

Work Instructions: Lightning Receptor Inspection and Service

LR;DA - practical inspection cues, continuity checks, service and escalation

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Audience: Inspection and service technicians; maintenance planners

Scope: Vendor-neutral guidance for lightning receptor damage classification and common service steps

Key outputs (what this manual enables)

- Component-level cues to identify LR;DA
- Severity-based action table
- A safe continuity measurement workflow
- Service actions: reseal, replace receptor, escalation triggers

Document control

Revision	Date	Change summary
v1.0	2026-01-16	Initial synthetic release for academic RAG baseline
v1.1	2026-01-16	Expanded procedures, checklists and reporting templates

How to use this document

This manual is designed for fast field use: identify the defect, assign a severity level, execute the minimal viable corrective action, and produce a standardized report for downstream systems.

It is intentionally vendor-neutral. Whenever a step references torque, curing, material spec or acceptance values, treat these as placeholders and verify with OEM or site procedures.

Quick start

- Confirm access, weather, and stop/run status (safety gate).
- Capture evidence: overview photo, close-up, and scale reference.
- Classify defect using the provided taxonomy and severity rubric.
- Select action: monitor, protect, repair, or stop turbine.
- Create a report using the provided template and attach photos.

System overview

This manual targets LR;DA: lightning receptor damage. It is focused on practical inspection and service steps that complement generic blade repair guidance.

LPS components (high level)

Component	Purpose	Typical observable issues
Receptor	Lightning attachment point	Scorching, deformation, recessed base, corrosion
Receptor block	Connect receptor to down conductor	Corrosion, poor contact, internal damage
Down conductor	Carry current to root	Separation, fatigue, damaged connection
Root terminal / slip ring	Transfer to hub/tower system	Loose connection, wear
Transfer system	Blade-to-ground transfer	Brush wear, spark gap wear

Safety gate

- Treat LPS work as electrical and structural work. Follow permit and site procedure.
- Do not perform resistance measurement during thunderstorms or in wet conditions.
- Use fall protection and keep tools tethered.

Procedure A - visual inspection (LR;DA)

A1. Identify receptor damage

- Scorch marks or dark halo around receptor base.
- Deformation: melted/rounded edges, pitting, or missing material.
- Receptor base recessed below blade surface.
- Missing or degraded sealant around receptor.

A2. Severity and action

Severity	Field cues (examples)	Action
S1	Light discoloration; sealant intact	Record + monitor
S2	Minor pitting or sealant edge gaps	Reseal or plan replacement

S3	Scorching + deformation; base still flush	Replace receptor at next stop
S4	Base recessed or severe corrosion; sealant missing	Urgent service; consider stop
S5	Evidence of bypass (burn marks on laminate) or missing receptor	Stop turbine and escalate

A3. Documentation

- Photo: close-up showing base, plus medium shot showing receptor position on blade.
- Record receptor location index (tip/LE/TE/side) if known.
- Note sealant condition and any laminate scorching.

Procedure B - resistance measurement (investigative)

Resistance measurement can confirm continuity but cannot guarantee current transfer capacity. Use it as an investigative tool when defects are suspected.

- B1. Isolate system per site electrical safety procedure.
- B2. Connect meter leads: tip receptor to root terminal (blade-level).
- B3. Record measured value, meter type, and lead compensation method.
- B4. If continuity is missing, segment the test to localize (between receptors, block, root).

Procedure C - receptor service (generic)

C1. Reseal (minor)

- Remove loose/aged sealant carefully without damaging laminate.
- Clean and dry contact area.
- Apply approved sealant; ensure full bead and no voids.
- Cure per product instructions; record ambient conditions.

C2. Replace receptor (moderate/major)

- Verify correct replacement part type and thread.
- Remove damaged receptor; inspect thread and block surface.
- Clean corrosion products; do not remove structural laminate.
- Install receptor with proper seating (flush with blade surface).
- Apply sealant and mark with date.

C3. Escalation criteria

- Receptor cannot seat flush or threads are damaged.
- Continuity failure persists after receptor replacement.
- Visible laminate burn, delamination, or internal smell/soot.
- Repeated lightning events with recurring receptor damage.

QA and close-out

- Visual: receptor flush, sealant continuous.
- Documentation: before/after photos, measured resistance (if performed).
- Follow-up: schedule a verification inspection after first major storm season.