TG-24

Solar Tracking Racking

Automatic sun tracking, eight-point damping

WZPV-SZTZ-24



Installation Sequence Overview

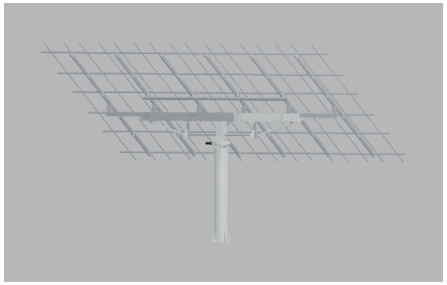
Proceed to the next stage only after the previous connection and stability check has passed. Assembly configuration and lifting methods follow the project plan.



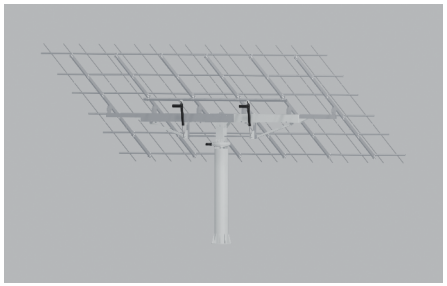
01 Column



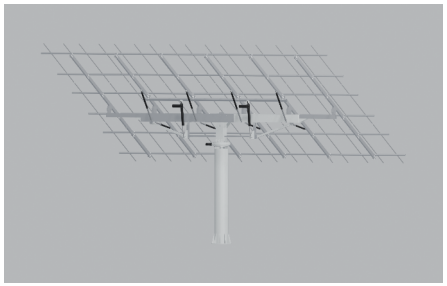
02 Central slew drive



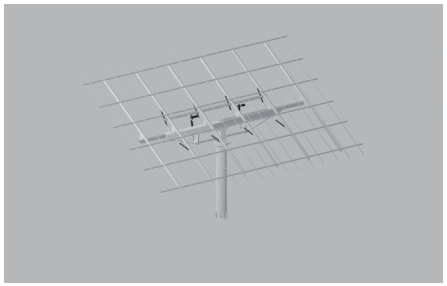
03 Load-bearing frame



04 Rear twin actuators



05 Eight-point damping



06 Mechanical recheck

Customer module mounting (conditional branch) -> Electrical connection -> Single-axis verification -> Calibration and protection -> Site acceptance

The models below show staged assembly relationships; lifting gear and temporary supports are not shown. Module mounting is a separate conditional branch.

Delivery Inspection and Start-Up Preparation

Confirm quantity, revision and condition item by item; resolve transport anomalies before installation.

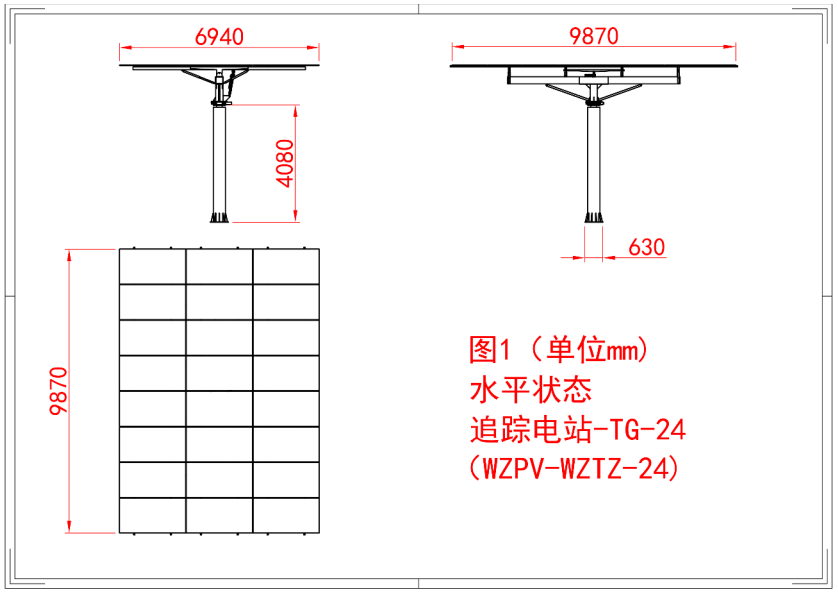
First check the packing list, controlled documents and lifting/support plan. Inspect column, slew, frame, actuators and dampers stage by stage.

Inspection item	Operation and acceptance records
Configuration count	Check structural parts, 1 slew drive, 2 actuators, 8 dampers, fasteners and the supplied control accessories against the packing list; record name, part number, revision and quantity.
Structural parts	Check deformation, cracks, weld appearance, mating faces, coating and rust; record locations and photograph. Anomalies are judged by the engineering lead.
Drive and rods	Check piston-rod damage, leakage, joints and terminations, loose connections, breather valves and interface protection; do not use test motion to mask damage.
Cabling and enclosures	Check cable damage, connectors, gland fittings, control-box sealing and labels; keep original wire numbers and do not mix harnesses.
Storage	Protect parts per their storage requirements; seal exposed interfaces against water, sand and debris, and keep identification labels readable.

Record: packaging condition, quantities received, anomaly photos, supplier disposition and re-inspection conclusions. Deformation, leakage or model mismatch that has not been dispositioned must not enter assembly.

Foundation and Installation Space Acceptance

Release the site against the approved foundation drawings and the full motion envelope; the horizontal outline alone cannot prove the site is sufficient.



Source-drawing reference postures and outline; foundation per construction drawings

Step	Acceptance judgment and records
Verify engineering inputs	The foundation engineer checks geology, design wind/snow, foundation reactions, construction drawings and the actual configuration; record drawing numbers and calculation revisions.
Foundation and anchor checks	Test position, elevation, anchor specification / projection / spacing, flange match and workmanship against the construction drawings; record measured and allowable deviations.
Confirm curing release	Review construction acceptance, strength / curing certificates and loading release records; a uniform number of days does not replace engineering approval.
Verify motion space	Check ground, neighbouring units, buildings, vegetation and maintenance corridors against the permitted posture envelope; record the highest point, lowest edge and clearances to each obstacle.

The source drawing's horizontal reference outline is 6940 × 9870 mm; 4080 mm is the column-top support datum, not the module-top height. The 40° / 70° postures are not the permitted range; foundation and full motion space are accepted against the corresponding engineering drawings.

Lifting and Temporary Stability

Mass, centre of gravity, lifting points and member posture are defined by the approved lifting plan; the 228 kg slew-drive mass is not the unit lifting weight.

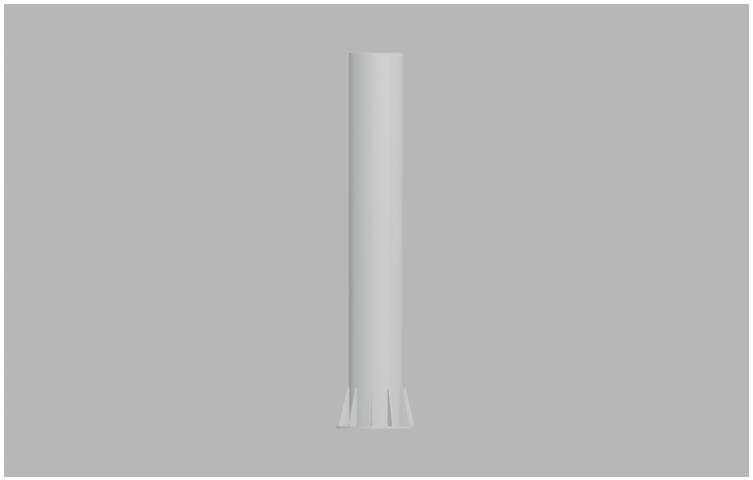
Lifting gear and temporary supports are not shown. Column and frame landings must keep the stability measures required by the construction plan; unload per the plan after checks pass.

Stage	Operation and release conditions
Before the lift	Verify lifting points, gear, route, ground bearing capacity and weather window; confirm the responsible person, exclusion zone and signalling method.
Lifting and landing	Operate with the approved lifting points and posture; protect actuators, damper rods and cables. Actuator rods or damper terminations must not be used as unapproved lifting points.
Temporary supports	Set stability supports per the assembly plan; do not rely on the motor, actuators or dampers alone to keep the lifted assembly stable before connections are complete.
Unloading and release	After load-bearing connections, tightening and stability checks are signed off, unload the lifting gear and remove temporary supports per the plan.

Record: mass / centre-of-gravity basis, lifting-point diagram, gear inspection, landing posture, connection status and release signatory. Stop immediately if conditions are incomplete or instability appears.

01 Column Placement and Fixing

After foundation loading acceptance, establish the column datum and stable support.



Staged assembly state



Connection detail

Install

Land the column per the lifting plan and check the base flange against the anchors. Adjust direction, elevation and plumb as specified, then complete connections and thread locking per the tightening table.

Check

Mating faces seat fully and all fasteners are present; record datum measurements and tightening results. Keep the temporary stability required for this stage.

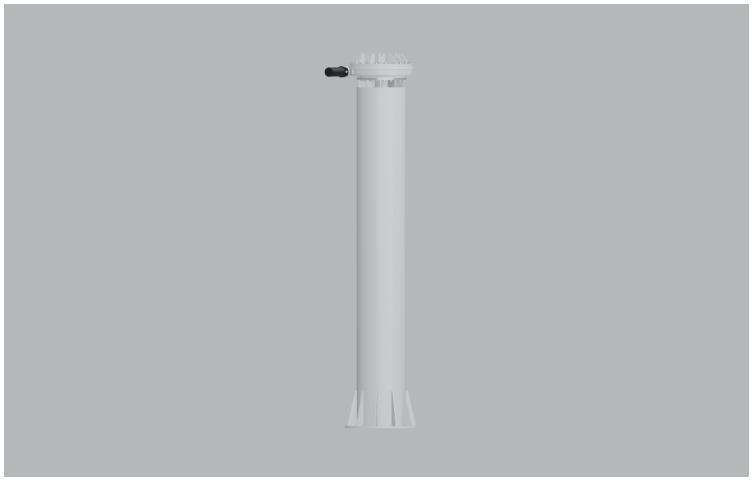
Next step

After the base connection and stability check are signed off, unload the lifting gear per the plan and install the central slew drive.

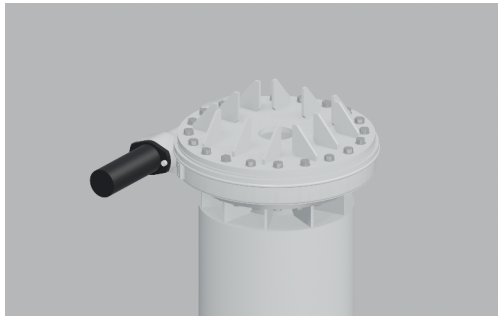
Column-base anchor layout, foundation dimensions and connection torques use the project construction drawings; the model base plate cannot replace the anchor drawing.

02 Central Slew Drive Installation

The central slew drive sits on top of the column; the frame and central tilt support land afterwards as pre-assembled sub-assemblies.



Staged assembly state



Connection detail

Install

Verify SDE17A-102MHB-25MRC-1009 Rev.B. Land on the datum with clean mounting faces; check flange, hole pattern and cable routing.

Check

Mating faces seat fully, tightening and thread locking are complete, and the motor and harness are not pinched. Upper pre-assembled interfaces match the assembly datums.

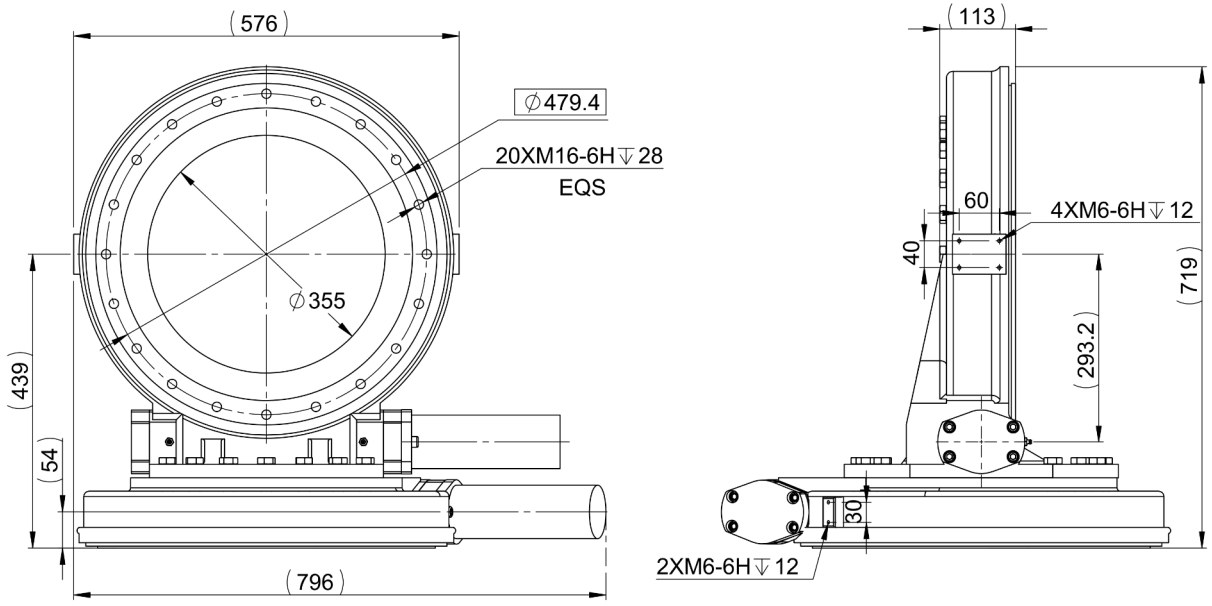
Next step

After the slew drive, column interface and stability checks pass, release frame installation.

Azimuth is driven by 1 central slew drive; tilt by 2 rear actuators.

Central Slew Drive Mounting Interface and Dimensions

SDE17A-102MHB-25MRC-1009 Rev.B original component drawing. Check hole pattern, flange interface and orientation before installation; dimensions in mm.

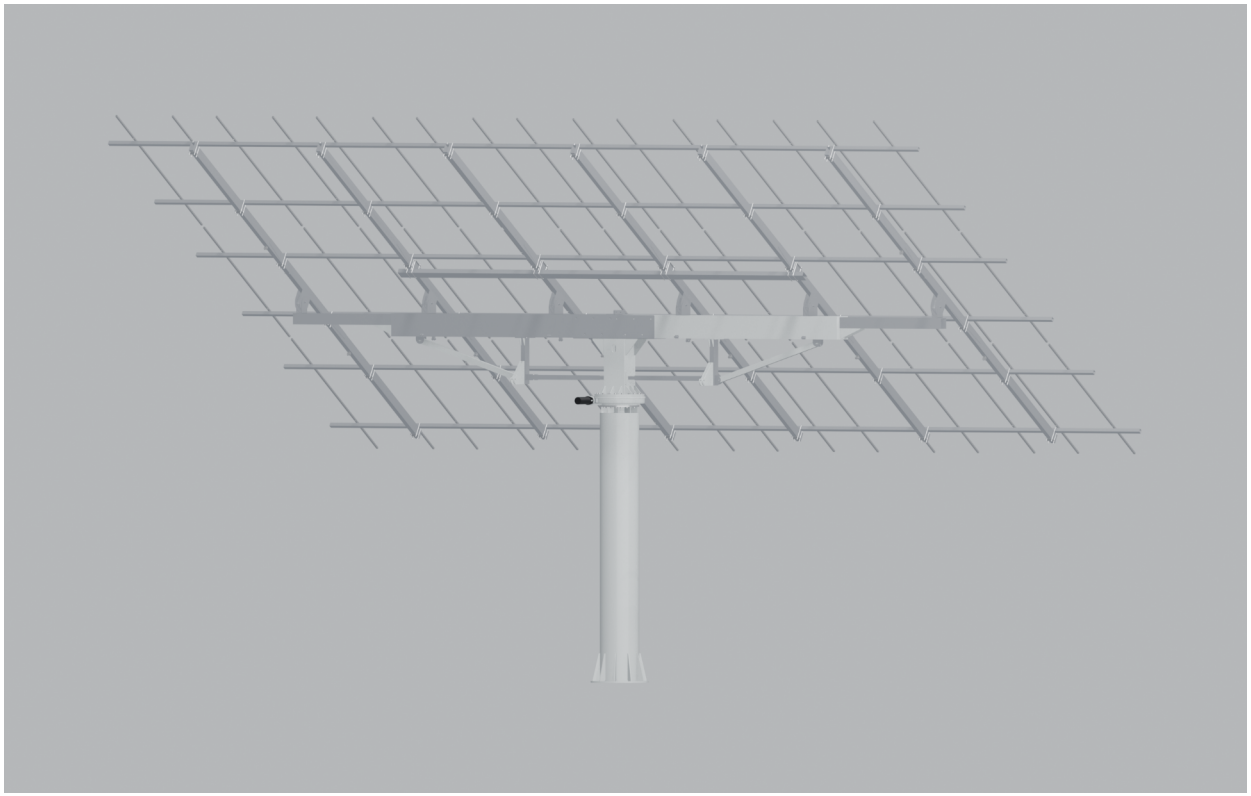


Interface check	Source-drawing requirement
Bolt circle	ϕ479.4 mm
Fixed threaded holes	20 × M16-6H, depth 28 mm
Side threaded holes	4 × M6-6H, depth 12 mm
Orientation and datum	Check upper and lower interfaces against the source drawing and assembly datums

Thread specifications do not replace bolt strength grades or tightening torques. Connections follow the corresponding assembly drawings and tightening tables; this is not the foundation anchor layout.

03 Load-Bearing Frame Assembly

Main beams, cross beams, purlins, braces and central stiffening connections form the load-bearing frame; central supports land with their pre-assembled sub-assemblies.



Install

Use factory pre-assembly recheck, ground pre-assembly or sectional installation per the project plan. Join the frame by part number, then complete the connections to the central supports.

Check

Orientation, quantity, geometry and thread locking are correct. The frame matches the tilt connections; never force alignment, ream holes or weld on site.

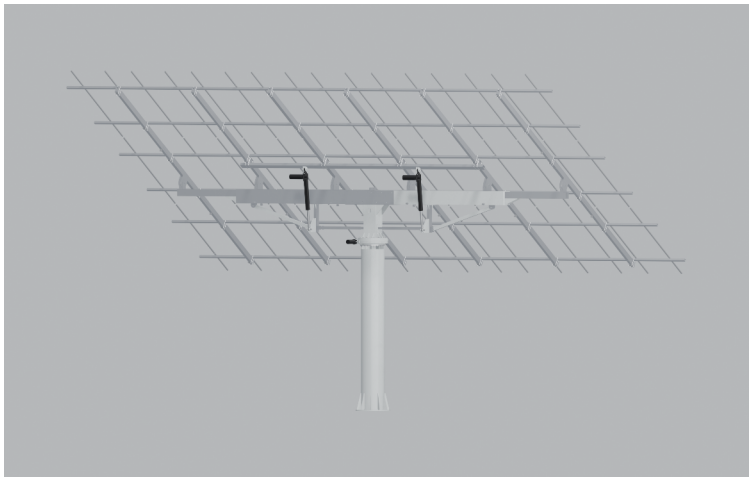
Next step

Load-bearing connections and temporary stability checks pass. Keep the necessary supports and install the rear actuators and dampers.

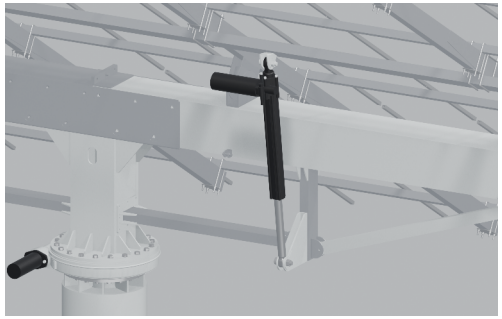
Lifting mass, centre of gravity and lifting points for ground pre-assembly require engineering confirmation; do not rely on actuators or dampers alone for installation stability.

04 Twin Rear Actuator Connection

Two actuators mount at the two actuation positions on the rear of the array and drive tilt through extension.



Staged assembly state



Connection detail

Install

Connect both actuators and end pins at the approved posture and centre distance; check front and rear terminations. Keep the inverted mounting and waterproof breather structure intact.

Check

Articulation moves freely, thread locking, initial position and harness identity are correct, with no forced skew, side load or pinching; record remaining stroke on both sides.

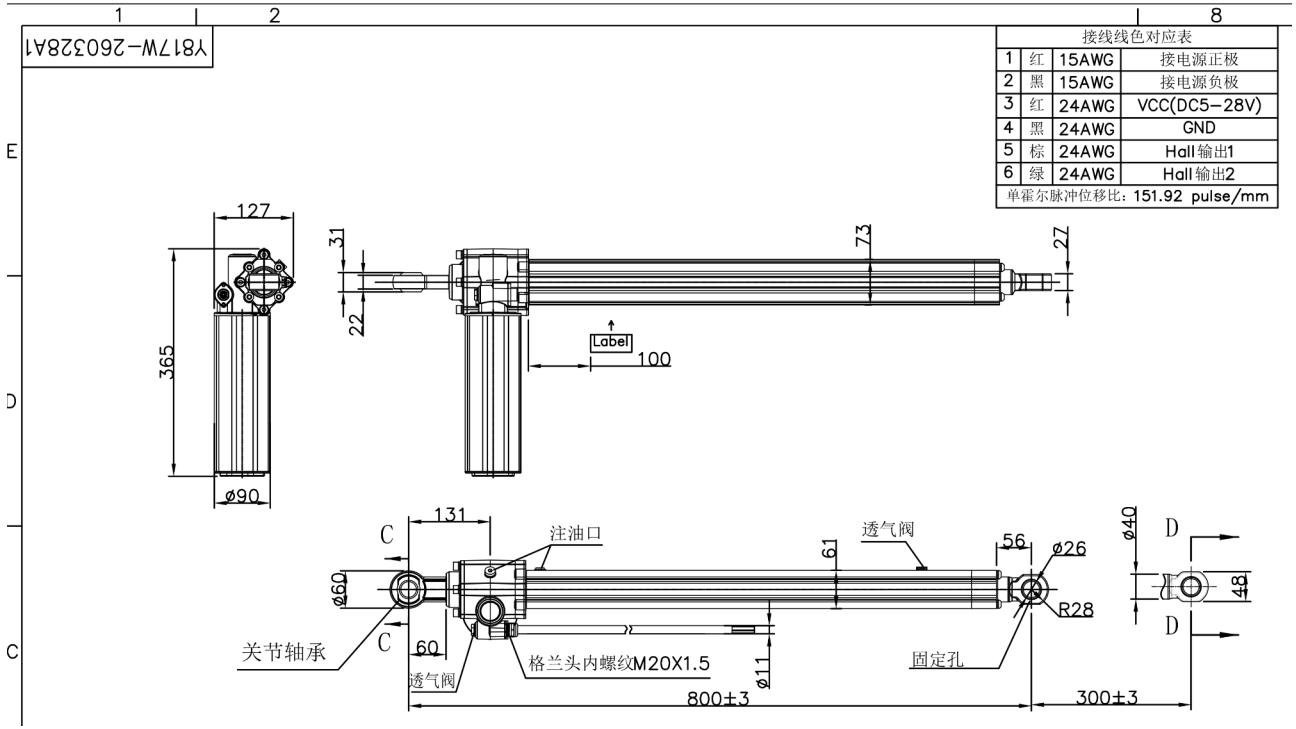
Next step

Both connections and orientations pass and the frame is stable; release eight-point damper installation.

800 ± 3 mm is the minimum installation distance, not a universal target. If either side's position or joint does not match, resolve the assembly issue first; never power on to force alignment.

Actuator Mounting Interface and Dimensions

HB-DJ817W / Y817W-260328A1. Check terminations, stroke, installation distance and waterproofing conditions against the original component drawing.

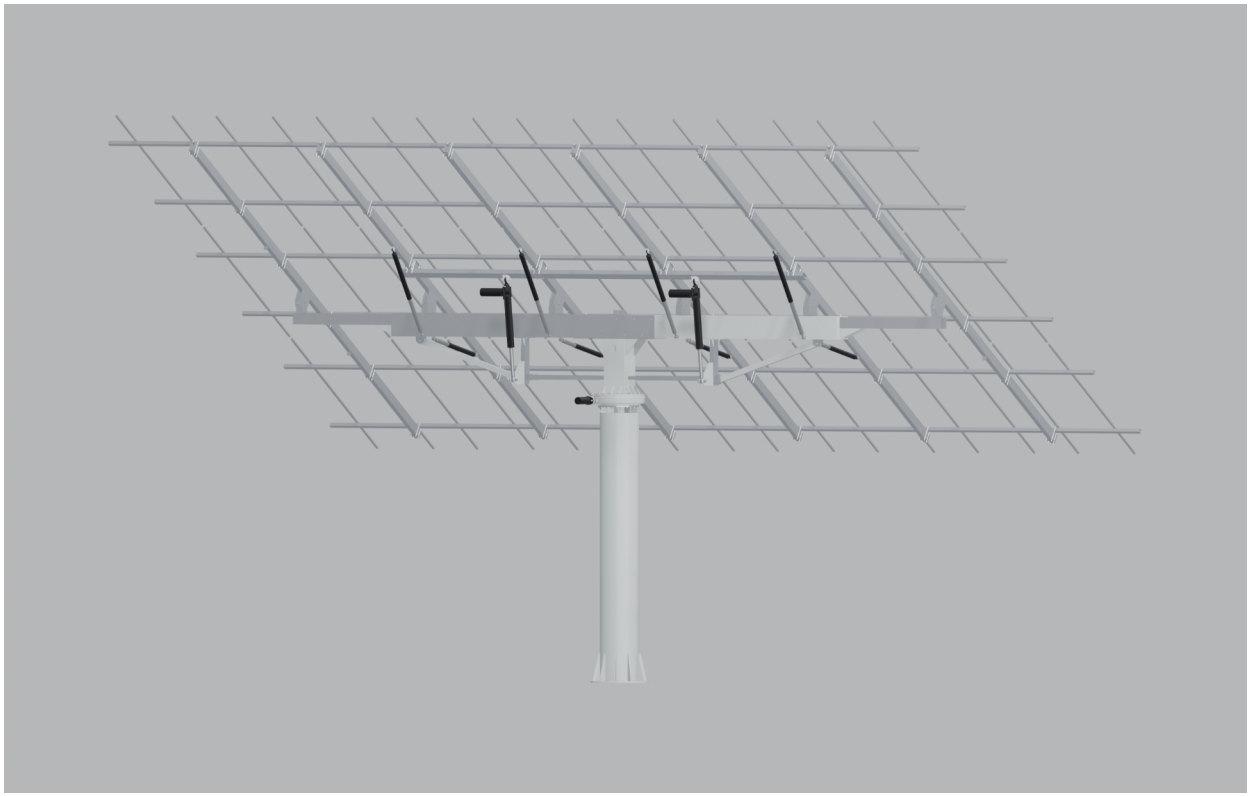


Interface	Source-drawing requirement
Front interface	ϕ26 fixed hole
Rear interface	ϕ25 spherical bearing
Stroke	300 ± 3 mm
Min. installation distance	800 ± 3 mm
Posture and waterproofing	Inverted mounting; waterproof breather structure intact
Hall feedback	151.92 pulse/mm per channel

800 ± 3 mm is the minimum centre distance and 300 ± 3 mm the stroke. The 50 kN static load applies to one unit at half stroke; IP66 requires the specified inverted mounting and waterproof breather conditions.

05 Eight-Damper Installation

Four lateral stations, each carrying two S30-535QQ units; piston-rod ends up.



Install

Connect in four pairs by position number. Protect the chrome rod surface; check ball-pin terminations, joint movement and thread locking.

Check

Confirm the 8 units, four paired positions and orientation. During installation verify static centre distance and margin first; no oil leakage, rod damage, pinching or forced skew.

Next step

Damper terminations and static margins pass. The dynamic full-permitted-envelope check is left to the calibration stage.

Dampers must not be driven to bottom-out or full extension as limit stops. The source drawing requires at least 25 N · m for the ball-pin terminations; other connections follow their own tightening tables.

Eight-Point Damper Position Verification

Four lateral stations, paired. Number and record each unit by assembly position; check rod-end orientation and termination condition.

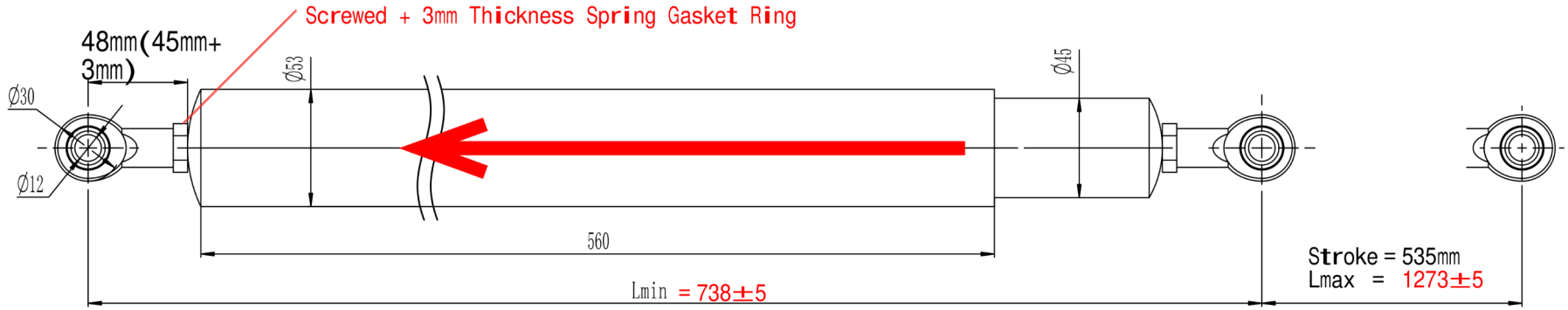


Check 2 units at each of A, B, C, D: quantity · rod end up · joint movement · termination locking · static margin

Station letters in the figure are for position verification only; part numbers and position codes follow the unit's assembly drawing.

Damper Length, Orientation and Terminations

S30-535QQ original dimension drawing. The installed centre distance follows the assembly drawing at the installed posture, keeping static stroke and spherical-joint movement margin.

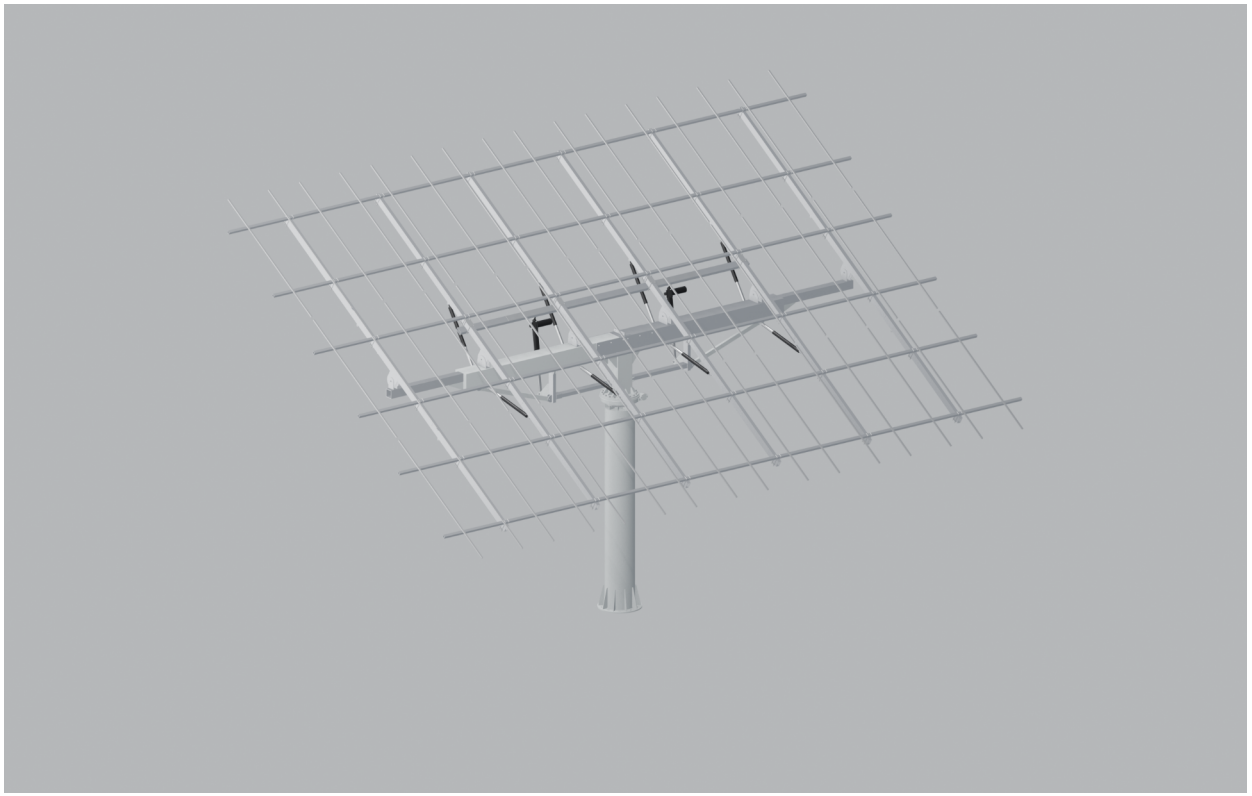


Check item	Source-drawing definition and installation judgment
Stroke	535 mm
Centre distance range	Lmin 738 ± 5 mm; Lmax 1273 ± 5 mm, installed distance set by the assembly posture
Orientation and terminations	Piston-rod end up; spherical joints move freely; ball-pin terminations >= 25 N·m per the source drawing
Margin check	Verify statically at installation and across the full permitted envelope at commissioning; never use bottom-out or full extension as limit stops

980 mm is the transport / test centre distance, not a universal installation length. The 25 N·m minimum applies only to the source drawing's ball-pin connection and is not a machine-wide tightening value.

06 Mechanical Recheck of the Bare Racking

Confirm that load-bearing connections, the two rear actuators and the 8 dampers are fully assembled.



Connection recheck

Recheck column base, slew drive, central supports, frame, actuator terminations and damper terminations item by item. Complete records per the tightening table and verify thread locking.

Stability and space

Confirm the current posture and static margins; cables clear all moving parts. Handle temporary supports and lifting gear per the plan after inspection.

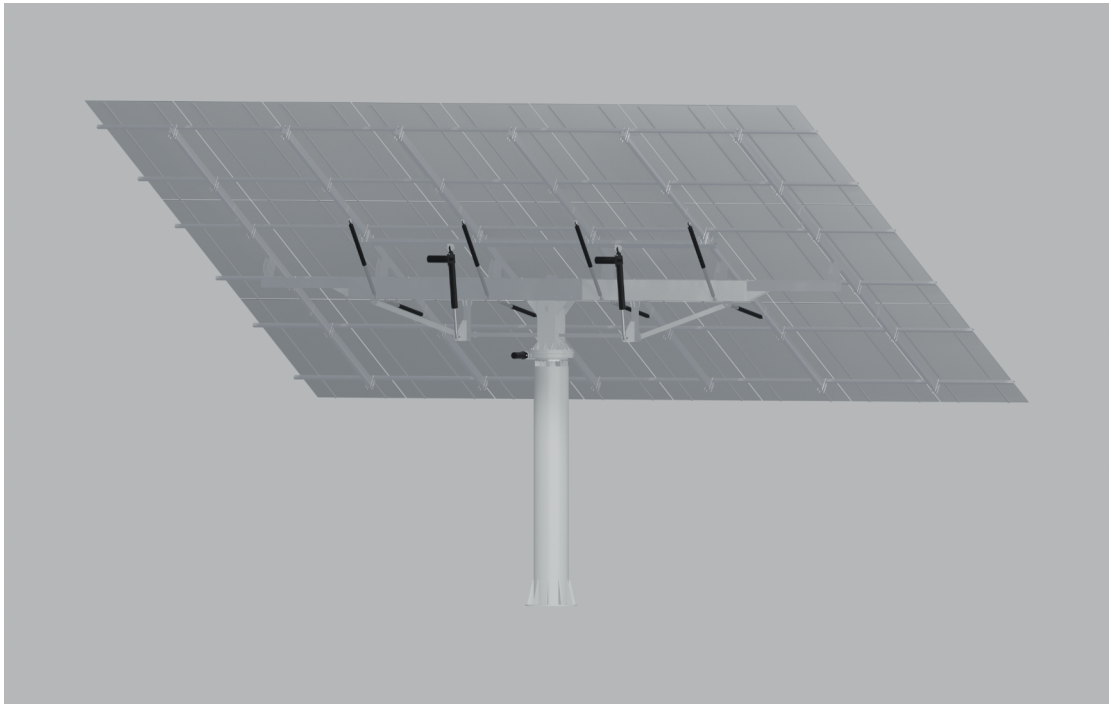
Next step

For bare-racking delivery, proceed to wiring. With customer modules, complete module adaptation and mounting first, then repeat the load and motion checks.

Figures show the racking as supplied, without PV modules. Formal motion verification requires wiring and calibration conditions to be complete.

Customer Module Mounting | Conditional Branch

Racking supply excludes modules. After structural and interface confirmation of the customer's modules, install them per the module manufacturer's instructions and the approved array layout.



Adaptation confirmation

Check module model, dimensions, mass, clamping zone and installation instructions; mount only after the structure matches.

Mounting sequence

Install per the approved 3 × 8 layout. Clamping positions and torques follow the module and clamp instructions; light-facing surface to the front, both actuators kept on the rear side.

Post-mounting recheck

Check fastening, glass, frames, cables and clamps. Wire per the PV electrical drawings and re-verify loads, motion envelope and electrical connection.

Skip this branch for bare-racking delivery; 24 × 740 W = 17.76 kWp is an example module option.

Record: module model and batch, adaptation sheet, clamp / fastening basis, main-circuit drawing number and inspection results. Do not install unmatched modules or mounting accessories.

07 Electrical Connection and Pre-Energization Checks

Wire strictly to the approved terminal diagram, harness list and I/O point table. Wire color only helps verify identified circuits; it never replaces wire numbers and terminal definitions.

Circuit	Component definitions and checks
Actuator power	2 × 15 AWG: red to power positive, black to power negative; actuator operating voltage 24 V DC. Verify control terminals, polarity and protection.
Actuator Hall	4 × 24 AWG: red VCC (DC 5-28 V), black GND, brown Hall1, green Hall2; 151.92 pulse/mm per channel. Verify controller signal supply first.
Slew motor / limits	Wire per the delivered slew harness and I/O point table; never reuse actuator wire colors for slew terminals or azimuth feedback interfaces.
Grounding, sealing and moving-line routing	Test per the grounding protection drawing; check gland fittings, strain relief, abrasion protection and margin across the full permitted posture. Label power red/black separately from feedback red/black.
Communication and registration	Connect the configured interfaces (4G / RS485 etc.) per the communication table; verify device ID, communication parameters and platform binding.

The Hall supply range is not the power voltage range. Do not energize with unknown harness identity, mismatched terminals, short circuits / reversed polarity or unaccepted grounding. Check power and control circuits separately.

08 First Power-Up and Single-Axis Verification

Per the approved test plan, confirm direction, feedback and stopping with manually supervised staged motions; do not go directly to automatic tracking.

Step	Pass criteria and records
Power-up preparation	Clear the area; brief stop and isolation methods. Check supply, polarity, protection, grounding and cabling; record measurements and tools.
Control state confirmation	Verify device identity, time and location, firmware, online status and limit indication; record initial posture and actual feedback.
Azimuth axis verification	Command azimuth motion and stop separately within the approved test range; actual direction, angle change and stop response must be correct with no structure / cable interference.
Tilt axis and both-side feedback	Verify tilt separately; confirm Hall response to displacement and channel ownership rod by rod, circuit by circuit; record both positions, difference and actual motion.
Duty cycle and anomalies	Testing must respect the 10% maximum duty cycle and the supplied confirmed cycle / continuous-duration figures. Stop immediately on mismatch, feedback loss, abnormal current / temperature rise or noise.

Never force the two sides level by repeated jogging. The no-load 1.0 mm/s ± 10% cannot predict full-load return time, and the 5 A maximum is not directly a stall-trip setting.

09 Zero Position, Limits and Permitted Range

Build the calibration record from approved datums and allowable deviations; drawing postures and platform example angles are not setting values.

Verification item	Operation and acceptance basis
Zero position and direction	Establish the approved azimuth / tilt datum posture; check physical direction, display direction and offsets; after entering calibration values, save and read back.
Hardware limits	Verify each of the four limit directions on site per the test plan: actuation, platform status and stop at limit; never validate by driving hard into the mechanical end point.
Software boundaries	Enter the approved permitted range; verify in-bound motion and out-of-bound command handling, recording targets, feedback and stop results.
Full permitted envelope	Check actuator / damper stroke, joints, modules, cables and obstacle clearances in stages; record the worst postures and minimum margins.
Parameter archiving	Set, save and read back all parameters by group; archive zero position, boundaries, deviation limits, versions, dates and approvers.

Stop and rectify if motion continues at a limit, feedback disagrees with the site, or interference occurs within the permitted range. The 40° / 70° drawing figures and the 45° / 30° interface examples are not operating limits.

10 Operating Strategies and Platform Integration

Verify the complete chain from trigger to motion, arrival, hold and recovery; protection tests use approved simulated inputs - never risk real high-wind trials.

Test group	To verify and record
Daily modes	Initialization, manual angle setting, automatic tracking, night sleep and wake-up; verify inputs, modes, target angles, actual posture and recovery permission.
Weather protection	Verify data source and freshness, trigger values, stow position, priority, arrival confirmation, hold and release conditions; invalid data does not prove the risk has cleared.
Self-check, reset and anomalies	Verify enabled self-checks, stopping, fault reset and behaviour on network loss / power loss / sensor faults; authorize recovery after the cause is cleared and confirmed on site.
Platform and permissions	Verify device consistency across PC / mini program / dashboard; test view, angle setting, stop, parameters and temporary authorization by role, confirming the selected device scope.
Monitoring and metering	Verify angle, limit, status and alarm history; match voltage, current, power / energy to real sensor, inverter or meter sources.

Keep inputs, actual motions, status read-back, judgments and operators. A cloud command issued is not a command executed; do not re-send motion commands with stale data or an offline device.

11 Site Acceptance and Handover

Release only after foundation, installation, motion, protection and platform items all pass. Factory tests, promotional videos and "it can move" never replace site acceptance.

Record sheet	Minimum fields
Device and documents	Project, device ID, component revisions, BOM, engineering drawings, controller / firmware, parameters and change-order versions.
Mechanical and electrical	Foundation / connection release, tightening and grounding records, zero position, permitted range, clearances, both-side feedback, duty cycle and electrical test results.
Functions and protection	For each item: precondition, input, target, measured value, judgment, allowable deviation, witness, date; anomaly rectification and re-test results.
Configuration and permissions	Enabled strategies, weather data sources and thresholds, stow / recovery positions, anomaly behaviour, platform device binding, roles and metering boundaries.
Operational handover	Stop / isolation / authorized-recovery training, maintenance manual, spares and service contacts; open items, owners, deadlines and operating restrictions.

Engineering lead, commissioning lead and acceptance party sign off. Failed items affecting stability, protection or permitted motion keep the unit stopped; release in writing after rectification and re-testing.

After-sales: sales@lianstor.com; website: lianstor.com. Repair requests should include device ID, anomaly time, mode, motion, angle / limit, feedback and electrical check records.

This manual covers installation and commissioning handover; long-term inspection, servicing, replacement and fault handling use the separate O&M manual.

Installation Connection Check Record

Fill in the values specified by the unit's drawings and the actual inspection results. Archive drawings, tools and personnel information together.

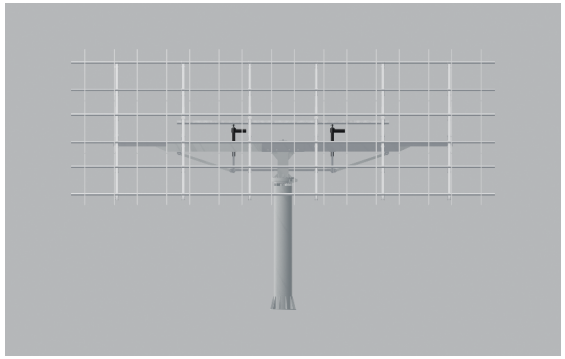
Project: _____ Device ID: _____ Drawing / Rev.: _____ Date: _____

Connection / position	Drawing value / basis	Measured or verified result	Signature
Column base flange / anchors			
Slew lower interface			
Central support / tilt connection			
Main beam / cross beam / purlin / brace			
Left rear actuator front / rear terminations			
Right rear actuator front / rear terminations			
Damper station A: two units			
Damper station B: two units			
Damper station C: two units			
Damper station D: two units			

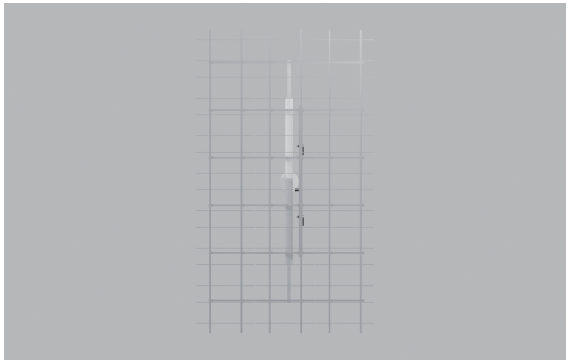
Record project, device ID, drawing number / revision, date, tool ID and inspector. Sign after rectification and re-inspection of incomplete items.

Completed Racking Orthographic Views

Front, side and top views verify installation relationships and member positions. Dimensions and connection definitions follow the original engineering drawings.



Front view



Top view



Side view

This page is not a new foundation or anchor construction drawing. Verify the full permitted motion space against the actual module option and the approved motion envelope.

Engineering Documents and Stage Release

Tie every missing datum to a specific document; suspend that stage's work until the corresponding approval is obtained.

Stage	Required documents and record fields
Site foundation	Geological / environmental inputs, foundation calculation and construction drawings, anchor drawings; record drawing numbers, revisions, elevation, positioning and the acceptance release signatory.
Mechanical assembly	Signed BOM, assembly and connection drawings, tightening tables; record part numbers, bolt specs, target torques, tool IDs and inspector.
Lifting	Assembly and component masses, centres of gravity, approved lifting points, gear and work plan; record posture, route, weather window and responsible person.
Wiring	Single-line diagram, terminal diagram, harness list, I/O point table and grounding protection drawing; record circuits, terminals, polarity and test results.
Commissioning	Zero / angle tables, actuator duty cycle and allowable deviations, weather strategy table, FAT / SAT plan; record approved values, measured values and release signatory.

Obtain technical confirmation for site changes first, then update drawings, BOM, parameters and acceptance records. Never fill blanks with foundation, mass, torque or firmware values from other models.

Start-up checklist: project / device ID, drawing numbers and revisions of each document, missing items, disposition number, date, approver.

Responsibilities and Abnormal-Stop Rules

Before installation, define who approves, who operates and who records. Automatic-operation permission is not handed over before commissioning is complete.

Role	Responsibilities
Project engineering lead	Approves configuration, foundation and assembly documents, parameters and test boundaries; organizes clarifications and releases.
Mechanical / lifting lead	Verifies members, lifting stability, connections and mechanism positions; completes stage checks.
Electrical / control personnel	Wires, calibrates and tests limits and protection per approved drawings; keeps measured and read-back records.
Acceptance and operations personnel	Witness tests and confirm open items; receive training on isolation, stopping, authorized recovery and repair reporting.

Stop motion immediately on structural deformation, connection instability, abnormal noise / vibration, damper leakage, actuator mismatch, feedback loss, motion continuing at a limit, or cables being pulled or pinched.

Execute the stop first and confirm the actual shutdown; complete energy isolation and reliable support before servicing or entering the mechanism's hazard zone. A platform "Stop" does not replace energy isolation.

With the cause unknown or protection unverified, do not repeatedly jog, reset or raise protection thresholds; have the relevant technical personnel handle it and authorize recovery after re-testing.

This manual does not replace foundation construction drawings, lifting plans, electrical diagrams or the selected modules' installation instructions.

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C Certified

L Long-lasting

E Efficient

A Affordable

N Net-positive