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Test dynamic façade response to sun-tracking control sequences

Test dynamic façade response to sun-tracking control sequences with our interactive checklist; commentable and export as PDF/Excel for commissioning & QA.

Project:

Date:

Filled by:

Pre-Test Verification

1	Confirm latest approved control schematics and sun-tracking sequence narrative match the installed system; compare revision dates to project records. Acceptance: current IFC/approved issue. Evidence: annotated screenshots and responsible engineer's initials.
2	Disable conflicting schedules and legacy scenes so only sun-tracking logic is active during testing. Method: BMS override with timestamp. Acceptance: no parallel commands seen. Evidence: trend screenshot of command priorities.
3	Verify actuator power supplies and protections. Method: measure output (e.g., 24 V DC or 230 V AC) with a calibrated multimeter. Acceptance: voltage within $\pm 5\%$ of nameplate. Evidence: photo of readings and panel ID.
4	Inspect representative façade modules for free travel. Method: visual check and torque-limited jog. Acceptance: no binding; seals intact. Evidence: photos of tracks, cables, and end-stops.

Sensor and Timebase Validation

5	Calibrate rooftop or façade illuminance sensors against a reference lux meter. Method: side-by-side reading. Acceptance: $\pm 10\%$ across 5 points (100–50,000 lx). Evidence: table of paired readings and meter serial numbers.
6	Verify site GPS coordinates, timezone, and daylight saving settings in BMS. Method: compare to verified source and NTP status. Acceptance: lat/long within 0.01° , clock offset < 1 s. Evidence: configuration screenshots.
7	Validate solar ephemeris engine. Method: compare BMS sun azimuth/elevation to an external calculator at three times. Acceptance: each within $\pm 1^\circ$. Evidence: captured values with timestamps.
8	Check weather inputs (wind/rain) change state correctly. Method: vendor simulator or safe functional test. Acceptance: input status transitions within 2 s. Evidence: I/O trend and device photos.

Control Sequence Simulation	
9	Simulate morning condition (sun elevation 10–20°). Method: BMS time-shift. Acceptance: façade issues open/tilt commands per sequence within 2 s. Evidence: command log export (CSV).
10	Simulate midday condition (peak elevation). Method: BMS scheduler. Acceptance: slat angle setpoint tracks algorithm; measured position within $\pm 3^\circ$ of setpoint. Evidence: setpoint vs actual trend plot.
11	Simulate afternoon condition mirroring morning. Acceptance: symmetrical behavior; no cumulative offset. Evidence: overlay of morning/afternoon response with time alignment.
12	Introduce cloud transients. Method: step illuminance using sensor simulator. Acceptance: no more than 2 position changes per minute (anti-hunting). Evidence: event count and deadband settings screenshot.
13	Check group commands and addressing. Method: broadcast vs group tests on a 10-module set. Acceptance: inter-module start-time skew ≤ 0.5 s. Evidence: time-synced video or high-speed log.

Physical Response Measurement	
14	Measure actuation delay from command to motion start. Method: stopwatch or 120 fps video. Acceptance: < 2 s. Evidence: timestamped clip and noted frame count.
15	Measure full travel time 0–90° (and return). Method: timed cycle. Acceptance: within $\pm 10\%$ of manufacturer data. Evidence: recorded times and module IDs.
16	Verify slat/blade angle accuracy. Method: digital inclinometer or photogoniometer at 0°, 30°, 60°, 90°. Acceptance: $\pm 2^\circ$. Evidence: readings with calibration certificate reference.
17	Check operational noise and vibration. Method: sound level meter at 1 m during motion. Acceptance: ≤ 60 dB(A). Evidence: SPL readings and device make/model.
18	Assess motor temperature after 10 consecutive cycles. Method: IR camera. Acceptance: surface temperature $\leq 60^\circ\text{C}$. Evidence: thermal images with emissivity setting noted.

Fail-safes and Overrides	
19	Verify wind override behavior per approved project specifications. Method: simulate wind above threshold (e.g., 12 m/s). Acceptance: safe position reached within 5 s. Evidence: alarm log and position trend.
20	Test fire alarm interface per approved project specifications and authority requirements. Acceptance: required position achieved within 10 s; normal restored on reset. Evidence: cause-and-effect log excerpt.
21	Confirm local manual override priority. Method: wall switch or maintenance HMI. Acceptance: local command takes precedence; BMS logs reason code. Evidence: video and event record.
22	Check obstruction/protection function. Method: introduce soft block during close. Acceptance: current limit trips and reversal occurs. Evidence: video, fault code, and reset record.

Data Logging and Handover	
23	Verify trend logging cadence. Method: inspect historian settings. Acceptance: ≥ 1 Hz for position/state; time-synced to NTP. Evidence: configuration screenshot.
24	Export as-built parameters, firmware versions, and device addresses. Acceptance: all modules listed with dates and lot numbers. Evidence: CSV/PDF attached to record.
25	Capture as-left photos of representative elevations at key angles. Acceptance: geotagged images labeled with location and angle. Evidence: photo set uploaded to record.
26	Obtain digital sign-offs from contractor, controls vendor, and client. Acceptance: all roles signed; deviations noted. Evidence: signed PDF with QR-authenticated link.

Comments:

Filled by:

Signature:

Introduction	How to use this checklist
Test dynamic façade response to sun-tracking control sequences ensures automated shading systems perform reliably under real and simulated solar conditions. This checklist focuses on daylight-responsive façades driven by solar-tracking algorithms within a building management system (BMS). It verifies sensor calibration, time and location settings, command logic, and physical actuation so that blinds, louvers, or panels track the sun smoothly, reduce glare, and optimize daylight. The scope includes performance tolerances, response times, safety interlocks, and evidence capture for commissioning records; it excludes architectural design changes and unrelated building controls. By confirming correct sequencing, fail-safes, and data logging, teams avoid occupant discomfort, motor wear, façade damage in high winds, and compliance delays. Use this practical sequence: validate inputs, simulate sun positions, measure response and accuracy, then prove overrides and export results. Start interactive mode to tick items, add comments, and export as PDF/Excel with an embedded QR code for authenticated sharing.	1. Preparation: Gather calibrated lux meter, digital inclinometer, IR camera, sound level meter, stopwatch/high-speed camera, vendor sensor simulator, and PPE. Confirm safe access, permits, and witness schedule. Enable NTP, back up BMS database, and stage a clear test window free of conflicting schedules. 2. Using the Interactive Checklist: Start interactive mode, tick each step as executed, and attach photos, videos, and logs. Use comments to note deviations and approvals. When finished, export the record as PDF/Excel and share the QR-secured link with stakeholders. 3. Sign-Off: Collect digital signatures from the commissioning agent, controls vendor, and client representative. Archive the signed package and instrument certificates in the project repository, confirming QR authentication for future audits and maintenance.