Comparison of a Recloser and a Motorized Disconnector for 10 kV Overhead Lines

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Executive Brief — DJED RU12 focus

Scope and Assumptions

The comparison targets 10–12 kV overhead distribution lines. The goal is to choose equipment for remote sectionalizing of feeders and for operational control of OHL sections. Protection, autoreclosing (AR), and telecontrol at the feeding substation are assumed to be in place.

Definitions

Recloser — a load/short-circuit breaking device with automatic reclosing (AR), vacuum or SF6 type, designed to switch load and fault currents.
Motorized disconnector — a switching apparatus without capability to interrupt load/fault current, intended for a visible break under no-load conditions, with local/remote operation. In this document we consider a typical DJED-RU12 (DJED-D/DC12) with an electric drive and SCADA integration.

Executive Summary

Recommendation: for remote sectionalizing and operational control on 10 kV OHL, a motorized disconnector (e.g., DJED-RU12) is the rational choice. It delivers the required functions with substantially lower cost and complexity, is easier to operate, does not burden protection coordination, and avoids repeated AR onto a permanent fault.

Key Criteria — When the Disconnector is Objectively Better

- Substation already has fast protection and AR; feeder-side repeated reclosing is not required.
- Goal: cost-effective improvement of controllability and maintainability (quickly isolate a damaged span and restore power to the healthy part).
- Requirements of ecology and easy maintenance (no vacuum/SF6 interrupters).
- Mass/size limits on existing poles.

DJED-RU12 — Factual Data Used

- Ratings: 10–12 kV, 50 Hz, 630 A; withstand currents: thermal 12.5 kA (3 s), dynamic 31.5 kA.
- Operation with icing up to 20 mm and wind up to 15 m/s; polymer insulators (safety factor 1.5).
- Ingress protection: drive ≥ IP65, control cabinet ≥ IP54; autonomous operation up to 24 h from 2×12 V 7.2 Ah batteries.
- Integration: IEC 60870-5-104; remote, local and manual operation.
- Dimensions & mass: disconnector ≈ 750×730×450 mm, ≈ 38 kg; drive cabinet ≈ 67 kg.
- Operating time per open/close cycle up to 4 s; drive power up to 180 W.

Risks of Using a Recloser Instead

- Excess functionality and cost when AR exists at the substation.
- Additional selectivity settings; risk of “competing” AR logics.
- Re-energizing a permanent fault during AR cycles (mechanical/thermal impact at the fault point).
- Potential environmental/regulatory concerns for SF6 models.

Final Conclusion

For remote sectionalizing and faster restoration on 10 kV OHL, a motorized disconnector (e.g., DJED-RU12) offers optimal functionality, cost, and operational simplicity. Select a recloser only where local breaking of load/fault current and autonomous service restoration are truly required at the installation point.

Why the Motorized Disconnector is the Best Choice for 10 kV OHL

What it gives in our task

- Accurate sectionalizing without “protection fights”: simple open/close logic from SCADA or operators.
- No AR cycles at the fault location: avoids reignition and mechanical blows to the fault.
- Minimal extra electronics: simpler architecture → higher predictability and easier diagnostics.

Reliability & Operation

- No vacuum/SF6 interrupters — fewer ageing factors, simpler maintenance routines.
- Harsh climate operation: performs under icing/wind; IP65 drive, IP54 cabinet.
- Autonomy: cabinet batteries allow remote operations during power loss.

Safety & Technological Aspects

- Visible break: blade position is obvious, reducing mis-operations.
- Three modes: remote, local, manual — handy for switching and restoration.
- Task-specific options: motor drive, current sensors, telemetry; line-side earthing switches if needed.

Integration & Control

- SCADA out-of-the-box: standard protocols (e.g., IEC 60870-5-104), tele-signals, telemetry, events.
- Simple scenarios: open — isolate the fault; close — restore power to the healthy section.

Economics (CAPEX/OPEX)

- Significantly lower CAPEX vs. recloser: no costly interrupter chambers or AR logic.
- Lower OPEX: fewer maintenance items; no SF6 handling.
- Lower mass/dimensions: easier retrofit on existing poles; lower installation cost.

When the Disconnector Wins

- Radial OHL with tuned protections/AR at the substation.
- Need to quickly restore power to the healthy feeder part after localization.

- Strict budget and simplicity requirements.
- Repeated energization of the fault is undesirable due to risks for conductor, fittings, poles.

When a Recloser is Needed

- Local switching of load/fault current and autonomous restoration is required at the point of installation.
- Fast local protective function is needed without reliance on substation/telecom.

Figures (as referenced)

The uploaded PDF references technical drawings/photos from “TT_RusHydro_400_630.docx”. If you provide that file, we can embed each figure. Placeholders are listed below.

Figure 1. Motorized disconnector RU-12 — general view (source: TT_RusHydro_400_630.docx)

Figure 2. Mounting dimensions & frame (source: TT_RusHydro_400_630.docx)

Figure 3. Electric drive & kinematics (source: TT_RusHydro_400_630.docx)

Figure 4. Control cabinet & interfaces (source: TT_RusHydro_400_630.docx)

Figure 5. Pole installation scheme (source: TT_RusHydro_400_630.docx)

Figure 6. Secondary wiring & sensors (source: TT_RusHydro_400_630.docx)

Figure 7. Anti-corrosion & climate (source: TT_RusHydro_400_630.docx)

Figure 8. Earthing-switch option (source: TT_RusHydro_400_630.docx)