

Battery Backup Sizing for Access Control Systems

Battery Backup Fundamentals

Battery backup ensures access control systems remain operational during power outages. Proper sizing requires calculating amp-hour (AH) capacity based on system load and desired runtime.

Runtime Calculation Formula

AH (Amp Hours) = System Current (Amps) x Desired Runtime (Hours)

Example 1: System draws 2A continuously, need 4 hours backup

AH = 2A x 4 hours = 8AH battery required

Example 2: System draws 5A continuously, need 8 hours backup

AH = 5A x 8 hours = 40AH battery required (two 20AH batteries in parallel)

Common Battery Sizes

Capacity	Dimensions	Weight	Typical Runtime
7Ah	5.94" x 3.86" x 3.68"	5.1 lbs	3.5 hrs @ 2A
12Ah	5.94" x 3.86" x 6.6"	8.2 lbs	6 hrs @ 2A
18Ah	6.89" x 7.48" x 7.13"	14.4 lbs	9 hrs @ 2A
24Ah	7.5" x 6.56" x 8.24"	18.6 lbs	12 hrs @ 2A

Temperature Derating Factors

Lead-acid battery capacity decreases in cold environments. Apply derating factors based on operating temperature:

77°F (25°C): 100% capacity (baseline)

59°F (15°C): 90% capacity

41°F (5°C): 80% capacity

32°F (0°C): 65% capacity

Below 0°F (-18°C): Battery not recommended for backup

Temperature Derating Example

System in unheated vestibule draws 3A, needs 6 hours backup in winter (32°F).

Base calculation: 3A x 6 hrs = 18AH

Apply 65% derating: 18AH / 0.65 = 27.7AH

Recommendation: Use two 18AH batteries in parallel for 36AH total

System Load Calculation

Device	Qty	Amps Each	Total Amps
Magnetic Lock (24V)	2	2.5A	5.0A
Card Reader	2	0.1A	0.2A
Door Contact	1	0.03A	0.03A
System Controller	1	0.5A	0.5A
Backup Indicator Light	1	0.05A	0.05A
		Total	5.78A

Battery Selection Guide

Residential/Small Office: 7-12AH, 4-6 hours runtime

Commercial Access Control: 12-18AH, 6-8 hours runtime

High-Security/Mission-Critical: 24AH+, 12+ hours runtime or generator fallback

Cold Climate Installations: Increase sizing by 20-30% to compensate for derating

Maintenance Recommendations

Monthly: Verify battery terminals are clean and tight

Quarterly: Check voltage (should be 13.5-13.8V for fully charged 12V system)

Annually: Perform load test; replace if voltage drops below 12V under load

Every 3-5 years: Replace batteries regardless of apparent condition