.1 – Main cabinet with Doors Closed

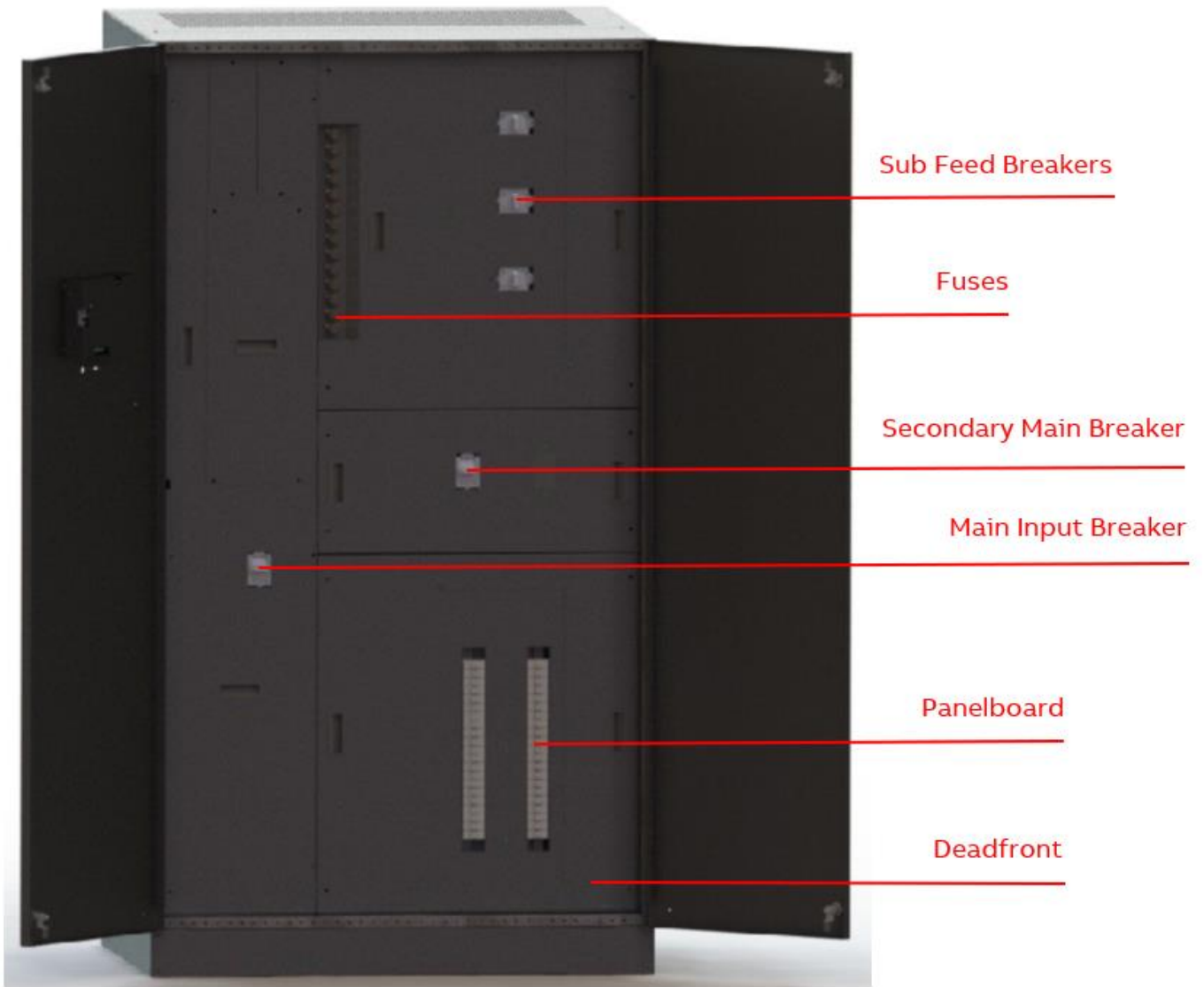


Figure 3.1.2 – Main cabinet with Doors Open; Sub Feed Breaker + Panelboard Configuration Displayed

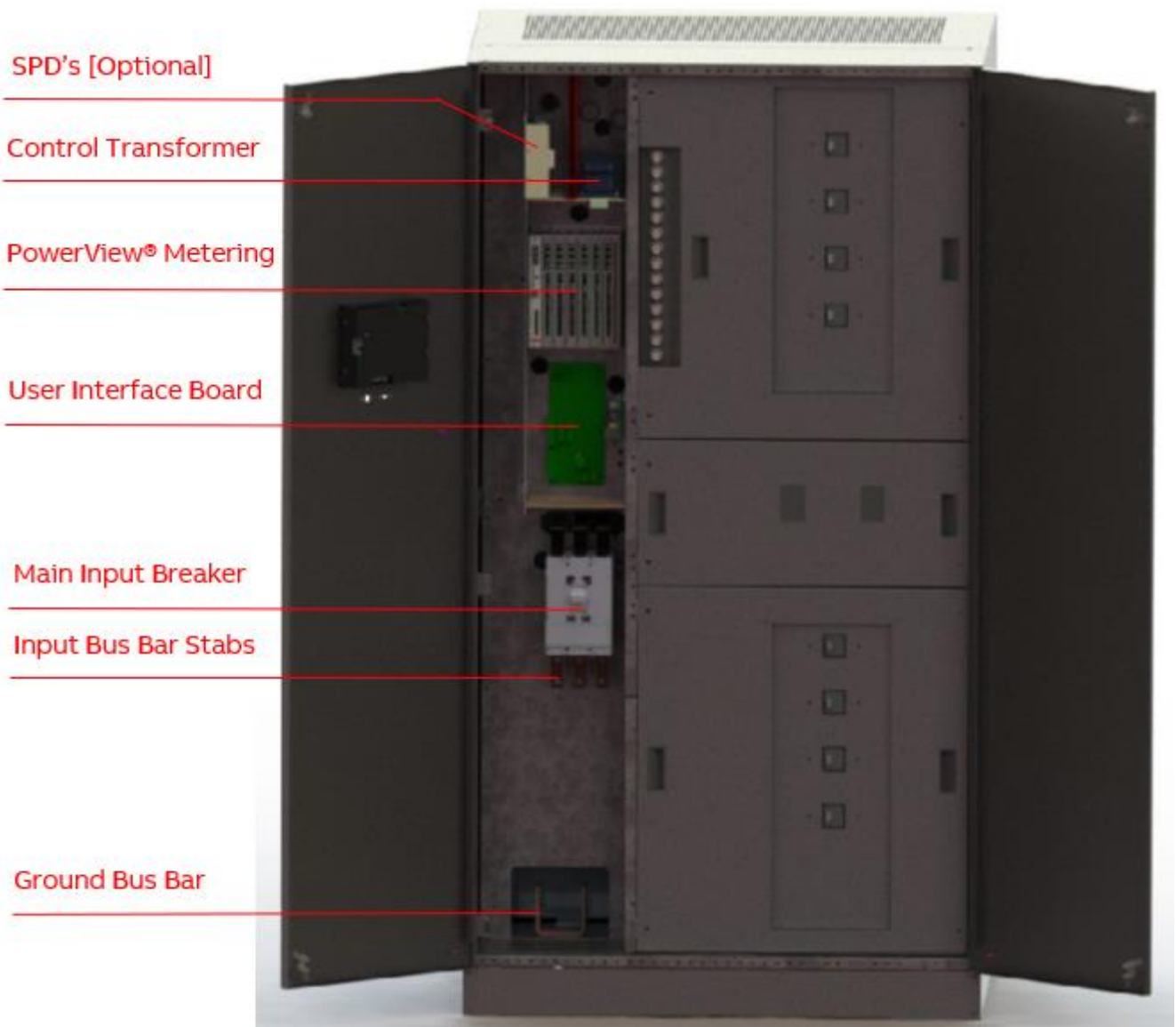


Figure 3.1.3 – Main cabinet with Doors Open; Logic and Main Connections

4 Installation

4.1 Shipping and Delivery

Every TruFit product is fully tested and has passed our thorough quality control inspection prior to delivery. Once the product is tested and quality control inspected, the unit is then carefully packaged for delivery.

On delivery, inspect the system for any exterior damage that may have occurred during transit from the factory. Any damage should be reported to the trucking company and marked on the bill of lading while the driver is still on the premises. **Also report any damages to ABB Field Service Support by calling 1-800-647-4782.**

Inspect the PDU shipping container for any signs of damage or mishandling before removing any packing material or attempting to unload the unit from the truck.

- Ensure that the items on the bill of lading correspond to the material indicated in the delivery note.
- Many units include kickplates that attach to the bottom of the unit. These are shipped separately and require installation after the unit has been positioned into its destination. Store the kickplates in a secure area until needed.
- Inspect the outside of the packing material for obvious damage or rough handling.
- DO NOT remove the packaging material until the PDU is ready for installation.
- A thorough internal inspection should be conducted only after the enclosure has been positioned for installation, and prior to making electrical connections.
- Before moving the load (the unit and transport device, i.e. pallet jack or forklift), make sure that the pathway is wide enough for the load and can support the load all the way to the installation site.

If damage is observed, file a damage claim with the shipper immediately and contact your ABB representative to inform them of the equipment condition and claim.

- If there is no visible sign of damage or indication of excessive shock, verify the equipment received to the bill of lading. Report any missing or incorrect items to your ABB representative immediately.

4.2 Transport

The PDU is packaged on a pallet suitable for handling with a forklift or pallet jack.

The PDU must be moved in **upright position**.

Do not tilt cabinets **more than +/- 10°** during handling.

Move the PDU in its original packaging to the final destination.

Do not stack other packages on top: This could damage the PDU.

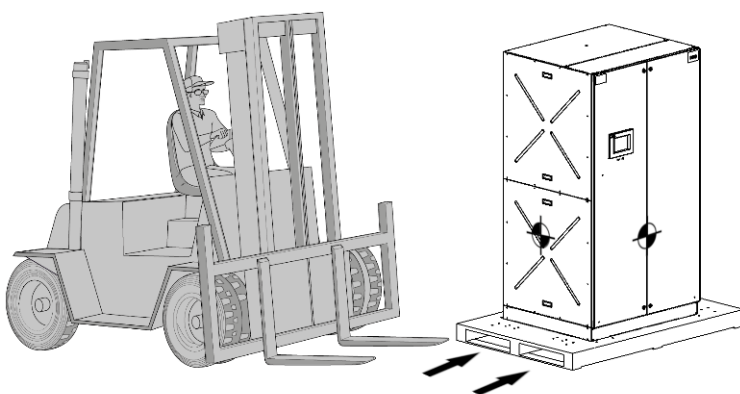


Figure 4.2.1 - Position of the forklift when moving the PDU

Forklift

Take note of the **Center of Gravity** marked on the unit or outline drawing.

Check unit weight before handling the cabinet.

Image is representative only. Consult outline drawing for detailed information.

4.2.1 Dimensions and weights TruFit PDU 50-300kVA

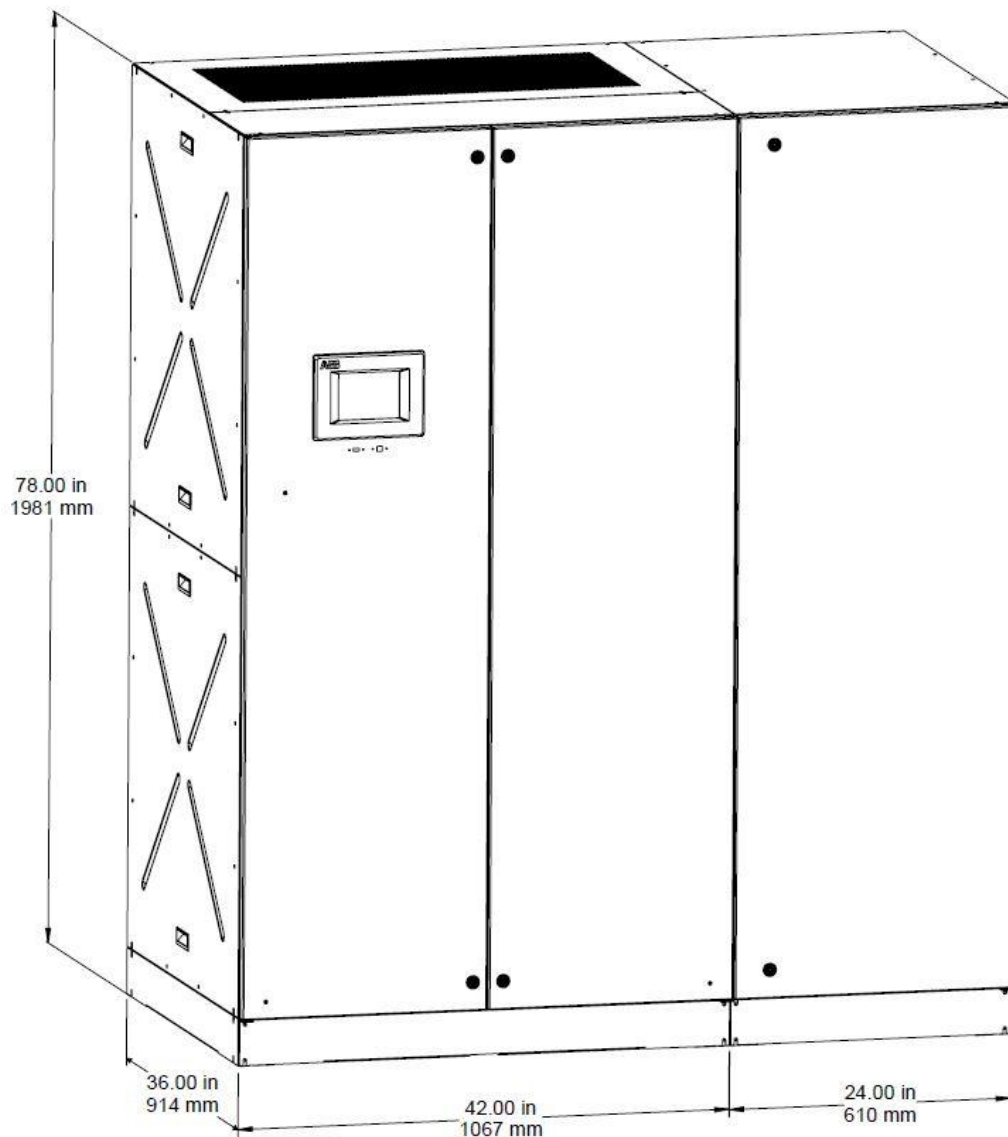


Figure 4.2.2 - TruFit PDU 50-300kVA (Left) + 24 in. Wide Side Car (Right) Dimensions

Dimensions (W x D x H):

TruFit PDU 50-300kVA
42.00 x 36.00 x 78.00 [inches] / 1067 x 914 x 1981 [mm]

24 inch / 610 mm Wide Side Car
24.00 x 36.00 x 78.00 / 610 x 914 x 1981 [mm]

Approximate Weight:

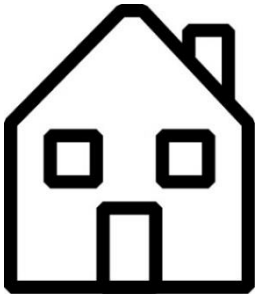
TruFit PDU 50-300kVA		
300kVA, Cabinet	2800 lbs	1270 kg
24 in / 610 mm Wide Side Car	350 lbs	159 kg

Estimated Floor Loading:

TruFit PDU 50-300kVA		
300kVA Cabinet	267 lbs/ft ²	1302 kg/m ²
24 in / 610 mm Wide Side Car	58 lbsft ²	285 kg/m ²

4.3 Storage

4.3.1 Storage of the PDU for Later Commissioning



The equipment is carefully packed for transport and storage so that it is in a perfect condition when eventually installed.

Never leave a PDU outside the building and do not store the PDU one on top of the other.

It is advisable to store the PDU in its original package in a dry, dust-free room, away from chemical substances, and with a temperature range not exceeding **-13°F (-25°C) to 131°F (55°C)**.

Care must be taken to prevent foreign objects to fall into PDU openings (e.g. debris due to construction works or fasteners). Do not perform construction work over the PDU cabinet.

Some important functions of the PDU, such as the customized functions, are defined by parameters stored in a **RAM memory**.

A small backup Battery located on the Control Unit board supplies the RAM. If the storage time of the PDU exceeds **1 year**, these functions **should be verified** by an authorized Service Center before putting the PDU into operation.

4.4 Place of installation

4.4.1 PDU location



PDU installation and connection must be performed only by an ABB Service Technician!

If optional cabinets and accessories are included with the PDU, please refer to those accompanying manuals for installation and operating instructions.

The PDU is intended for use in a restricted-access location only.

Do not locate or stock easily flammable materials in the same room as the PDU.

The PDU is designed for indoor applications only and must be protected from excessive moisture or corrosive environments. The PDU is not intended for use in the presence of explosive gases.

It is important to have a clean, dust-free environment provided with proper ventilation and air-conditioning to keep the ambient temperature within the specified operating range.

Required operating environment conditions:

- Ambient: 32°F to 104°F (0°C to 40°C)
- Relative humidity: 10 to 95% non-condensing
- Altitude: 3300 feet (1000 meters)

This unit complies with the limits for a Class A digital device in accordance with Part 15, Subpart J of the FCC rules; therefore, it is suitable for use in a commercial environment. If not used in accordance with its design intent, and in accordance with the instructions contained within this manual, PDU may cause interference with radio frequency communications. If interference is expected, the PDU should be moved away from sensitive equipment.

Check for **proper floor load capacity** before installing the PDU.

4.4.2 Positioning of the PDU

Your PDU has been designed to perform at optimum efficiency when the following positioning concerns are taken into consideration:

CAUTION

- Make sure all ventilation openings are clear of obstructions.

1. The system is designed to properly cool by using natural convection. Positioning the unit onto the raised floor ensures optimum placement practices.
 - a. Some applications may require fans to assist with cooling. Refer to as ordered documents
2. The system is enclosed in one of the industry's most substantial cabinets and contains electrical apparatus such as molded case circuit breakers, transformers, and distribution panelboards. Consequently, floor loading should be addressed to verify the PDU system does not exceed your raised floor load specifications.

Refer to section 4.2.1 for weight and dimensional specifications of your ABB product.
3. If additional raised floor supports are required, contact your raised flooring supplier or ABB for either floor jacks or full frame floor stand specifications.

4.4.3 Access

The system is designed to allow the customer to use every available square foot of computer room space for operating your computers versus your power conditioning equipment. TruFit PDU products typically require forty-two inches (42") of FRONT ACCESS for service area. Please refer to supplied outline drawing for exact service and operational access requirements.

The forty-two inches (42") of front access allows the unit to be fully serviced while also complying with most local electrical codes for access to circuit breaker distribution equipment. Please refer to applicable local electrical codes, as these will take precedence.

4.5 Handling and moving the equipment

CAUTION

- Risk of unit damage.
- Exercise extreme care to avoid equipment damage or injury to personnel.
- Do not exceed a ten (10) degree tilt by forklift or incline ramp.
- Note the unit's weight and center of gravity before handling the cabinet.

- The units are bolted to shipping pallets to allow handling by forklift or pallet jack.
- Move the equipment in its original packing to the place of installation before unpacking.
- Set the packaged units in a level area with sufficient room for removal from the shipping pallet. Remove external shipping material; locate and remove the bolts at the base of the unit (used to secure unit to the pallet). Using a forklift, raise the unit off the pallet and onto the floor. If the unit includes a sidecar, a forklift is permitted if the unit is lifted at the center of gravity.
- Internally inspect the unit per inspection items listed in section 4.6.2.



- The PDU is not designed to rest on its ends or sides, regardless of the packaging.

Consideration should be given as to how to protect the raised floor while PDU is moved across. If kick plates were provided with your unit, moving the system to location could be a little difficult. Consider removing the kick plates and then re-installing once unit is in place. NOTE: The solid kick plate option is only available for applications where the PDU is installed on a computer raised floor with chilled air being fed through the floor into the PDU for cooling. For all other applications, vented kick plates must be used to ensure adequate system cooling.

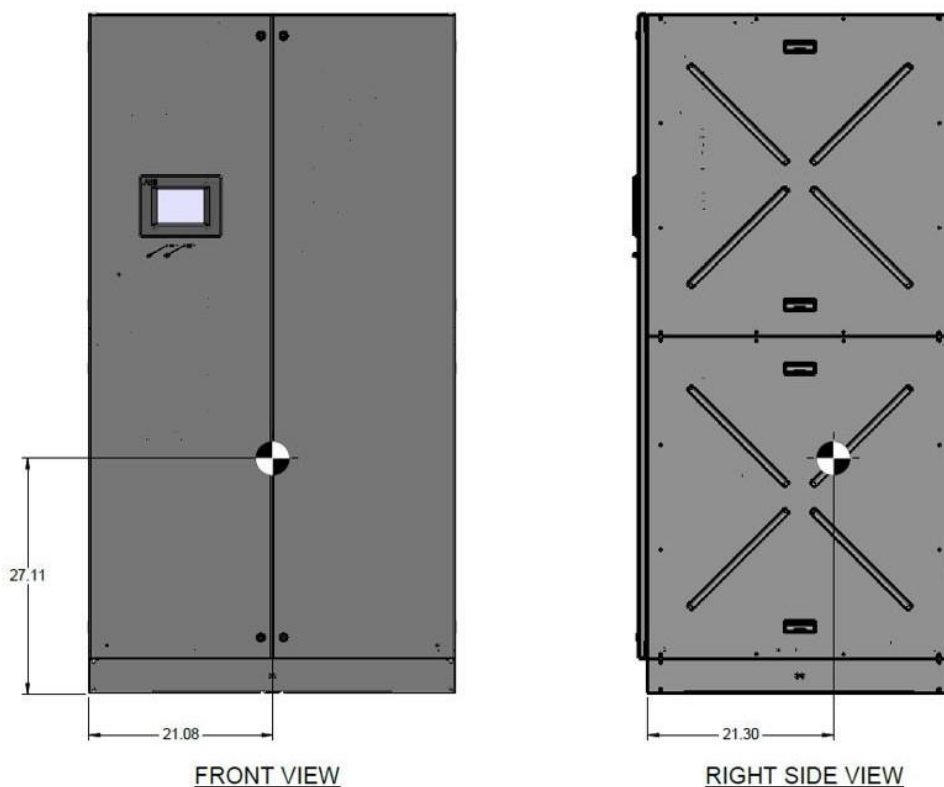


Figure 4.5.1 - TruFit PDU Center of Gravity

4.6 Checking the supplied parts

4.6.1 Packaging

Your TruFit system is protected by stretch wrap material to protect the system's heat treated, matte finished, and powder coated paint against abrasion and vibration during transit. In addition, ABB then protects each of the four corners with double wall corrugated corner boards which protect the unit during transit.

4.6.2 After Positioning the PDU

- Verify all items have been received, including spare parts if purchased.
- Carefully remove the stretch wrap by cutting the material at one of the rear corners of the system. REMEMBER, this stretch wrap is the final layer of packing material on the system, so be careful in both cutting and removing the stretch wrap.
- Verify model numbers match the numbers shown on your order. Model and serial numbers, as well as rating configuration, are located on the inside front door. Record these numbers in the front of this installation manual.
- Open the doors and interior access panels to check for shipping damage. Verify the system's main circuit breaker, any secondary main circuit breaker, and all branch circuit breakers are in the "OFF" position prior to initial system start-up.
- Check for unsecured components or any loose connections in the cabinet.
- Check for any unsafe condition that may be a potential safety hazard.
- Once the inspection has been completed and no problems found, the unit is ready for installation.

Packing material recycling!



ABB, in compliance with environment protection, uses only environmentally friendly material at the end of its service life, must be recovered conforming to the local applicable regulations.

PDU packing materials must be recycled in compliance with all applicable regulations.

4.7 Ventilation and cooling

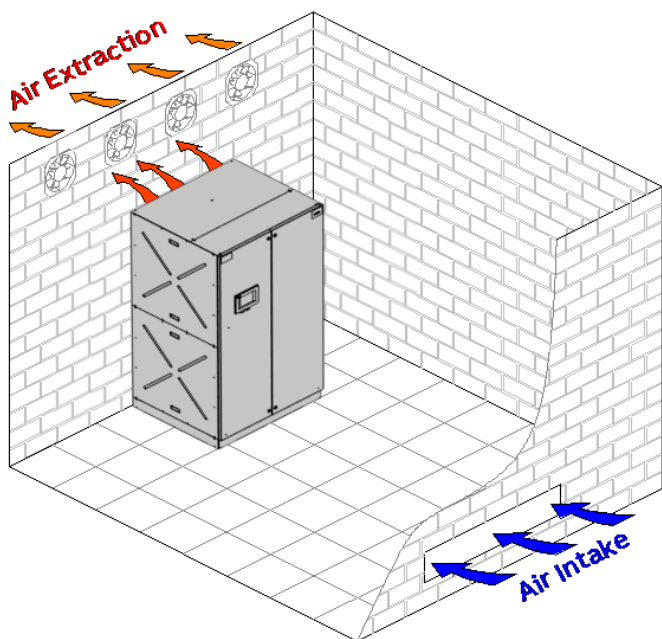


Figure 4.7.1 - Installation on plain floor

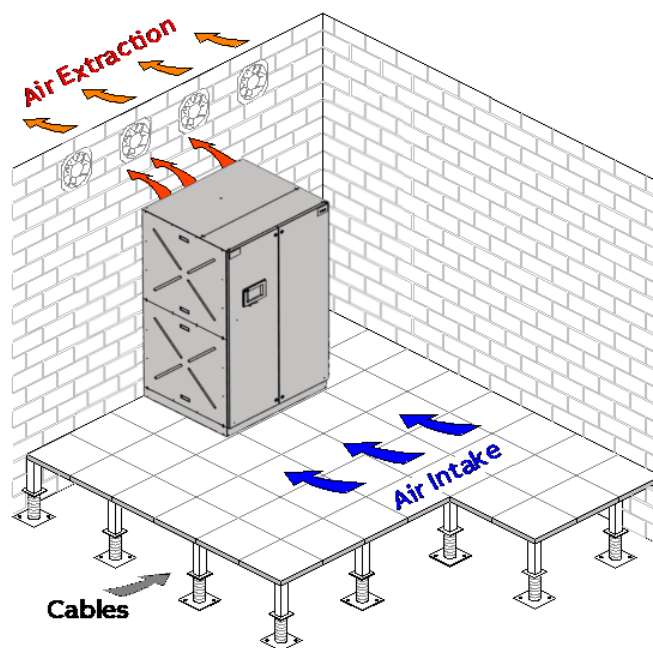


Figure 4.7.2 - Installation on raised floor

The heat produced by the PDU is transferred to the environment by its ventilation.

Ventilation air enters the cabinet through vented kickplates and exits through a vent located on top of the cabinet. Solid kickplates may be used if the PDU is installed on a raised floor with chilled air being fed through the floor.



Note!

Do not put anything on the top of the cabinet.

18" (460mm) of air clearance from the top must be left free of any object for a sufficient exhausted air exchange, proper cooling, service access and safety.

Air filtering systems could be required when the PDU operates in a dirty environment.

In order to prevent the system from overheating, proper ventilation must be provided in order to extract the heat generated by the PDU. Ensure that the ambient temperature is kept within the specified operating range of 32°F to 104°F (0°C to 40°C). Contact your **ABB Service Center** for appropriate solutions.

The below table indicates the heat dissipation at full load at **PF = 1**, up to **3280 ft** (1000 m) altitude.

PDU Model	Heat Output					
	K = 4		K = 13		K = 20	
50kVA	5,220 BTU/hr	1.53 kW	5,835 BTU/hr	1.71 kW	6,585 BTU/hr	1.93 kW
75kVA	6,278 BTU/hr	1.84 kW	7,984 BTU/hr	2.34 kW	9,451 BTU/hr	2.77 kW
125kVA	9,656 BTU/hr	2.83 kW	12,351 BTU/hr	3.62 kW	14,262 BTU/hr	4.18 kW
150kVA	11,260 BTU/hr	3.30 kW	14,092 BTU/hr	4.13 kW	16,548 BTU/hr	4.85 kW
225kVA	16,105 BTU/hr	4.72 kW	20,813 BTU/hr	6.10 kW	23,952 BTU/hr	7.02 kW
300kVA	20,506 BTU/hr	6.01 kW	26,921 BTU/hr	7.89 kW	31,459 BTU/hr	9.22 kW

4.8 Installation Instructions

The following procedure is intended to serve as an outline only in installing your TruFit product. Only qualified electricians following the guidelines of the current National Electrical Code should install any electrical apparatus, including this TruFit product. Please remember that the intended application of this unit is as an information technology distribution system.

CAUTION – Not a paralleling device



- This power distribution system is not a paralleling device! Under no circumstances shall a combination of main input or tie circuit breakers be installed in the system that will permit two (2) or more independent sources to be connected together unless custom configured for this application.



- For all stages of installation, please use caution and refer to all warning labels that are provided on your PDU.
 - Unit must not be installed in an area with a pollution rating above 2.
 - This PDU is designed to receive power from one (1) power source. When the power source is energized, this unit contains hazardous voltages. Hazardous voltages exist within the PDU PANEL. Before making any connections to the unit or performing any maintenance, ensure that all power is turned off and locked out.
 - As lethal voltages exist within all operating modes of the PDU, maintenance must be performed by qualified and trained service personnel.
 - ABB neither recommends nor knowingly sells this product for use with life support applications or other FDA-designated critical applications.
 - All wiring should be performed by qualified electricians and in accordance with local and national electrical safety codes. Before placing the unit into service, a thorough inspection and supervised start up should be performed by a qualified technician.
-

4.8.1 Main Cabinet Installation

Located at each corner of the PDU base is a foot with a ½” mounting hole. Insert a ½-13 x 3” bolt through each of the mounting holes into the floor or floor stand. Both a flat washer and lock washer should be used under the head of the bolt. Refer to Figure 4.8.1.

If the unit is equipped with casters, a stabilizing foot is located at each corner of the PDU (see Figure 4.8.1). Each stabilizing foot should be lowered to make contact with the floor. This will help to keep your system stable and in place. If a floor stand is used, then a 1/2-13 x 3” bolt should be installed through the corner supports as described above.

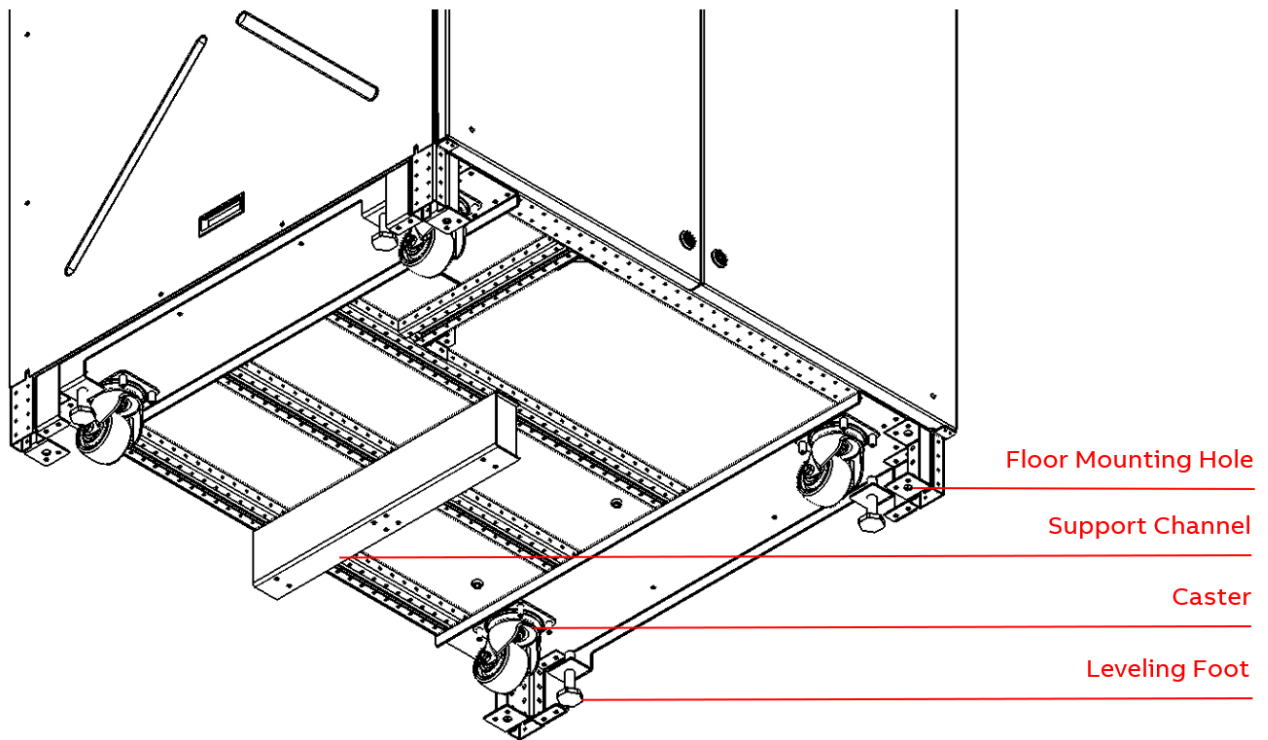


Figure 4.8.1 - Cabinet mounting features with optional casters

4.8.2 Sidecar Installation

If the PDU includes a distribution sidecar, internal connections are made before shipping. The sidecar should be attached to the floor following the same steps as in the previous section. Electrical attachments to both the main cabinet and sidecar should follow the instructions outlined in section 4.9.

4.8.3 Floor Stand Installation Instructions

- Inspect concrete prior to installation; **floor stand cannot be bolted on cracked or damaged concrete.**
- Bolt the floor stand to the floor using HILTI HIT-RE 500 + HAS 1/2 x 6 1/2 adhesive anchor system. Ensure a minimum depth of 3 1/4" embedded into concrete. After installation, inspect the concrete for cracks or damage. All anchors must be perpendicular to the concrete with the nuts tightened flush to the steel foot.
- Position the cabinet onto the floor stand in the orientation shown in Figure 4.8.2.
- Using the holes at each corner, attach the cabinet to the floor stand using 1/2-13 x 3" Grade 5 bolts and place both a flat washer and a lock washer under the head of the bolt.

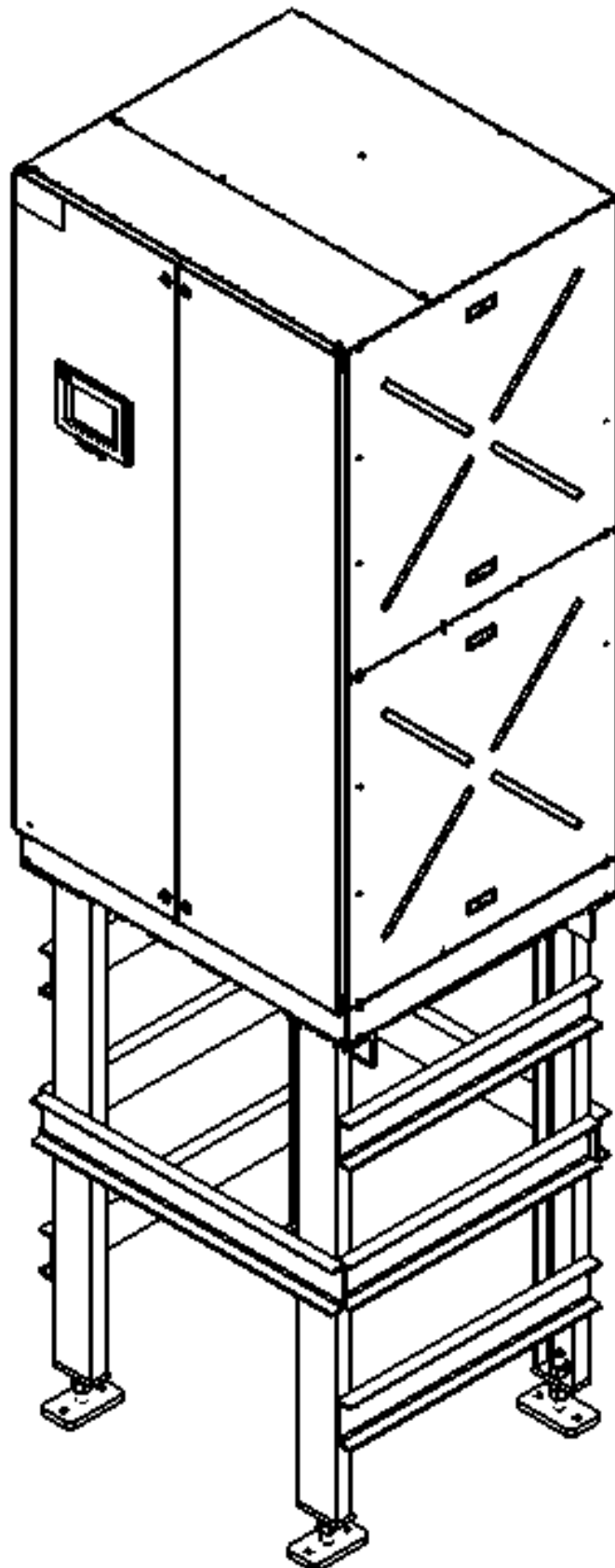


Figure 4.8.2 - Cabinet position on floor stand

4.8.4 Kick Plate Installation Instructions

Kick plates are added to properly channel air flow through the unit, depending on the application. Solid kick plates are available when the unit is installed on a raised floor and forced ventilation from the unit's bottom is present. Vented kick plates are typically used on units installed on solid floors, where no ventilation is available from beneath the floor.

The kick plates are typically installed last so that the bottom of the unit is accessible for moving the unit and routing cable. Be sure to identify the kick plate kit during unpackaging and store it safely until the unit is in position and ready for installation of the kick plates.

Kick plate kit parts list:

- (16) ¼-20 screws
- (2) Front/back kick plates
- (2) Side kick plates

Assembly procedure:

Attach each side, front, and back kick plate to the frame using (4) ¼-20 screws. The screws in this kit are thread forming so a high amount of torque may be required to start threading them into the frame. Over tightening the screws may cause damage to the kick plate.

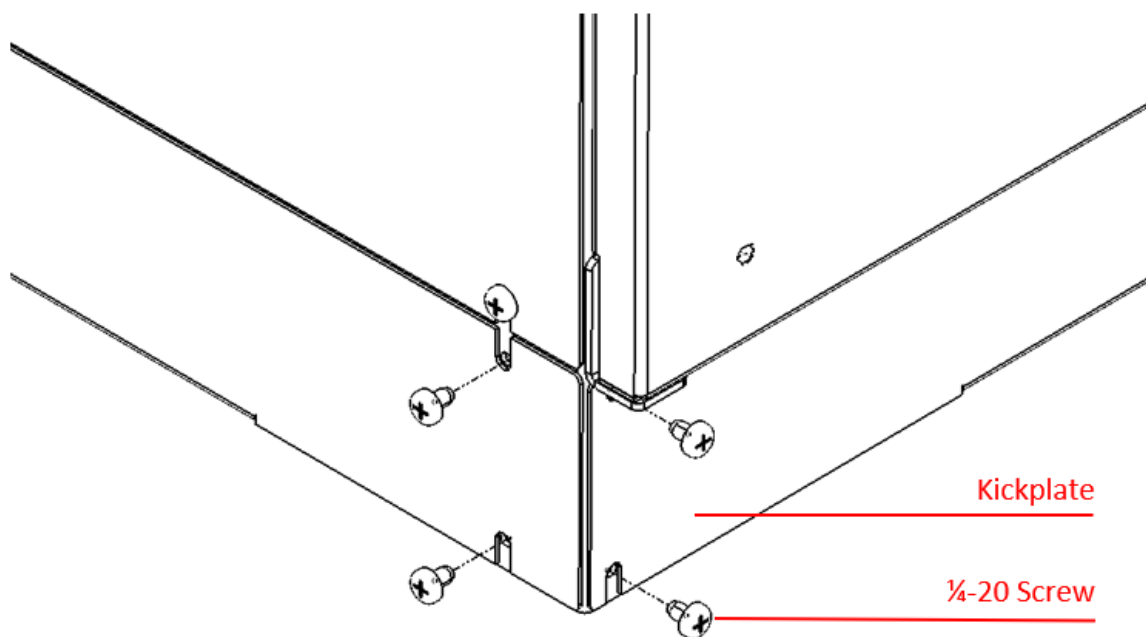


Figure 4.8.3 - Kick plate installation

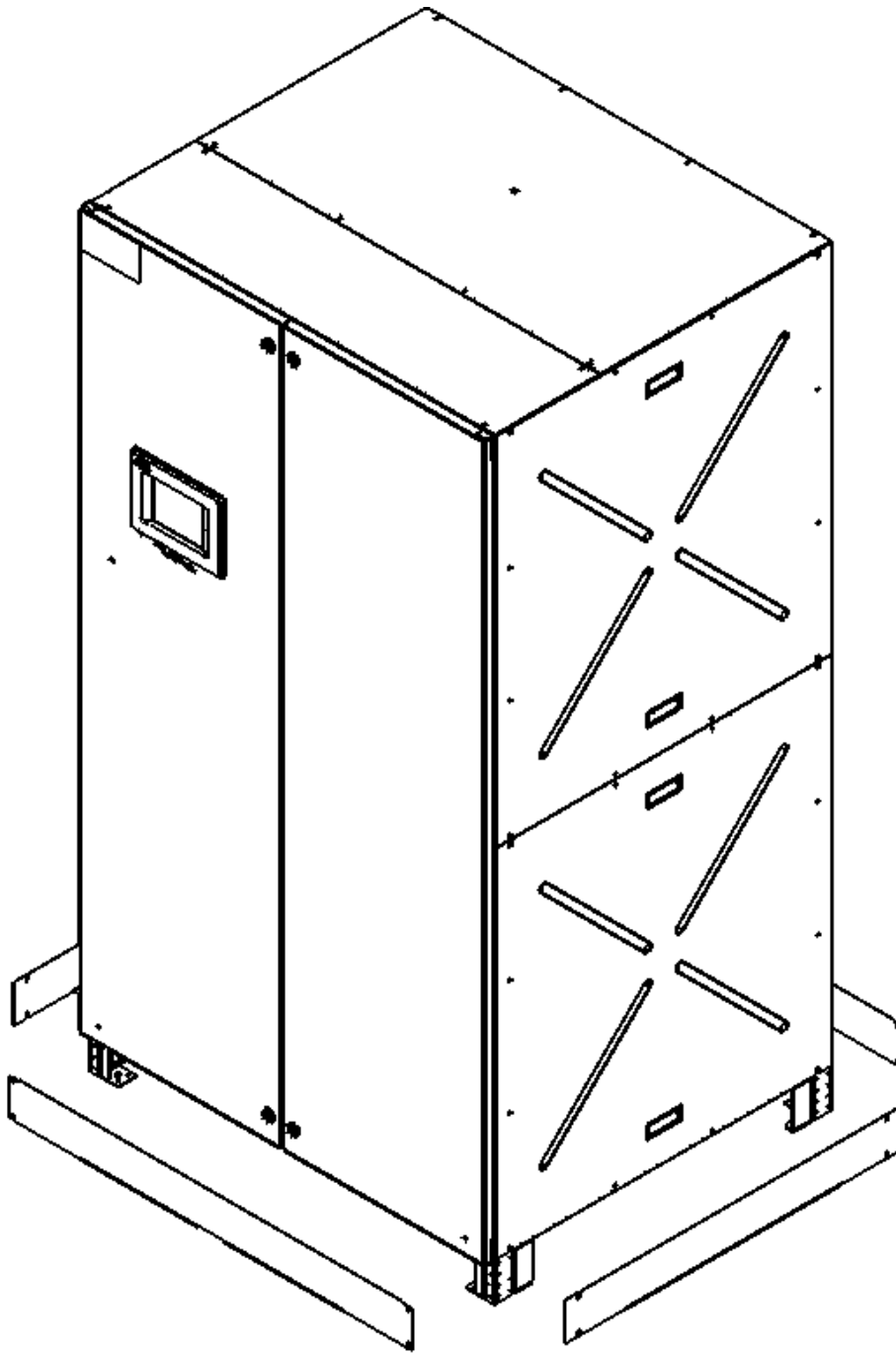


Figure 4.8.4 - Kick plate positioning at bottom of unit

4.9 Electrical wiring

⚠ WARNING

Upstream overcurrent protective devices (OCPD) must be provided by the customer in accordance with the NEC and local codes.
See Section 7 for manufacturer's OCPD recommendations.

4.9.1 Pre-checks

The TruFit is designed for operation with a three (3) wire grounded source. The unit is designed to operate from a power source with a phase rotation of A-B-C only.

4.9.2 Equipment Terminals

4.9.2.1 Main Input Terminals

Plated copper bus bars, to accommodate standard NEMA two (2) hole lugs are provided internal to the unit for input power and grounding power connections and are accessible from the front, as shown in Figure 3.1.3.

4.9.2.2 Subfeed Terminals

Phase connections to subfeed circuit breakers are to be made directly on the breaker in accordance with the breaker manufacturer's recommendations. Copper bus bars for NEMA two (2) hole lugs are also provided for subfeed ground and neutral connections. Refer to the outline drawing for specific model connection details, such as dimensioned bus bar hole patterns.

Torque recommendations for XT-series breakers are shown in the table(s) below.

Min. and max. lug widths for connections to sub-feed breakers provided in front terminal table.

Table - Front Terminals:

Terminals for circuit breaker

Front terminals - F

CB	Vers.	Busbars dimensions [mm/in]						Cables terminals [mm/in]		Tightening [Nm/lb-in]	
		W min	W max	H	Ø	D min	D max	W	Ø	Cable or busbar / Terminal	
XT3	F	17/ 0.669	24/ 0.945	9.5/ 0.374	8.5/ 0.335	5/ 0.197	8/ 0.315	24/ 0.945	8.5/ 0.335	M8	8/ 70.8
XT4	F	17/ 0.669	25/ 0.984	10/ 0.394	8.5/ 0.335	5/ 0.197	8/ 0.315	25/ 0.984	8.5/ 0.335	M8	8/ 70.8
XT5	F	25/ 0.984	35/ 1.378	12/ 0.472	10.5/ 0.413	5/ 0.197	10/ 0.394	35/ 1.378	10.5/ 0.413	M10	28/ 247.82

Table - Mechanical Lugs:

Terminals for copper/aluminium cables - FCCuAl

CB	Type of terminal	Vers.	Cable		Tightening		
			AWG/ kcmil	mm ²	[Nm/lb-in]		
					Terminal/ CB	Cable or busbar/ Terminal	Terminal
XT2	internal	F-P-W	1x14...1/0	1x2.5...50	2.5/22	3/16	≤ 10mm ² (8 AWG):4.5/40 > 10mm ² (8 AWG) 5.7/50
	internal	F-P-W	1x10...2/0	1x6...70	3.4/30	M4	≤ 10mm ² (8 AWG):4.5/40 > 10mm ² (8 AWG) 9/80
XT3	internal	F-P	1x14...1/0	1x2.5...50	9/80	slot	≤6mm ² (10 AWG) 2.3/20.4 >6mm ² (10AWG) 5.6/50
	internal	F-P	1x4...300	1x35...150	9/80	M6	22.6/200
XT4	internal	F-P-W	1x14...1/0	1x2.5...50	9/80	slot	≤6mm ² (10 AWG) 2.3/20.4 >6mm ² (10AWG) 5.6/50
	internal	F-P-W	1x4...300	1x35...150	9/80	M6	22.6/200
XT5	internal	F-P-W	1x6...350	1x35...185	28/250	M8	35/310
	internal	F-P-W	1x4/0...500	1x120...240	28/250	M8	43/380
	external	F-P-W	2x2/0...500	2x70...240	28/250	M8	31/275

4.9.2.3 Panelboard Terminals

Refer to panelboard manufacturer's documentation for detailed installation instructions. Refer to circuit breaker documentation for allowable wire temperature rating, wire size and tightening torque.

General recommendations:

Tightening torque for line, neutral and equipment ground terminal

Slotted Screw		
AWG Wire	Lbs-Ins	
	Min	Max
14-10	32	35
8	36	40
6-4	41	45
3-2/0	45	50

Internal Hex		
Hex Size	Lbs-Ins	
	Min	Max
3/16	108	120
1/4	180	200
5/16	240	275
3/8	330	375
1/2	450	500

Hardware torque values

Screw Size	Torque (In-Lbs)
#4 Steel	16
#10 Plastic	16
#8 Cu/Al/Steel	24
#10-32 Cu/Al/Steel	32
1/4-20 Al/<.150 Thick Cu	44
1/4-20 .150 Thick Cu	60
5/16-18 Cu/Al/Steel	110
3/8-16 Cu/Al/Steel	220
1/2-13 Cu/Al/Steel	220

CT wire routing:

Every CT has an internal protective resistor which allows for safe voltages across all the CTs even when the secondary is opened. The CT Strip Assemblies are designed to sense branch currents from panelboards. The power wire from each branch circuit breaker will pass through a CT (with 1 turn) on the CT Strip Assembly. A secondary sensing signal is brought to the PowerView Module via the wire harnesses.

Type and AWG of CT Load Wire: All 8AWG & THHN 6AWG (or Equivalent)

Neutral & Ground bus terminals:

Terminals are provided for Panelboard neutral and ground connections, as shown below.

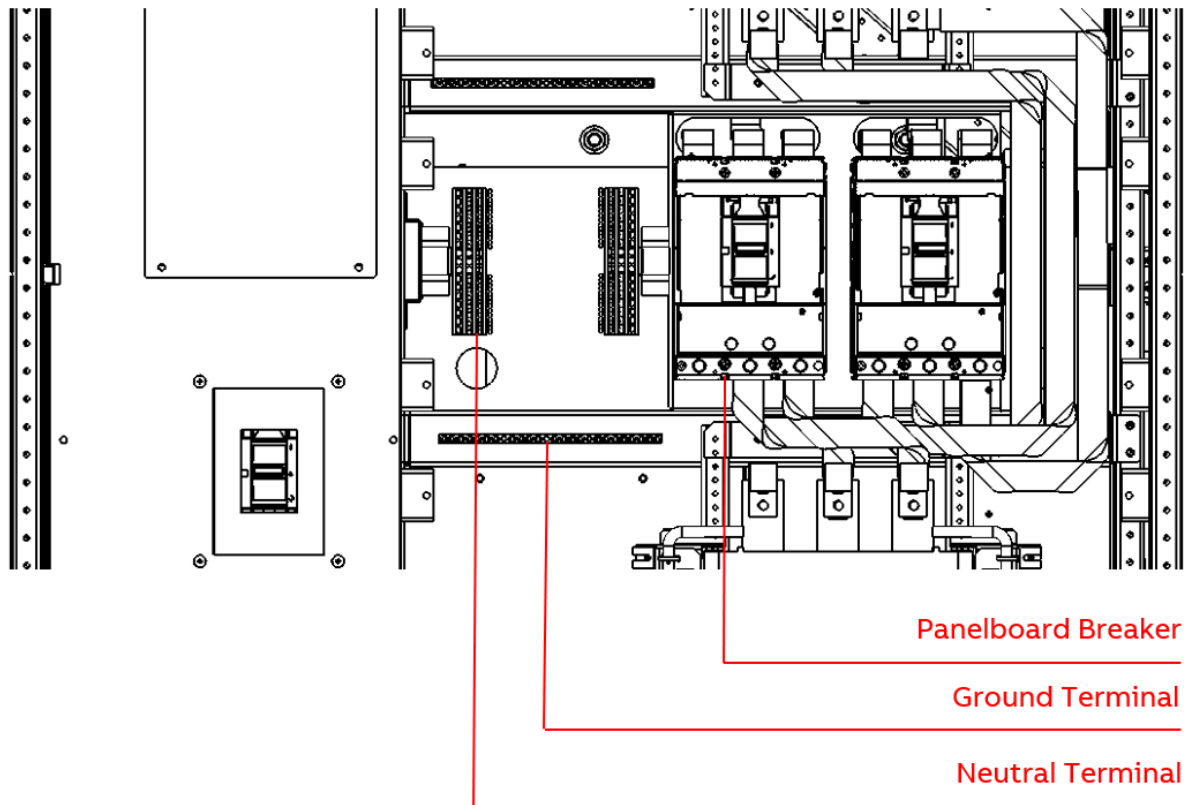


Figure 4.9.1 – Neutral and ground terminal locations

Recommended Torque values

Wire AWG	Torque lb-in.
14-10 Cu, 12-10 AL	20
8	25
6-4	35
two 14 or 12 Cu, two 12 or 10 AL	25

4.9.3 Main/Power circuit installation

All wiring methods and materials must comply with the NEC and applicable local codes, and be installed by a qualified electrician.

Cable entrance/exit is from either the top or bottom of the unit via removable conduit plates. Conduit openings and fittings are to be provided by the installer, refer to the outline drawing for permitted opening locations. Consult the factory if other NEC compliant methods are intended to be used for the connection of power circuits.

Wiring shall be sized in accordance with the NEC, on the basis of 75°C rated, copper conductors and the applicable installation and environmental conditions; see table below for maximum recommended wire sizes and lugs. Equipment grounding conductors shall be provided for each input and output power feed, sized in accordance with the NEC based on the upstream overcurrent protective devices.

PDU kVA	Main CB / upstream OCPD Amps	Cable type (per phase)	Thomas & Betts Lug	Ground Cable	Thomas & Betts Lug
50	125AF / 75AT	1 x #4	256-30695-733PH	#6	256-30695-868PH
75	125AF / 125AT	1 x 1/0	256-30695-593PH	#6	256-30695-868PH
125	250AF / 200AT	1 x 4/0	54868BEPH	#6	256-30695-868PH
150	250AF / 225AT	1 x 300kcmil	54870BEPH	#4	256-30695-733PH
225	400AF / 350AT	2 x 3/0	54864BEPH	#3	54811BEPH
300	600AF / 450AT	2 x 250MCM	54870BEPH	#1	54857BEPH

Maximum Recommended Cable Sizes and Compression Lugs - Main Breaker

Use lugs consistent with applicable codes; ABB recommends the long barrel, NEMA 2-Hole compression lugs shown in Table 3-1 for connections to the TruFit using code stranded copper conductors. For all input and output power circuit connections, ABB recommends using SAE Grade 5 hardware with Belleville spring washers. Always use two (2) wrenches when tightening connections to prevent distortion or damage. Refer to Section 5.2 for standard hardware torque specifications. Refer to individual electrical components' labels (e.g. molded case switches) for component specific torque specifications.

4.9.4 Control/Auxiliary circuit installation

Control wiring must comply with the NEC and applicable local codes. A qualified electrician must install all wiring. Two suggested routes for incoming control power are shown below. Control wire & cables should be routed such that installation and removal of barriers should not be hindered, and access to components and wiring shall not be prevented. Installer is responsible to maintain separation between control wiring and power cables.

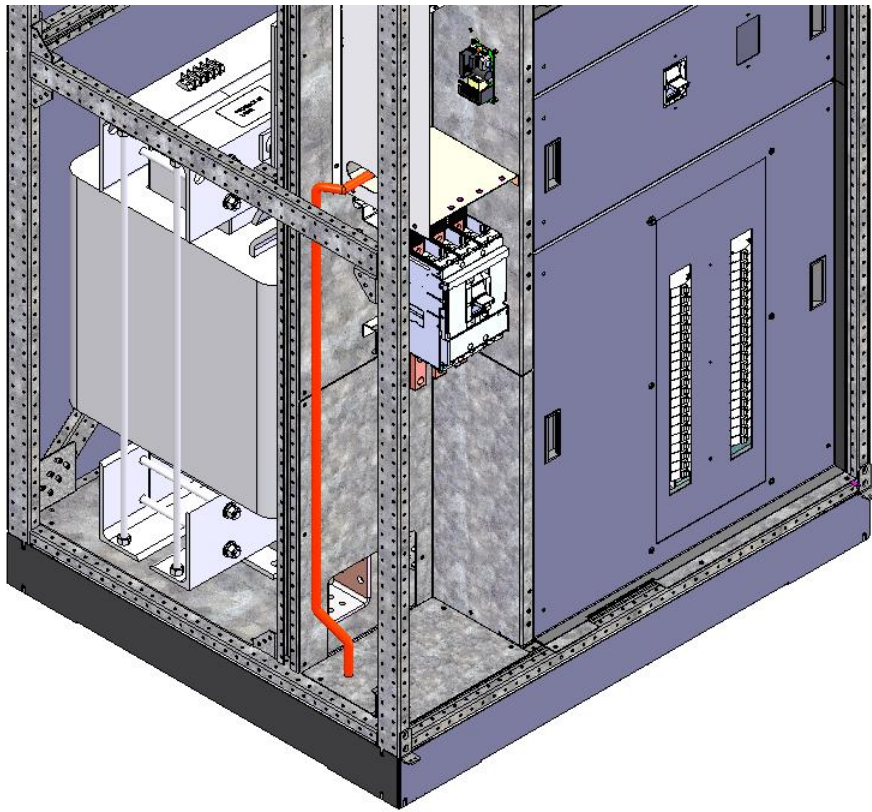


Figure 4.9.2 - Suggested control wire routing to UIB from bottom

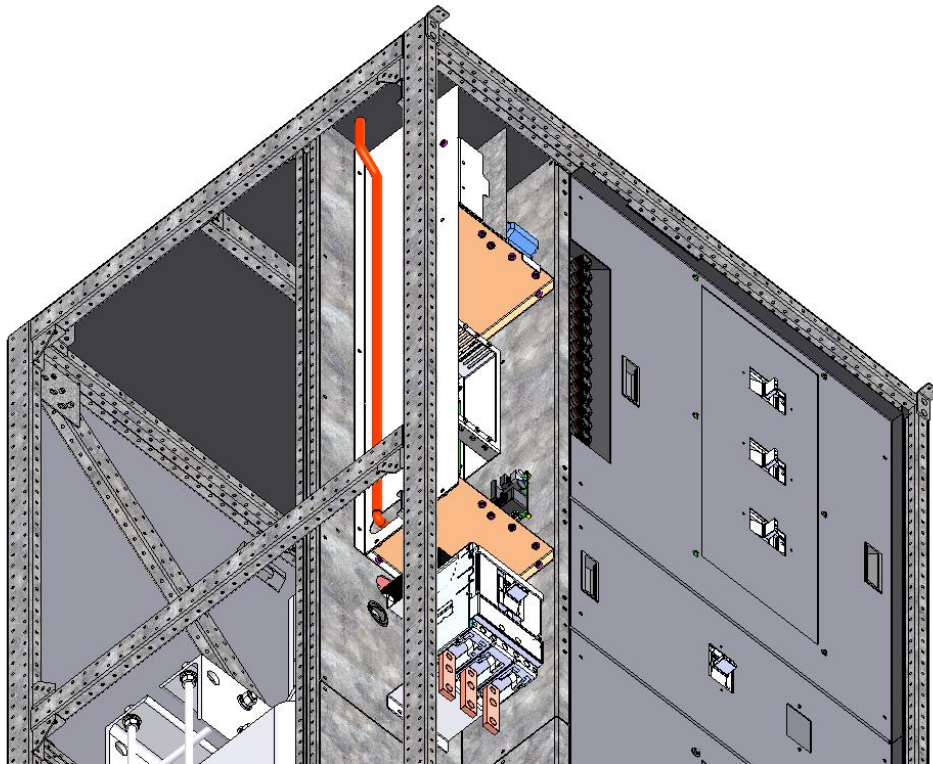


Figure 4.9.3 - Suggested control wire routing to UIB from top

4.9.5 Thermocouple Installation

Thermocouples are used for PDU systems equipped with Powerview Thermal Monitoring. The thermocouple sensor is encased inside of a molded silicone housing, which allows for flexible installation around a curved power wire. The silicone housing has a self-adhesive foil backing to aid in securing the sensor to the power wire.

Thermocouple sensors have a standard cable length of 15ft. Terminals or crimped connections should not be used to extend cable lengths, as signal loss will occur, and affect temperature readings.



- Thermocouple cable installation is typically performed by ABB personnel, but individual situations may dictate otherwise.
 - **If installing thermocouple cables to the Powerview Thermocouple Interface Board (TIB), please contact ABB Service Center at 1-800-292-3739 for support.**
-

To install:

- Position the sensor head (A) with the foil backing in contact with the cable insulation.

CAUTION

The foil backing provides quick response to temperature changes, but inherently has a low resistance and lack of isolation. **Care must be taken to ensure the thermocouple is positioned with a minimum clearance of 2" creepage over surface, per UL891.**

- Remove paper liner from foil backing to expose adhesive and apply pressure while wrapping silicone housing around the cable.
- Secure sensor head and thermocouple cable to power wire with **plastic** cable ties. Ensure cable tie is taut, preventing rotation or slippage of any component in the securing scheme. Take care not to overtighten or deform the sensor head or thermocouple cable.



Securing tension is dependent on the cable tie used and should be specified by the manufacturer. For example, Thomas & Betts TY23M Ty-Rap® is installed with Tool ERG50, at tension setting 6 – 8.

- The thermocouple cable (B) should be routed away from the back of the sensor as shown.

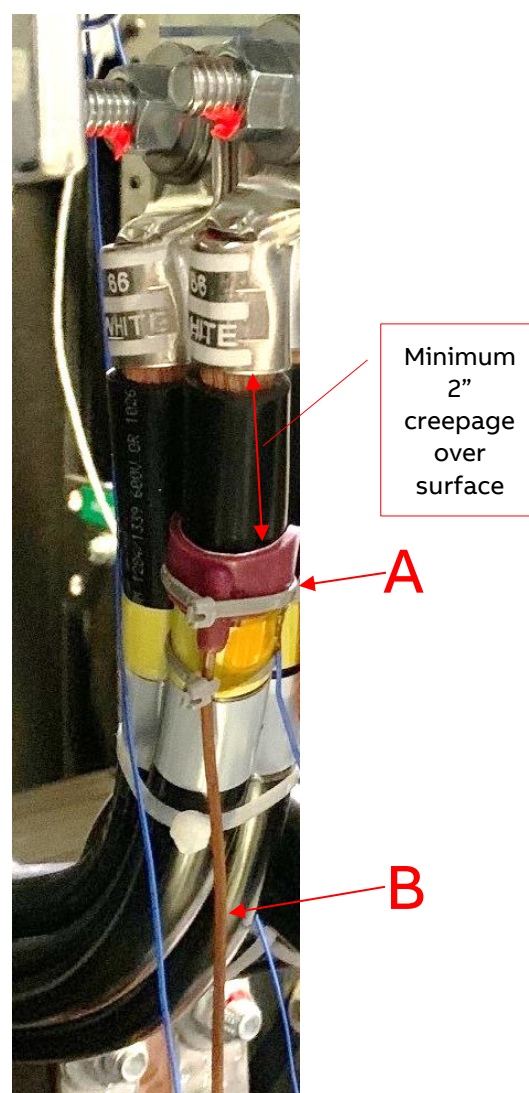


Figure 4.9.4 – Thermocouple installation

4.10 User Interface Board

The User-Interface Board (UIB) provides an interface for connecting the PDU to external monitoring and control equipment. The main features of this board include the following items. (Also see Figure 4.4.1 below.)

1. Alarm relay contacts (Form C)

Alarm designation	Terminals (J12)	Contact type
Summary alarm	1 – 3	NO/CFA
	2 – 3	NO/OFA
Unacknowledged events	4 – 6	NO/CFA
	5 – 6	NO/OFA

Default settings

NO = Normally Open (when relay coil is de-energized)

NC = Normally Closed (when relay coil is de-energized)

CFA = Closed for Alarm

OFA = Open for Alarm

2. Remote Emergency Power Off (REPO) user input

Closing the circuit between J8-11 and J8-12 forces a shunt-trip on the input breaker. (For use with isolated dry contacts.)

3. Ethernet connection

J7 (RJ-45 connector) is for an Ethernet connection to the PDU. For cybersecurity compliance and list of open ports, refer to TruFit User's Manual.

4. RS-485 (Modbus-RTU) connection

The 5-point terminal block, J3, is for an RS-485 (Modbus-RTU) connection. It can be connected to a building monitoring system.

Refer to **Modbus** section in **PowerView manual 94-1100-00002861** for more details.

All field wiring connections are made via pluggable screw terminals, rated for **solid or stranded wiring sized #12 to #22AWG**.

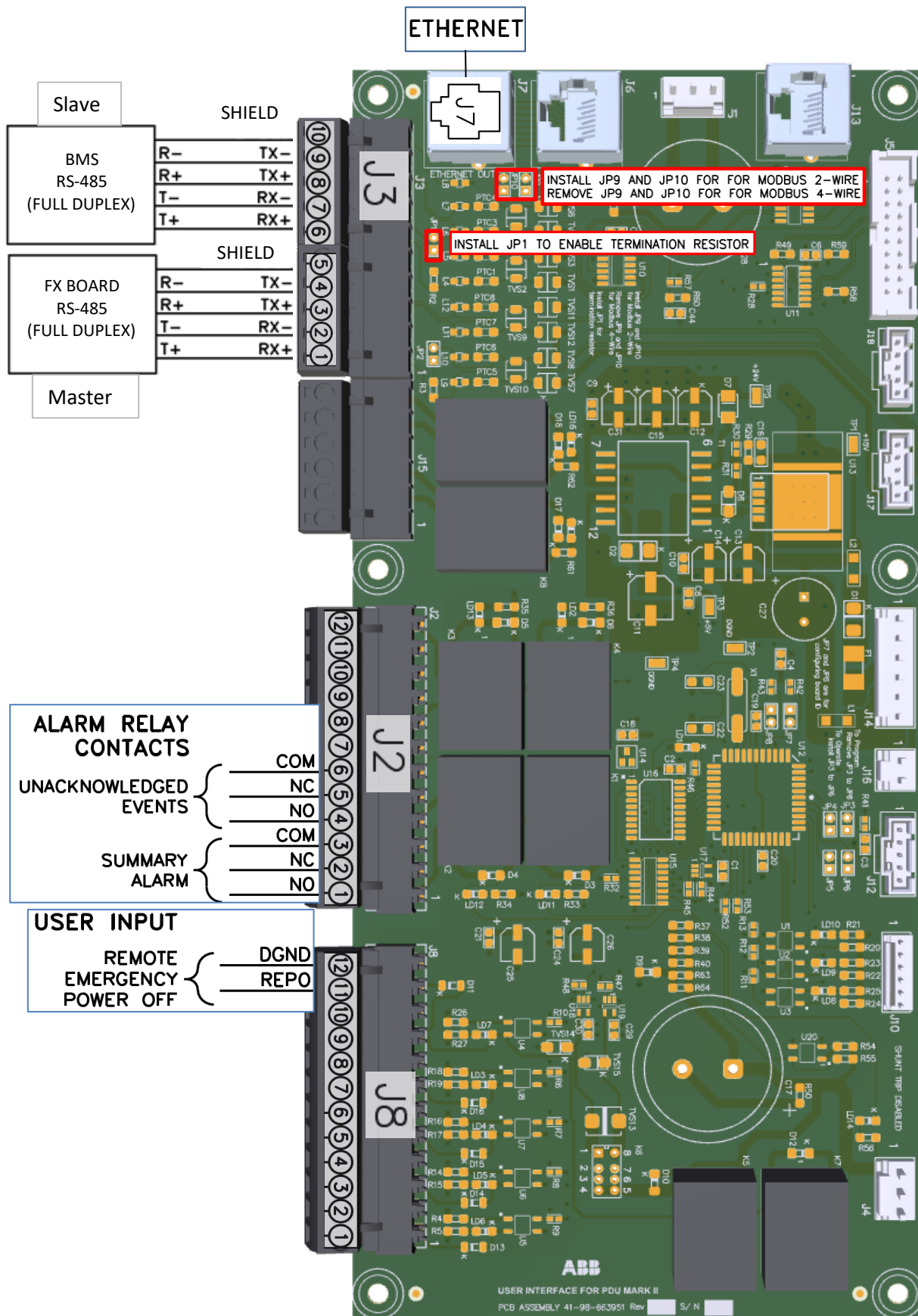


Figure 4.10.1 - Suggested control wire routing to UIB from top

4.11 Final installation checks

After unit installation and connection is complete, there are a few important final steps to perform:

- Clean the equipment carefully to remove any debris, wire strands, packing material, etc., which may have accumulated.
- Replace any barriers which may have been removed during installation.
- Ensure kickplates are installed if they were removed during installation.
- Inspect side panels for damage.
- Inspect all connectors for proper electrical and physical integrity.
- Ensure proper cabinet grounding; verify external ground wire has been brought into the cabinet and connected to the ground bus bar only.
- Verify all power wire connections are crimped or tightened properly. Recommended torque values are listed in the Appendix section of this document.
- Verify all breakers are in the open position.

ABB Service Center personnel can provide a more detailed final checklist prior to energizing the unit.

5.2 Tightening torques

Recommended tightening torque for all nuts and bolts is listed in the table below. As applicable, torque seal has been utilized to indicate bolt torqueing.

Table 5-1: Recommended tightening torque

Thread Size	SAE Grade 5 120,000 psi Medium Carbon Heat T.	
	Inch	Lb-ft
1/4	6	8
5/16	11	15
3/8	20	27
1/2	48	65

All internal bolts are SAE Grade 5.

Note bolt head markings above to distinguish between grades.

All internal machine screws are Grade 2.



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