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Inspect dynamic façade louver synchronization and control logic

Inspect dynamic façade louver synchronization and control logic with an interactive checklist that's commentable and can export as PDF/Excel for records.

Project:

Date:

Filled by:

Pre-Inspection Documentation

1	Verify approved control schematics and sequences of operation are onsite and current; method: compare against latest IFC/as-built; acceptance: revision/date match transmittal; evidence: photos of title blocks and document IDs.
2	Confirm actuators, controllers, and sensors match approved submittals; method: tag/model comparison; acceptance: matches equipment schedule; evidence: photos of nameplates and recorded serial numbers.
3	Ensure power and network single-line diagrams are current; method: cross-check panel IDs and network topology; acceptance: labels align with diagrams; evidence: panel label photos and marked single-line extract.

Network and Power Integrity

4	Measure control panel supply voltage at terminals; method: calibrated multimeter; acceptance: 230 V $\pm 10\%$ or per approved project specifications and authority requirements; evidence: photo of reading and panel label.
5	Verify UPS backup runtime for façade controllers under typical load; method: timed discharge test; acceptance: ≥ 15 min or per approved project specifications and authority requirements; evidence: timestamped video/log and UPS screen photo.
6	Test Ethernet/RS485 bus continuity, impedance, and polarity; method: cable certifier/oscilloscope; acceptance: Cat6 100 $\pm 10 \Omega$, RS485 A/B correct; evidence: tester report PDF and cable label photos.
7	Confirm NTP/BACnet time synchronization across controllers and BMS; method: compare device clocks; acceptance: time offset ≤ 2 s; evidence: screenshots of clocks and NTP source.
8	Check controller firmware and BMS object mapping; method: compare versions and point lists; acceptance: per approved project specifications and authority requirements; evidence: exported mapping file and version screenshots.

Sensor Calibration and Inputs

9	Calibrate façade irradiance sensor using a reference pyranometer; method: 10 minute average comparison; acceptance: $\pm 5\%$; evidence: side-by-side photo and calibration certificates.
10	Verify wind sensor cut-out threshold configuration; method: signal generator or calibrated fan; acceptance: trip at setpoint ± 0.2 m/s; evidence: trend log and configuration screenshot.
11	Validate exterior air temperature sensor accuracy; method: 0 °C ice bath or traceable reference; acceptance: 0 ± 0.5 °C; evidence: calibration sheet and probe photo.
12	Confirm window/door interlock inputs change state; method: magnet or contact test; acceptance: debounced within 200 ms; evidence: controller event log and input card photo.
13	Test rain sensor function; method: controlled spray; acceptance: wet detection within 5 s and clear within 60 s; evidence: trend plot and wetted sensor photo.

Actuator Alignment and Mechanical Limits

14	Inspect actuator mounting torque and linkage free play; method: torque wrench and feeler gauge; acceptance: bolts 8 N·m or per approved project specifications and authority requirements, play ≤ 1 mm; evidence: photos of tools and joints.
15	Set and record mechanical end stops; method: manufacturer tool; acceptance: 0% closed/100% open repeatable within $\pm 1^\circ$; evidence: video of cycles and recorded setpoints.
16	Measure louver bank synchronization on common shaft; method: digital angle gauge at three positions; acceptance: maximum angle difference $\leq 2^\circ$; evidence: readings table (photo/CSV).
17	Confirm emergency open/close overrides function; method: local switch and BMS command; acceptance: response < 3 s; evidence: trend screenshots and test video.
18	Verify noise and vibration during operation; method: sound level meter and vibrometer; acceptance: ≤ 55 dB(A) at 1 m, vibration per approved project specifications and authority requirements; evidence: logs and meter photos.

Synchronization Tests

19	Execute group step-move to 25/50/75/100%; method: BMS script; acceptance: each louver within $\pm 2\%$ of target and within ± 1.5 s of peers; evidence: trend plots with timestamps.
20	Test sun-tracking algorithm under simulated irradiance; method: playback test profile; acceptance: calculated angle within $\pm 3^\circ$ of model; evidence: overlay plots and parameter screenshot.
21	Validate anti-surge staggering to limit inrush; method: current clamp and logger; acceptance: inrush $< 80\%$ MCB rating, stagger interval per approved project specifications and authority requirements; evidence: current log and MCB label photo.
22	Confirm fault handling and retries; method: disconnect one actuator; acceptance: ≤ 3 retries then alarm within 10 s; evidence: alarm screenshot and fault ticket reference.
23	Assess wind/rain override priority; method: activate sensors during motion; acceptance: safe position within 10 s, resume after clear + delay; evidence: trend logs and priority table screenshot.

Control Logic Validation and Handover	
24	Review BACnet point names, units, and writable priorities; method: export list; acceptance: naming convention followed, SI units, priorities documented; evidence: CSV export.
25	Verify schedule and holiday tables block motion during quiet hours; method: simulate date/time; acceptance: no motion outside permitted windows; evidence: trend and schedule screenshots.
26	Conduct loss of communication fail-safe test; method: unplug network; acceptance: louvers move to safe angle within 15 s; evidence: test video and event log.
27	Confirm manual/auto handback logic; method: toggle HOA and BMS; acceptance: auto resumes within 5 s after manual release; evidence: controller log and HOA photo.
28	Capture final tuning parameters and approved setpoints; method: export controller backup; acceptance: baseline saved and backed up; evidence: file hash and backup location screenshot.
29	Obtain stakeholder digital sign-off and close punch list; method: review comments to closure; acceptance: all items resolved; evidence: signatures and QR-authenticated report.
30	Train operators on routine checks and maintenance; method: toolbox talk; acceptance: attendance sheet and O&M; acknowledgment; evidence: scanned sign-in and materials upload.

Comments:

Filled by:

Signature:

Introduction	How to use this checklist
Inspect dynamic façade louver synchronization and control logic. This checklist guides commissioning engineers, controls integrators, and operations teams through end-to-end validation of automated shading systems, including BMS integration, actuator alignment, time synchronization, and safety overrides. It focuses on coordinated group movement, accurate sensor inputs, and deterministic control sequences that respect environmental cut-outs and priority hierarchies. By following these steps, you'll reduce nuisance alarms, prevent actuator strain, and avoid occupant discomfort or energy penalties. Network timing, BACnet object mapping, sun-tracking algorithms, and fail-safe behavior are verified against measurable tolerances with clear evidence requirements. Mechanical checks ensure louvers move uniformly, stop reliably, and remain within acoustic and vibration limits. The outcome is a dependable façade control platform that responds predictably to wind, rain, irradiance, and schedules while maintaining maintainable records. Use this interactive checklist to tick items, add comments, and export to PDF/Excel with a QR-secured audit trail.	1. Preparation: bring calibrated multimeter, clamp meter, cable certifier, digital angle gauge, sound meter, vibrometer, reference pyranometer, test fans/sprayers, laptop with BMS access, PPE, and current drawings. 2. Project setup: open the checklist, select building/zone, add team members, set target tolerances, and pre-load device tags, schedules, and testing scripts. 3. Using the Interactive Checklist: start interactive mode, tick each step as completed, attach photos/videos/screenshots, and add timestamped comments for findings and resolutions. 4. Evidence and QA: log instrument serials and calibration dates, upload trend exports (CSV/PDF), and link test profiles used for simulated irradiance and wind. 5. Review and Resolve: filter by open comments, assign actions, retest affected steps, and mark items accepted when evidence meets tolerance criteria. 6. Sign-Off: capture digital signatures, generate an export as PDF/Excel, verify the QR authentication, distribute to stakeholders, and archive with backups.