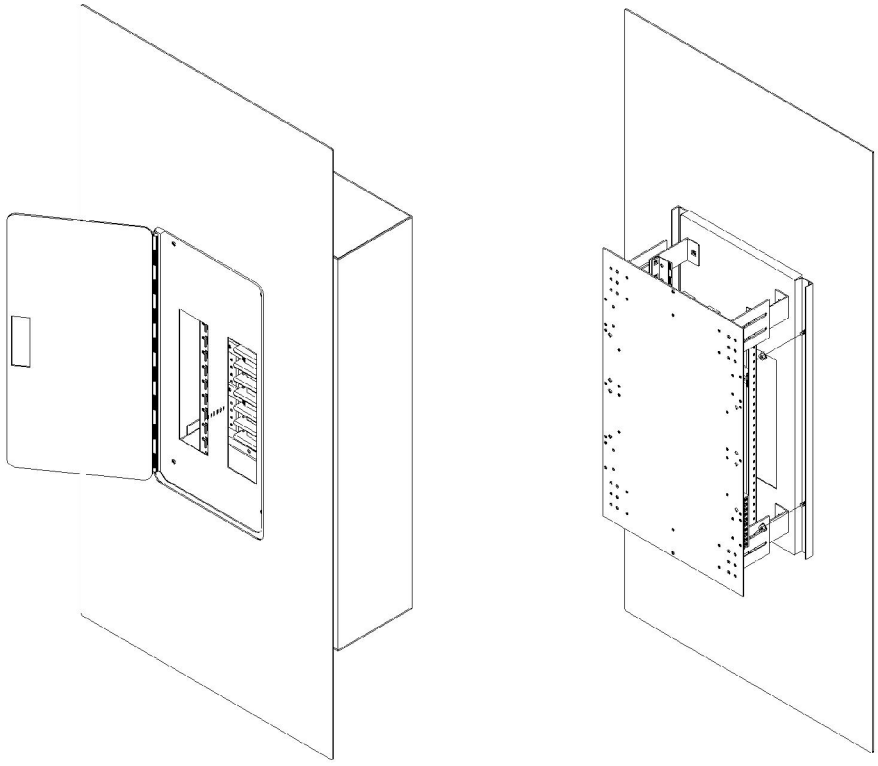
Instruction Manual PUB50895 Effective May 2016

Pow-R-Line Retrofit Panelboards
P1R 240Vac Max & P2R 347/600Vac Max



Powering Business Worldwide

Contents

Installation Criteria

The Eaton Pow-R-Line **P1R** & **P2R** panelboards are intended for use in the following list of panelboard enclosures and which meet the minimum size requirements listed in the tables below.

Table 1 P1RL & P1RB Panelboards

Main Device	Circuits	Current (Amperes)	Minimum Height (in / mm)	Minimum Width (in / mm)	Minimum Depth (in / mm)
Lug	18	100	19.5 / 495	14.25 / 362	4.5 / 121
	24		22.5 / 571		
	30		26.5 / 673		
	42		33.5 / 851		
	18	225	22 / 559		
	24		25 / 635		
	30		28 / 711		
	42		34 / 864		
	60		43 / 1092		
Breaker (BAB)	18	60-100	19.5 / 495		
	30		26.5 / 673		
	42		33.5 / 851		
Breaker (E or F Frame)	18	60-225	30 / 762		
	30		36 / 914		
	42		42 / 1067		
Lug	24	400	48 / 1219	20.0 / 508	5.75 / 127
	30				
	42				

Table 2 P2RL & P2RB Panelboards

Main Device	Circuits	Current (Amperes)	Minimum Height (in / mm)	Minimum Width (in / mm)	Minimum Depth (in / mm)
Lug	18	100	19.5 / 495	14.25 / 362	4.75 / 121
	24		22.5 / 571		
	30		26.5 / 673		
	42		33.5 / 851		
	18	225	22 / 559		
	24		25 / 635		
	30		28 / 711		
	42		34 / 864		
	60		43 / 1092		
Breaker (GBH, GHB)	18	60-100	19.5 / 495		
	30		26.5 / 673		
	42		33.5 / 851		
Breaker (E or F Frame)	18	60-225	30 / 762		
	30		36 / 914		
	42		42 / 1067		
Lug	24	400	48 / 1219	20.0 / 508	5.75 / 127
	30				
	42				

Safety Measures

This publication contains instructions on the installation of Eaton low voltage distribution Panelboards. Any person or persons that design, purchase, install, operate or maintain new systems utilizing these products must understand the equipment; it's markings and limitations. Hazardous voltages in distribution panelboards and all other electrical equipment pose a potential hazard to life and property. Please follow instructions, labeling and applicable codes and standards for installation, maintenance and operation of this equipment and its components.

Only "Qualified Persons" should install and/or service this equipment. NFPA 70 – National Electrical Code defines a "Qualified Person" as "One who has skills and knowledge related to the construction an operation of electrical equipment and installations and has received safety training on the hazards involved". Standard symbols have been established for recognition of potentially hazardous situations and conditions. Please review and understand the critical warning symbols shown below. These symbols will appear on safety labels affixed to the product. Installer should always read and understand these labels before working on equipment.

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Introduction

This instruction manual is designed to supplement other industry standards including all local, state and federal codes and safety regulations, such as OSHA, NFPA 70 (National Electrical Code), Canadian Electrical Code, NFPA 70E (Standard for Electrical Safety Requirements for Employee Workplaces, NEMA™ PB2.1) General Instructions for Proper Handling, Installation, Operation and Maintenance of Dead-front Distribution Panelboards Rated 600 Volts and Less, other workplace, electrical installation requirements and all safety rules.

Safety

Due to the weight and size of Panelboards and dangers from electrical hazards, every precaution should be taken to maintain safe working conditions when handling this equipment. Due to the custom nature of panelboards and the site variables, every potential situation cannot be anticipated. Safety must always be the overriding factor. Always follow all instructions and all safety guidelines published by OSHA and other industry and local, state and federal agencies.

Symbol Meaning

The addition of either symbol to a "Danger" or "Warning" safety label indicates that an electrical hazard exists which will result in personal injury if the instructions are not followed. This is the safety alert symbol. It is used to alert you to potential personal hazards. Obey all safety messages that follow this symbol to avoid possible injury and death.

⚠ DANGER

"DANGER" INDICATES AN IMMINENTLY HAZARDOUS SITUATION WHICH, IF NOT AVOIDED, WILL RESULT IN DEATH OR SERIOUS INJURY.

⚠ WARNING

"WARNING" INDICATES A POTENTIALLY HAZARDOUS SITUATION WHICH, IF NOT AVOIDED, CAN RESULT IN DEATH OR SERIOUS INJURY.

⚠ CAUTION

"CAUTION" INDICATES A POTENTIALLY HAZARDOUS SITUATION WHICH, IF NOT AVOIDED, CAN RESULT IN MINOR OR MODERATE INJURY.

CAUTION

"CAUTION", USED WITHOUT THE SAFETY ALERT SYMBOL, INDICATES A POTENTIALLY HAZARDOUS SITUATION WHICH, IF NOT AVOIDED, CAN RESULT IN PROPERTY DAMAGE.

Pre-Installation: Receiving, Handling and Storage

Receiving

Upon delivery, use the packing list to confirm the number of items against what was received to ensure that the shipment is complete. Any discrepancies should be noted on the freight bill before signing. Report any shortages or damage to the freight carrier immediately.
Immediately upon receipt of the panelboard interior and trim, the packaging should be carefully removed and a thorough inspection of each section should be made to detect any damage incurred during shipment. Any damage should be noted on the bill of lading (freight bill) and the consignee receiving the equipment should notify the freight carrier.

FAILURE TO NOTIFY THE FREIGHT CARRIER OF DAMAGE IN A TIMELY MANNER MAY RESULT IN THE CONSIGNEE ASSUMING THE COSTS ASSOCIATED WITH REPAIR OR REPLACEMENT OF DAMAGED EQUIPMENT.

After inspection, the components should be returned to its packaging until it is ready for installation.

Handling

Depending on the configuration, panelboards may weigh in excess of 100 pounds. Before moving or lifting, verify that the panel is within safe limits of the installers lifting capacity.

Storage

Panelboards, which cannot be immediately installed and energized, should be stored in an indoor dry, clean and heated environment.
Do not store in areas where conditions such as dampness, changes in temperature, cement dust or a corrosive atmosphere is present.

⚠ WARNING

HAZARDOUS VOLTAGE. WILL CAUSE SEVERRE INJURY OR DEATH.

⚠ WARNING

ONLY THOSE PROFESSIONALS TRAINED AND QUALIFIED ON ELECTRICAL DISTRIBUTION PANELBOARDS SHOULD INSTALL AND/OR SERVICE THIS EQUIPMENT

Removal of Existing Panelboard Interior

DO NOT work on electrical equipment while energized. Verify power entering the equipment is de-energized at the source.
Follow appropriate lockout procedure to this panel before starting work.

Electrical Disconnection of Existing Panelboard

After panel has been de-energized and the feeder device is locked out, removal procedure can begin.
Carefully identify all connections, load and line paying particular attention to main incoming phasing.
Identify correct phasing on the mains and disconnect all phases, neutral and ground connections.
Identify and disconnect all load wires (line & neutral) connected to existing branch breakers, noting current values. Before proceeding, it is important to verify that the line and load cables (phase, neutrals and grounds) are long enough to connect to the new interior.
Proceed to disconnect all electrical connections attached to the existing interior. Once the conductors are disconnected from the old interior, the cables should be formed in the space provided. Care should be taken in forming insulated cables to ensure that no insulation is forced permanently against the edges of any metal parts.

Removal of Existing Interior

Remove all chassis mounting hardware. Carefully remove chassis to ensure that cable insulation is not damaged by sharp edges.
To allow for adequate bonding, all attempts should be made to utilize existing mounting studs/system in the enclosure.
If it is not feasible to use existing mounting system, remove all protrusions to allow for a flat mounting surface.

Installation of RetroFit Panelboard Interior

Removal of Dead-front cover

Remove the interior from packaging.
Place on a solid work surface, remove qty 4 ¼-20 screws that fasten the dead-front cover to the chassis – (see Fig. A). Place dead-front cover and hardware in a safe location to prevent damage.

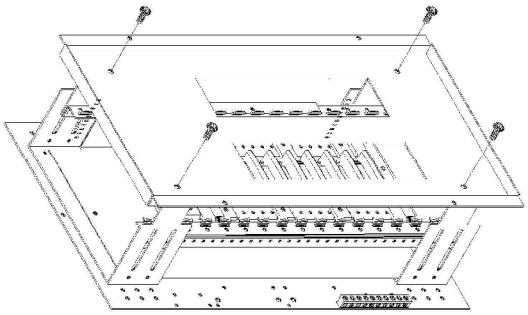

Figure A

Locating Interior Mounting Holes in Enclosure

In most instances the chassis should be centered in the enclosure unless a special offset trim has been ordered. Measure and draw vertical and horizontal centerlines.
Using these marks, support the interior in the enclosure and mark the 4 holes that are located on the center axis. See figure below.
Re-verify that all electrical conductors long enough to be terminated properly.
Ensure main incoming cables are long enough to reach Main and Neutral termination locations without compromising wire bending space requirements as listed in the Appendix Table 3.
Ensure that electrical clearance requirements are maintained per NEC™/CEC™.
Care must be taken to ensure that the trim will completely cover openings in the enclosure.
If not using existing mounting hardware, mark minimum of 8 mounting locations, on the back of the enclosure. Drill and tap 10-32 holes as per Fig. B

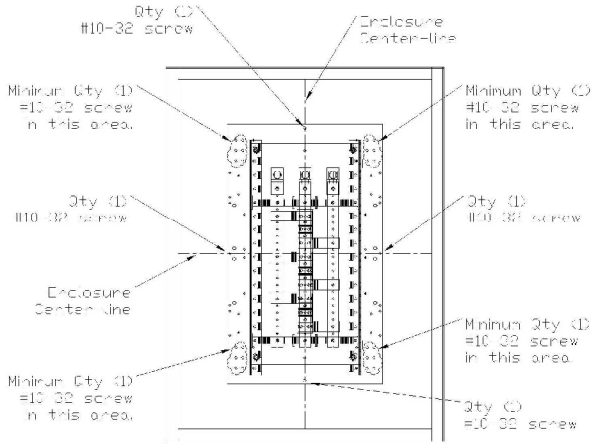

Figure B Recommended Mounting Locations

Determine proper depth setting

To determine preset depth of the chassis, place a non-conducting, insulated straight edge across the finished wall surface and measure to the rear of the enclosure. See Fig. C

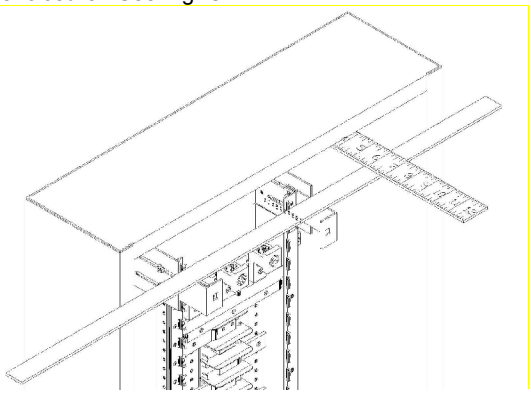

Figure C Measuring Depth of Enclosure

Loosen qty. 8, 10-32 screws Fig. D installed at the chassis corners.

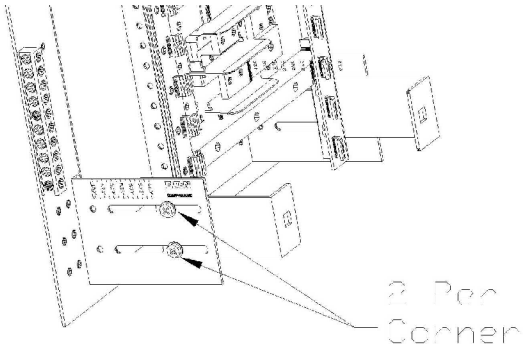

Figure D Depth Adjustment Bracket Screws

Set chassis depth by aligning bottom edge of interior mounting rail with the appropriate depth as determined by the measurement obtained inn the previous step. Torque #10-32 screws to 24 in-lbs.

Install Interior

Install interior using mounting holes drilled and tapped in previous steps using supplied 10-32 hardware.

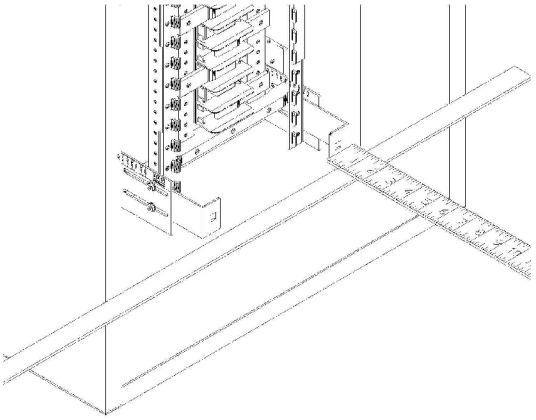

Figure E Verifying Depth of Mounting

Verify Interior depth adjustment - Using a non-conducting, insulated straight edge, verify dimension from the front surface of the dead-front cover mounting bracket. This should not be less than 11/16" (0.6875"). See Fig. E. If adjustments are required, remove interior and readjust depth as per previous steps.

Installation of Incoming Panelboard Connections

Main incoming connections (mains, neutral and ground).
Note: As a minimum, all panelboard connections are rated for use with 75°C or higher rated conductors. When wire is used with temperature ratings above 75°C, it shall be sized based on the ampacity of wire rated 75°C.

Wire/Cabling

Mechanical setscrew lugs are typically supplied for incoming cable connection.
Using appropriate tools, the installer must strip the conductor insulation sufficiently to fill the entire barrel of the connector with bare, non-insulated conductor.
Conductor must be stripped without damage to the conductor strands. Bare strands should be of equal length (flush) on the end cut. Do not strip off more insulation than needed. Exposure of bare conductor outside lug can compromise clearances. The connector and conductor should be free of all foreign debris.
Never clip cable/wire strands in order to fit within connectors. If cable/wire does not match the rating of the connector, contact the manufacturer.
Use an antioxidant compound, if required. Insert bare conductor into lug so the bare conductor fills the full length of the lug body. Tighten lug, then torque to levels indicated on the panelboard label.

If compression lugs are utilized and supplied with the panelboard, the lugs will be mounted on the incoming lug pad. Remove lugs from the pad. Use an antioxidant compound, if required. Use a crimping tool approved for that specific lug manufacturer and lug size.
Follow instructions provided by the manufacturer of the crimp tool. Once the lug is affixed to the conductor, re-install the lug on the lug pad utilizing the existing hardware. Torque hardware using information provided in Appendix Table 4 for torque values.
To ensure retrofit interior mounting pan is sufficiently bonded to ground, a minimum of 1 existing mounting stud should be used to mount the chassis. If this is not feasible, install the supplied bonding wire and lug to assembly between one of the chassis ground bars to the enclosure. You may be required to drill and tap a #10-32 hole. Use hardware supplied with interior.

Connect all load grounds
Connect all load neutrals.
Connect all loads

Trim Installation

Install dead-front cover to the rear of trim with supplied #10-32 Keps nuts. See Fig. F. Verify door opens in desired direction

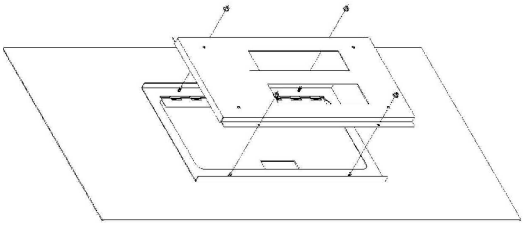

Figure F Installing Dead Front Cover

Install trim and dead-front cover as one assembly using qty 4 ¼-20 X 0.75" screws.

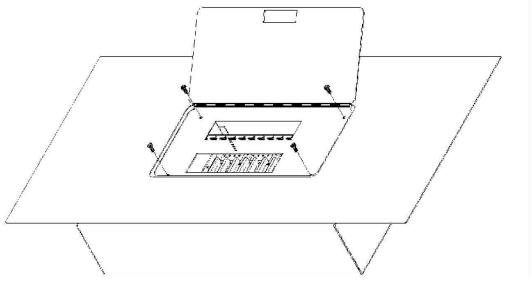

Figure G Installing Dead Front Trim Assembly

Install directory cardholder, and Latch. Trim number strip to the appropriate length and install on Deadfront cover.

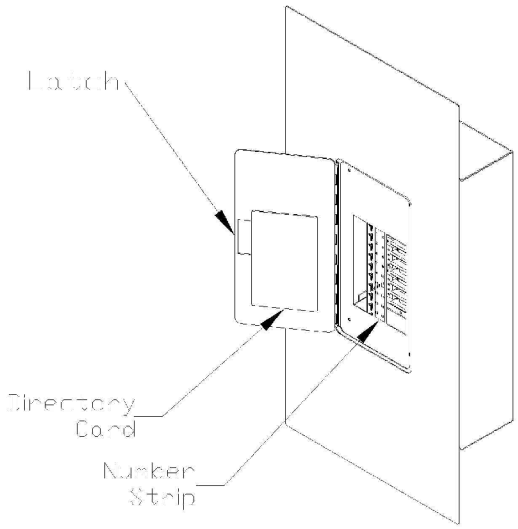

Figure H Installing Directory Card Holder, Latch, and Number Strip

Transfer all pertinent information from the old directory card to the new card and insert in holder.

Pre-Energizing Procedures and Inspection

Before energizing any panelboard, perform a comprehensive inspection to make certain that the panelboard is ready to be energized. This includes the following steps:

1. Verify that the panelboard is not energized.
2. Visually inspect the panelboard and remove all foreign materials, such as, tools, scraps of wire and other debris from all panelboard sections.
3. Remove and discard all packing materials and temporary shipping braces from the panelboard.
4. Any accumulation of dust and dirt should be removed with a vacuum cleaner. Use a lint-free cloth to remove dust and dirt on other surfaces. Never use compressed air as this may blow contaminants into electrical and/or electronic components. Never use solvents or other chemicals to clean surfaces or components.
5. Visually inspect all ventilation points to ensure that there is no blockage or debris. Remove all debris, if present.
6. Verify all field wire connections have the proper torque per instructions on the panelboard and on components.
7. All factory connections are made utilizing calibrated power tools. However, vibrations do occur in transit and handling. Verify factory connections by checking at least 10% of the total factory connections for tightness. If this spot check reveals loose connections, proceed to check all factory connections. These connections include bus hardware connections, circuit breaker terminals, and other connections, including the incoming terminals.
8. Visually inspect panelboard insulators, bus bar and conductors for damage. DO NOT ENERGIZE IF DAMAGE IS FOUND. Contact Eaton.

Circuit Breakers

Circuit breakers are typically shipped in either the open (OFF) or “tripped” position. Manually close, and then open these devices to ensure they are functioning properly. At the completion of this process, be sure that the circuit breaker is in the “OFF” or “tripped” position. Inspect circuit breakers for any visible damage.
If damage is found, DO NOT ENERGIZE the panelboard. Contact Eaton.

Overcurrent Devices with Ground Fault Protection

This panelboard may contain overcurrent devices with Ground Fault Protection (GFP). The National Electrical Code may require ground fault protection for this installation. Other GFP applications may be used including multi-level ground fault protection. Refer to the panelboard drawings and electrical construction drawings for usage and placement within the panelboard.
Ground fault protection may be installed integral to overcurrent device(s) or as a separate system. Separate systems typically are connected to a shunt tripping mechanism on an overcurrent device. Visibly inspect connections on GFP systems, neutral sensors and ground connections. Refer to manufacturer’s instructions for details.
The National Electrical Code, Article 230-95 requires that any GFP systems must be performance tested when first installed. Conduct tests in accordance with the approved instructions provided with the equipment. A written test report must be available for the Authority Having Jurisdiction (AHJ). Refer to the National Electrical Code for specific requirement or contact Eaton. Field-testing of ground fault protection must follow instructions provided with each GFP device. Due to the varied types of GFP systems, testing instructions can vary from device to device. Refer to the specific testing instructions for each device. Refer to instruction leaflets that are shipped with each panelboard containing GFP or contact Eaton.

Preparing Panelboard for Insulation/Megger Testing

Devices Installed with Control Power Fusing

Devices, which require control power fusing, can be easily damaged beyond repair if not disconnected during the testing phase. These devices include, but are not limited to, customer metering equipment, electronic breaker trip units, motor operators and communication equipment. Prior to testing the panelboard, turn off all control power devices in the panelboard to prevent damage to components. The control power may be turned off by utilizing the control power switch or by removing the fuses. Components that use power supplies include customer metering and certain breaker accessories and these must be isolated before testing.

⚠ WARNING

TO PREVENT DAMAGE TO GROUND FAULT CONTROL CIRCUITS, METERING CIRCUITS, TRANSIENT VOLTAGE SURGE PROTECTION (TVSS) OR OTHER CONTROL CIRCUITS, WHEN MEGGERING PANELBOARD, ISOLATE CIRCUITS FROM PANELBOARD SYSTEM BEFORE BEGINNING THE MEGGER OPERATION. BE SURE TO RECONNECT THOSE CIRCUITS AFTER MEGGER TESTS ARE COMPLETED.
NOTE: SOME GROUND FAULT CIRCUITS MAY NOT BE FUSED, THEREFORE ISOLATION OF THOSE CIRCUITS REQUIRES DISCONNECTING WIRING FROM BUS BARS.

⚠ CAUTION

DO NOT TEST A CIRCUIT BREAKER WHILE IT'S IN SERVICE AND ENERGIZED.

⚠ CAUTION

TESTING OF A CIRCUIT BREAKER THAT RESULTS IN THE TRIPPING OF THE CIRCUIT BREAKER SHOULD BE DONE ONLY WHEN THE PANELBOARD IS DE-ENERGIZED.

⚠ CAUTION

FAILURE TO SHORT OR DISCONNECT DURING PANELBOARD TESTING WILL RESULT IN FAILURE OF ELECTRONIC COMPONENTS.

⚠ WARNING

DISCONNECT POWER AT SOURCE BEFORE REMOVING OR INSTALLING FUSES. HAZARDOUS VOLTAGE. WILL CAUSE SEVERE INJURY OR DEATH.
Failure to disconnect control power during panelboard testing will result in failure of electronic components and void manufacturer's warranty.

Pre-Energizing Panelboard Insulation Testing

Exercise extreme care to prevent the equipment from being connected to the power source while tests are being conducted.

Prior to energizing the panelboard, perform a Megger or DC test of the panelboard's insulation with the neutral isolated from the ground and the switches and/or circuit breakers open, conduct electrical insulation resistance tests from phase to phase, phase to ground, phase to neutral, and neutral to ground. Retain results for use to compare to results produced in the future. Prior to testing, remove all control power fusing and connections to products, which will be damaged in this test. See above.

DO NOT USE AC Dielectric testing.

Test resulting in readings at or above 1 mega-ohm (MΩ) is satisfactory.

Post-Testing

After testing, and with the panelboard de-energized, reconnect all devices, control fusing and disconnects removed prior to testing.

Securing the Panelboard

Install the dead front cover and trim parts on the panelboard using hardware supplied by the manufacturer. Take caution that conductors are not pinched between parts when installing the dead-front cover and trim. All parts should be aligned and secured when installed.
Do not leave holes or gaps in the dead-front construction.
Clean up any debris in and around the panelboard.

⚠ CAUTION

FAILURE TO DISCONNECT CONTROL POWER DURING PANELBOARD TESTING WILL RESULT IN FAILURE OF ELECTRONIC COMPONENTS.

⚠ WARNING

TO PREVENT DAMAGE TO GROUND FAULT CONTROL CIRCUITS, METERING CIRCUITS, OR OTHER CONTROL CIRCUITS WHEN MEGGERING PANELBOARD, ISOLATE CIRCUITS FROM PANELBOARD SYSTEM BEFORE BEGINNING THE MEGGER OPERATION. BE SURE TO RECONNECT THOSE CIRCUITS AFTER MEGGER TESTS ARE COMPLETED. NOTE: SOME GROUND FAULT CIRCUITS MAY NOT BE FUSED, THEREFORE ISOLATION OF THOSE CIRCUITS REQUIRES DISCONNECTING WIRING FROM BUS BARS.

⚠ WARNING

DO NOT USE AC DIELECTRIC/MEGGER TESTING.

Energizing Panelboard

Extreme hazards can exist when energizing electrical distribution equipment and panelboards. Take all precautions necessary to protect people and property when energizing the equipment. Short circuits and ground faults may exist as a result from inadequate installation. Short circuits and ground faults within the panelboard can cause catastrophic damage, injury and death.

1. Determine and always use proper Personnel Protective Equipment (PPE) per NFPA 70E.
2. Prior to energizing the panelboard, turn OFF all overcurrent devices and loads internal to the panelboard plus mains in downstream equipment.
3. Verify and follow the sequence of energizing circuits and loads. Verify phase sequencing on loads, such as motors, which can be damaged or destroyed by incorrect phase connections.
4. If provided, use remote operators to close and energize panelboard, overcurrent devices and loads.
5. Beginning with the main(s), turn ON each overcurrent device.

Maintenance

It is essential to maintain the equipment in satisfactory condition.
To ensure continued quality service, a systematic maintenance schedule is vital. Facility operation and local conditions vary to such an extent that the schedule must be prepared to suit the conditions. The maintenance schedule for individual devices, such as circuit breakers, meters, fusible switches, etc., should be based upon recommendations contained in the individual instruction leaflet for each device. Inspection and test operations should be coordinated with an overall testing program to result in the least operating inconvenience and system shutdowns.

Prior to performing any maintenance on the panelboard, first de-energize the panelboard at the source. Use lockout/ tag-out precautions as prescribed in OSHA, NFPA 70E and other safety manuals.
The panelboard should be given a thorough maintenance check annually.
Exercise extreme care to prevent the equipment from being connected to the power source while tests are being conducted.

⚠ WARNING

HAZARDOUS VOLTAGE. WILL CAUSE SEVERE INJURY OR DEATH.

⚠ WARNING

ONLY THOSE PROFESSIONALS TRAINED AND QUALIFIED ON ELECTRICAL DISTRIBUTION PANELBOARDS SHOULD INSTALL AND/OR SERVICE THIS EQUIPMENT.

⚠ DANGER

HAZARDOUS VOLTAGE WILL CAUSE SEVERE INJURY OR DEATH. DE-ENERGIZE PANELBOARD PRIOR TO SERVICING.

⚠ WARNING

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Panelboard Insulation Resistance Testing

Maintenance before Cleaning

Prior to cleaning, perform an initial Megger or DC test of the panelboard insulation, between phases and ground. Inspect for symptoms that may indicate overheating or weakened insulation. Record test readings. Refer to NEMA publication AB-4 "Guidelines for Inspection and Preventative Maintenance of Molded Case Circuit Breakers Used in Commercial and Industrial Application." Prior to testing, remove all control power fusing and connections to products, which will be damaged in this test. This includes all components with control wire fusing, Transient Voltage Surge Suppression, Surge Protective Devices, metering equipment, etc.

Cleaning

While the panelboard is de-energized, remove dust and debris from bus bars, connections, supports and enclosure surfaces. A vacuum cleaner with a nozzle will be of assistance. Wipe clean with a lint-free cloth. Do not use solvents to clean equipment as damage to surfaces can occur. Should the panelboard be exposed to adverse conditions, such as, airborne contaminants, more frequent inspections and cleaning may be required.
Use of compressed air to clean or blow out debris in panelboards may imbed the contaminants within overcurrent devices, metering equipment and other components. Damage to insulation and other surface materials can occur. Do Not Use Compressed Air in cleaning.

Maintenance after Cleaning

After cleaning, perform a second Megger or DC test of the panelboard insulation between phases and ground. Prior to testing, remove all control power fusing and connections to products, which will be damaged in this test. This includes all components with control wire fusing, Transient Voltage Surge Suppression, Surge Protective Devices, metering equipment, etc.

DO NOT USE AC dielectric testing.

Test resulting in readings at or above 1 megaohm is satisfactory.
Compare these test readings with prior readings and retain with previous testing for future comparisons. Trends of lowered insulation resistance are signs of potential problems.

Bus and Cable Connections

1. Inspect bus bar and cables for visible damage.
2. Visually inspect connections for overheating and damage.
3. All bus bars and cable connections should be checked and torque in accordance with labeling on the panelboard. Refer to Appendix Table 4 for torque values.
4. Inspect for broken wire strands and pinched or damaged insulation on cable connections.

Insulation

All bus bar and structure insulation in the panelboard including bus supports, bus shields, bus bracing, insulating barriers, etc., should be visually checked for damage. Replace damaged parts. The life of insulation material is dependent on keeping the material dry and clean.

⚠ WARNING

TO PREVENT DAMAGE TO GROUND FAULT CONTROL CIRCUITS, METERING CIRCUITS, TRANSIENT VOLTAGE SURGE PROTECTION (TVSS) OR OTHER CONTROL CIRCUITS, WHEN MEGGERING PANELBOARD, ISOLATE CIRCUITS FROM PANELBOARD SYSTEM BEFORE BEGINNING THE MEGGER OPERATION. BE SURE TO RECONNECT THOSE CIRCUITS AFTER MEGGER TESTS ARE COMPLETED.
NOTE: SOME GROUND FAULT CIRCUITS MAY NOT BE FUSED, THEREFORE ISOLATION OF THOSE CIRCUITS REQUIRES DISCONNECTING WIRING FROM BUS BARS.

⚠ WARNING

DO NOT USE ALTERNATING CURRENT (AC) DIELECTRIC/MEGGER TESTING. DAMAGE TO COMPONENTS WILL OCCUR.

⚠ WARNING

DO NOT USE COMPRESSED AIR TO CLEAN OR BLOW OUT DEBRIS OR DUST IN PANELBOARDS.

⚠ WARNING

TO PREVENT DAMAGE TO GROUND FAULT CONTROL CIRCUITS, METERING CIRCUITS, TRANSIENT VOLTAGE SURGE PROTECTION (TVSS) OR OTHER CONTROL CIRCUITS, WHEN MEGGERING PANELBOARD, ISOLATE CIRCUITS FROM PANELBOARD SYSTEM BEFORE BEGINNING THE MEGGER OPERATION. BE SURE TO RECONNECT THOSE CIRCUITS AFTER MEGGER TESTS ARE COMPLETED.
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Secondary Wiring

Check all wiring connections for tightness, including those at the current and potential transformers, if present, and at all terminal blocks. Check all secondary wiring connections to ensure they are properly connected to the panelboard ground bus, where indicated. Look for broken wire strands and pinched or damaged insulation.

Ventilation

Check all grills and ventilation ports for obstructions and accumulations of dirt. Clean ventilation ports, if necessary. For panelboards installed outdoors, inspect the air space under the panelboard to be sure that it is clean and clear of debris, leaves and obstructions.

Records

It is essential to maintain the equipment in satisfactory condition.
Maintain a permanent record of all maintenance activities and testing for future reference. The condition of each panelboard should be recorded as a guide for anticipating the need for any replacement parts or components or special attention at the next regular maintenance period. It is recommended that a series of inspections be made at quarterly intervals until the progressive effects of local conditions can be analyzed to determine a regular schedule.

Panelboard Events and Service Interruptions

Short-Circuits, Ground-Faults and Overloads

A thorough assessment, identification and correction of the event origin must be completed. An additional assessment of the conductor insulation and other insulating materials should be made. Replace all damaged insulation materials, conductors and overcurrent devices. Original panelboard parts, insulators, insulation material and overcurrent devices must be replaced with renewal parts from Eaton. (Refer to your local Eaton Sales Representative for support.)

Do not attempt to re-energize panelboard overcurrent components after electrical events, such as short-circuits, ground-faults and overloads, until the cause of the event has been identified and corrected.

After the event has been rectified, test equipment per the maintenance process described in this publication.

Physical Damage

Any physical damage to the panelboard that occurs after the panelboard is installed must be corrected. A thorough inspection, which includes the exterior enclosure and dead-front, plus interior components in the damaged portion of the panelboard, should be conducted. Replace all damaged parts and components. Ensure that there are no gaps in the panelboard enclosure that could cause exposure to live parts. Contact Eaton for renewal parts and assistance. After the physical damage has been corrected, test equipment per the maintenance process described in this publication.

⚠ DANGER

HAZARDOUS VOLTAGE WILL CAUSE SEVERE INJURY OR DEATH. DE-ENERGIZE BOARD PRIOR TO SERVICING FUSIBLE DEVICES.

⚠ WARNING

NEVER USE COMPRESSED AIR TO CLEAN OR BLOW OUT DEBRIS OR DUST IN PANELBOARDS.

⚠ WARNING

**DO NOT ATTEMPT TO RE-ENERGIZE PANELBOARD OVERCURRENT DEVICES AFTER ELECTRICAL EVENTS, SUCH AS SHORT-CIRCUITS, GROUND-FAULTS AND OVERLOADS,
UNTIL THE CAUSE OF THE EVENT HAS BEEN IDENTIFIED AND CORRECTED.**

Water Damage

**DO NOT WORK ON SURFACES OR FLOORS WHERE THERE IS STANDING WATER.
DO NOT WORK ON WET ENERGIZED ELECTRICAL EQUIPMENT.**

Major accumulation of water or moisture on any part of the panelboard can cause catastrophic damage to the panelboard. If a panelboard has been submerged by more than 2 inches or where running or standing water has had contact with current carrying parts, it has sustained significant damage. The panelboard and its components may be damaged beyond repair and may need replacement.

1. Do not attempt to clean or repair water-damaged equipment or components.
2. De-energize the panelboard at its source.
3. Do not energize.
4. Contact Eaton for replacement.

Minor accumulations of moisture, such as condensation, over a short period of time may be corrected using heat. De-energize panelboard. Apply approximately 250 watts per vertical section for a sufficient period of time until the moisture disappears, then remove all heat sources and materials used for drying. Inspect for damage to components and any corrosion. If any damage or corrosion is present, contact Eaton. DO NOT RE-ENERGIZE PANELBOARD. After the panelboard has completely dried, remove all materials and tools from the equipment. Inspect all connections for damage and torque. Re-install all covers, fillers, dead-front assemblies and side sheets. Conduct panelboard insulation resistance testing described in this publication.

Renewal Parts

To ensure safety and to maintain UL™ listing and CSA™ approval, it is essential that only new parts and components from Eaton be utilized. When ordering renewal parts or when requesting information on the panelboard, it is essential to include as much information as possible.
Each panelboard will have a nameplate and other identification marks with details that will help expedite information requests and orders. The following may be required to help identify parts and information requests.

- ___ Catalog number of the panelboard
- ___ Description of the equipment
- ___ Supply voltage
- ___ Equipment ratings
- ___ Description of the part
- ___ Style number of part, if available
- ___ Rating of part(s)

Electrical distribution equipment has a limited life span. As such, the manufacturer cannot guarantee the availability of obsolete equipment or parts. Equipment replacement may be recommended.

⚠ DANGER

WET PANELBOARDS PRESENT A HAZARDOUS CONDITION AND MAY CAUSE INJURY OR DEATH. DE-ENERGIZE POWER TO ALL EQUIPMENT BEFORE SERVICING.

⚠ DANGER

DO NOT WORK ON PANELBOARDS OR ENTER AREAS THAT HAVE STANDING WATER. DE-ENERGIZE ALL EQUIPMENT IN AREAS WITH STANDING WATER.

⚠ WARNING

PANELBOARD COMPONENTS, INCLUDING CIRCUIT BREAKERS, FUSIBLE SWITCHES, METERING, ETC., SUBJECTED TO WATER OR MOISTURE MAY BE RENDERED UNSAFE. REPLACEMENT IS REQUIRED.

Appendix

Table 3 Wire Bending Space Requirements for Cable Sizes

Wire Size (AWG)	Main Circuit Breaker Interior (in / mm)	Main Lug Interior (in / mm)
#3	2” / 51	2” / 51
#2	2.5” / 64	2.5” / 64
#1	3” / 76	3” / 76
#1/0	5” / 127	5” / 127
#2/0	6” / 152	6” / 152
3/0	6.5” / 165	6” / 152
4/0	7” / 178	6” / 152
250MCM	8” / 203	6.5” / 165

Table 4 Torque Values for Copper or Aluminum Bus Bar Connections

Bolt Size	Torque (inch pounds)	Torque (foot pounds)	Torque (Newton Meters)
#10	30	2.5	3.4
¼”	65	5.4	7.3
5/16”	130	10.8	14.7
⅜”	240	20	27.1
½”	600	50	67.8

Notes

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