

// INSTALLATION & OPERATING MANUAL

UL 891 Low-Voltage Switchboard

Receiving, handling, installation, bus and cable connections, energization, operation, and maintenance for dead-front, front-accessible UL 891 switchboards supplied by Bet Power.

DOCUMENT	APPLIES TO
BP-IOM-SB891-001	400 – 6000 A · 208 – 600 V · up to 200 kA SCCR

Built for Speed. Priced for Reality.

// READ BEFORE INSTALLING

This equipment carries lethal voltages and stores fault energy capable of causing an arc flash. Installation, connection, and maintenance must be performed only by qualified personnel following the NEC (NFPA 70), NFPA 70E, OSHA 29 CFR 1910 Subpart S, the serving utility's requirements, and the site arc-flash study. Keep this manual with the switchboard for the life of the equipment.

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// 01 **Safety**

A UL 891 switchboard is not a panelboard. The available fault current at the main bus is the full service fault current, and secondary compartments are routinely above 40 cal/cm². Nothing here replaces your site's lockout/tagout procedure, the arc-flash study, or NFPA 70E.

// **DANGER — HAZARDOUS VOLTAGE**

De-energize, lock out, test for absence of voltage at every incoming and outgoing terminal, and apply grounds before removing any cover, barrier, or breaker. The line side of the main device stays live when the main is open. Utility-metered sections and any generator or PV tie can back-feed the bus.

// HOW TO USE THIS MANUAL

Sections 03 through 10 are sequential. Complete each section's checklist before moving on. Section 11 onward is for the life of the switchboard.

The unit-specific nameplate, approved shop drawings, one-line, and breaker trip-unit settings sheet govern over any general value in this manual. If they disagree, stop and call Bet Power Engineering.

// **NAMEPLATE FIRST**

Record the switchboard serial number, voltage, main bus ampacity, SCCR, and enclosure type from the nameplate into Appendix A before the sections leave the receiving area.

// **DIRECT LINES**

Engineering	engineering@bet-power.com
Field support	support@bet-power.com
Logistics (24/7 desk)	logistics@bet-power.com
Orders	orders@bet-power.com

Signal words used in this manual

WORD	MEANING
DANGER	Will cause death or serious injury if not avoided.
WARNING	Can cause death, serious injury, or major equipment damage.
CAUTION	Can cause minor injury or equipment damage.
NOTE	Information that affects performance, warranty, or the next step.

Rules that apply to every section

1. Only qualified persons (NFPA 70E definition) remove covers, rack breakers, or make connections.
2. Wear arc-rated PPE matched to the incident energy on the arc-flash label. If no label is installed, treat the board as above 40 cal/cm² and do not open it energized.
3. Keep all doors closed and covers bolted whenever personnel are not actively working inside. Dead-front protection only exists with the covers on.
4. Never operate a breaker with the door open unless the breaker is rated and listed for door-open operation. Stand to the hinge side, not in front of the breaker face.
5. Do not energize a section that has been dropped, tipped, water-damaged, or shows any bus deformation. Call Bet Power first.
6. Do not use the switchboard as a work platform, ladder anchor, or storage shelf, at any time.
7. Confirm the ground bus is bonded to the building grounding electrode system before any phase conductor is landed.
8. Never defeat a key interlock, kirk-key scheme, or breaker cell interlock. They exist to keep two sources from paralleling.

// WARNING — MULTIPLE SOURCES

Boards with generator, PV, or BESS connections, or a tie breaker, can be energized from more than one direction. Isolate every source and verify at the bus, not at one breaker, before working inside.

// 02 Scope and product description

This manual covers Bet Power low-voltage switchboards listed to UL 891 and built to NEMA PB 2, front-accessible, dead-front, with individually mounted or group-mounted overcurrent devices.

Typical ratings

PARAMETER	STANDARD RANGE
System voltage	208Y/120, 240 Delta, 480Y/277, 480 Delta, 600Y/347 V, 60 Hz, 3-phase 3W or 4W
Main bus ampacity	400 – 6000 A, copper (silver or tin plated) or aluminum as ordered

Neutral bus	100% or 200% of phase, as ordered
Ground bus	Full length, copper, 25% of phase minimum
Short-circuit current rating (SCCR)	65 / 100 / 150 / 200 kA at rated voltage, fully rated (no series ratings unless marked)
Bus bracing	Equal to or greater than SCCR
Main device	Main lugs only, main breaker (MCCB or ICCB, fixed or drawout), or fused switch
Feeders	MCCB group-mounted or individually mounted; ICCB drawout optional
Enclosure	NEMA 1 standard; NEMA 3R walk-in or non-walk-in optional; ANSI 61 gray
Section size	Typ. 90 in H × 36 – 44 in W × 30 – 60 in D per shop drawing
Access	Front only standard; rear access on rear-connected boards
Metering / options	Utility metering section, digital power meter, SPD, ground-fault protection, key interlocks, IR windows

// NOTE

The values above are the standard range. The nameplate, the approved shop drawings, and the breaker schedule define the exact ratings, bus configuration, and device lineup for the serial number in hand.

Standard construction**Structure**

- Freestanding 12-gauge steel sections bolted into a lineup; each section ships with a lifting angle or lifting eyes
- Horizontal main bus runs through every section; vertical bus per section feeds the devices
- Bus joints are bolted with Belleville washers at every splice and shipping split
- Cable compartments with lug pads sized per NEC 310 for the device ampacity
- Removable bolt-on covers front; hinged doors on breaker fronts where ordered

Devices and controls

- Main and feeder breakers per the schedule, with electronic trip units (LSI or LSIG) on frames 400 A and up
- Ground-fault protection on the main where required by NEC 230.95 (1000 A and up, 480Y/277 V)
- Surge protective device (SPD) on the main bus, where ordered
- Metering: utility CT/PT compartment, revenue meter socket, or customer power meter
- Control power transformer and terminal blocks for remote trip, status, and metering circuits

// 03 Receiving and inspection

Switchboards ship as one or more shipping splits, each on its own skid, wrapped and braced. Inspect every split before the carrier leaves. Concealed damage claims after the driver is gone

are routinely denied.

- 01 Count shipping splits against the packing list and the shipping-split drawing. Match each section's serial tag.
- 02 Check the tilt / impact indicator on each skid. If tripped, note it on the bill of lading and photograph it.
- 03 Walk all sides. Look for dents, scraped paint, racked or bowed frames, bent doors, broken shipping braces, and any loose hardware in the wrap.
- 04 Open the front covers on each split and check the bus for shifted supports, cracked insulators, or loose splice hardware. Check breakers are seated and handles are not broken.
- 05 Confirm loose-shipped items are present: splice kits (bus links, hardware, Belleville washers), section-to-section bolts, lifting angles, keys, breaker handles or racking tools, spare fuses, drawings, and the factory test report.
- 06 Check for water: wet wrap, water stains inside, or condensation on the bus. A wet board cannot be energized until dried and megger-tested.
- 07 Record everything in Appendix A. Note any damage on the bill of lading **before signing**. Have the driver sign it.

// WARNING

A section that was dropped or tipped may have cracked bus insulators or shifted bus supports that pass visual inspection and fail under fault. Do not energize. Contact logistics@bet-power.com within 24 hours with photos and the bill of lading.

// 04 Storage

A switchboard is an indoor product. Store it indoors in a clean, dry, heated space. A NEMA 3R enclosure is weather-resistant in service, not in storage, because its shipping splits are open at the ends.

- Keep sections upright on the shipping skids, off the floor, on a level surface. Do not stack.
- Keep the wrap on and covers closed. Keep the ends of shipping splits covered where the bus is exposed.
- If the space is unheated or humid, run a 100 – 150 W space heater or a lamp in each section to keep the interior above dew point.
- Every 30 days: check for moisture, rodents, and dust ingress. Log it.
- Storage over 6 months: megger the bus and all breakers before energizing. Consult Bet Power Engineering on any results outside Section 09 limits.

CONDITION	LIMIT
Storage temperature	-20°C to +60°C
Relative humidity	≤ 80%, non-condensing
Outdoor storage	Not permitted, any enclosure type
Stacking	Not permitted

// 05 Handling and moving

Section weights are on the shop drawings. A 4000 A section can weigh over 2500 lb. Size rigging for the heaviest split plus a 25% margin.

Lifting

- Lift by the factory lifting angles or lifting eyes only, using all lift points, with a spreader bar so slings are vertical. Included sling angle must be **60° or steeper** from horizontal.
- Never lift by the doors, bus, breaker handles, or a single lift point.
- Keep sections upright at all times. Maximum tilt: **10°**. Tall sections are top-heavy; never leave one unsupported on its own footprint on a truck or rollers.
- Remove the lifting angles after setting (unless the drawing shows them as permanent) and plug the holes.

Rollers, skates, and forklifts

- Roll only on the base channels. Never on the side sheets or the front sills.
- Forklifts: forks must reach fully under the base channels from the front or rear per the drawing, with the load centered. Never pick from the side unless the drawing shows side fork pockets.
- Lift only high enough to clear the floor. Do not push or pull sections across rough concrete; use skates.

// CAUTION

Dragging a section by its frame twists the structure enough to misalign bus splices and breaker cells. If a section will not roll freely, stop and re-rig.

// 06 Site preparation and foundation

The approved shop drawings show the lineup footprint, the conduit entry windows, and the anchor bolt pattern. Build to that drawing. The values below are minimums where the drawing is silent.

ITEM	REQUIREMENT
Floor / pad	Reinforced concrete rated for the lineup weight; level within 1/8 in over the full lineup length and 1/16 in per section. Out-of-level floors bow the bus and prevent doors from closing. Use a 4 in housekeeping pad indoors; NEMA 3R units go on a pad above grade with drainage away.

Floor sill channels	Where specified, set and level the sill channels in the pour, flush with finished floor, before the board arrives.
Conduit windows	Match the shop drawing. Bottom-entry conduits must stub up inside the cable compartment window, 1 – 2 in above the floor, deburred and bushed, and must not project into the bus or breaker area. Top entry through the roof only where the drawing shows a top plate.
Front working space (NEC 110.26)	3 ft minimum for ≤ 150 V to ground; 3.5 ft (Condition 2) or 4 ft (Condition 3) for 151 – 600 V. 30 in min. width; 6.5 ft headroom. Doors must open 90°.
Rear / side clearance	Front-accessible boards: none required, may be set against a wall. Rear-connected boards: same working space at the rear.
Dedicated space (NEC 110.26(E))	The footprint plus 6 ft above (or to the structural ceiling) must be free of piping, ducts, and foreign systems. No sprinkler heads directly above without a drip shield.
Ambient	-5°C to $+40^{\circ}\text{C}$, 24-h average $\leq 35^{\circ}\text{C}$, $\leq 95\%$ RH non-condensing, ≤ 6600 ft elevation without derate
Ventilation	Room must reject the board's losses (allow $\sim 0.5\%$ of throughput kW at full load). Do not block enclosure louvers.
Grounding	Grounding electrode conductor per NEC 250.66 stubbed into the service section; supply-side bonding jumper sized per 250.102(C).
Egress	Boards ≥ 1200 A and over 6 ft wide need an egress path at each end (NEC 110.26(C)(2)) unless double the working depth is provided. Panic hardware on doors within 25 ft.

Before the pour, confirm conduit window dimensions against the actual delivered sections, not the submittal. Conduits stubbed up under the bus compartment are the most common field problem on switchboard installs.

// 07 Installation and section assembly

Set sections in the order shown on the shipping-split drawing, starting from the section that lands the incoming service or the section fixed by the utility metering location.

- 01 Pull incoming and feeder cables through the conduits and protect the ends before setting sections. Leave enough tail to reach the lug pads with the minimum bending radius (Section 08).
- 02 Remove shipping braces, skids, and any hardware tagged "remove before installation." Keep the shipping-split bus link covers on until the sections are aligned.
- 03 Set the first section over its conduit window, level in both axes using shims under the base channels only. Do not shim under the side sheets.

- 04 Set the next section against it. Align the top, front, and base flush. Bolt the sections together through the frame bolt holes with the supplied hardware. Do not draw sections together with the bolts; move the section until the holes line up.
- 05 Remove the splice covers and install the horizontal bus links at each shipping split using the splice kit: bus link, bolts, flat washers, and Belleville washers. Bolt heads face front. Torque per the table in Section 08 and mark each bolt with a torque stripe.
- 06 Install the neutral bus and ground bus links at each split the same way.
- 07 Reinstall the splice covers and barriers. Every barrier removed for splicing must go back before energization.
- 08 Anchor each section to the floor through the base channel anchor holes with 1/2 in minimum anchors per the drawing. Anchoring is required in seismic areas and recommended everywhere. Do not weld the frame to the sills.
- 09 Bond the ground bus to the building grounding electrode system. Do this **before any phase conductor is landed**.
- 10 Install drawout breakers (if shipped separately) per the breaker manufacturer's instructions: rack to TEST, verify secondary contacts, then rack to CONNECTED only during energization.
- 11 Seal all open conduit and window area after cables are landed with a fire-stop or rodent-block compound.

// WARNING

A single missing Belleville washer or an under-torqued splice bolt is the most common cause of a bus fire in a new switchboard. Every splice, every bolt, torqued and striped, no exceptions.

// 08 Electrical connections

Incoming service and feeder cables

- Terminate with the factory-supplied mechanical lugs or field-supplied compression lugs listed for the conductor material and size. Aluminum conductors need AL9CU-rated lugs and oxide inhibitor.
- Phase sequence follows the bus labels A-B-C left to right, top to bottom, or front to back when viewed from the front (NEC 408.3(E)). Match the utility's phasing on the incoming.
- Distribute parallel conductors evenly across the lug pad. Same length, same size, same material, same routing per NEC 310.10(G).
- Train cables with the manufacturer's minimum bending radius (typically $8 \times$ cable OD for 600 V unshielded). Support cables so the lug is not carrying weight or side load. Use cable supports in the compartment for runs over 3 ft.
- Keep all conductors of a circuit (phases, neutral, and equipment ground) in the same conduit and same compartment entry. Splitting phases across ferrous conduits induces heating.

- Do not run cables across the bus compartment or in front of breakers to reach another compartment.

Neutral and ground

- Service entrance boards: install the main bonding jumper (neutral to ground bus) in the service section only, per NEC 250.24. Remove the bonding jumper on any board that is **not** service entrance (fed from a transformer or another board) and document it in Appendix A.
- Ground-fault protected boards: the neutral must be bonded only at the service; a second neutral-ground bond downstream defeats ground-fault protection and will cause nuisance trips or no trip at all.
- Land the equipment grounding conductor of every feeder on the ground bus, never on the neutral.

Bolted joint torque

BOLT SIZE	PLATED STEEL, GRADE 5	SILICON BRONZE	WHERE USED
1/4 in	6 ft·lb (8 N·m)	5 ft·lb (7 N·m)	Control, small lug pads
5/16 in	11 ft·lb (15 N·m)	10 ft·lb (14 N·m)	Feeder lug pads ≤ 400 A
3/8 in	20 ft·lb (27 N·m)	18 ft·lb (24 N·m)	Bus splices, lug pads ≤ 1200 A
1/2 in	50 ft·lb (68 N·m)	40 ft·lb (54 N·m)	Bus splices, lug pads > 1200 A
5/8 in	85 ft·lb (115 N·m)	—	Main bus splices ≥ 4000 A

Mechanical lug set-screws torque to the value stamped on the lug or per UL 486A/B; that value governs over this table. Use a calibrated torque wrench, not an impact.

Control and metering wiring

- Wire remote trip, breaker status, ground-fault alarm, and meter communications to the terminal blocks per the wiring diagram in the door pocket. Contacts are dry unless the diagram says otherwise.
- Utility metering: do not land or disturb CT secondary wiring; that compartment is sealed by the utility. Never open a CT secondary circuit under load.
- Route control wiring in the wireway, away from power conductors, and out through a separate conduit.

// NOTE — TRIP UNIT SETTINGS

Breakers ship with trip units at factory minimum settings. Set every LSI/LSIG trip unit to the values on the coordination study or the settings sheet supplied with the board before energization. Record settings in Appendix A. A board energized on minimum settings will nuisance-trip; a board energized on maximum settings will not protect the cable.

// 09 Pre-energization checks

Every item below is a hold point. Do not energize with an open item. Record results in Appendix A.

- ☐ Nameplate voltage, bus rating, and SCCR match the drawings and the calculated available fault current at the service. A board with SCCR below available fault current cannot be energized.

- ☐ All shipping braces removed. All splice covers, barriers, and dead-front covers reinstalled. No tools, hardware, or debris in any compartment. Vacuum every compartment; do not blow with compressed air.
- ☐ Every bus splice bolt torqued and striped. Every lug torqued and striped.
- ☐ Ground bus bonded to the grounding electrode system; resistance measured and recorded. Main bonding jumper installed (service) or removed (non-service) per design.
- ☐ Phase sequence A-B-C verified at the incoming lugs against the bus labels.
- ☐ Insulation resistance (megger) test at 1000 V DC, all breakers open, board isolated from source and load: phase-to-phase, phase-to-ground, and neutral-to-ground with the bonding jumper lifted. Acceptable: $\geq 100 \text{ M}\Omega$ each, corrected to 20°C; compare with the factory test report. Reconnect the bonding jumper after the test.
- ☐ Contact resistance (ductor) across each bus splice: $\leq 50 \text{ }\mu\Omega$, and no splice more than 25% above the average of the others.
- ☐ All breaker trip units set per the coordination study; settings recorded. Ground-fault pickup and delay set; ground-fault system performance tested per NEC 230.95(C) with a written record.
- ☐ Every breaker operated open-close-open by hand; drawout breakers racked TEST to CONNECTED and back; key interlocks proven.
- ☐ Control power circuits energized from a temporary source and function-tested: remote trip, status contacts, meter display.
- ☐ Downstream: all feeder breakers open; all loads off; no backfeed sources connected (generator, PV, BESS, tie).
- ☐ Arc-flash labels installed on every section per the site study. Working space clear; nothing stored in front of the board.
- ☐ Conduit windows sealed. Doors close and latch; covers bolted.
- ☐ Site clear of unnecessary personnel. Fire extinguisher (Class C) within reach.

// 10 Energization

- 01 Close and bolt every cover and door. Nobody stands in front of the board during energization; the person operating stands to the hinge side in full PPE.
- 02 Energize the incoming from the utility or upstream device with the main breaker **open**. Verify voltage and phase rotation on the line side of the main with a rated meter through the test points or at the metering PTs. Do not open a cover to measure.
- 03 Close the main breaker. Listen for 60 seconds. Bus hum is normal; buzzing, crackling, or a rising tone means open the main immediately.

- 04 Verify bus voltage phase-to-phase and phase-to-neutral at the power meter or test points. Voltage should be within $\pm 5\%$ of nominal and balanced within 2%.
- 05 Confirm phase rotation at the load side (A-B-C / clockwise) before any motor feeder is closed.
- 06 Run at no load for 30 minutes. Recheck for noise, smell, and meter readings.
- 07 Close feeders one at a time, largest first, checking each downstream load before the next.
- 08 After 4 hours at operating load, thermograph every bus splice, lug, and breaker terminal through the IR windows or with covers removed only if the board is then de-energized to reinstall them. No joint more than 15°C above adjacent phases or 30°C above ambient.
- 09 Record energization date, voltages, rotation, trip settings, and IR results in Appendix A. Send a copy of the completed record to support@bet-power.com for the unit file.

// WARNING — FIRST CLOSE

The first close of the main is the highest-risk operation in the life of the board. A wiring error, a forgotten shipping brace, or a mis-phased incoming shows up here as a bolted fault at full available current. Complete Section 09 in full, then close remotely if the board has a remote close, or with a rope or hot stick if not.

// 11 Operation

Loading

ITEM	LIMIT
Main bus, continuous	100% of nameplate at 40°C ambient; derate 1% per $^{\circ}\text{C}$ above 40°C
Breakers, continuous	80% of frame rating unless the breaker and board are both marked 100%-rated
Neutral, 100%	Phase current; derate for non-linear loads over 30% of connected load
Neutral, 200%	Twice phase current; use where harmonic (data center, VFD, LED) loads dominate
Bus temperature at joints	$\leq 65^{\circ}\text{C}$ rise over 40°C ambient (105°C total, UL 891)

Breaker operation

- Open and close breakers by the handle or pushbutton with the door closed. Stand to the hinge side. Use the door-mounted operator where fitted.
- Drawout breakers: rack only with the door closed, using the racking handle through the door port. Positions are CONNECTED, TEST, DISCONNECTED, WITHDRAWN. Never rack a closed breaker.
- After a trip: identify the cause from the trip unit indicator (overload, short-time, instantaneous, ground fault) before reclosing. Reset the trip unit, then close. Do not reclose more than once on a fault indication.

- Molded-case breakers that have interrupted a fault at or near their interrupting rating should be inspected and, on any sign of damage, replaced.
- Key interlocks and tie schemes: follow the interlock sequence on the drawing. Do not force a key.

// DANGER

A breaker that trips instantaneously on close is closing into a fault. Do not reclose. Isolate, find the fault, and megger the feeder before re-energizing.

Ground-fault protection

Where fitted, the main ground-fault system (NEC 230.95) is set per the study, typically 1200 A pickup maximum with a 1 second maximum delay at 3000 A. Test it annually with the built-in test switch and every 5 years with primary injection. A neutral-ground bond anywhere downstream of the sensor defeats the system; investigate any nuisance trip first as a downstream bond.

Surge protection

Where an SPD is fitted, its status indicators (green normal, red replace) are visible on the door. A red indicator means the SPD has sacrificed itself; the board is unprotected until it is replaced. SPDs are replaced de-energized only.

// 12 Maintenance

A switchboard fails at the joints and in the breakers, and it fails from heat, dust, and moisture. Maintain per NFPA 70B and keep a log; the warranty and the insurance carrier will both ask for it.

INTERVAL	TASK	UNIT STATE
Monthly	Exterior walk-around: doors closed and latched, covers in place, no storage in working space, no water or dust on the floor at the board, ventilation clear, SPD indicators green, no unusual noise or smell.	Energized, covers on
Quarterly	Read and log the power meter (kW, A per phase, V, PF, THD). Check per-phase balance. Check trip unit health LEDs. Exercise the ground-fault test switch.	Energized, qualified person
Annually	Infrared scan of all splices, lugs, and breaker terminals under $\geq 40\%$ load through IR windows. Exercise every breaker open-close-open (schedule a shutdown for feeders). Verify trip settings unchanged. Clean louvers and filters.	IR energized; exercise de-energized
Every 3 years	De-energized: remove covers, vacuum all compartments, inspect bus for discoloration or tracking, torque-check 10% of joints (all if any are loose), megger bus and breakers, ductor splices, secondary-injection test trip units, inspect breaker contacts and lubricate mechanisms per breaker OEM.	De-energized, locked out
Every 5 years	Primary-injection test of main and ground-fault protection. Replace SPD if over 10 years old or any indicator red.	De-energized

After any fault	Inspect the breaker that cleared it and the bus downstream, megger the feeder, ductor any splice on the fault path, before re-energizing.	De-energized
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Test limits in service

TEST	ACCEPTABLE	INVESTIGATE
Insulation resistance, 1000 V DC, 1 min	$\geq 100 \text{ M}\Omega$	$< 100 \text{ M}\Omega$ or a 50% drop from last test
Contact resistance, bus splice	$\leq 50 \text{ }\mu\Omega$	$> 25\%$ above adjacent splices
Breaker contact resistance	Per OEM; typ. $\leq 100 \text{ }\mu\Omega$ for ICCB	$> 50\%$ above pole average
IR, any joint	$\leq 15^\circ\text{C}$ over adjacent phase	$15 - 40^\circ\text{C}$ repair at next outage; $> 40^\circ\text{C}$ repair now
Trip unit secondary injection	Within $\pm 10\%$ of setting	Outside tolerance: replace trip unit

Do not

- Blow out compartments with compressed air. It drives dust into breaker mechanisms and insulators. Vacuum only.
- Use solvent on bus insulation or insulators. Use a dry lint-free cloth or one dampened with isopropyl alcohol.
- Re-torque a joint that passed IR and ductor. Repeated torquing work-hardens the bus and cracks plating.
- Replace a breaker with a different frame, interrupting rating, or manufacturer without Bet Power Engineering approval. The UL 891 listing is for the devices on the schedule.
- Drill or cut the enclosure. Metal chips on the bus are a fault waiting to happen.

// 13 Troubleshooting

SYMPTOM	LIKELY CAUSE	ACTION
Main trips on first close	Wiring fault; mis-phased incoming; shipping brace or tool left in board; trip unit at minimum	Do not reclose. Open, inspect every compartment, megger, check settings.
Feeder trips on overload (long-time)	Load exceeds setting; setting below study value; 80% breaker at $> 80\%$	Verify load with the meter; correct setting to the study; upsize if load is legitimate.
Ground-fault trip, no fault found	Downstream neutral-ground bond; shared neutral between feeders; CT polarity	Lift downstream bonds one at a time; verify sensor polarity; retest per 230.95(C).

Nuisance trip on motor start	Instantaneous or short-time set too low for inrush	Raise per study, never above cable damage curve.
Hot spot on IR at a splice or lug	Loose joint; missing Belleville; undersized lug; corrosion	De-energize, clean, re-terminate with new hardware, torque, stripe.
Voltage unbalance > 2%	Single-phase loads unevenly distributed; open phase upstream; loose incoming lug	Rebalance loads across phases; check upstream; IR the incoming lugs.
Neutral running hot	Harmonic loads on a 100% neutral; unbalanced single-phase load	Measure neutral current and THD; rebalance; upgrade to 200% neutral if needed.
Buzzing from a breaker	Loose mechanism; contacts not fully closed; loose terminal	De-energize; check torque; exercise; replace if buzz persists.
Drawout breaker will not rack	Breaker closed; interlock engaged; cell misalignment	Open the breaker; check interlocks; do not force.
Water or condensation inside	Sprinkler or roof leak above; unsealed conduit; unheated room	De-energize if wet. Dry, seal, megger before re-energizing. Add a space heater.
SPD indicator red	SPD sacrificed after surge, or end of life	Replace de-energized. Board is unprotected until replaced.

// 14 **Warranty and support**

Bet Power is the manufacturer of record for this switchboard and holds the warranty. The full warranty statement is published at bet-power.com/resources/documentation and governs over this summary.

- Warranty requires installation and operation in accordance with this manual, the shop drawings, and applicable codes, and a maintenance log per Section 12.
- Warranty does not cover damage from mis-handling, water ingress, dust or corrosive atmosphere, operation above SCCR, incorrect trip settings, field modification of bus or enclosure, or substitution of devices not on the schedule.
- Breakers, trip units, meters, and SPDs carry their manufacturer's warranty, administered by Bet Power.

Getting help

You talk to the person who built the quote and the engineer who reviewed the drawings. No ticket queue. Have the serial number, the nameplate photo, and the trip unit indication ready.

Field support and warranty	support@bet-power.com
Engineering (settings, coordination, device substitution)	engineering@bet-power.com
Logistics desk, 24/7 (shipping damage, delivery)	logistics@bet-power.com
Web	bet-power.com/contact