power temp systems INC.

Quick Connect Panels

Installation, Operation, and Maintenance Manual, General Requirements and Safety Guide

Product Overview

Power Temp Systems Quick Connect Panels provide a safe, code-compliant interface for connecting temporary power sources such as portable generators or load banks. The panels are designed to allow rapid connection and disconnection of temporary power sources. Configurations may include Cam-Lok connectors, mechanical lugs, monitoring devices, breakers, and optional accessories, depending on application requirements. Configurations vary by project.

This guide provides general installation, operation, maintenance, and safety information applicable to all Quick Connect Panel configurations.

www.powertemp.com

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Document History:

Doc No.	Revision	Date	Description of Changes	Prepared by	Approved by
GL-PTS-OPS-L3-MN-0001	Rev A	01/2026	Initial release	Nicoleta Paval	Jerry Babb

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Important Safety Information

Read these instructions carefully and become familiar with the equipment before installing, operating, servicing, or maintaining it.
This manual contains important safety information and instructions intended to help prevent personal injury, equipment damage, and improper operation. Safety messages may appear throughout this manual or on the equipment to identify potential hazards or to clarify procedures.

⚠ The addition of this symbol to a “Danger” or “Warning” safety message indicates that an electrical hazard exists which will result in death or serious injury if the instructions are not followed.

DANGER
DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.

WARNING
WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION
CAUTION indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTICE
NOTICE identifies practices not related to personal injury. The safety alert symbol is not used with this signal word.

Electrical equipment must be installed, operated, serviced, and maintained only by qualified personnel. Power Temp Systems assumes no responsibility for injury, damage, or other consequences resulting from the use or misuse of this material.

A qualified person is defined as an individual who has the training, skills, licensing (where required), and technical knowledge necessary for the construction, installation, operation, and servicing of electrical equipment, and who has received appropriate safety training to recognize and avoid electrical hazards.

⚠⚠ WARNING – 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, or NOM-029-STPS. • 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. • Apply approved Lockout/Tagout (LOTO) procedures to prevent inadvertent energization. • Always use a properly rated voltage sensing device to confirm absence of voltage. • Before restoring power, reinstall all protective devices, doors, and covers. **Failure to follow these instructions will result in death or serious injury.**

⚠⚠ WARNING – ARC FLASH HAZARD
• Electrical equipment may present an arc flash hazard. Arc flash boundaries, required personal protective equipment (PPE), and safe work practices must be determined by the employer in accordance with NFPA 70E. • Always follow site-specific arc flash labeling, procedures, and applicable regulations when working on or near energized equipment.

⚠⚠ WARNING – BACKFEED HAZARD
• Improper connection of a generator or temporary power source can result in backfeeding, creating severe shock hazards, equipment damage, or unintended energization of upstream systems. • Ensure all connections are made only to de-energized equipment and in accordance with approved procedures.

DANGER – CARBON MONOXIDE HAZARD
• Portable generators and other combustion-engine power sources produce carbon monoxide (CO), a colorless, odorless gas that can cause serious injury or death. • Operate generators outdoors only and position them away from doors, windows, vents, and HVAC air intakes. Follow generator manufacturer's recommendations regarding placement, exhaust direction, and minimum clearance distances. Never operate generators in enclosed or partially enclosed spaces, including garages, buildings, or near occupied areas where exhaust gases may accumulate. • Failure to follow these instructions may result in serious injury or death.

Limited Warranty

Warranty coverage for this equipment is subject to the terms and conditions of the Power Temp Systems warranty in effect at the time of purchase. For the most current warranty information, refer to the latest warranty statement published by Power Temp Systems. No other warranties, expressed or implied, apply unless specifically stated in writing. Contact Power Temp Systems Technical Support with any warranty-related questions.

Technical Support

Power Temp Systems provides comprehensive technical support for all PTS equipment, including assistance with troubleshooting, installation guidance, product configuration, and operational inquiries. Our support team is staffed with qualified personnel who are familiar with the construction and application of PTS generator docking systems.
If you require assistance, please contact us using the information below. Additional documentation, wiring diagrams, product specifications, and service resources are available on our website.

Phone: 1-866-977-3512
Hours: Monday–Friday, 8:00 AM to 5:00 PM CST
Website: https://powertemp.com

Technical support may also be submitted through the **Request an Expert** form available on the Power Temp website: https://powertemp.com/request-an-expert/

For after-hours emergencies, warranty service authorization, or advanced engineering support, please refer to the contact procedures provided on our website.

Unpacking and Inspection

⚠ CAUTION – SHARP EDGES / CUT HAZARD
Use caution when opening the shipping container. Sharp tools may damage the enclosure surface, paint finish, gaskets, labels, or internal wiring.

Thorough unpacking and inspection upon delivery help ensure the equipment is ready for safe installation and operation. Follow the guidelines below:

1. Safe Unpacking
- Open shipping materials carefully, using proper lifting techniques and tools.
- Avoid using knives or blades near the enclosure surface.
- Do not discard packaging until inspection is complete.

2. Verify Shipment Contents:
- Compare the received equipment with the packing list or purchase order.
- Ensure all accessories, hardware kits, documentation, and optional components are present.

3. Perform a Visual Inspection
- Inspect the following areas for any visible signs of damage:
- Enclosure doors, hinges, and latches
- Gaskets, seals, and door alignment
- Sidewalls, corners, and mounting flanges
- Cam-Lok connectors, mechanical lugs, and internal terminations
- Nameplates, labels, and arc flash stickers
- Look for dents, scratches, punctures, loose hardware, displaced components, or compromised seals.

4. Verify Ratings and Nameplate Data

Confirm that the equipment matches the intended application:
- Voltage rating
- Ampacity
- Phase configuration
- SCCR (Short-Circuit Current Rating)
- NEMA enclosure rating
- Model number and part number.

If the unit rating does not match the job specifications, do not install the unit and contact Power Temp Systems.

5. Report Shipping Damage Immediately
If any damage is found:
- Photograph the affected areas.
- Note the condition of the packaging
- Do not attempt to energize or install the unit.
- Contact Power Temp Systems and the carrier for claim instructions.

6. Temporary Storage (If Installation is Delayed):
- Store the equipment indoors in a clean, dry, secure location.
- Protect the enclosure from dust, moisture, and temperature extremes.
- Keep the equipment upright to avoid internal component stress.

Proper unpacking and inspection help ensure safe installation and prevent premature equipment failure.

Site Preparation

Prepare the installation site in accordance with all applicable local codes, the National Electrical Code (NEC), national standards, and any requirements specified by the Authority Having Jurisdiction (AHJ). Proper site preparation ensures that the Quick Connect Panel is installed in a safe, code-compliant, and environmentally appropriate location.

1. Structural & Mounting Surface Requirements:

- Install the enclosure on a level, stable, and load-bearing surface.
- Concrete pads must be adequately sized and capable of supporting both enclosure weight and cable tension.
- For wall-mounted units, ensure the wall structure is sufficient for the enclosure weight and any applicable seismic/load requirements.
- Maintain cabinet stability at all times; units may be top-heavy.

2. Safety Clearances & Accessibility:

- Maintain working clearances in accordance with NEC, considering system voltage, equipment condition, and instalation environment.
- Provide adequate working space for generator cables, load bank cables, and service tools.
- Ensure the site is well-lit and accessible for emergency personnel.

3. Environmental and Ventilation Requirements:

- Install the enclosure in a clean, dry, and well-ventilated area.
- Avoid installation near corrosive atmospheres, standing water, or locations prone to flooding.
- Outdoor units must be protected from excessive dust, chemical vapors, and physical impact hazards.
- Prevent direct water spray or pressure washing of NEMA 3R enclosures unless specifically rated for such exposure.

4. Generator Placement and CO Safety:
To prevent carbon monoxide intrusion into buildings:

- Position portable generators outdoors only and away from windows, doors, vents, and HVAC intakes.
- Follow generator manufacturer's recommendations regarding exhaust direction and safe operating distances.
- Ensure ventilation paths are not obstructed.
- Never operate generators inside garages, warehouses, or enclosed areas.

5. Grounding & Bonding Considerations:

- Grounding and bonding must comply with NEC Article 250 and NEC 702 for optional standby systems.
- Prepare grounding electrodes and bonding paths as required by the AHJ.
- Confirm system configuration (separately derived or non–separately derived) prior to installation.

6. Conduit Routing & Penetration Planning:

- Plan conduit entries to maintain the enclosure's NEMA rating.
- Use watertight hubs or gaskets for all penetrations.
- Avoid routing conduits where they may interfere with cable landing space or door swing.

- Ensure proper conductor bending radius and conduit fill as required by the NEC and applicable installation standards.

7. Environmental Operating Conditions:

- Verify that the installation environment meets the equipment specifications, including:
  - Temperature range.
  - Humidity range.
  - Vibration or mechanical stress limits.
- Do not install the equipment in locations exceeding its rated conditions.

8. Pre-Installation Checklist:
A comprehensive pre-installation checklist is provided in **Appendix A.**
This checklist must be completed before mounting or wiring the equipment.

Installation Steps

Step 1: Mounting the Panel

⚠ CAUTION
IMPROPER MOUNTING MAY RESULT IN WATER INTRUSION, EQUIPMENT DAMAGE, OR INSTABILITY.

The enclosure must be mounted level and plumb to ensure proper drainage through the weep holes and to prevent excessive stress on doors, hinges, and mounting hardware.
Mounting Requirements:

- Position the enclosure so that all doors can fully open without obstruction and required working clearances per NEC are maintained.
- Verify that the mounting surface is structurally capable of supporting the cabinet weight and cable tension loads.
- Secure the enclosure using corrosion-resistant fasteners and anchors appropriate for the mounting surface and installation environment, or as specified by the equipment manufacturer.
- Tighten all mounting hardware before installing any internal wiring.
- For free-standing units, ensure the unit is properly anchored to prevent tipping (top-heavy hazard).

NOTICE
Do not drill into the enclosure in areas where internal wiring, bus bars, or protective devices may be damaged.

Step 2: Installing the Conduit

⚠ WARNING – MOISTURE INTRUSION HAZARD
Failure to properly seal conduit entries may allow moisture to enter the enclosure, causing corrosion, equipment malfunction, or electrical shock hazards.

To maintain the enclosure rating:

- Use UL-listed NEMA watertight fittings, gaskets, and sealing washers that are equivalent to the enclosure NEMA rating.
- When making conduit openings, use a knockout punch to maintain enclosure integrity. Avoid saw blades that distort surface flatness.
- Internal barriers or panels should be removed only as required to access the termination area-replace them before energizing the unit.
- Size conduit according to NEC conductor fill requirements and cable bend radius.
- When drawing a knockout toward the outside of the enclosure, support the metal to avoid deforming the panel.
- Seal any unused openings with rated closure devices.

NOTICE
Conduit must not interfere with wiring access, door swing, or Cam-Lok connector operation.

Step 3: Wiring the Lug Terminals

⚠⚠ WARNING
ELECTRICAL SHOCK / ARC FLASH

Before performing any wiring, ensure all circuit breakers are in the OFF position and that the power source supplying the panel is locked out and tagged out.
Verify the absence of voltage using properly rated test instruments.

⚠ WARNING – GENERATOR INLET MISUSE HAZARD
• The male Cam-Lok inlet is for generator power only. • Energizing this inlet with utility power or backfeeding from a load source may result in severe electrical shock, equipment damage, or death.

Wiring Requirements:
All wiring shall be installed in accordance with applicable requirements of the NEC and local codes, as enforced by the Authority Having Jurisdiction (AHJ).
Conductor insulation shall be rated for 90°C, unless otherwise required by the NEC, equipment manufacturer, or the local AHJ.

Wiring Procedure:

- Pull all required wiring into the panel, ensuring cables are not kinked or subject to strain.
- Terminate equipment grounding conductors first.
- Tighten all mechanical lugs per the manufacturer's specified torque values (see **Appendix C** for torque specifications).
- If metallic conduit is used, install a bonding jumper from the grounding bushing to the enclosure grounding point.

NOTICE
Conduit must not be used as the grounding conductor.

- Terminate the neutral conductor first, followed by Phase A, Phase B, and Phase C.
- Route conductors neatly using cable management methods to prevent interference with door operation or access panels.

Step 4: Phase Rotation Verification

WARNING
INCORRECT PHASE ROTATION CAN DAMAGE CONNECTED EQUIPMENT

Before energizing the system:

- Verify generator phase rotation using a phase rotation monitor.
- Standard phase rotation is ABC (clockwise) unless otherwise required by the facility.
- If an alternate rotation (such as CBA) is required: reconfigure phase connections in accordance with equipment manufacturer instructions and site requirements.
- After wiring adjustments, re-test phase rotation to confirm correctness.
- Document phase rotation results on the installation checklist.

Step 5: Final Enclosure Assembly & Pre-Energization Check.
Before Energizing the System:

- Check all terminations for proper torque.
- Ensure no foreign objects, tools, debris, or wire insulation scraps remain inside the enclosure.
- Replace all internal panels, barriers, and covers.
- Close all doors and ensure latches are fully engaged to maintain the enclosure's NEMA rating.
- Inspect the enclosure exterior for damage, loose hardware, or missing labels.
- Confirm the generator is placed in a safe, ventilated outdoor area per CO safety guidelines.
- Verify grounding and bonding paths comply with system configuration (separately-derived vs. non–separately-derived).

NOTICE
Energize the equipment only after completing the full Pre-Installation Checklist in **Appendix A.**

Operating Instructions

⚠ WARNING
Failure to follow applicable codes, NFPA practices, and approved facility procedures may result in serious injury, death, or equipment damage.

These instructions provide general operational guidance applicable to all PTS Quick Connect panels, regardless of specific configuration. Always follow site-specific procedures and applicable codes.

1. Pre-Operation Checks.

Installation & Site Verification

Before operating the equipment:

- Confirm that installation and site preparation steps have been completed.
- Ensure all enclosure doors and covers are closed and latched, unless performing approved, de-energized work.
- Maintain the required working clearances and a clean, unobstructed work area.

Personnel & Safety

- Only trained and qualified personnel should operate this equipment.
- Use appropriate PPE in accordance with company, local, regional, and national requirements.
- Confirm Lockout/Tagout (LOTO) has been applied to any upstream equipment as required.

Environmental Conditions

- Ensure the area is dry, well-ventilated, and free from combustible materials.
- Verify adequate lighting and safe footing.
- Confirm generator placement meets CO safety requirements.

2. Power Source Verification.

Before making any connections:

- Confirm the generator or external power source matches the panel's voltage, frequency, and phase rating.
- Verify grounding and bonding comply with NEC and system design (separately or non-separately derived).
- Ensure all power source control devices (e.g., generator output switch, disconnect, breaker, if applicable) are in the OFF position.

⚠ WARNING – ELECTRICAL SHOCK HAZARD
Do not energize any conductors during cable installation. Energized conductors may result in serious injury or death.

3. Cable Connection Sequence (Energizing)

⚠⚠ WARNING
• Failure to follow this sequence may result in electric shock, arc flash, or equipment damage. • Follow Lockout/Tagout (LOTO) procedurs before handling or connecting any cables.

Connect cables in the following order prior to energizing the system:

1. Equipment grounding conductor (Green)
2. Neutral (White), if provided
3. Phase conductors in the following order:
   - Phase A
   - Phase B
   - Phase C, if present.

This sequence establishes a grounded reference before connecting energized conductors.

4. Proper Cam-Lok Connections:

⚠ WARNING
• Failure to properly match cable and connector colors, or forcing mismatched Cam-Lok connectors, may result in equipment damage, overheating, or electric shock.

Match cable color to connector color.

Insert Cam-Lok fully into the receptacle.

Rotate clockwise until it locks.

Tug lightly to verify secure engagement.

5. Phase Rotation Verification

⚠⚠ WARNING
Incorrect phase rotation may cause damage to connected equipment.

After all cables are connected:

- Verify correct phase rotation (typically ABC) using a phase rotation monitor.
- If rotation is incorrect, adjust at the generator or per facility procedures.
- Retest to confirm correct sequencing.

6. Initial Energization

⚠⚠ WARNING – ELECTRICAL SHOCK, ARC FLASH, AND EQUIPMENT DAMAGE HAZARD
Applying power to the system may expose personnel to energized conductors and arc flash hazards. • Only qualified personnel shall perform initial energization. • Ensure all covers, barriers, and doors are installed and secured before applying power. • Verify all connections are complete, properly torqued, and in accordance with the wiring schematic. • Confirm correct voltage, phase, frequency, and grounding/bonding configuration prior to closing any breaker or output device. • Stand clear of equipment and cables during initial energization. Failure to follow these instructions could result in death, serious injury, or equipment damage.

PTS panels vary by model, apply the steps below as applicable.
System Readiness:

- Verify all covers, barriers, and doors are installed and secured.
- Ensure all downstream loads or equipment are in the appropriate starting state (typically OFF).

Apply Power from the Source:

- Start the generator (or other power source) according to the manufacturer's instructions.
- Allow voltage and frequency to stabilize.
- Close the generator breaker, switch, or output control once proper readings are confirmed.

Energizing the Load (If Applicable):

- If the panel feeds loads directly or indirectly:
- Apply load gradually following facility procedures.
- Monitor for abnormal noise, heat, odor, or vibration.
- If the panel is used only for load bank testing, proceed to load bank setup after stabilization.

7. Normal Operation

⚠ CAUTION
If abnormal conditions occur, immediately shut down the generator and investigate the cause before resuming operation.

During operation:

- Continue monitoring voltage, current, and temperature.
- Periodically visually inspect cables to ensure they remain properly seated and supported.
- Keep enclosure doors closed except when required for authorized inspection or servicing, to maintain the enclosure rating.

8. Cable Disconnection Sequence (De-Energizing)

⚠ WARNING
Failure to follow this sequence may result in electric shock, arc flash, or equipment damage. Verify all power sources are de-energized and locked out before disconnecting any cables.

Before disconnecting:

- Turn OFF all power sources (generator output breaker, disconnects, etc.).
- Shut down the generator in accordance with the manufacturer's instructions.
- Verify absence of voltage using an approved, voltage-rated test instrument.

Disconnect cables in the following order after the system has been de-energized and verified safe:

1. Phase conductors (C, then B, then A, if provided)
2. Neutral (White), if provided.
3. Equipment grounding conductor (Green) – LAST.

This sequence removes live conductors first while maintaining a continuous reference to ground, reducing shock and arc-flash risk.

Disconnect Cam-Lok connectors following the prescribed phase sequence.

Grasp Cam-Lok firmly and rotate counterclockwise until it stops.

Pull Cam-Lok connector straight out of the receptacle; do not twist or force.

9. Post-Operation Checks

After all cables have been disconnected:

- Inspect connectors and cables for abnormal heat, discoloration, damage, or excessive wear.
- Close and latch all doors, covers, and access panels.
- Store cables properly to prevent mechanical damage, moisture exposure, or contamination.
- Document operating notes, run time, and any abnormal conditions observed.

10. Returning to Normal Facility Operation (If Applicable)

If the panel interfaces with facility equipment:

- Confirm the generator is fully shut down and de-energized.
- Restore facility systems in accordance with site-specific procedures.
- Reconnect to utility or normal power sources per facility guidelines and authorization.

- If the panel is used only for portable power docking, this step may not apply.

11. Documentation & Continued Safe Use
    - Maintain records of operation, inspections, and maintenance activities.
    - Ensure personnel receive required periodic refresher training.
    - Monitor applicable NEC updates and internal procedural requirements.

NOTE:
If abnormal conditions occur during operation, including alarms, unexpected shutdowns, tripped protective devices, overheating, or improper indications, do not continue operation.
De-energize the equipment, apply approved Lockout/Tagout (LOTO) procedures, and refer to the Troubleshooting section for guidance.
If the condition cannot be safely identified or corrected, contact Power Temp Systems Technical Support.

Troubleshooting

WARNING – ELECTRICAL HAZARD
Troubleshooting shall be performed only by qualified personnel.

This section provides general guidance for identifying common issues encountered during operation. It does not replace site-specific procedures, electrical one-line diagrams, or Authority Having Jurisdiction (AHJ) requirements.
Before performing any troubleshooting activities:

- De-energize all power sources
- Apply Lockout/Tagout (LOTO)
- Verify absence of voltage using properly rated, voltage-rated test instruments.
- Wear appropriate PPE per NFPA 70E and site requirements.

For detailed troubleshooting steps, observed conditions, safe checks, and corrective actions, refer to **Appendix D:** Troubleshooting Quick Reference.

If conditions cannot be safely verified or corrected using the steps provided, stop work and contact Power Temp Systems Technical Support.

Maintenance

Power Temp Systems recommends establishing a structured maintenance program in accordance with the guidelines below, as well as all applicable codes, standards, and facility requirements. The frequency and scope of maintenance may vary depending on environmental conditions, duty cycle, and operational demands.

1. Scheduled Inspections.
Conduct comprehensive inspections at least annually, or more frequently as required by site conditions or applicable codes. Increase inspection frequency if the equipment is installed in: harsh or corrosive environments, outdoor locations subject to weather exposure, or high-use facilities. Refer to **Appendix B –** Maintenance Checklist for baseline inspection items and recommended documentation practices.

2. Qualified Personnel.

- All maintenance activities must be performed only by trained and qualified personnel who are familiar with the construction and operation of this type of equipment, electrical hazards and NFPA 70E safe work practices, proper selection and use of PPE, NEC requirements and applicable OSHA regulations.
- Unqualified personnel must not perform maintenance on this equipment.

3. Lockout/Tagout (LOTO) Procedures.
Before performing maintenance, follow approved LOTO procedures:

- De-energize and isolate all power sources feeding the equipment.
- Apply locks and tags to prevent inadvertent energization.
- Verify absence of voltage using properly rated test instruments.
- Release or neutralize all stored electrical, mechanical, or thermal energy.

⚠ WARNING
Failure to follow proper Lockout/Tagout (LOTO) procedures may result in death or serious injury.

4. Cleaning and Housekeeping

⚠⚠ WARNING – ELECTRICAL HAZARD
Do not use high-pressure cleaning equipment or water jets on the enclosure.

⚠ CAUTION – CLEANING AGENTS
Use of inappropriate cleaning agents may result in equipment damage.

- Do not use solvents, alcohol, or corrosive cleaners. Maintain the surrounding area as follows:
- Keep the area dry, clean, and unobstructed.
- Remove dust, debris, oil, moisture, and other contaminants that may interfere with ventilation and cooling, electrical insulation, or safe access for operation and service.
- Use only non-flammable and non-corrosive cleaning agents.

5. Component Inspection and Replacement
Inspect all components for signs of:
Electrical Issues:

- Loose or degraded terminations (including lugs, grounding points, and Cam-Lok connectors).
- Damaged, cracked, or discolored insulation.
- Corrosion or evidence of moisture intrusion.

- Overheating, arcing marks, or discoloration.

Mechanical Issues:

- Hinges, latches, gaskets, handles, and fasteners for wear or binding.
- Incorrect door alignment or damaged seals.
- Cable strain relief, supports, or hardware for integrity.

Cam-Lok Connector Evaluation:

- Cam-Lok connectors shall be evaluated in accordance with the defined wear criteria. Any connector exhibiting excessive wear, signs of overheating, damaged insulation, or loose or damaged retention springs shall be removed from service and replaced immediately.
- Field repair, modification, or refurbishment of Cam-Lok connectors is not permitted.

6. Torque Verification

As part of periodic maintenance, re-torque all accessible mechanical lugs and grounding points to the manufacturer's specified torque values.

- Verify Cam-Lok connectors and terminations for proper engagement and mechanical integrity.
- Verify any optional components (if present), such as indicators, monitors, or distribution hardware.
- Torque values shall be applied in accordance with the manufacturer's torque specifications. Refer to **Appendix C** – Torque Specifications for required torque values.

⚠ WARNING
Improper torque is a leading cause of overheating and equipment failure.

7. Testing and Verification

After completing maintenance:

- Restore equipment according to accepted procedures.
- Verify proper operation of indicators, sensors, or monitoring devices (if applicable).
- Confirm all protective devices, covers, and guards are properly reinstalled.
- Ensure emergency stops, safety interlocks, or status indicators (where applicable) function correctly.
- Equipment shall not be returned to service until all tests confirm safe operation.

8. Documentation and Recordkeeping

Maintain detailed records of:

- Inspection dates and findings.
- Maintenance tasks performed.
- Components replaced.
- Corrective actions taken.
- Results of testing and verification.

Accurate recordkeeping supports warranty validation, regulatory compliance, and long-term reliability analysis.

NOTICE
Failure to perform routine maintenance as recommended may result in equipment malfunction, unsafe operating conditions, and may void the warranty.

A structured maintenance program helps ensure safe operation, extends equipment service life, and maintains system reliability.

Optional Accessories

PTS Quick Connect Panels may be equipped with one or more of the following optional accessories, depending on configuration and project requirements.

Phase Rotation Monitor (PRM)

Where provided, the Phase Rotation Monitor (PRM) monitors the incoming three-phase power supply and indicates whether the phase sequence is correct or incorrect using a visual indicator.

Importance of the Phase Rotation Monitor:
Correct phase rotation is essential for proper operation of three-phase equipment such as motors, pumps, and compressors. Phase rotation must be verified and corrected as required before operation.
Incorrect phase sequence or phase loss can result in:

- Reverse rotation of motors.
- Reduced performance or process failure.
- Mechanical damage to equipment.
- Increased wear or overheating.

Normal Operation:

- When acceptable phase conditions are present, the PRM allows normal equipment operation.
- If incorrect phase rotation or phase loss is detected, the PRM inhibits operation to protect the system.
- Normal operation may resume automatically once proper power conditions are restored.

⚠⚠ WARNING – ELECTRICAL HAZARD
• Do not bypass, disable or ignore the Phase Rotation Monitor indication. Operating three-phase equipment without proper phase rotation may result in equipment damage, improper operation, or unsafe conditions. • Disconnect and lock out all power sources before inspecting or replacing PRM circuit fuses.

Limitations: The Phase Rotation Monitor provides phase indication only and does not replace required overcurrent protection, disconnecting means, or other safety devices required by applicable UL standards or the National Electrical Code (NFPA 70).

Maintenance: Under normal operating conditions, the Phase Rotation Monitor (PRM) does not require routine maintenance.

If the PRM indication is not present, or if repeated phase-related issues occur, the facility power supply and PRM circuit should be evaluated by qualified electrical personnel in accordance with applicable electrical codes.
Where equipped, PRM circuit fuses (typically 1 A) may open during abnormal conditions and require replacement once the underlying issue has been identified and corrected.

Surge Protection Device (SPD)

When installed, the Surge Protection Device (SPD) is intended to reduce the effects of transient overvoltage events on the equipment by diverting surge energy away from sensitive electrical and electronic components.

Importance of the Surge Protection Device:
Electrical surges caused by lightning, utility switching, or internal load changes can damage or degrade electrical and electronic components. The SPD helps:

- Reduce the risk of damage from transient voltage surges.
- Improve equipment reliability and service life.
- Support compliance with applicable electrical safety practices.

Normal Operation:

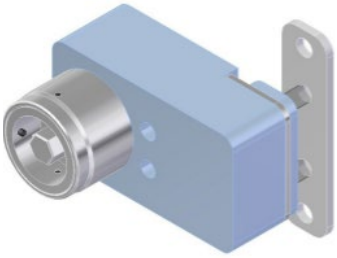
- The SPD operates automatically and does not require user interaction. Under normal conditions, the SPD remains inactive.
- When a transient overvoltage occurs, the SPD limits surge voltage to acceptable levels in accordance with its rating.
- Normal equipment operation continues once the surge event has passed.

⚠⚠ WARNING – ELECTRICAL HAZARD
The SPD may be energized whenever power is applied to the equipment. Servicing shall be performed only by qualified personnel in accordance with applicable electrical safety practices and codes.

Limitations: The Surge Protection Device reduces the effects of transient overvoltage events but does not eliminate all surge-related risks or damage. It does not replace required grounding, bonding, overcurrent protection, or other protective devices required by the National Electrical Code (NFPA 70) or UL standards.

Maintenance: The SPD is maintenance-free during normal operation. If the device includes a status indicator, periodic visual inspection is recommended. If the SPD indicates a fault or end-of-life condition, it should be evaluated and replaced by qualified personnel.

Trap Key Interlock System



When present, the Trap Key Interlock System provides a mechanical safety interlock to control the sequence of equipment operation and access, helping to reduce the risk of unsafe conditions during operation and maintenance.

Importance of the Trap Keys Interlock System:
Controlled access and proper operating sequence are critical for personnel safety when working with energized or potentially hazardous equipment.
The Trap Key Interlock System helps:

- Prevent access to energized compartments.
- Enforce safe operating and shutdown sequences.
- Reduce the risk of electrical shock or mechanical injury.
- Support compliance with established safety procedures.

The system uses uniquely coded mechanical keys to ensure that required conditions are met before access is permitted.

Normal Operation:

- The Trap Key Interlock System requires specific operating conditions to be satisfied before a key can be released.
- Release of a key allows the next permitted action, such as opening an access door or enabling a related operation.
- Keys must be returned to their designated positions to restore normal operation.
- The system operates mechanically and does not rely on electrical power.

⚠ WARNING – PERSONAL INJURY HAZARD
Do not bypass, defeat, or modify the Trap Key Interlock System. Doing so may result in exposure to energized equipment, serious injury, or unsafe operating conditions.

Limitations: The Trap Key Interlock System is a mechanical safety aid and does not replace required electrical disconnecting means, lockout/tagout procedures (LOTO), or other safety measures required by applicable UL standards or the National Electrical Code (NFPA 70).

Maintenance: The Trap Key Interlock System is maintenance-free under normal operating conditions. Keys and interlock mechanisms should be kept clean and free of damage. If keys are lost, damaged, or the interlock does not function as intended, the system should be evaluated by qualified personnel before continued operation. Replacement keys can usally be ordered by contacting PTS Technical support.

Access Annunciation Switch

Where provided, the Access Annunciation Switch indicates the status of an equipment access point and provides a signal when the access opening is opened or closed.

Importance of the Access Annunciation Switch:
Monitoring access points is important for maintaining safe and reliable equipment operation. The Access Annunciation Switch helps:

- Indicate when an access opening is open.
- Support operational awareness during use or servicing.
- Assist in maintaining compliance with facility safety procedures.

Normal Operation:

- The switch changes state based on the position of the access opening (open or closed).
- The annunciation signal may be used for indication, alarm, or system monitoring, depending on system configuration.
- The switch provides status indication only and does not control or isolate electrical power.

⚠ WARNING – EQUIPMENT SAFETY
Do not rely on the Access Annunciation Switch as a means of personnel protection or electrical isolation. Accessing the equipment while energized may expose personnel to hazardous conditions.

Limitations: The Access Annunciation Switch is an indicating device only and does not replace required safety interlocks, disconnecting means, or lockout/tagout procedures required by applicable UL standards or the National Electrical Code (NFPA 70).

Maintenance: The Access Annunciation Switch is maintenance-free under normal operating conditions. If improper indication or physical damage is observed, the switch should be evaluated by qualified personnel prior to continued operation.

Voltage Test Port

When equipped, the Voltage Test Port allows verification of the presence of electrical voltage at designated test points within the equipment using appropriate test instruments.

Importance of the Voltage Test Port:
Verifying voltage presence is essential for safe operation, troubleshooting, and confirmation of proper power supply conditions. The Voltage Test Port allows voltage checks to be performed without exposing internal components, helping to reduce the risk of electrical hazards.

Normal Operation:

- The Voltage Test Port allows access for measuring voltage using a properly rated voltage tester or meter.
- Voltage readings indicate the presence of voltage at the monitored circuit only.
- Voltage measurements are for indication purposes only and do not replace required lockout or electrical isolation procedures.

⚠⚠ WARNING – ELECTRICAL SHOCK HAZARD
Only qualified personnel using properly rated test equipment shall perform voltage measurements. All applicable electrical safety practices and codes shall be followed. Do not rely on the Voltage Test Port as the sole means of verifying absence of voltage.

Limitations: The Voltage Test Port is an indicating feature only and does not provide electrical isolation or de-energization. Absence of a voltage indication does not confirm that all internal circuits are de-energized. Verification of absence of voltage shall be performed using approved test equipment and procedures.
The Voltage Test Port contains internal resistors that may reduce measured voltage values by up to 5%.

Maintenance: The Voltage Test Port is maintenance-free under normal operating conditions. If abnormal readings or physical damage are observed, the equipment should be evaluated by qualified electrical personnel.

Strip Heater

When installed, the strip heater is used to maintain the internal enclosure temperature above ambient conditions to help reduce the effects of condensation and moisture.

Importance of the Strip Heater:
Condensation inside electrical enclosures can lead to corrosion, insulation degradation, and unreliable operation of electrical components. The strip heater helps support reliable operation in low-temperature or high-humidity environments.

Normal Operation:

- The strip heater operates automatically to provide supplemental heat within the enclosure.
- Heater operation is controlled by an associated thermostat or humidistat, as applicable.
- The heater circuit is protected by an appropriately rated branch circuit protective device.
- The heater does not provide enclosure temperature indication and is not intended for environmental control beyond condensation mitigation.

⚠⚠ **WARNING – ELECTRICAL / HOT SURFACE HAZARD**
The strip heater may be energized whenever control power is present and may become hot during operation. Avoid contact with the heater while energized. Servicing shall be performed only by qualified personnel in accordance with applicable electrical safety practices.

Limitations: The strip heater is intended for condensation control only and is not designed for personnel comfort, space heating, or freeze protection purposes. It does not replace environmental controls required by code or site conditions.

Maintenance: The strip heater and associated controls are maintenance-free under normal operating conditions. Periodic visual inspection for damage or abnormal operation is recommended. Any observed issues should be evaluated by qualified electrical personnel.

Infrared (IR) Inspection Window

Where provided, the Infrared (IR) Inspection Window allows thermal inspection of internal electrical components using infrared imaging equipment without opening the enclosure.

Importance of the Infrared (IR) Inspection Window:
Thermal inspections are commonly used to identify abnormal heating conditions that may indicate loose connections, overloads, or component degradation. The IR Inspection Window helps:
Support condition-based maintenance and early fault detection.
Reduce exposure to energized components during inspection.
Minimize the need to open electrical enclosures.

Normal Operation:

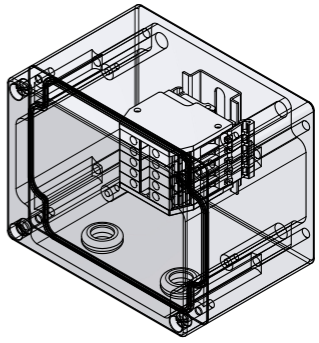
- The IR Inspection Window provides a transparent viewing area for infrared imaging devices.
- Thermal inspections may be performed while the equipment is energized, using appropriate inspection tools, PPE, and procedures.
- The window does not affect normal equipment operation.

⚠⚠ WARNING – ELECTRICAL HAZARD
The presence of an IR Inspection Window does not eliminate electrical hazards. Only qualified personnel using appropriate personal protective equipment (PPE) and safe work practices shall perform inspections in accordance with applicable electrical safety standards.

Limitations: The IR Inspection Window provides visual and thermal access only and does not provide electrical isolation, or authorization to work on energized equipment. All applicable safety procedures and regulatory requirements remain in effect.

Maintenance: The IR Inspection Window is maintenance-free during normal operation. The window should be kept clean and free of damage to ensure accurate thermal readings. If the window becomes damaged or cloudy, it should be evaluated or replaced by qualified personnel.

SCADA Terminal Port (STP)



If equipped, the SCADA Terminal Port (STP) allows connection of external monitoring or control systems to the equipment for data acquisition and communication purposes.

Importance of the SCADA:
The SCADA Terminal Port supports integration of the equipment into supervisory control and monitoring systems. It allows authorized personnel to observe operational status, alarms, and selected parameters without direct interaction with internal components.

Normal Operation:

- The SCADA Terminal Port provides designated connection points for communication or signal interfaces as defined by the system configuration.
- Signals available at the port may include status, alarms, or control inputs, depending on the application.
- Use of the port does not alter normal equipment operation unless external commands are intentionally applied through an approved and configured interface.

⚠ **WARNING – ELECTRICAL / COMMUNICATION INTERFACE**
Connection to the SCADA Terminal Port shall be performed only by qualified personnel using compatible and properly rated equipment. Improper connections may result in equipment malfunction or unsafe operating conditions.

Limitations: The SCADA Terminal Port is an interface feature only and does not provide electrical isolation, cybersecurity protection, or system safety interlocking. All required safeguards, protections, and operating limits remain the responsibility of the connected system and applicable codes.

Maintenance: The SCADA Terminal Port is maintenance-free under normal operating conditions. If communication faults or physical damage are observed, the interface should be evaluated by qualified personnel prior to continued use.

Receptacles



PTS Quick Connect Panels may include convenience receptacles, depending on panel configuration. These receptacles are intended for local convenience use at the panel and are protected by dedicated, appropriately rated branch circuit breakers.

Importance of the Receptacles:
Where provided, convenience receptacles supply local power for temporary or auxiliary equipment-such as maintenance tools, trickle chargers, block heaters, or other approved accessories.

Normal Operation:

- Each convenience receptacle is supplied from an internal or external branch circuit protected by a dedicated circuit breaker.
- Receptacles are available in multiple voltage and configuration options, depending on the application.
- Receptacles operate only when the panel is energized and the associated protective device is in the ON position.

Available receptacle options may include, but are not limited to:

- 20A, 120V GFCI Duplex Receptacle.
- 30A, 120V NEMA L5-30 Receptacle (Block Heater).
- 30A, 240V NEMA L6-30 Receptacle (Block Heater).
- 50A, 120/240V CS-Type (Non-NEMA) Receptacle.

⚠⚠ WARNING – ELECTRICAL HAZARD
Use of convenience receptacles shall be limited to loads within the receptacle and circuit breaker ratings. Improper use or connection of incompatible equipment may result in equipment damage or unsafe conditions.

Limitations: Convenience receptacles are intended for temporary or auxiliary use only and should not be used as a permanent power source. They do not replace required branch circuits, disconnecting means, or overcurrent protection required by the National Electrical Code (NFPA 70).

Maintenance: Convenience receptacles are maintenance-free during normal operation. Periodic inspection for physical damage, loose connections, or tripped circuit breakers is recommended. Any damaged receptacle shall be evaluated or replaced by qualified electrical personnel.

Auto Start Terminals

Where provided, the Auto Start Terminals allow connection to an external control signal used to automatically start or stop connected equipment or initiate a start/stop command to a power source, in accordance with system requirements.

Importance of the Auto Start Terminals:
Automatic start capability supports remote operation, load management, and system coordination. The Auto Start Terminals enable integration with external controls such as transfer switches, monitoring systems, or control relays to initiate operation without manual intervention.

Normal Operation:

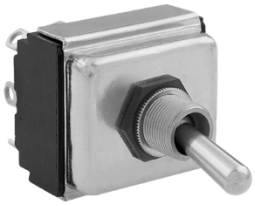
- The Auto Start Terminals accept a control signal from an external device as defined by the system configuration.
- When the appropriate signal is present, the equipment responds by initiating or terminating operation.
- Operation through the Auto Start Terminals does not bypass internal safety controls or protective devices.

⚠ WARNING – AUTOMATIC OPERATION
Equipment connected to Auto Start Terminals may start or stop without warning when an external control signal is applied. Personnel shall remain clear of equipment during automatic operation. Only qualified personnel shall connect or modify control wiring.

Limitations: The Auto Start Terminals provide a control interface only and do not replace required safety interlocks, disconnecting means, or emergency stop functions required by applicable UL standards or the National Electrical Code (NFPA 70).

Maintenance: The Auto Start Terminals are maintenance-free under normal operating conditions. If unintended operation or control signal faults are observed, the external control system and associated wiring should be evaluated by qualified personnel prior to continued use.

Signal Destination Switch



If installed, the Signal Destination Switch allows selection of the destination for control or status signals generated by the equipment to external systems.

Importance of the Signal Destination Switch:
Where provided, the Signal Destination Switch (SDS) allows the automatic start (Auto-Start) signal to be directed to either a permanent generator or a portable generator, as selected by the operator.
This function enables maintenance to be performed on the permanent generator without risk of an automatic start signal being applied, while maintaining system reliability by allowing the Auto-Start signal to be routed to the portable generator.
The SDS does not generate, modify, or inhibit the Auto-Start signal; it only selects the destination of the signal.

Normal Operation:

- The Signal Destination Switch allows manual selection between available signal destinations as defined by the system configuration.
- Only the selected destination receives the active signal at any given time.
- Switching signal destinations does not alter normal equipment operation beyond signal routing.

⚠ WARNING – CONTROL SYSTEM OPERATION
Improper signal routing may result in unintended equipment operation or loss of monitoring capability. The Signal Destination Switch should be operated only by qualified personnel familiar with the system configuration and operating requirements.

Limitations: The Signal Destination Switch provides signal routing functionality only and does not provide electrical isolation, interlocking, or safety protection. All required safeguards, interlocks, and protective devices remain in effect regardless of switch position.

Maintenance: The Signal Destination Switch is maintenance-free under normal operating conditions. If incorrect signal routing, improper indication, or physical damage is observed, the switch and associated wiring should be evaluated by qualified personnel prior to continued operation.

Appendix A: Pre-Installation Checklist

Task Category	Action Items	Completed (Y/N)	Notes / Findings	Date / Initials
Pre-Installation Preparation	Confirm that all required permits are obtained and applicable federal, state, and local codes are reviewed.			
	Ensure the installation team is trained, authorized, and wearing appropriate PPE.			
Site Preparation	Verify the mounting surface is level, stable, and can support the panel weight and cables.			
	Confirm adequate clearances and that the area is free from debris and hazards.			
	Ensure proper grounding and bonding measures are in place per NEC and local codes.			
	Validate environmental conditions: proper ventilation, no direct moisture, corrosive elements, or excessive heat.			
	Confirm panel location minimizes CO exposure risks (if generators or combustion sources are nearby) and verify available fault current does not exceed the panel's Short-Circuit Current Rating (SCCR).			
Equipment Unpacking & Inspection	Inspect enclosure doors, latches, hinges, and seals for physical damage and correct alignment.			
	Check for dents, scratches, or compromised seals on the enclosure; ensure all nameplates and labels are intact.			
	Verify that all shipped components, accessories, and documentation match the order and are undamaged.			
Mounting the Panel	Use appropriate fasteners to securely mount the panel onto the prepared surface.			
	Ensure the panel is plumb and level to allow for proper drainage from weep holes.			
Conduit & Cable Installation	After cutting conduit holes, maintain NEMA 3R (or applicable rating) compliance using proper gaskets and seals.			
	Verify conduit and cable sizing meets project specifications and NEC requirements.			
Wiring & Grounding	Confirm all power sources are de-energized, locked out, and tagged (LOTO) before connecting conductors.			

Task Category	Action Items	Completed (Y/N)	Notes / Findings	Date / Initials
	Ensure that the intended purpose of the installation matches the wiring schematic for correct form and function.			
	Connect ground conductors first, followed by neutral, then phase conductors (A, B, C) per wiring schematic and labeling.			
	Tighten all lugs and terminations to torque values listed in the product data sheet using a calibrated torque tool.			
Phase Rotation Verification	Check factory-set ABC rotation; adjust (swap L1 and L2) if CBA rotation is required by the equipment.			
Final Inspection	Ensure all enclosure doors and covers are closed, latched, and sealed per the UL/NEMA rating.			
	Confirm that the installation meets all applicable codes, standards, and manufacturer recommendations.			
Documentation	Record installation details including torque values, conductor types, environmental rating verification, and any adjustments.			
	Obtain sign-off from qualified personnel verifying the installation is complete and code-compliant.			

Appendix B: Maintenance Checklist

Task Category	Action Items	Completed (Y/N)	Notes / Findings	Date / Initials
Pre-Inspection Preparation	Verify power sources are de-energized, locked out, and tagged.(LOTO)			
	Ensure maintenance personnel are trained, authorized, and wearing PPE.			
Environmental & Structural	Confirm the installation area is clean, dry, and free of debris or obstructions.			
	Inspect the mounting surface and enclosure supports for corrosion, physical damage, or signs of instability.			
Enclosure & Hardware	Examine doors, latches, hinges, and seals for proper operation and secure closure.			
	Verify that nameplates, safety labels, and warning decals are intact and legible.			
	Ensure external surfaces are free of excessive dust, moisture, and corrosive substances.			
Electrical Components & Connections	Inspect wiring and insulation for wear, discoloration, or damage.			
	Verify cable terminations for looseness or corrosion; tighten to specified torque.			
	Confirm that grounding and bonding conductors are secure and corrosion-free.			
	Ensure conduit entries and fittings maintain NEMA/IP rating (proper gaskets/seals).			
Protective Devices & Safety Equipment	Inspect fuses, breakers, and protective relays for correct ratings and integrity.			
	Test emergency stops, interlocks, and phase rotation monitors for correct operation.			
Generator & Cable	Examine Cam-Lok and other connectors for wear, corrosion, or damage.			

Task Category	Action Items	Completed (Y/N)	Notes / Findings	Date / Initials
Interface (If Applicable)	Inspect generator cables for cuts, fraying, or missing grounding pins.			
Functional Verification	After maintenance, re-energize the equipment and test under no-load conditions.			
	Monitor for unusual sounds, odors, or overheating upon start-up.			
Documentation & Recordkeeping	Record all maintenance findings, actions taken, and parts replaced.			
	Note any recurring issues and schedule additional maintenance if needed.			

Appendix C: Torque Specifications

Lug Torque Specifications		
Type	**Lug Size**	**Torque Value**
 AU-350	#4 AWG – 350 kcmil	375 in-lb
 AU-600	#2 AWG – 600 kcmil	500 in-lb
 TA-250	#6 AWG – 250 kcmil	275 in-lb
 TA-350	#4 AWG – 350 kcmil	375 in-lb
 TA-600	#2 AWG – 600 kcmil	500 in-lb
 TA-2/0	#6 AWG – 2/0 AWG	275 in-lb

Lug Torque Specifications		
Type	**Lug Size**	**Torque Value**
 3-800T	300 – 800 kcmil	500 in-lb
 PB2-600-2N	Up to 600 kcmil, dual-barrel	500 in-lb
 K2A2	#14 – 2 AWG	150 in-lb
	1/0 – 2 AWG	180 in-lb

NOTE:
Torque values listed in this appendix are provided for reference only. Always follow the lug manufacture's published installation instructions and torque requirements. Use a properly calibrated torque wrench when tightening electrical connections.

Appendix D: Troubleshooting Quick Reference

This appendix provides detailed troubleshooting guidance for qualified personnel after the system has been de-energized and verified safe.

Observed Condition	Cause	Safe Checks (De-Energized)	Corrective Action
No power available at panel	Generator not running or output breaker open.	Verify generator status and output device position	Start generator and close output device per manufacturer procedure
	Generator voltage, phase, or frequency mismatch.	Compare generator output ratings to panel nameplate	Correct generator settings or use proper power source
	PRM inhibiting operation (if equipped).	Check PRM status indication	Correct phase or voltage condition before energizing
Generator runs but load does not energize	Downstream equipment not in the proper start state or configured correctly.	Verify breaker and protective device status.	Place loads in proper start condition
	Incorrect phase rotation.	Verify phase rotation using an approved phase rotation monitor.	Correct phase rotation at generator or approved termination point
	Interlock or control logic preventing operation.	Inspect interlock positions and control status	Restore required operating sequence
PRM alarm or inhibited operation (if equipped)	Phase loss.	Verify all phase conductors are present and secure	Correct cabling or conductor termination
	Incorrect phase sequence	Confirm cable color-to-connector matching	Correct phase rotation and re-test
	Undervoltage or unstable output	Measure generator output voltage and frequency	Stabilize or service generator
Breaker trips or fuses open during energization	Load fault or short circuit	Isolate downstream loads	Identify and correct load issue
	Improper grounding or bonding	Verify grounding/bonding configuration matches system design	Correct grounding/bonding per NEC and site requirements
	Loose or improperly torqued terminations	Inspect and re-torque lugs per **Appendix C.**	Re-torque using calibrated torque tool
Cam-Lok connectors overheating or discolored	Incomplete engagement	Inspect connector insertion and locking mechanism	Fully insert and rotate until locked

Observed Condition	Cause	Safe Checks (De-Energized)	Corrective Action
	Worn or damaged connector	Inspect for discoloration, cracks, damaged springs	Remove from service and replace connector
	Contaminated mating surfaces	Inspect for dirt or moisture	Clean and dry if permitted
Moisture or condensation inside enclosure	Improperly sealed conduit entries	Inspect hubs, gaskets, unused openings	Reseal using rated fittings and closures
	Damaged door gaskets or seals	Inspect enclosure seals	Replace damaged gaskets
	Strip heater not operating (if equipped)	Verify heater circuit continuity (de-energized)	Restore heater operation
SPD indicates fault or end-of-life (if equipped)	Surge event exceeded capacity	Inspect SPD indicator (visual or LED)	Replace SPD per manufacturer's instructions
SCADA or control signal not present (if equipped)	Incorrect wiring or termination	Verify terminal connections and wiring	Correct wiring or terminations
	Signal Destination Switch in wrong position	Verify switch position	Select correct destination
	Loss of control power	Verify control power source	Restore control power

When to Stop and Contact Power Temp Systems
Discontinue troubleshooting and contact Power Temp Systems Technical Support if:

- Repeated faults occur after corrective actions
- Evidence of arcing, overheating, or insulation failure is observed
- Panel configuration does not match site one-line or labeling
- Grounding or bonding configuration is unclear
- Internal component or enclosure damage is suspected

Technical Support
Phone: 1-866-977-3512
Website: www.powertemp.com

When contacting Technical Support, please have the following information available:

- Panel model and serial number
- Voltage, phase, and SCCR
- Description of observed condition and indicator states
- Generator make, model, and settings
- Photos of affected areas (de-energized only).