# Energy and Power-Quality Systems Repair Decision and Parts Planning Sheet - Intermittent Fault

Energy and Power-Quality Systems | Intermittent Fault | Asset ID FIX-23-07-01

**Safety gate: Stop, isolate and verify before exposure to hazardous energy. Lockout/Tagout and live testing require the applicable site procedure, authorised controls and a qualified person. Never bypass a guard, interlock or protective device to complete this workbook.**

## How to use this field resource

This is an equipment-agnostic documentation workbook for energy and power-quality systems. It helps a trained team link demand, disturbance, load, tariff and equipment symptoms using authorised data. It does not identify a fault by itself and does not replace the equipment-specific OEM manual, drawings, limits, permits or a qualified technician's judgement.

| Intake field | Record |
|---|---|
| Asset or equipment ID | _____ |
| Site and location | _____ |
| Reported by / time | _____ |
| Fault situation | Intermittent Fault |
| Operating state | Stopped / standby / starting / running / loaded |
| Safety owner | _____ |
| OEM reference used | Document number and revision: _____ |

## Evidence areas for this system

For a intermittent fault, focus on evidence that can be dated, repeated and handed to another technician. Capture the as-found state before clearing alarms, changing settings or disturbing connections.

| # | Evidence area | First record |
|---|---|---|
| 1 | Load and operating schedule | As-found note: _____ |
| 2 | Voltage or frequency event record | As-found note: _____ |
| 3 | Power-factor indication | As-found note: _____ |
| 4 | Harmonic or disturbance evidence | As-found note: _____ |
| 5 | Energy-use trend | As-found note: _____ |
| 6 | Recent electrical change | As-found note: _____ |

## Repair Decision and Parts Planning Sheet

Use this section to capture the conditions that make the symptom appear and disappear. Record time, load, temperature, weather and recent operator action before choosing the next action.

| Plan field | Decision question | Record |
|---|---|---|
| Repair objective | Restore which function? | _____ |
| Confirmed cause | Evidence reference | _____ |
| Approved method | OEM document and revision | _____ |
| Parts and materials | Exact approved specification | _____ |
| Tools and test gear | Suitability and calibration | _____ |
| Isolation and permits | Owner and release point | _____ |
| Verification | Acceptance criteria | _____ |

### Authorisation gate

Do not begin from this planning sheet alone. The repair owner must confirm competence, parts, tools, safe isolation, environmental controls, OEM procedure and return-to-service authority.

## Energy and Power-Quality Systems Evidence Map

**Evidence first: Preserve alarms, event history, settings, trends and the as-found physical state before reset, disconnection or adjustment. If safe access is uncertain, stop and refer the task to the authorised person.**

| # | System area | Evidence action | Trace | Record |
|---|---|---|---|---|
| 1 | Load and operating schedule | Observe and identify | Evidence ID: _____ | Finding: _____ |
| 2 | Voltage or frequency event record | Record source and time | Evidence ID: _____ | Finding: _____ |
| 3 | Power-factor indication | Compare with reference | Evidence ID: _____ | Finding: _____ |
| 4 | Harmonic or disturbance evidence | State what it supports | Evidence ID: _____ | Finding: _____ |
| 5 | Energy-use trend | State what it rules out | Evidence ID: _____ | Finding: _____ |
| 6 | Recent electrical change | Choose the least invasive next check | Evidence ID: _____ | Finding: _____ |

## Scenario boundary

For this intermittent fault, do not replace a part until the evidence separates at least two plausible causes. Write the boundary before testing so urgency does not quietly change the rules.

| Boundary | Definition |
|---|---|
| Known good condition | _____ |
| Known failed condition | _____ |
| Difference between them | _____ |
| First missing evidence | _____ |
| Stop-work threshold | _____ |
| Escalation owner | _____ |

### Evidence labels

- FACT - directly observed and traceable.
- REPORT - supplied by another person; source recorded.
- INFERENCE - reasonable explanation that still needs a test.
- UNKNOWN - important gap that must not be filled by assumption.
- LIMIT - OEM, engineering or site acceptance value.

## Intermittent Fault Condition Workbook

The goal is to capture the conditions that make the symptom appear and disappear. Describe the failed state narrowly enough that another trained person could look for the same thing without being told your suspected cause.

| Question | Boundary prompt | Record |
|---|---|---|
| What changed? | Function, output, indication or behaviour | _____ |
| Where? | Asset, side, circuit, zone or process stage | _____ |
| When? | Sequence step, runtime, load or environment | _____ |
| How often? | Every cycle, random, once, or after delay | _____ |
| What restores it? | Nothing, time, reset, cooling or load change | _____ |
| What stays normal? | Unaffected systems or functions | _____ |
| What changed recently? | Work, software, settings, parts or operating duty | _____ |

## Controlled reproduction plan

| Plan field | Record |
|---|---|
| Safe starting state | _____ |
| One condition to vary | _____ |
| Conditions held constant | _____ |
| Evidence captured | Time, load, temperature, weather and recent operator action |
| Maximum attempts | _____ |
| Immediate stop signal | _____ |
| Authorising person | _____ |

### Attempt notes

| Attempt | Starting condition | Result | Decision |
|---|---|---|---|
| 1 | State: _____ | Observed: _____ | Next decision: _____ |
| 2 | State: _____ | Observed: _____ | Next decision: _____ |
| 3 | State: _____ | Observed: _____ | Next decision: _____ |
| 4 | State: _____ | Observed: _____ | Next decision: _____ |

## Measurement and Evidence Register

**Measurement boundary: This page records an approved test; it does not authorise one. A qualified person must choose the method, instrument category, connection points, isolation state and protective controls from the applicable procedure.**

| ID | Evidence area | Traceable source | Result | When |
|---|---|---|---|---|
| 1 | Load and operating schedule | Method / source: _____ | Value / state: _____ | Time: _____ |
| 2 | Voltage or frequency event record | Method / source: _____ | Value / state: _____ | Time: _____ |
| 3 | Power-factor indication | Method / source: _____ | Value / state: _____ | Time: _____ |
| 4 | Harmonic or disturbance evidence | Method / source: _____ | Value / state: _____ | Time: _____ |
| 5 | Energy-use trend | Method / source: _____ | Value / state: _____ | Time: _____ |
| 6 | Recent electrical change | Method / source: _____ | Value / state: _____ | Time: _____ |

## Instrument and reference record

| Control | Record |
|---|---|
| Instrument or data source | _____ |
| Identifier and range | _____ |
| Calibration / validation status | _____ |
| OEM or engineering reference | Document and revision: _____ |
| Equipment operating state | _____ |
| Uncertainty or limitation | _____ |

### Before using a value

- Check units, scale, timestamp and source identity.
- Keep raw evidence where practical; do not retain only a conclusion.
- Record values that disagree with the current theory.
- Compare only like operating conditions.
- Treat a single normal reading as one data point, not proof that an intermittent fault is absent.

## Cause and Evidence Matrix

List competing explanations before the team settles on one. A good next check separates hypotheses; a poor check produces the same answer no matter which cause is true.

| # | Hypothesis | Supporting | Contradicting | Discriminating check |
|---|---|---|---|---|
| 1 | Load and operating schedule hypothesis | For: _____ | Against: _____ | Next evidence: _____ |
| 2 | Voltage or frequency event record hypothesis | For: _____ | Against: _____ | Next evidence: _____ |
| 3 | Power-factor indication hypothesis | For: _____ | Against: _____ | Next evidence: _____ |
| 4 | Harmonic or disturbance evidence hypothesis | For: _____ | Against: _____ | Next evidence: _____ |
| 5 | Energy-use trend hypothesis | For: _____ | Against: _____ | Next evidence: _____ |
| 6 | Recent electrical change hypothesis | For: _____ | Against: _____ | Next evidence: _____ |

## Five-why chain with evidence

| Level | Explanation | Proof or gap |
|---|---|---|
| Problem | Intermittent Fault | Evidence ID: _____ |
| Why 1 | _____ | Evidence: _____ |
| Why 2 | _____ | Evidence: _____ |
| Why 3 | _____ | Evidence: _____ |
| Why 4 | _____ | Evidence: _____ |
| Why 5 | _____ | Evidence: _____ |

### Cause confidence

- Confirmed - reproduced or directly measured against a valid reference.
- Probable - best fit, but one meaningful alternative remains.
- Possible - plausible and worth a safe test.
- Unrelated - contradicted by the evidence.
- Unknown - evidence is missing or unreliable.

## Repair Decision and Return-to-Service Gate

**Release authority: Completion of a repair is not permission to energise or operate. Restore energy and return equipment to service only through the site's authorised process, with guards and protective functions reinstated.**

| Decision field | Record |
|---|---|
| Confirmed problem | _____ |
| Evidence-supported cause | _____ |
| Approved repair reference | Document and revision: _____ |
| Work completed | _____ |
| Parts / settings changed | _____ |
| Residual defect or restriction | _____ |
| Person completing / checking | _____ |

## Controlled verification

| Verification | Acceptance basis | Status |
|---|---|---|
| As-found symptom | Intermittent Fault | Absent / present / not tested |
| Primary function | Load and operating schedule | Pass / fail / not tested |
| Related function | Voltage or frequency event record | Pass / fail / not tested |
| Protection and alarms | Normal protective state retained | Pass / fail / not tested |
| Leak, heat, noise or damage | No new adverse condition | Pass / fail / not tested |
| Recorded operating condition | Load / mode / duration: _____ | Accepted / restricted |

### Release signatures

- Technical check by: _____ Date/time: _____
- Operations acceptance by: _____ Date/time: _____
- Safety or permit close-out by: _____ Date/time: _____
- Follow-up owner and due date: _____

## Handover, Follow-Up and Prevention Plan

Close the record so the next shift can understand the intermittent fault, the evidence, the repair decision and any remaining restriction without relying on memory.

| Handover field | Record |
|---|---|
| Current equipment state | _____ |
| What was confirmed | _____ |
| What remains unknown | _____ |
| Operating restriction | _____ |
| Evidence location | Log / work order / folder: _____ |
| Next owner and action | _____ |
| Escalation trigger | _____ |

## Follow-up schedule

| When | Review | Record |
|---|---|---|
| Next shift | Confirm state and restriction | Owner: _____ Result: _____ |
| 24 hours | Review load and operating schedule | Owner: _____ Result: _____ |
| 7 days | Check for repeat events under comparable duty | Owner: _____ Result: _____ |
| 30 days | Review effectiveness and maintenance action | Owner: _____ Result: _____ |

### Prevention decision

- Update the task, limit, drawing or training only when the cause supports it.
- Remove any temporary control by its approved expiry point.
- Share the lesson without exposing private, security-sensitive or proprietary data.
- Record whether the action reduced repeat faults, downtime or diagnostic effort.
- Reopen the analysis if the symptom returns under the same conditions.

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