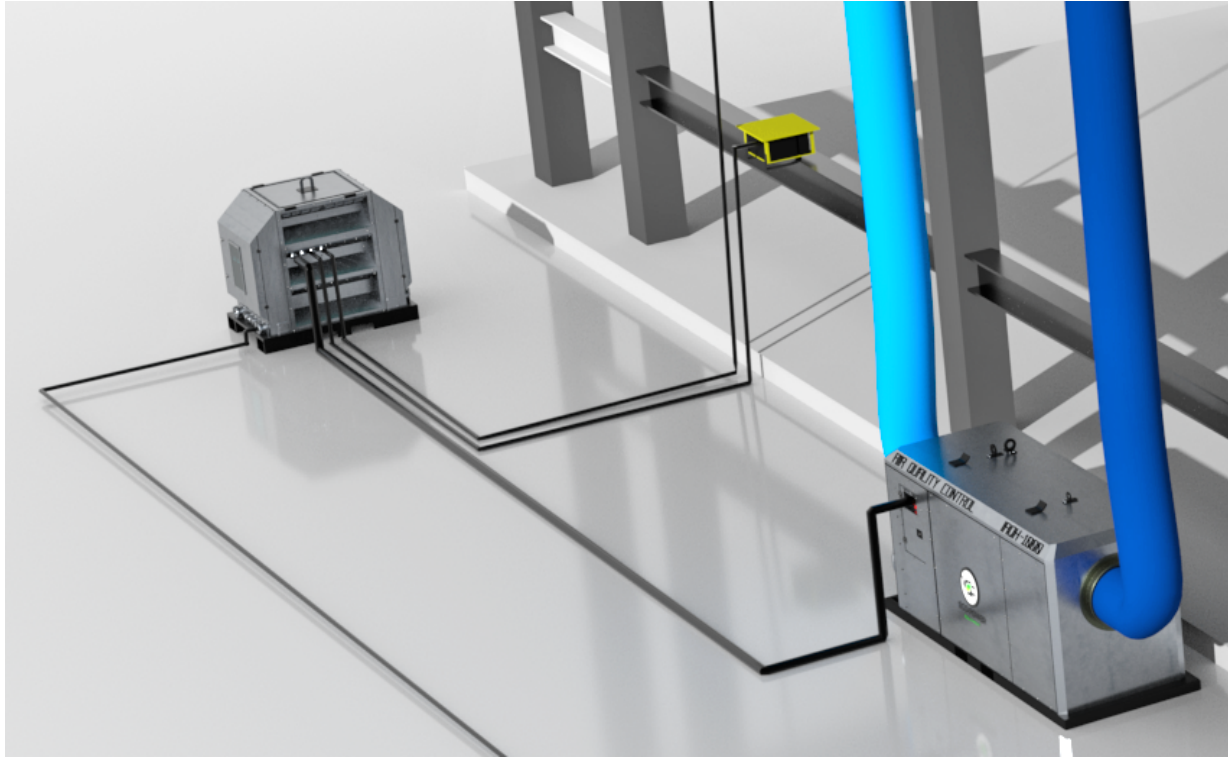




Installation and User Instructions

SBP-XFMR Series







March 2022

Version 1.0

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All pertinent state, regional, and local safety regulations must be observed when installing and using this product.

When devices are used for applications with technical safety requirements, the relevant instructions must be followed.

Failure to observe this information can result in injury or equipment damage.

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Product Modifications

Year	Type	Modifications
2022	1	SBP-XFMR V1

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Date	Version Number	Document Changes



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1. PREFACE

1.1 Description of the User

This manual is intended to support end users of the Eco Power Equipment SBP power distribution products. Our products are designed and intended to provide site power solutions for temporary and prime rated power on a variety of applications including construction job site, oil, and gas job sites, pipelines, events, security, and government or military operations.

The user will deploy and set up the SBP and should be qualified and follow all instructions contained in this operating manual.

1.2 Conventions Used in This Manual

The following style conventions are used in this document:

Bold

Names of product elements, commands, options, programs, processes, services, and utilities Names of interface elements (such windows, dialog boxes, buttons, fields, and menus)

Interface elements the user selects, clicks, presses, or types

Italic

Publication titles referenced in text

Emphasis (for example a new term)

Variables

`Courier`

System output, such as an error message or script

URLs, complete paths, filenames, prompts, and syntax

User input variables

< > Angle brackets surround user-supplied values

[] Square brackets surround optional items

| Vertical bar indicates alternate selections - the bar means “or”

1.3 Explanation of Safety Warnings

⚠ DANGER

Danger indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury

⚠ WARNING

Warning indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.

⚠ CAUTION

Caution indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.

NOTICE

Indicates information considered important, but not hazard-related.

1.4 Retaining Instructions

Read and understand this manual and its safety instructions before using this product. Failure to do so can result in serious injury or death.

Follow all the instructions. This will avoid fire, explosions, electric shocks or other hazards that may result in damage to property and/or severe or fatal injuries.

The product shall only be used by persons who have fully read and understand the contents of this user manual and understand the safe operation of the machine.

Ensure that each person who uses the product has read these warnings and instructions and follows them.

Keep all safety information and instructions for future reference and pass them on to subsequent users of the product.

The manufacturer is not liable for cases of material damage or personal injury caused by incorrect handling or non-compliance with the safety instructions. In such cases, the warranty will be voided.



1.5 Obtaining Documentation and Information

1.5.1 Internet

The latest version of the documentation is available at the following address: <http://www.ecopowerequip.com>

1.5.2 Ordering Documentation

Documentation, user instructions and technical information can be ordered by calling Eco Power Equipment Ltd. at 1-888-483-4843

1.5.3 Other languages

This is the English user manual. Manuals in other languages are available upon request. Not all languages are covered.

1.5.4 Documentation Feedback

If you are reading Eco Power Equipment Ltd. product documentation on the internet, any comments can be submitted on the support website. Comments can also be sent to support@ecopowerequip.com

We appreciate your comments.

1.5.5 Support and service

For information about special tools and materials please contact:

Eco Power Equipment

Address: #8, 26004 TWP 544, Sturgeon County, AB, T8T 0B6

Phone: 1-844-332-0924

Web: www.ecopowerequip.ca

For other questions, information, technical assistance, ordering user instructions, and service related information please contact the manufacturer:

Eco Power Equipment Ltd.

Address: #8, 26004 TWP 544, Sturgeon County, AB, T8T 0B6

Phone: 1-888-483-4843

Web: www.ecopowerequip.com



2 Description of the product

2.1 Intended Use and Reasonably Foreseeable Misuse

The machine is a mobile, skid-mounted transformer with integrated power distribution panel board and receptacle outlets. This system is designed to support power distribution application. The Eco Power Equipment SBP unit consists of a skid with power distribution equipment mounted within a NEMA 3R tested sheet metal enclosure.

This machine is intended for prime rated power requirements and has been designed to operate 24/7. This equipment is also intended for the purpose of supplying electrical power to connected loads. Refer to the product rating plate for the output voltage and frequency of the unit, and for the maximum output power limit of the panel.

This machine has been designed and built strictly for the intended use described above. Using the machine for any other purpose could permanently damage the machine or seriously injure the operator or other persons in the area. Machine damage caused by misuse is not covered under warranty.

The following are some examples of misuse:

Connecting a load that has voltage and frequency requirements that are incompatible with the rating

Overloading the machine with a device that draws excessive power during either continuous running or start-up

Operating the device in a manner that is inconsistent with all federal, provincial and local codes and regulations

Operating the machine outside of factory specifications

Operating the machine in a manner inconsistent with all warnings found on the machine and in the Operator's Manual

This machine has been designed and built in accordance with the latest Canadian safety standards. It has been engineered to eliminate hazards as far as practicable and to increase operator safety through protective guards and labeling. However, some risks may remain even after protective measures have been taken. They are called residual risks. On this machine, they may include exposure to:

Electric shock and arc flash

To protect yourself and others, make sure you thoroughly read and understand the safety information presented in this manual before operating the machine



Follow safe Electrical Work Practices:

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E, CSA Z462.
- This equipment must only be installed and serviced by qualified electrical personnel.
- Turn off all power supplying this equipment before working on or inside the equipment.
- Always use a properly rated voltage sensing device to confirm all power is off.
- Read and understand this entire instruction bulletin and the latest edition of the included NEMA PB 1.1 standards publication before installing, operating, or maintaining this equipment.
- Local codes vary, but are adopted and enforced to promote safe electrical installations. A permit may be needed to do electrical work, and some codes may require an inspection of the electrical work.
- Replace all devices, doors, and covers before turning on power to this equipment.

Failure to follow these instructions will result in death or serious injury.



2.2 Maintenance

Eco Power Equipment Recommends all customers integrate a routine maintenance for all mobile power distribution equipment. This equipment has been designed to provide mobile power distribution and as such we recommend our customer implement a routine maintenance program:

1. Torque Check Procedure: All mobile power distribution should undergo regular torquing procedures before use. This procedure should be developed based on the movement and usage of the equipment. With regular checking and verification of critical connection points, here are some examples:
 - a. Hubbell Bus Tab Connection Points: 107-inch lb (9 ft-lb)
 - b. MCCB Tab to Breaker Bolts: 288 in-lbs (24 ft-lb)
 - c. MCCB and other items have torque ratings directly labelled on the device
2. Thermal Inspection: Abnormal heating associated with high resistance or excessive current flow is the main cause of many problems in electrical systems. Infrared thermography allows us to see these invisible thermal signatures of impending damage before the damage occurs. When current flows through an electric circuit, part of the electrical energy is converted into heat energy. This is normal. But, if there is an abnormally high resistance in the circuit or abnormally high current flow, abnormally high heat is generated which is wasteful, potentially damaging and not normal.

2.3 Setup Process

The setup and deployment process involved for the SBP-XFMR series power distribution panel involves locating the unit on a level, suitable terrain, connecting earth ground, and connecting electrical distribution.

Before using the unit, be sure to read and understand all of the instructions. This equipment was designed for specific applications; DO NOT modify or use this equipment for any application other than which it was designed for. Equipment operated improperly or by untrained personnel can be dangerous.

Before using a unit visually inspect the unit for damage. A complete visual inspection of all power distribution connections.

Equipment Spacing:

Eco Power Equipment recommends that SBP-XFMR type power transformers be mounted so that there is an air space of no less than 305 mm (12") between the enclosure and any adjacent wall unless otherwise marked. Furthermore, it is recommended that a minimum air space of 610 mm (24") be allowed above the transformer for adequate cooling. A minimum working space of 762 mm (30") is recommended for all removable access panels that provide access to connections, and any renewable or adjustable parts / accessories. If the transformer must be located near a combustible surface / wall, the minimum clearance established by the Local Electrical Code and Fire Marshal should be maintained.



Location and Environment

Dry type transformers should be located such that they comply with all applicable local safety and electrical codes. It should not interfere with the normal movement of personnel, equipment and material and should not expose the transformer to potential damage from cranes or other moving equipment.

Enclosures are intended for use in secured areas, generally not accessible to unauthorized or untrained persons. Transformers with open bottom enclosures, or with bottom ventilation openings should not be installed on or over combustible surfaces.

Outdoor ventilated units should ideally be located such that nearby buildings or landscape features can help reduce windblown dust, rain or snow from entering the enclosure.

Transformers to be installed at altitudes greater than 1,000 m (3,300 ft.) above sea level, or in ambient temperatures exceeding a maximum average of 30 °C and a maximum peak temperature of 40°C must be specifically designed for these environmental conditions to operate correctly

Setup Guide:

1. Inspect the unit, before connecting it to a load.
2. Check that all safety guards are in their correct position and secure.
3. Read and understand ALL safety sections at the beginning of this manual.
4. Ensure all maintenance procedures are up to date.
5. Ensure the unit is set up on firm and level ground, with the area around the unit clean, and setback space as outlined in this manual
6. Ground unit in accordance with local grounding requirements, the green cam locks are bonded to the enclosure, there is also a mechanical lug provided on the chassis for bonding purposes.
7. Warn personnel on site of pending startup.
8. Connect primary side de-energized camlocks (*Alternatively a qualified electrician can configure the primary size connection via direct hard wire, connect via gland with appropriately rated connector to maintain enclosure compliance*)
9. Ensure main breakers are in the OFF / Green position
10. Inspect all electrical connections; repair or replace any that are cut, worn, or bare. This includes inspecting cords external to the panel to the load-use safe electrical practices in accordance with local guidelines and best practices
11. This unit is equipped with primary and secondary transformer protection and uses adjustable MCCB(s), the user must adjust to local code requirements (600V applications require the breakers to be adjusted down in certain cases, typically to a 0.9-0.8 - see the unit rating plate)
12. Verify voltage and frequency are correct before turning on the main circuit breaker, this machine is designed to operate at multiple voltages and phases
13. Turn on secondary main MCCB,
14. Turn on secondary branch circuits



15. It is advised that the loading is increased gradually such that the circulating current begins from 10% of the rated amperage, and increase in 10% -15% increments every 10 minutes until it reaches 50% – 75% of the rated current.

WARNING:

It is the operator's responsibility to ensure that the panel is properly and safely positioned at the location. This includes setting MCCB dials properly for your application.

DANGER:

Entering the electrical compartment while equipment is in operation can result in death or serious injury.

Safety Instructions

⚠ WARNING

Read and understand this manual and its safety instructions before using this product. Failure to do so can result in serious injury or death.

PROPER MATING of HUBBELL® SINGLE POLE DEVICES

Connecting

1. Align large arrows, & insert female into male device.
2. Push together & bottomed, 50 lb (222 N) maximum, with gap between shoulders.
3. Twist clockwise by hand in the direction of the arrow, locking between 30° and 180°.

Disconnecting

1. Twist counter clockwise by hand, until large arrows are aligned.
2. Pull devices apart.

WARNING: Use only replacement part Cat. No. HBLMBXX or HBLFBXX series with Attachment Plug or Cord connector Cat Nos. HBL300MXX, HBL400MXX or HBL300FXX, HBL400FXX series only. **WARNING:** Risk of Fire or Electric Shock. Do not use this replacement enclosure housing (plug body) with any attachment plug or cord connector, (as appropriate), other than the one specified on the replacement mark packaging and in these instructions.



2.4 How to Use the Product

2.4.1 Safety information

- Only qualified technicians should attempt to work on electrical equipment.
- Always wear protective clothing and footwear when working on or around the transformer.
- Any person with a pacemaker, metal implant, or jewelry should not come within 10 feet of the transformer enclosure while it is in operation.
- The use of electrical safety, arc flash safety grounding, and lockout/tagout procedures should always be followed to ensure personal safety when installing, servicing and uninstalling electrical equipment.
- Never energize a transformer if it appears to be damaged.
- Never lift anything over head or over top of other persons.
- Generally, the voltage required will be the rated voltage times the per unit impedance time the percentage of current required. The winding temperature should not be allowed to exceed the average winding temperature rise or 100 °C, whichever is lower. Refer to ANSI/IEEE C57.94
- In the event of a fire, do not use water to extinguish the flames. Use a suitable quenching agent such as, CO₂.
- Terminals are for electrical loading only. Wherever possible, use flexible connectors to avoid mechanical strain on terminal pads.
- Always inspect the unit to ensure that nothing has entered the enclosure or unit that might create a safety hazard such as debris, rodents, animals, etc. This is more likely to occur if the transformer has been stored for any length of time.
- Make sure all power supplies are disconnected and properly grounded before attempting to work on the transformer or inside of the control box.
- Do not make any connections that are not authorized by the nameplate or the connection diagram.
- Do not enter the cabinet or stick objects into the unit when energized. This could result in injury or death.
- High voltage is present in the system while on, never attempt to service the electrical system while the engine is on, or the system is on - qualified technicians should only setup this equipment
- Do not a unit if there are signs of wear or damage
- Never permit anyone to operate the unit without proper training
- No supply cables should come in contact with the core or any live part except the terminal that it is intended for. Ensure that minimum electrical clearances are maintained. (Refer to Table 1, Section 7.4)
- Never modify equipment without the written consent of Eco Power Equipment

Transformer Specific Details

- User installed cables must be kept as far away from coils and top clamps as possible. Refer to the Table 1 below for recommended minimum electrical clearance when performing final check. You should only make those connections specified by the nameplate or connection diagram. Be sure to check all tap jumpers for correct location and torque.
- Some tap connections and other joints involve bare aluminum or copper. If it is necessary to change taps or assemble a joint of bare aluminum or copper, lightly clean the contact surfaces. Once the contact areas have

been abraded, assemble the parts and tighten securely. Always use two wrenches when breaking or making joints to prevent damage to parts.

Minimum Electrical Clearances	
BIL [kV]	Minimum Clearance [in (mm)]
10	1.0 (25)
20	1.0 (25)
30	1.5 (38)
45	2.5 (64)
60	3.5 (89)
95	4.75 (121)
110	7.50 (191)
125	8.75 (222)
150	11.25 (286)
200	16.00 (406)

Table 1: Minimum Electrical Clearances Chart

Table 2 below summarizes the recommended torque values for the different types of bolted electrical connections found on dry-type transformers. All electrical connections should be checked prior to the energization of a unit.

Recommended Torque Ranges for Bolted Electrical Connections			
Bolt Size	Carbon Steel Grade 2 or 5 [ft-lb]	Brass Alloy CU270 [ft-lb]	Stainless Steel B8 or B8M [ft-lb]
1/4" – 20	10 – 12	n/a	5 – 10
3/8" – 16	15 – 30	12 – 15	15 – 20
1/2" – 13	40 – 70	20 – 30	30 – 40

Table 2: Recommended Torque Ranges for Bolted Electrical Connections

Tap connections are typically provided to adjust for difference between nominal and tested incoming voltage values. Standard units have taps located on the face of each phase coil (See figure 9). Unless specifically instructed otherwise, transformer are shipped with the tap connection made for the nominal voltage. The taps are marked with letters or numbers which correspond to the markings on the nameplate schematic. When changing taps, the following instructions should be followed:

1. De-energize the transformer.
2. Short-circuit and ground the HV and LV terminals.
3. Locate the tap jumpers.
4. Loosen the hardware on the tap jumpers.
5. Remove the tap jumper and move the connection to the desired tap on each phase. (All coils must have identical tap setting).

6. Verify all coils are connected at identical taps.
7. Torque the taps connections to the recommended values per Table 2, Section 7.5.
8. Remove the shorting connection on the HV and LV terminals.
9. Inspect the transformer to ensure that no tools or other objects have been left in the vicinity of the transformer
10. Replace all access panels, and re-energize the transformer

When cable connections are required, conductors suitable for at least 90°C should be used. Connections should be made and supported such that they do not stress the terminals with the weight of the cables while still allowing for expansion and contraction. The minimum electrical clearances to the core & coil per Table 1 in Section 7.4 should be maintained and all connections should be torqued to the recommended values per Table 2 in Section 7.5.

Note: Top cable entry is not permitted in the main transformer compartment in accordance with CSA C22.2 No.47. If the enclosure is fitted with air terminal chambers barriered off from the main compartment, then cables may be brought into the top of these terminal chambers. Please contact Rex Power Magnetics or refer to the outline drawings supplied at the order stage for instructions on appropriate cable entry locations.

Anti-vibration Pads

Dry type power transformers supplied as core & coils, or installed in an open bottom enclosure are supplied with standard neoprene anti-vibration pads to be positioned underneath the core and coil base channel assembly. These anti-vibration pads reduce the transfer or vibration and noise from the transformer core to the mounting surface. Refer to figure 6 for proper location of these

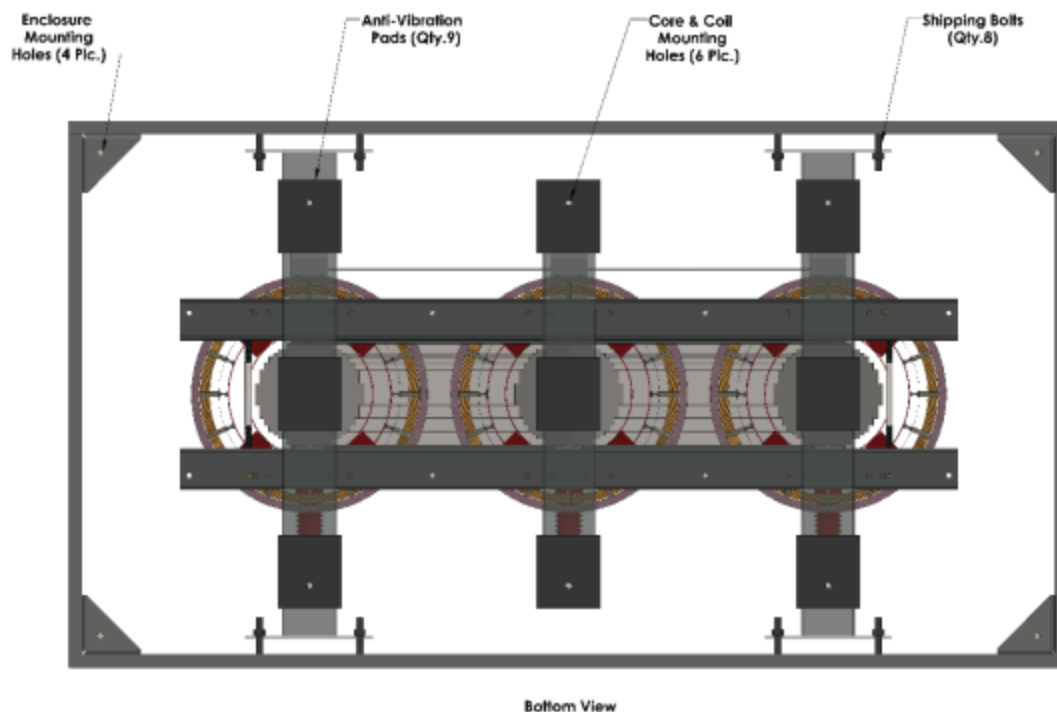


Figure 6: Standard Transformer Base Detail

pads.

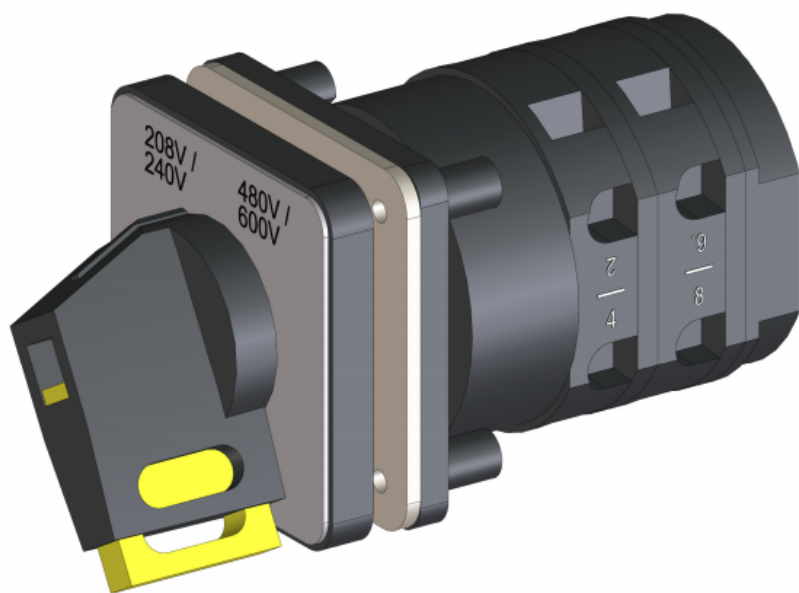
Loading:

When energizing a transformer from a cold start, it is preferable to slowly increase the load while monitoring current, voltage and load levels. If this is not possible, full load may be applied with caution. Note: When energizing a dry type transformer for the first time, some smoke and vapor may appear during the first few hours of operation. This is normal, and should dissipate within a few hours.

Parallel Operation:

Transformer may be operated in parallel to supply larger load as long as their polarity/phase shift, rated voltage, frequency, impedance and turns ratios are the same. If these parameters differ, circulating currents will flow in the circuit loop between the parallel units. The greater the difference between these parameters, the larger the magnitude of the circulating current. The difference in impedance should not exceed 10% and the remaining parameters should be identical. When specifying a transformer to be operated in parallel with an existing unit, the precise parameters of the existing units need to be noted.

Voltage Selector Switch



- Always set to the appropriate voltage for your application, these units have been factory set to 480V and 600V tap positions - review on each installation and commissioning
- Note the this is a multi tap transformer, so it is possible to fine tune output voltage if your applications requires changes



Panel Board Specific Details

See Panel board manufacturers documentation for completed details.

For QOB Circuit Breakers:

Push inward until the circuit breaker connector is centered on the branch connector mounting hole. Engage the screw into the branch connector hole and tighten it to the torque values shown on the interior wiring and torque diagram.

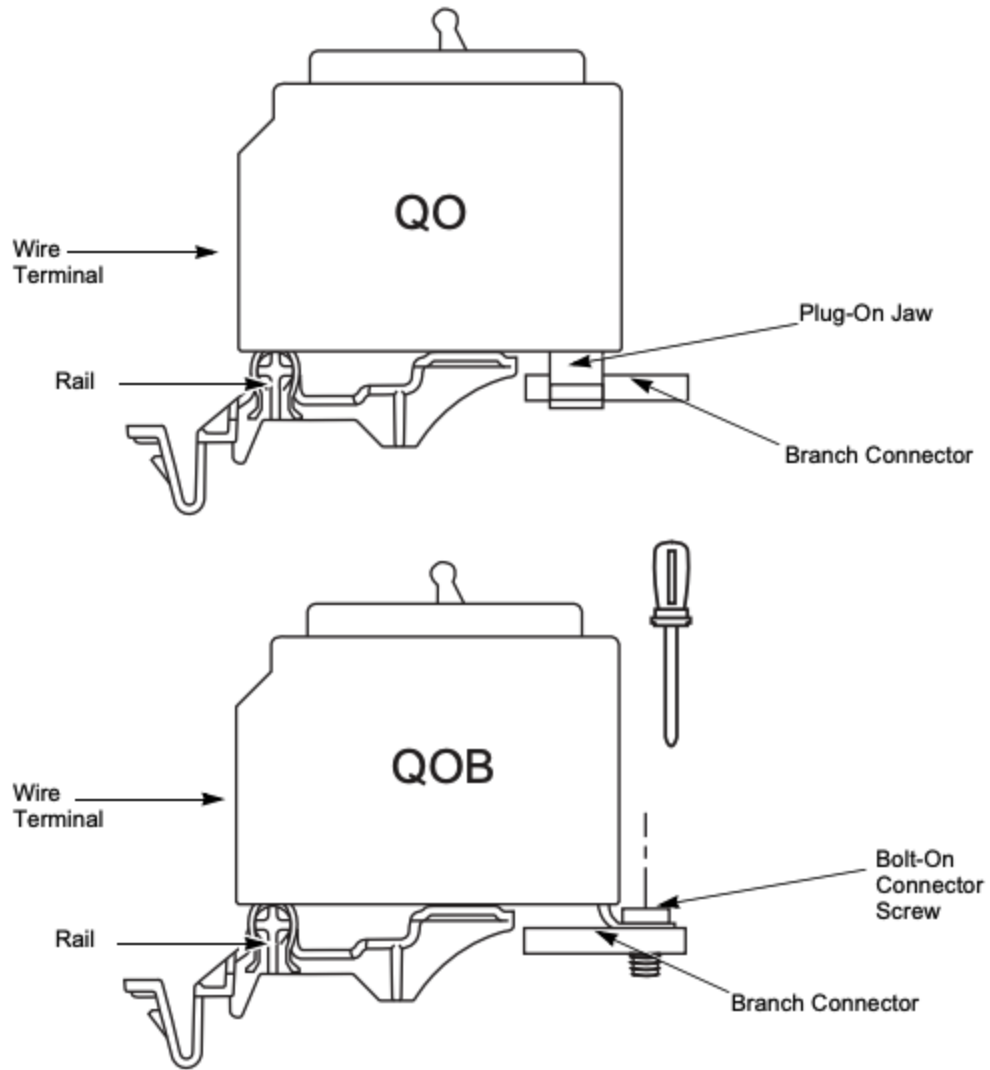
6. Install the load wire.
7. Reinstall the deadfront.
8. Install a filler plate in all branch circuit breaker spaces not used.

QO and QOB Circuit Breaker Removal

Refer to Figure 4, QO and QOB Circuit Breaker Installation and Removal, on page 15, for the following instructions:

1. Turn OFF all power to the panelboard.
2. Remove the deadfront.
3. Remove the load wire.
4. Disengage the branch connector. For QO Circuit Breakers: Pull outward until the plug-on jaws fully disengage the branch connector. For QOB Circuit Breakers: Loosen the screw in the circuit breaker connector and pull the circuit breaker off of the branch connector. 80043-712-06 Rev. 06 NQ/NQM Panelboards and QONQ Load Centers 07/2021 Installation 15 ENGLISH
5. Snap the wire terminal end of the circuit breaker off of the mounting rail.
6. Reinstall the deadfront.
7. Install a filler plate in all branch circuit breaker spaces not used.

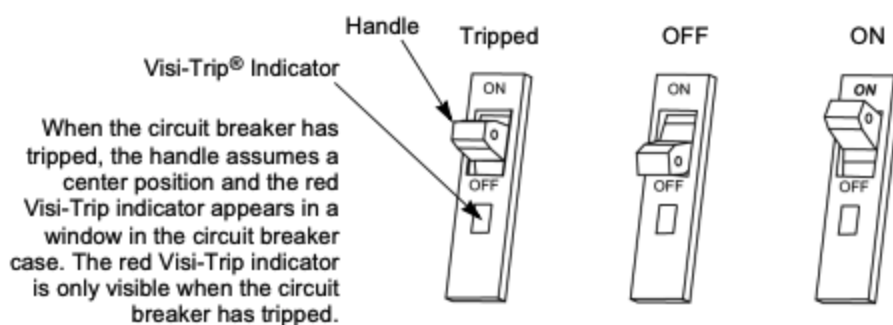
Figure 4: QO and QOB Circuit Breaker Installation and Removal



Circuit Breaker Reset Instructions

If the circuit breaker is tripped, the handle will be at the mid-position between ON and OFF. To reset the circuit breaker, push the handle to the OFF position, then to the ON position.

Figure 5: Circuit Breaker Handle Positions



2.4.2 Technical life span

- Unit Lift Span: 5+ Years in mobile applications
- Eco Power recommends that our customers implement an inspection process regularly on equipment to ensure long life and successful operation: regular torque procedures on mobile equipment are required for long term success, either with a regular schedule torque between maintenance, or advising customer to torque check before each application setup

2.4.3 Personal Protective Equipment

- Always wear personal protective equipment: follow CSA Z462& NFPA 70E for guidelines



2.5 Inspection Tasks

2.5.1 Before use inspection tasks (never open a live panel, see above safety recommendations)

Task	Action
Visual inspection of the unit	Remove cover panels and inspect all items
Torque all connections	MCCB tabs and cam lock points
Cam lock connections and torque	Ensure proper mating
MCCB switch settings	Set switches properly for your application

2.5.2 Quarterly Inspection tasks

Task	Action
Thermal inspection	On location during application review and testing for long term applications