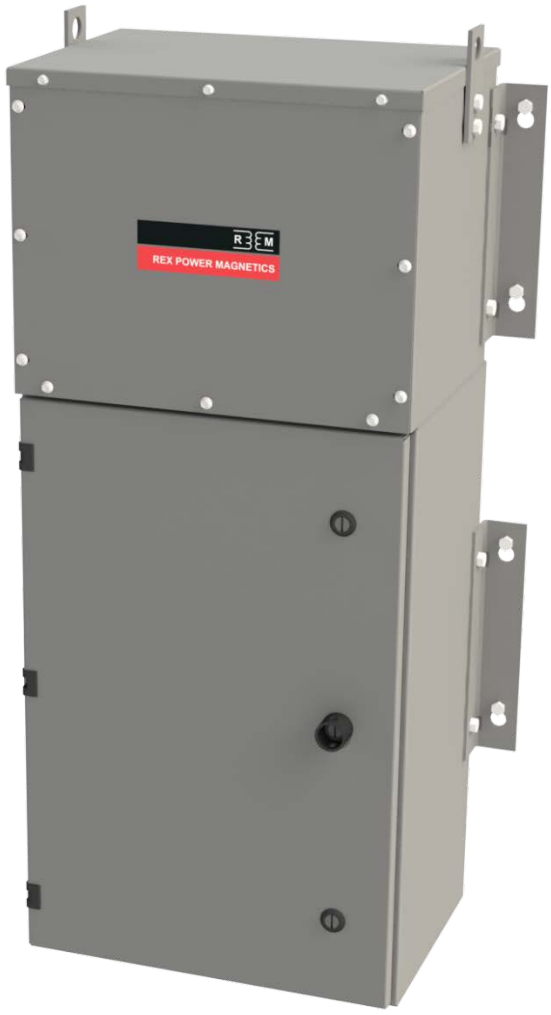
MINI POWER CENTERS

INSTALLATION, OPERATION AND MAINTENANCE MANUAL



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1.0 SAFETY

The safety recommendations and guidelines below are to assist the operator in reaching the highest possible level of safety. If further information is required, or particular problems arise which are not covered in this document, please contact Rex Power Magnetics.

DANGER

There is a hazard of electric shock or burn whenever working in or around electrical equipment. Power must be locked off before working inside a transformer enclosure. This equipment is to be installed and maintained by qualified personnel only.

- ☐ Only qualified technicians should attempt to work on electrical equipment.
- ☐ A risk assessment should be conducted to determine what hazards are present that need to be addressed in the project plan.
- ☐ Always wear protective clothing and footwear when working on or around the transformer.
- ☐ 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 Mini Power Center if it appears to be damaged.
- ☐ When working at heights, fall protection should be worn.
- ☐ Never lift anything over head or over top of other persons.
- ☐ When moving material, ensure that there are no other interferences that might come into contact with the unit such as overhead power lines.
- ☐ To avoid lacerations, be aware of the possibility of sharp edges on metal objects.
- ☐ In the event of a fire, do not use water to extinguish the flames. Use a suitable quenching agent such as, CO_2.
- ☐ Terminals are for electrical loading only. Wherever possible, use flexible connectors to avoid mechanical strain on terminal pads.
- ☐ Do not lift or move a Mini Power Center without appropriate equipment and precautions.
- ☐ Use the proper “rigging” when handling the units and always connect to the designated lifting points.
- ☐ Ensure the lifting accessories are rated to handle the weight of the product and that the correct lifting calculations are used according to the angles of the cables or chains.
- ☐ 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 indicated by the nameplate or the connection diagram.
- ☐ Ensure that all electrical connections are tight.
- ☐ The proper PPE and insulated tool should always be used when working around potentially energized equipment.
- ☐ Do not attempt to change the primary or secondary tap connections or remove the enclosure panels while the transformer is energized.
- ☐ Do not energize the Mini Power Center without properly grounding the unit per the applicable national electrical code.
- ☐ Do not enter the cabinet or stick objects into the unit when energized. This could result in injury or death.
- ☐ After de-energization, the transformer will still be hot. Allow for the transformer to cool down before starting any work on it.

2.0 GENERAL & SCOPE

The successful and safe operation of Mini Power Centers is dependent upon proper handling, installation, and maintenance. Neglecting certain fundamental installation and maintenance requirements may lead to personnel injury, the premature failure of the unit as well as damage to other property.

This manual covers general recommendations & requirements for the installation, operation and maintenance of single and three phase Mini Power Centers.

IMPORTANT	
	**All persons working on the equipment should be qualified personnel who have experience and the necessary knowledge in working with high voltage equipment. Qualified personnel consist of customer service engineers, qualified professionals, and other authorized operating personnel. This document does NOT serve as a replacement for proper training. Certifications are required to transport, operate, store, install or move the product safely. Complying with these instructions will help to reduce hazards and accidents, while preserving the reliability and service life of the transformer.**

3.0 RECEIVING & HANDLING

Mini Power Centers are shipped completely assembled in a metallic enclosure. Units are oriented flat on a shipping pallet, and wrapped in a clear plastic sheet to prevent ingress or moisture and dust

It is imperative that a thorough inspection of each unit be done immediately upon receipt, prior to its acceptance, and removal from the carrier's vehicle. Confirm that the identifying part number on the Mini Power Center nameplate matches the packing list and bill of lading. In some cases, branch / feeder breakers may be shipped loose. Ensure all components have been received.

The units should be visually examined to detect any damage or indication of rough handling which may have been incurred during transit. Covers should be removed to review internal components as well. Inspections should be done to identify missing or damaged parts, loose or broken connections, dirt and standing water. If damage is detected or there are any critical observations from the inspection, write a brief description on the bill of lading, file a claim immediately with the carrier and send notice of the extent of damage to the local sales office.

CAUTION	
	**Never attempt to lift a Mini Power Center from points other than the lifting points provided. Unless the Mini Power Center has been supplied with floor mounting brackets, it should not be left to stand vertically as it may tip. Damage beyond repair may occur if the Mini Power Center is tilted/turned on its side or end.**

4.0 STORAGE

Mini Power Centers which are not installed and energized immediately should be stored in a dry, clean space having a uniform temperature to prevent condensation on the windings. Preferably, it should be stored in a heated building having adequate air circulation and protected from cement, plaster, paint, dirt, and water or other gases, powders, and dust. Precautions should be taken to prevent storage in an area that water could be present, such as roof leaks, windows, etc.

5.0 INSTALLATION

CAUTION

Installation should be performed only by experienced and qualified personnel. No attempt should ever be made to change the taps, or make cable connections while the transformer is energized. To maintain safe operating conditions, do not remove the panels or cover while the transformer is in operation.

5.1 Location & Environment

Mini Power Centers are supplied with either a Type 3R, 4 or 4X rated enclosure, and suitable for both indoor and outdoor installation. For outdoor installations, the appropriate applicable codes must be followed, included cable installation, and hardware suitable for outdoor service.

Mini Power Centers should be located such that they comply with all applicable local safety and electrical codes. NEC standards require that Mini Power Centers be accessible for inspection and located accordingly.

5.2 Ventilation

Mini Power Centers must be installed in an area where they can be cooled by means of the free circulation of air. Unless otherwise rated, the average ambient temperature should not exceed 30°C (86°F) and the absolute maximum ambient temperature should not exceed 40°C (104°F) at any time.

Adequate ventilation is essential for Mini Power Centers to meet their nameplate kVA capability. All Mini Power Centers should be located at least 20 cm (8 in) away from wall or any other obstructions and 25 cm (10 in) from roofs to allow free circulation of air.

5.3 Mounting

Unless special provisions have been made on the Mini Power Center base, Mini Power Centers should only be installed in the upright positon on walls, posts beams or other locations capable of supporting their weight, using the mounting holes provided

Mounting Instructions:

- Select an installation location that is on a non-combustible surface.
- The mounting location must allow for air circulation around the transformer for cooling purposes. Please refer to the minimum distances stated in the ventilation section.
- Using measurement from the table provided, drill the top two mounting holes on the mounting surface.
- Lift the Mini Power Center into position and install the top two mounting bolts.

- With the Mini Power Center hanging on the top two mounting bolts, level the unit, then mark and drill the lower mounting hole(s) into the mounting surface.
- To provide Type 3R protection (protection from falling rain), the Mini Power Center must be mounted vertically with the control panel at the bottom.
- Install the lower mounting bolts into the lower mounting holes.

5.4 Cable Connection

To gain access to the main breaker, remove the breaker cover plate by loosening the cover screws. Incoming cables should be connected directly to the primary side lugs of the main breaker. The electrical connections should be torqued to the values indicated on the breaker. After completing ll the connections, close the wiring compartment and ensure that the cover screw is tightly secured.

5.5 Grounding

A flexible grounding jumper from the core clamping structure to the enclosure/ground bus is provided which ensures all metallic conducting parts are solidly grounded to the enclosure. The Mini Power Center enclosure must be securely and effectively grounded as a safety precaution.

A transformer ground stud is provided for the customer's ground connections. The grounding should be done in accordance with the National Electrical Code.

5.6 Voltage Taps

CAUTION	
	**Never attempt to change taps or connections unless the transformer is de-energized and all windings are grounded.**

Tap connections are typically provided to adjust for difference between nominal and tested incoming voltage values. Taps are located in the transformer compartment. 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. Torque the taps connections to 10 – 12 ft-lbs
    a. Always use two wrenches when breaking or making joints to prevent damage to parts.
7. Remove the shorting connection on the HV and LV terminals.
8. Inspect the transformer to ensure that no tools or other objects have been left in the vicinity of the transformer
9. Replace all access panels, and re-energize the transformer

6.0 OPERATION

Mini Power Centers are designed to operate continuously are their rated nameplate kVA rating. The surface of the enclosure, particularly the transformer section, may be warm to the touch. Under normal operation / loading, the enclosure temperature may rise 65°C over ambient.

CAUTION	
	**Never operate a Mini Power Center without protective covers/panels installed. Never remove protective panels while the unit is energized. Injury or death may result, as well as damage to the equipment.**

6.1 Inspection Before Energization

For the safe and proper operation of the Mini Power Center, we recommend that the following items be checked for completeness:

- The insulation resistance between LV to HV + Ground and HV to LV + Ground should be greater than 10k ohms.
- Before energizing and connecting any loads, please measure and verify the output voltage matches the nameplate specification
- Ensure correct phase connections. Refer to the nameplate vector diagram.
- The enclosure should be grounded with the appropriately sized conductor.
- The clearance and tightness of all electrical connections should be checked.
- For single phase 3-wire 120/240 volt loads, care must be taken to ensure the neutral current does not exceed 1/2 of the Mini Power Center kVA rating.

6.2 Sound Level

Mini Power Centers have an inherent sound due to the energization of the core by the alternating voltage applied to the windings. The alternating flux in the core creates vibrations at twice the nominal frequency of the applied voltage.

Mini Power Centers are required to meet NEMA standards for the maximum sound levels permissible. These sound level standards vary from 40 to 50 DB and hence, can be an annoyance if located in close proximity to where people work or reside.

Amplification of audible sound can occur in a given area due to the presence of reflecting surfaces or mounting surfaces. Care should therefore be exercised in selecting sites for Mini Power Centers particularly to avoid sensitive areas like hospitals, classrooms and medical or office facilities.

The following guidelines may be helpful:

- Units should be mounted away from corners or reflecting walls & ceilings
- Cable and other flexible conduit should be considered to make connections
- Acoustically absorbing materials could be considered for walls and ceilings around the unit.
- The location of the unit should be located as far as practical from areas where sound levels could be considered undesirable.

7.0 MAINTENANCE

CAUTION	
	**Failure to de-energize and ground the transformer enclosure and terminals before performing maintenance could result in serious personal injury or death.**

Under normal operating conditions and environments, Mini Power Centers do not require maintenance. However, periodic care and inspection is a good practice, particularly if the unit is exposed to extreme environmental conditions.

Corrective measures taken when necessary to assure the most satisfactory service from this equipment. Evidence of rusting, corrosion, and deterioration of the insulation, varnish or paint should be checked, and corrective measures taken when necessary.

For clean, dry locations, an annual inspection may be sufficient, but for other locations, such as those with excessive dust or chemical fumes, more frequent inspections may be required. Usually after the first few inspection periods, a definite schedule can be set up based on the existing conditions.

Inspections should look out for the following:

- Dirt or dust accumulation
- Loose or corroded electrical connections.
- Signs of overheating and of voltage creepage over insulating surfaces as evidenced by tracking or carbonisation.
- Evidence of rusting, or corrosion of the paint.

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