

48V Traction Battery Pack



48V

NOMINAL
VOLTAGE

100–200Ah

CAPACITY
RANGE

3K+

CYCLE
LIFE

95%

ROUND-TRIP
EFF.

-40/+60°C

OPERATING
TEMP

Zero

MAINTENANCE

10yr+

DESIGN
LIFE

IP65

ENCLOSURE
RATING

ENERGY STORAGE YOU CAN BANK ON

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Series M 48V Traction Battery

- Sodium-Ion NFPP
- Drop-In Lead-Acid Traction Replacement
- 48V / 300Ah / 14.4 kWh



The Series M 48V is a direct drop-in replacement for lead-acid traction batteries in forklifts, golf carts, airport ground support equipment, and industrial vehicles. Built on Coulomb Technology's Sodium-Ion NFPP chemistry, it delivers **6,000+ cycle life**, zero maintenance, and a 30% weight reduction — with no thermal runaway risk and no toxic materials.

Key system features:

- 48V / 300Ah / 14.4 kWh configuration
- Integrated smart BMS with CAN bus
- Standard traction connector interface
- 16S2P prismatic sodium-ion cell stack
- Opportunity charging compatible
- Remote monitoring & diagnostics

KEY BENEFITS



Zero Thermal Runaway

Sodium-Ion NFPP chemistry is inherently non-flammable — no thermal runaway risk, no toxic gas emissions, and no special handling requirements in confined warehouse environments.

- ✓ No hydrogen gas emissions during charging
- ✓ Safe for indoor charging without ventilation
- ✓ Non-toxic, fully recyclable chemistry
- ✓ Simplified fire suppression requirements



Opportunity Charging

Accepts partial charges without memory effect — enabling opportunity charging during breaks to maximize fleet uptime without battery degradation.

- ✓ No memory effect — partial charges safe
- ✓ Fast charge to 80% in under 2 hours
- ✓ 6,000+ cycles at 80% DoD
- ✓ 10+ year design life



Zero Maintenance

Eliminates watering, equalization, and acid spill cleanup — reducing total fleet maintenance costs and freeing technicians for higher-value work.

- ✓ No watering or equalization required
- ✓ No acid spills or corrosion risk
- ✓ 40% reduction in fleet maintenance labor
- ✓ 30% lighter than equivalent lead-acid

WHERE THE SERIES M PERFORMS



FORKLIFTS / PALLET JACKS / AGVS

Warehouse & Logistics

Opportunity charging and zero maintenance for 24/7 warehouse operations — forklift fleets, pallet jacks, and automated guided vehicles.



GOLF CARTS / RESORT / HOSPITALITY

Golf & Resort Fleets

Drop-in replacement for lead-acid in golf cart fleets — with 3x the range per charge, zero watering, and no acid spill risk on turf.



AIRPORT / GROUND SUPPORT / GSE

Airport Ground Support

Reliable power for baggage tugs, belt loaders, and ground support equipment — with fast opportunity charging between flights and zero emissions.



UTILITY VEHICLES / CAMPUS / SECURITY

Utility & Campus Fleets

Zero-emission utility vehicles for campus security, grounds maintenance, and facility operations — with all-day runtime and overnight charging.

SERIES M — 48V BATTERY



NOMINAL VOLTAGE 48v 51.2V nominal (16S NFPP)	CAPACITY 300Ah 14.4 kWh usable energy	CYCLE LIFE 6K+ At 80% DoD, 25°C
WEIGHT 125kg 30% lighter than lead-acid	OPERATING TEMP -30/+55°C Discharge range	EFFICIENCY 95% Round-trip efficiency

PARAMETER	VALUE / DESCRIPTION	UNIT
NOMINAL VOLTAGE	51.2 (16S configuration)	VDC
CAPACITY	300 (14,400 Wh)	Ah
CELL CONFIGURATION	16S2P prismatic sodium-ion pouch cells	—
USABLE CAPACITY	80–100% DoD (vs. 50% lead-acid)	—
CYCLE LIFE	6,000+ @ 80% DoD, 25°C	—
CELL TYPE	Sodium-Ion NFPP (Non-Flammable Polymer Pouch)	—
DISCHARGE TEMP RANGE	-30°C to +55°C	—
CHARGE TEMP RANGE	-10°C to +45°C	—
SELF-DISCHARGE RATE	<3% per month	—
ROUND-TRIP EFFICIENCY	~95%	—
BMS COMMUNICATION	Integrated smart BMS; CAN bus / RS-485	—
CONNECTOR INTERFACE	Standard traction connector (SB350 / custom)	—
ENCLOSURE RATING	IP54 — dust and splash resistant	—

CERTIFICATIONS

UL 1973
UL 9540
UN 38.3

Cell & Module Level

UL 9540A TESTING

Cell: Tested & Passed
Module/System: In Progress

WARRANTY

Cell: 3 Years
 System: 5 Years
 Extended warranty available

QUALITY ASSURANCE & TEST SCOPE

- ✓ Visual, Mechanical & Dimensional Inspection
- ✓ BMS Protections & CAN Bus Communication Tests
- ✓ Functional & Conditioning Cycles
- ✓ 3 × 0.2C Capacity Verification (80% DoD)
- ✓ Baseline OCV & Self-Discharge Measurement
- ✓ Vibration & IP54 Seal Verification

- Performance
- Safety
- Total Cost of Ownership

WHY SODIUM-ION NFPP OUTPERFORMS LEGACY LEAD-ACID TRACTION TECHNOLOGY

A Clear Advantage Across Every Performance Dimension

Coulomb Technology's Sodium-Ion NFPP chemistry delivers superior cycle life, opportunity charging capability, zero maintenance, and a safer operating profile — making it the definitive upgrade for lead-acid traction battery fleets.

FEATURE	SODIUM-ION NFPP	LEAD-ACID TRACTION
Cycle Life	6,000+ cycles @ 80% DoD	1,000–1,500 cycles @ 50% DoD
Weight (300Ah / 48V)	125 kg	~180 kg
Usable Capacity	80–100% DoD	50% DoD (to preserve life)
Discharge Temp Range	–30°C to +55°C	–20°C to +45°C
Opportunity Charging	Full support — no degradation	Not recommended — reduces life
Maintenance	Zero maintenance	Weekly watering & equalization
Hydrogen Gas Emissions	None	Emitted during charging
Charging Efficiency	~95%	~75%
Thermal Runaway Risk	Zero risk	Low risk
Memory Effect	None	Sulfation if undercharged
Lifespan	10+ years	3–5 years
Environmental Impact	Non-toxic, recyclable	Lead & acid hazardous waste

6×

Longer cycle life
vs. lead-acid traction

30%

Lighter weight
per 300Ah pack

Zero

Maintenance
required

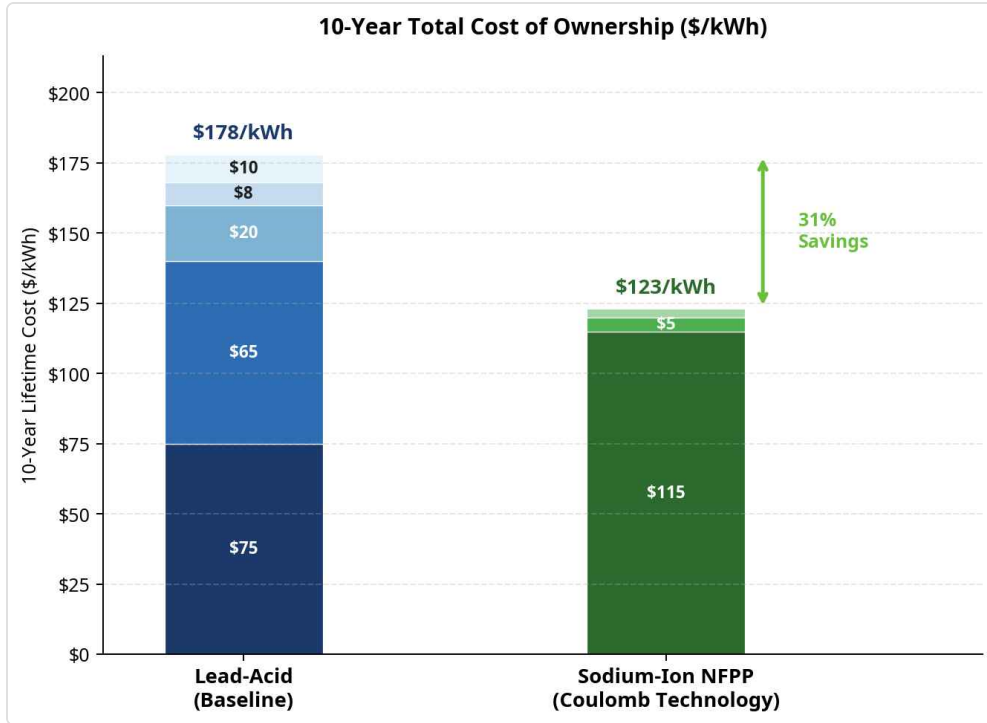
95%

Round-trip
efficiency

SYSTEM ADVANTAGE OVER LEAD-ACID TRACTION

31% Lower Total Cost of Ownership Over 10 Years

Sodium-Ion NFPP eliminates replacement costs, maintenance overhead, and hazardous disposal — delivering a 31% lower 10-year TCO vs. lead-acid traction, validated by real-world fleet deployments.



MODEL ASSUMPTIONS

Lead-acid replacement cycle	3-5 yr
NFPP design life	10+ yr
Analysis period	10 yr
Lead-acid replacements	2x
Maintenance cost delta	100%
Weight savings (300Ah)	30%
Charging efficiency delta	20%
Discount rate / NPV calc	8%

COST COMPONENTS

- Lead-Acid — CapEx
- Lead-Acid — Replacement
- Lead-Acid — O&M
- Lead-Acid — Disposal
- NFPP — CapEx
- NFPP — O&M
- NFPP — Disposal
- Lead-Acid — Downtime

31% Lower TCO — \$123/kWh (NFPP) vs. \$178/kWh (Lead-Acid) over 10 years. Savings driven by eliminated replacements, zero maintenance, and lower disposal costs.

31% — Lower 10-year TCO vs. lead-acid (\$123 vs. \$178/kWh)

Zero — Maintenance cost — no watering, no equalization

10yr+ — Design life vs. 3-5 years for lead-acid traction

RESEARCH & DEVELOPMENT PARTNERS

