



Stem Outdoor IT Rack - Installation Manual & Maintenance Guide

April 2026

Revision 2

Unlock Energy Intelligence



Stem Outdoor IT Rack - Installation Manual & Maintenance Guide

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Revision History			
Revision	Date	Author	Comments
1	October 2025	Engineering	Document Initial Release
2	April 2026	Engineering	Add HVAC detail and Maintenance section

Limitation of Liability

Stem reserves the right to make changes to its products and/or their specifications without notice. Obtain the latest version of the device specifications to ensure the most current information is available to the customer.

Stem assumes no liability for applications assistance, customer's system design, or infringement of patents or copyrights of third parties by/or arising from the use of Stem's devices.

STEM SHALL NOT BE LIABLE FOR CONSEQUENTIAL DAMAGES SUSTAINED IN CONNECTION WITH STEM PRODUCTS, EXCEPT TO THE EXTENT PROHIBITED BY APPLICABLE LAW. FURTHERMORE, STEM NEITHER ALLOWS NOR AUTHORIZES ANY OTHER PERSON TO ASSUME FOR IT ANY SUCH OBLIGATION OR LIABILITY.

Although the information contained in this document is believed to be accurate, Stem assumes no responsibility for any errors which may exist in this publication.

Installation Personnel

Installation and maintenance of the communications enclosure should only be performed by qualified, competent personnel who have appropriate training and experience with high voltage and current devices. The communications enclosure must be installed in accordance with all Local and National Electrical Safety Codes.

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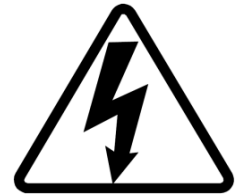
Warning

Failure to observe the following may result in severe injury or death:

- Keep these instructions.
- There are no user-serviceable parts inside. Refer service to an authorized service person.
- During normal operation of this device, hazardous voltages are present on the input terminals of the devices and throughout the connected power lines. Follow standard safety precautions while performing any installation or service work (i.e., remove line / PT fuses, disconnect power whenever adjusting terminations).
- This product must be used in accordance with the instructions in this manual. Otherwise, the product may not perform as expected and can cause hazards to the user.

Danger

Line voltages up to 600 VRMS are present on the input terminals of the device and throughout the connected line circuits during normal operation. These voltages may cause severe injury or death. Installation and servicing should be performed only by qualified, properly trained personnel.



FCC Statement

This device is classified as a Class A digital device.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operations.



Contents

1 General.....	5
1.1 Electrical Wiring.....	5
1.2 Documentation	5
1.3 Disclosure	5
1.4 Warranty	5
2 Outdoor Enclosure	6
2.1 Safety.....	6
2.2 Cabinet Specification	6
2.3 Moving the Enclosure	7
2.4 Mounting the Enclosure to Pad	8
2.5 Grounding	8
2.6 Powering the Cabinet	9
2.7 Powering External Equipment	9
3 UPS & Batteries	10
3.1 Safety.....	10
3.2 Installation of Batteries	10
4. HVAC Installation and Maintenance	13
4.1 Power and Condensate Drain Setup.....	13
4.2 Field Troubleshooting Guide	13
4.3 Quick Reference — Model Specifications	14
4.4. Key Reminders for Field Installers	14
5. Preventative Maintenance.....	15
5.1 Overview.....	15
5.2 Master Maintenance Checklist	15
5.3 Support Contact.....	19

1 General

1.1 Electrical Wiring

Because of possible electrical shock or fire hazards, the connection of this equipment should only be made by qualified personnel in compliance with all local applicable electrical codes and standards.

1.2 Documentation

This addendum is meant to cover the installation of OUTDOOR IT rack equipment.

Use this document in conjunction with the Stem General Installation Guide for complete understanding of installation and troubleshooting of the entire system. Stem supports many configurations and specific installations.

1.3 Disclosure

This publication contains information proprietary to Stem. No part of this publication may be reproduced in any form without prior written consent from Stem.

1.4 Warranty

The Stem communications enclosure is warrantied to the original purchaser against defective material and workmanship. During the warranty period, Stem will repair or replace, at its option, all defective equipment that is returned freight prepaid. There will be no charge for repair provided there is no evidence that the equipment has been mishandled or abused. If the equipment is found to be in proper working order, a service fee will be charged. The complete terms and conditions of the warranty are located at www.Stem.com.

2 Outdoor Enclosure

2.1 Safety

Warning

Always read the OEM manual for the specific cabinet being installed before using the product. Failure to do so can result in injury or death.

2.2 Cabinet Specification

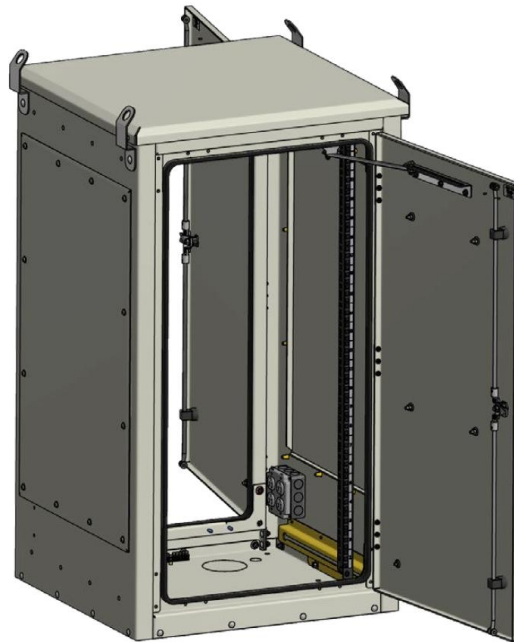


Figure 1 Typical enclosure, Isometric View

- The cabinet is constructed of powder coated aluminum for reduced weight and superior corrosion resistance. The front door is equipped with three point pad-lockable door latches. The top of the cabinet has a double wall construction to reduce the effects of solar radiation and for structural integrity.
- Each bay is equipped with four rack rails to evenly distribute equipment weight, with a static distributed load capacity of 1,500 lbs per bay.
- The cabinet utilizes stainless steel hardware, UL recognized EPDM edge gasketing (temp range of - 40F to +212 F.)
- When installing cables or equipment that enters the cabinet, Type 3R entrances, fittings or equipment is to be used to maintain the integrity of the enclosure
- No live equipment or components are to be installed below the lowest RU rack mounting provision or on the door of the enclosure
- Standard 19" rack width for all outdoor enclosures.

Stem offers 3 different outdoor rack variants, specifications shown below.

Part No.	External Dimensions (HxWxD) in	Rack Space	Approx. Weight (Empty / Full) Lbs	Bay Qty
SA-RK-AM58P-SPCL	58 x 26 x 36	36U	400 / 1900	1
SA-RK-AM78P-SPCL	78 x 26 x 36	42U	450 / 1950	1
SA-RK-AM68T-9036-108RU-SPCL	68 x 90 x 36	108U	1000 / 8500	3

2.3 Moving the Enclosure

Always refer to the OEM manual for additional safety and installation guidance.

Lifting Provisions

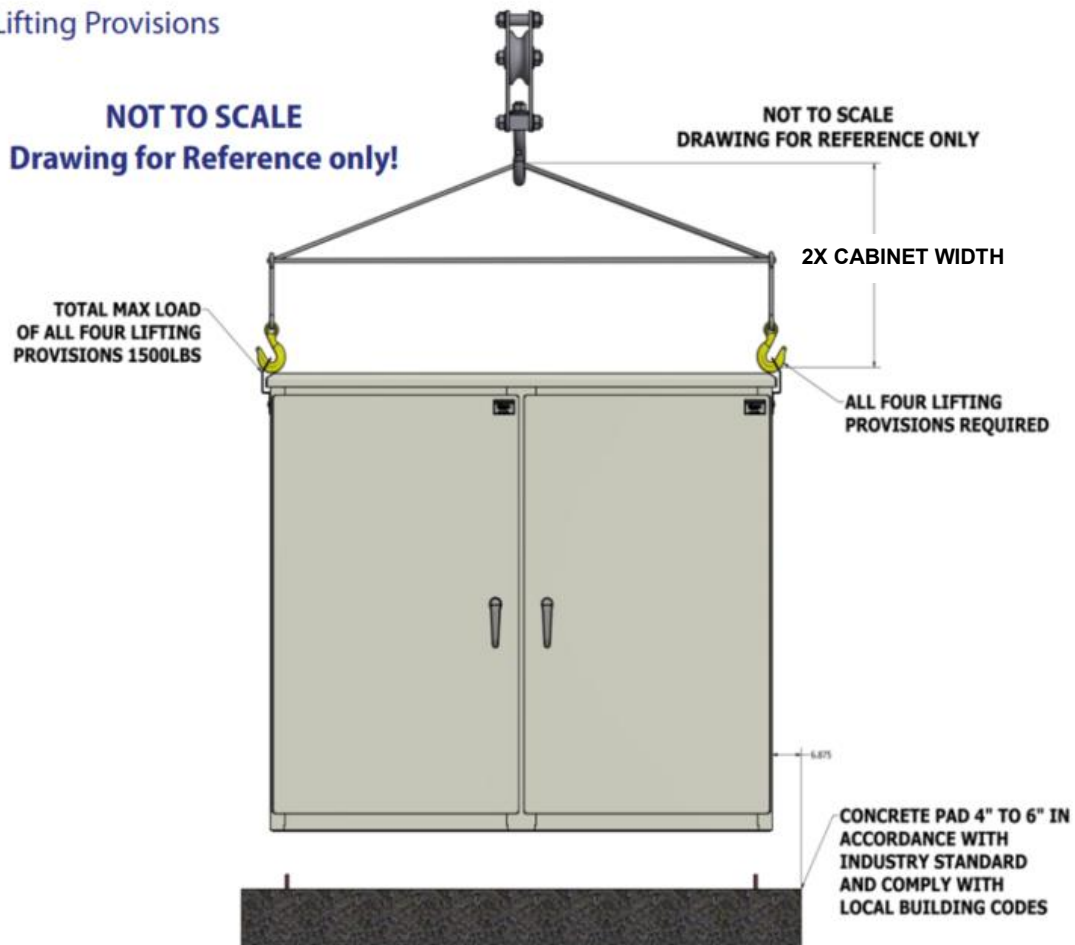


Figure 2 Enclosure Lifting Provisions (Double Bay shown for reference)

2.4 Mounting the Enclosure to Pad

- Use only concrete for new pad construction. Do not use substitute materials since they lack the rigidity for enclosure placement.
- Observe local building practices for pad construction. American Products recommends that the pad should extend a minimum of 8" beyond the enclosure base on all sides.
- Use a minimum of 6" of sand or gravel as a base for the pad for leveling purposes.
- See OEM for mounting hardware specifications



WARNING

When pad mounting, the compression strength of the pad must be at least 4000 psi as determined by ASTM C39 test of compression strength of concrete cylinders. The slump of the concrete shall be 2" to 4" as determined by ASTM C143 test method.

2.5 Grounding

Bonding and grounding should be done in accordance with industry standard procedures and comply with local electrical codes. The main cabinet ground bar is located in the rear of the cabinet as shown below.

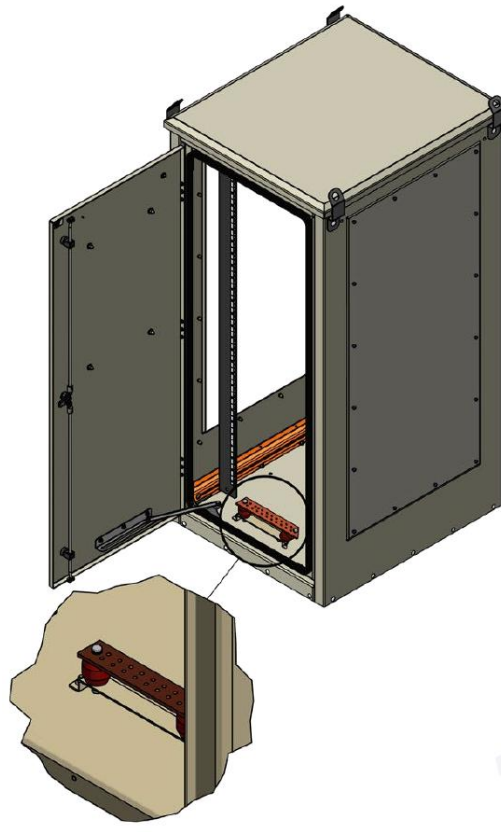


Figure 3 Grounding bar location in cabinet

2.6 Powering the Cabinet

Power for the rack is provided by a 100A load panel and is prewired to the climate control system as well as primary and redundant internal 120/240V single phase power for the server rack devices. Connect the load panel to a 100A 120/240 VAC 2P-3W circuit in accordance with all applicable codes and regulations. **Use the bottom knock outs to reduce water ingress potential.**

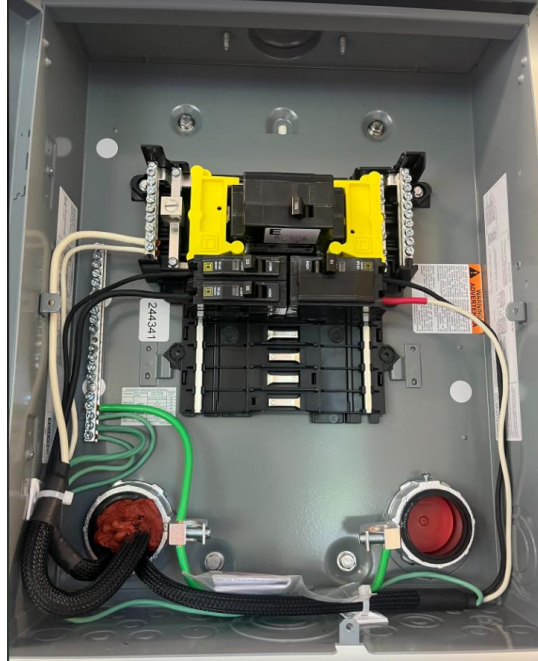


Figure 4 Wiring example of the 100A load panel, faceplate removed to expose wiring. AC Knockouts observed on the bottom of the photo

2.7 Powering External Equipment

External power can be supplied to auxiliary equipment off the 120VAC Power Distribution Unit in the main compartment of the cabinet.

After connecting to one of the PDU sockets, punch out the desired knock out hole in bottom of the outdoor cabinet and run your cable to the desired external equipment.

See the cabinet OEM manual for hole knock out locations and overall dimensions of the bottom of the enclosure.

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3 UPS & Batteries

3.1 Safety

Warning

Always read the OEM installation manual before installing or using any UPS or battery system. This equipment is heavy. Always use safe lifting practices adequate for the weight of the equipment. Each battery weighs 23kg (51lbs).

3.2 Installation of Batteries

The enclosures will ship to site without the batteries or UPS installed for safety and shipping damage prevention. Consult the drawing package panel layout diagram for proper location of the batteries within the rack. Generally, batteries are mounted at the bottom to lower the overall center of gravity of the enclosure.

Step 1 – Remove the Battery Modules

Warning

Remove the battery modules from the battery enclosures and the UPS. This is a critical step to ensure the enclosures can be mounted safely.

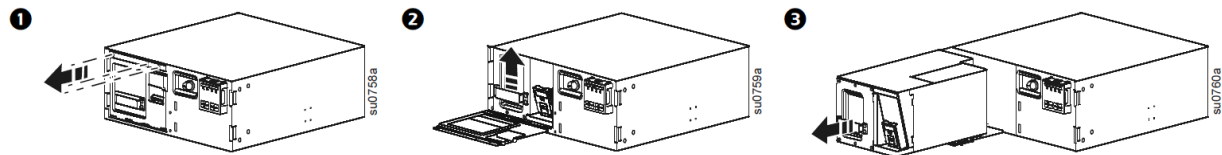


Figure 5 shows the 3 step process of removing the battery module from the enclosure

Step 2 – Mount the Battery Enclosures & UPS

Once the modules have been removed, mount the battery enclosures and UPS to the rack. There will be a 4-post shelf pre-installed in the rack for each battery and UPS enclosure. Consult the site drawing package for exact positioning of the battery enclosures and UPS.

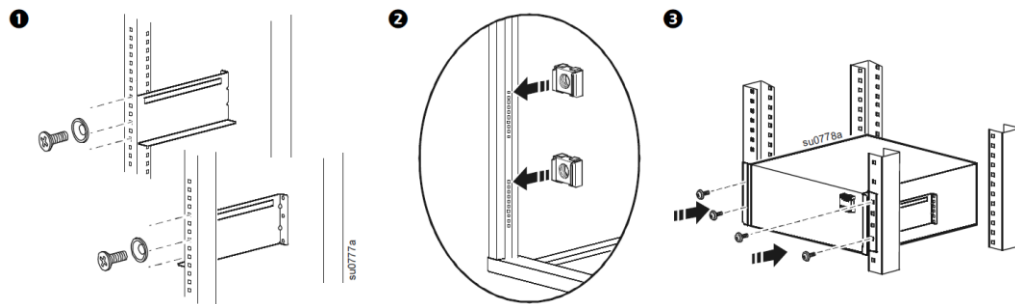


Figure 6 shows the process to mount the enclosures to a 4 post rack system

Step 3 – Insert Batteries into Battery Enclosures

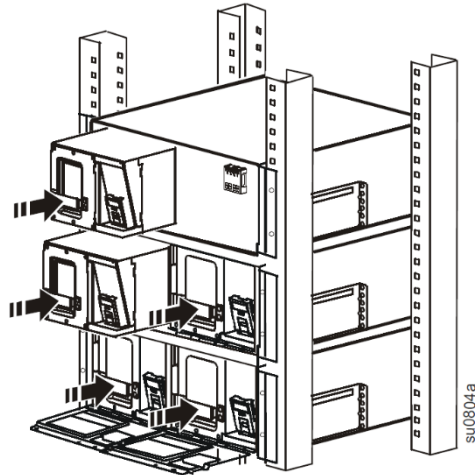


Figure 7 shows insertion of the battery modules into the battery enclosures

Step 4 – Connect the Battery Modules to the Battery Enclosures

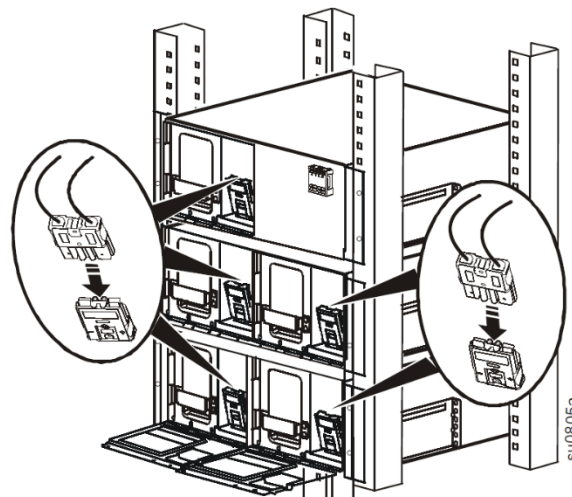


Figure 8 Showing where to connect the module connectors. The faceplate must be removed to access.

Step 5 – Replace the Module Faceplates and Vent Covers

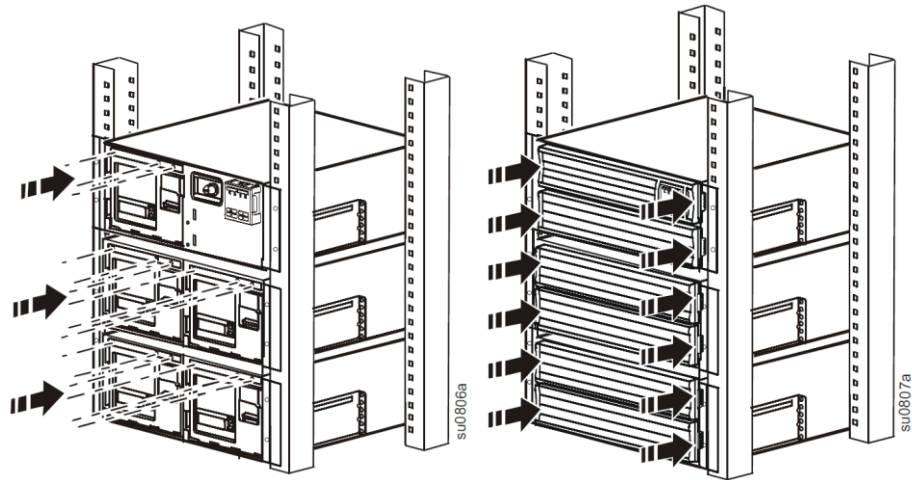


Figure 9 Shows the faceplates, fastening locations, and vent covers being re-installed

Step 6 – Connect the Enclosures to the UPS

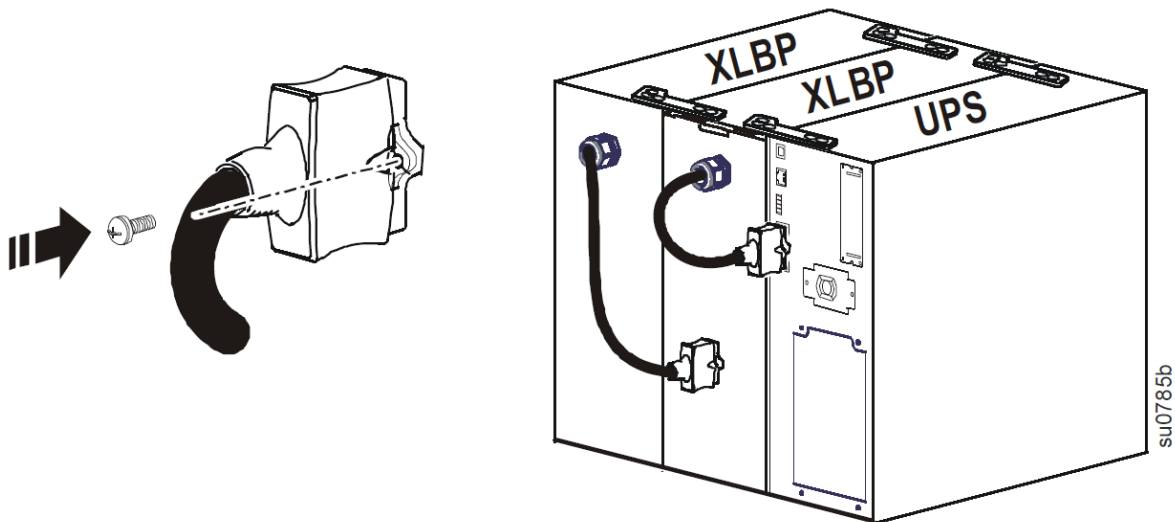


Figure 10 Showing the rear plug connection scheme

Step 7 – Configure the UPS

Follow the instructions in the OEM manual to configure the UPS' emergency off and controllable outlet groups functions.

4. HVAC Installation and Maintenance

4.1 Power and Condensate Drain Setup

The VoltAire AC units are pre-installed and pre-wired in the rack enclosure from the factory. The field installer is responsible for connecting the condensate drain and providing electrical service via the supplied cord and plug. Refer to the site specific panel electrical schematic for specific details. A condensate trap is not required, as the drain is located on the positive-pressure side of the evaporator fan.

The evaporator drain pan on all AT series units is fitted with a 0.40" outside diameter drain fitting. The drain tube and hose clamp ship loose with the unit.

1. Locate the drain fitting on the underside of the unit (condenser/exterior side).
2. Connect the supplied drip tube to the drain fitting and secure with the supplied hose clamp.
3. Route the drip tube away from the rack base, cable entry points, and any concrete pad or foundation.
4. If needed, extend the drain with field-supplied tubing to direct condensate away from the equipment pad.

NOTE: Both the AT06RM and AT12RN use the same 0.40" OD drain fitting. Verify the drip tube is clear and flowing freely before energizing the unit.

4.2 Field Troubleshooting Guide

For troubleshooting assistance, refer to the respective HVAC OEM manual. For VoltAire technical support, contact (407) 378-7482.

4.3 Quick Reference — Model Specifications

Specification	AT06RM	AT12RN
Nominal Capacity	6,000 BTU/hr	12,000 BTU/hr
Rated Voltage	115 VAC (single phase)	230 VAC (single phase)
Operating Load	4.8 A	7.0 A
Electric Service Size	15 A	15 A
Dimensions (W x H x D)	17.1 x 29.6 x 12.9 in	16.3 x 43.6 x 12.0 in
Weight	74.7 lbs	96.9 lbs
Refrigerant	R-134A	R-134A
Operating Temp Range	-40°F to 131°F	-40°F to 131°F
Anti-Short Cycle Delay	5 minutes after shutdown	5 minutes after shutdown
Drain Fitting OD	0.40 in	0.40 in
Transformer Tap	N/A (115V only)	Ships at 240V; set to 208V if site < 220V
Certifications	UL 484, UL Type 3R, RoHS	UL 484, UL Type 3R, RoHS

4.4. Key Reminders for Field Installers

- Verify supply voltage is within $\pm 10\%$ of nameplate rating before energizing. For the AT12RN, check the 24 VAC transformer tap setting (208V vs. 240V) and adjust if site voltage is below 220V.
- Do not restart the compressor for at least 5 minutes after any intentional or accidental shutdown (anti-short cycling). The NO-TIMER MODE DIP switch can temporarily bypass this for testing.
- Do not obstruct interior or exterior airflow paths. Maintain clearance around both intake and discharge openings.
- Use only non-acidic HVAC coil cleaner for maintenance. Acidic cleaners will damage the coils.
- Three pressure soft lockouts within 90 minutes will trigger a hard lockout. Hard lockouts can only be cleared by cycling power to the unit.
- For VoltAire technical support, contact (407) 378-7482.

5. Preventative Maintenance

5.1 Overview

This maintenance program covers all subsystems of the Stem outdoor IT rack enclosure. The schedule is designed for solar monitoring and SCADA sites where equipment is exposed to dust, pollen, temperature extremes, insects, and weather. All items should be performed during routine site visits or dedicated maintenance trips.

Maintenance is organized into two tiers: quarterly inspections (quick visual checks that can be combined with routine site visits) and annual inspections (more thorough service requiring more time and potentially specialty tools). Sites in harsh environments — desert, agricultural, coastal-adjacent — should increase quarterly items to monthly.

WARNING: Disconnect all power sources before performing any maintenance that involves opening the enclosure, servicing electrical connections, or working on the HVAC unit. Line voltages (115/230 VAC) are present and can cause severe injury or death.

IMPORTANT: Document all maintenance activities in the site maintenance log. Photograph any damage, corrosion, or anomalies found during inspection. Report issues to Stem Engineering.

5.2 Master Maintenance Checklist

Q = Quarterly (or monthly at harsh sites) | A = Annual | ✓ = Applicable interval

#	Subsystem	Maintenance Item	Q	A	Notes / Acceptance Criteria
ENCLOSURE / PHYSICAL INSPECTION					
1	Enclosure	Visual inspection for water ingress signs (staining, mineral deposits, standing water, corrosion at base)	✓		Look at base pan, cable entry areas, and below HVAC unit
2	Enclosure	Inspect door gasket condition (EPDM) for cracking, compression set, UV degradation, or gaps		✓	EPDM rated -40°F to +212°F; replace if brittle or no longer sealing
3	Enclosure	Verify three-point door latch engages fully at all three points; check padlock hasp function	✓		Latch should pull door tight against gasket with no gaps
4	Enclosure	Inspect all cable entry points and knockouts — verify unused knockouts are sealed and cable entries maintain NEMA 3R integrity		✓	Use Type 3R fittings only; seal any gaps with outdoor-rated sealant
5	Enclosure	Inspect exterior powder coat finish for chips, scratches, bare metal, or corrosion		✓	Touch up with manufacturer-approved paint; pay attention to base and hardware holes
6	Enclosure	Verify concrete pad condition and anchor bolt		✓	Check for cracking, settling, or heaving;

		tightness			re-torque anchors per OEM spec
7	Enclosure	Clean exterior surfaces (remove dirt, bird droppings, debris from top and sides)	✓		Double-wall top collects debris; clear for proper rain shedding
8	Enclosure	Inspect sealant around any field-cut penetrations or modifications		✓	Reapply exterior-rated silicone sealant if cracked or missing
ELECTRICAL / LOAD CENTER					
9	Load Center	Visual inspection of external load panel — no tripped breakers, no discoloration or heat damage on wiring, no moisture signs	✓		Check all breaker positions; investigate any tripped breakers before resetting
10	Load Center	Torque check on load center main lugs and branch circuit connections		✓	Thermal cycling loosens connections; re-torque per NEC and terminal manufacturer specs
11	Load Center	Verify grounding conductor intact and bonded to cabinet ground bar		✓	Check ground bar in rear of cabinet; verify no corrosion at bonding points
12	Load Center	Inspect load center enclosure seal and knockout integrity (bottom entry preferred to reduce water ingress)	✓		Verify conduit entries are properly sealed
13	PDU	Inspect internal PDU connections and outlets		✓	Verify all plugs are fully seated; check for discoloration at plug/outlet interfaces
HVAC Unit (VOLTAIRE AT06RM / AT12RN)					
14	HVAC	Check exterior condenser filter for blockage (if equipped)	✓		Monthly at dusty, sandy, or agricultural sites
15	HVAC	Clean exterior condenser coil (remove debris, dirt, insects, pollen)	✓		Use non-acidic HVAC coil cleaner only; never use acid-based cleaners
16	HVAC	Clean interior evaporator coil		✓	Non-acidic HVAC coil cleaner; inspect for ice buildup signs
17	HVAC	Run functionality check via control board Test Mode (press TEST button 1 sec)		✓	0–60s: cooling; 61–90s: heating; 91–120s: alarm LEDs. Verify all stages activate.
18	HVAC	Verify interior and exterior fan rotation (spin freely, no grinding or vibration)		✓	If sluggish, check fan run capacitor
19	HVAC	Inspect and clean condensate drain pipe (clear any blockages)		✓	Pour small amount of water to verify free flow; critical for preventing water in enclosure
20	HVAC	Inspect HVAC unit field sealant around all four sides		✓	Reapply exterior-rated silicone sealant if cracked or degraded
21	HVAC	Verify HVAC alarm dry contact output is connected to monitoring (if applicable)		✓	Alarm relay is fail-safe: energized when healthy, de-energized on fault or power

					loss
22	HVAC	Verify supply voltage within $\pm 10\%$ of nameplate		✓	AT06RM: 103.5–126.5 VAC; AT12RN: 207–253 VAC
23	HVAC	Check HVAC control board LED status indicators (HP, LP, TEMP)	✓		Solid red = hard lockout; flashing = soft lockout within last 100 hrs; no light = normal
UPS & BATTERIES					
24	UPS	Check UPS front panel status LEDs — verify no fault or alarm indicators	✓		Refer to UPS OEM manual for LED meaning; common faults: overload, battery fault, overtemp
25	UPS	Run UPS self-test (if supported by model)		✓	Initiates brief transfer to battery; verifies battery can support load. Schedule during low-risk window.
26	Batteries	Visual inspection of battery terminals for corrosion, swelling, or leakage	✓		White/green residue = corrosion; swollen case = replace immediately; each battery is 51 lbs
27	Batteries	Verify battery module connectors are fully seated in enclosures		✓	Remove faceplate to inspect connector; reseal if loose
28	Batteries	Verify battery vent covers are in place and unobstructed	✓		Blocked vents can cause thermal runaway
29	Batteries	Record UPS battery health / remaining runtime reading		✓	Log reading in site maintenance record; trending decline indicates replacement needed
30	UPS	Verify UPS input/output voltages and load percentage (from front panel or network card)	✓		Load should not exceed 80% of rated capacity for sustained operation
IT EQUIPMENT (SERVERS, SWITCHES, CLOCKS, LOGGERS)					
31	IT General	Verify all rack-mounted equipment status LEDs are normal (no red/amber fault lights)	✓		Check all servers, managed switches, GPS clocks, data loggers, routers, firewalls
32	IT General	Verify network link lights are active on all Ethernet ports that should be connected	✓		Dead link light may indicate cable fault, port failure, or upstream issue
33	IT General	Verify cable management is not blocking HVAC airflow paths (evaporator return/supply openings)	✓		Cables routed across HVAC openings reduce cooling capacity and can cause unit failure
34	IT General	Check rack rail hardware tightness (cage nuts, mounting screws, shelf fasteners)		✓	HVAC compressor vibration and thermal cycling can loosen hardware over time
35	IT General	Clean dust from equipment intake vents and fan grilles (where accessible)		✓	Use compressed air or soft brush; do not use liquid cleaners on electronics

36	IT General	Verify GPS/time clock antenna cable is intact and antenna is securely mounted		✓	Check for UV degradation on outdoor antenna cable; verify antenna has clear sky view
37	IT General	Verify serial/RS-485/fiber connections are secure (Modbus RTU, DNP3, etc.)		✓	Reseat any loose terminal block or DB9 connections; check fiber patch panel for dirty connectors
SITE / ENVIRONMENTAL					
38	Site	Clear vegetation and debris from around the rack (minimum 24" clearance all sides)	✓		Overgrowth blocks condenser airflow and harbors pests
39	Site	Inspect for pest/insect intrusion (wasps, mud daubers, ants, rodents)	✓		Check condenser coil, cable entries, and base of enclosure; remove nests
40	Site	Verify no unauthorized items stored on, against, or inside the rack	✓		Racks should not be used as staging areas, shelves, or leaning posts
41	Site	Verify site access path is clear and safe for maintenance personnel	✓		Overgrown paths, standing water, or tripping hazards should be reported to site owner
42	Site	Photograph overall rack condition (front, sides, top, base) for maintenance record	✓		Include close-ups of any damage, corrosion, or anomalies found

5.3 Support Contact

Stem SupportTrack

Direct access 7 days a week to best-in-class support resources and specialists

Open a case at home.alsoenergy.com/support

For onsite appointments:

If you know you are going to be onsite, it's best to schedule an appointment beforehand with our call center support staff.

Use our easy scheduling tool at Stemsupport.setmore.com/

If you would like to schedule a site visit from a Stem Field Technician, please send an email to onsiteservice@alsoenergy.com

For phone assistance:

Contact us at **866-303-5668**

Weekdays: 8 am – 9 pm US-EST

Weekends: 11 am – 7 pm US-EST

Software Training:

For video tutorials, login to PowerTrack and go to the Help menu.

Request 1-to-1 training: alsoenergytraining.setmore.com

Explore the self-guided options with the Software Onboarding Course
kb.alsoenergy.com/article.php?id=168&oid=128

NOTE: Use your PowerTrack username and password to login to the KB.