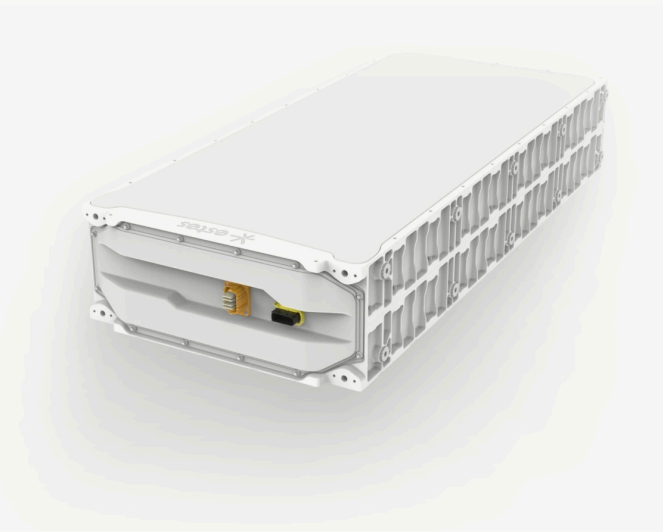
TRANSFORMING ADVANCED MATERIALS
INTO EXCEPTIONAL BATTERY SYSTEMS

FULLY SCALABLE ARCHITECTURE

Magnus™ Battery Platform

A thermo-structural, cell-to-pack battery platform cast from MgCarbonit™ magnesium alloy, built for commercial, rail, marine, and off-highway electrification.

C-SAMPLES	D-SAMPLES	LIMITED PRODUCTION
Available now	April 2027	2H 2027



230 Wh/kg
Pack energy density (Magnus+)

82%
Cell-to-pack conversion efficiency

50%
Reduction in non-cell mass

75%
Fewer unique components

02 · PLATFORM

Three sizes. One integration.

Every Magnus variant shares the same 590 × 236 mm cross-section and the same mounting, thermal, and communication interfaces, so the engineering done for one pack carries forward across sizes, voltage classes, and cell chemistries.



MAGNUS LV

9 kWh

Low voltage auxiliary systems



MAGNUS

69 kWh

Highway, commercial, marine



MAGNUS+

78 kWh

Rail, Class 8 truck

	MAGNUS LV	MAGNUS	MAGNUS+
MECHANICAL			
Dimensions L × W × H (mm)	305 × 590 × 236	1332 × 590 × 236	1480 × 590 × 236
Mass (kg)	48	300	337
ELECTRICAL			
Voltage class (DC) min / nom / max	48V 30/45/50 100V 60/90/100	400V 240/350/400 800V 480/700/800	500V 240/350/450 1000V 540/790/910
Current (A) 1.5C cont. / 3.0C peak	48V 300/600 100V 150/300	400V 300/600 800V 150/300	500V 300/600 1000V 150/300
ENERGY			
Rated energy (kWh)	8.6	69.0	77.6
Gravimetric density (Wh/kg)	180	228	230
Volumetric density (Wh/L)	207	372	376

Specifications are preliminary and subject to change without notice.

03 · CONFIGURATION

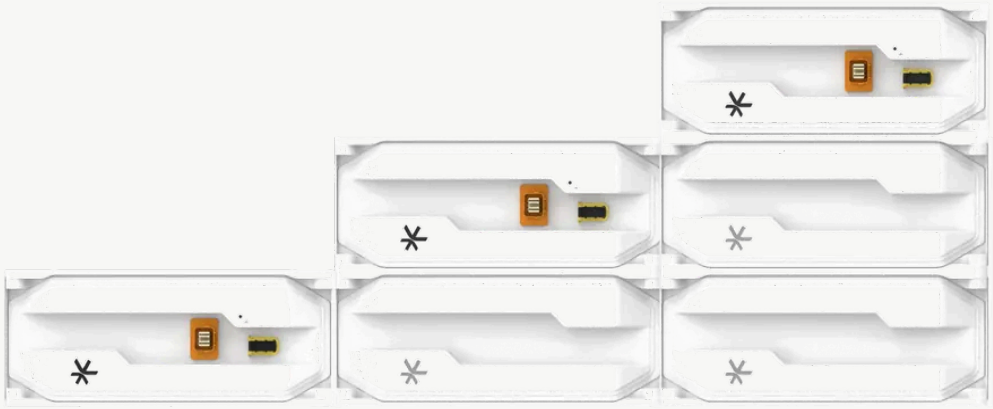
Stack to scale. One interface.

Each size is available as Magnus I, II, or III: one, two, or three strings stacked vertically, electrically in parallel., Presented to the vehicle as a single pack with a single interface.

available in

3

pack sizes



	I	II	III
ENERGY (kWh)			
Magnus LV	9	17	26
Magnus	69	138	207*
Magnus+	78	155	233*
MECHANICAL			
Height (mm)	236	472	708
Mass (multiple of single pack)	×1	×2	×3
HV / LV / thermal interfaces	1	1	1
ELECTRICAL			
Parallel strings	1	2	3
Current (A), 1.5C cont. / 3.0C peak	*see page 02*	300/600	300/600

*** OPTIONAL HEAVY-INDUSTRIAL VOLTAGE CLASS**

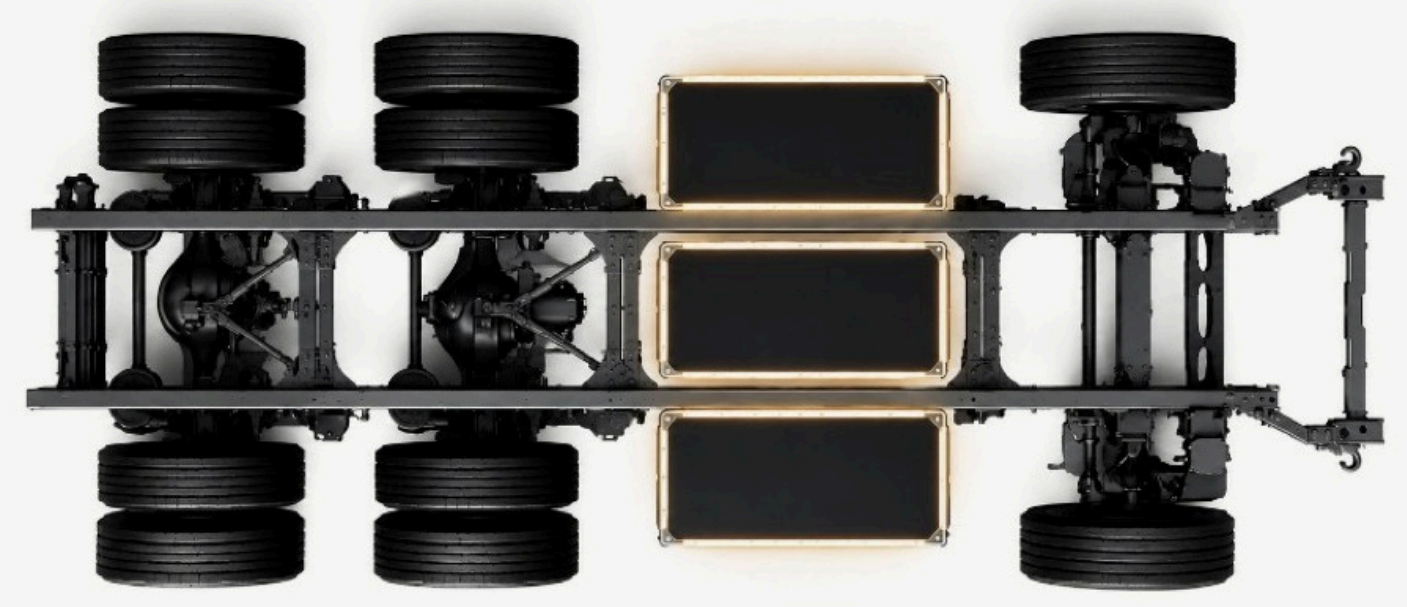
MAGNUS III	1200 VDC	207 kWh
MAGNUS+ III	1500 VDC	233 kWh

Single-string building blocks for megawatt-hour class systems in heavy mining, machinery, rail, and relocatable grid applications, where weight, space, and uptime are non-negotiable.

04 · APPLICATION

Class 8 truck. 700 kWh.
On a 144″ wheelbase.

Three Magnus+ III stacks mount across the frame between the steer and drive axles of an ultra-short tractor, a package short enough for day-cab and regional-haul layouts.



700 kWh	3030 kg	1000 V	230 Wh/kg
Installed energy	Battery system mass	Voltage class	System energy density

SYSTEM BUILD-UP

Stacks	3 × Magnus+ III
Packs	9 × Magnus+
Stack envelope (mm)	1480 × 590 × 708
Vehicle interfaces	3 × HV / LV / thermal

MASS AT EQUAL ENERGY

Conventional pack architecture, 170 Wh/kg — 4105 kg

Magnus+, 230 Wh/kg — **3030 kg**

1075 kg of battery mass returned to payload at equal energy.

Conventional figure is pack-level density with equivalent cells.

05 · CHEMISTRY

Same box. Same interfaces.
Different performance and economics.

Magnus is chemistry agnostic. Integrate Magnus Nickel today and move to LFP or silicon-anode cells as they arrive.



LFP	NICKEL	SILICON

CELL CHEMISTRY	PACK Wh/kg	STATUS
LFP	160	est. 2028
NICKEL (NCMA)	230	C-Samples Available Now
SILICON	280	est. 2028

PACK-LEVEL DENSITY, EQUIVALENT CELLS

+35%

more energy per kilogram than conventional pack architecture

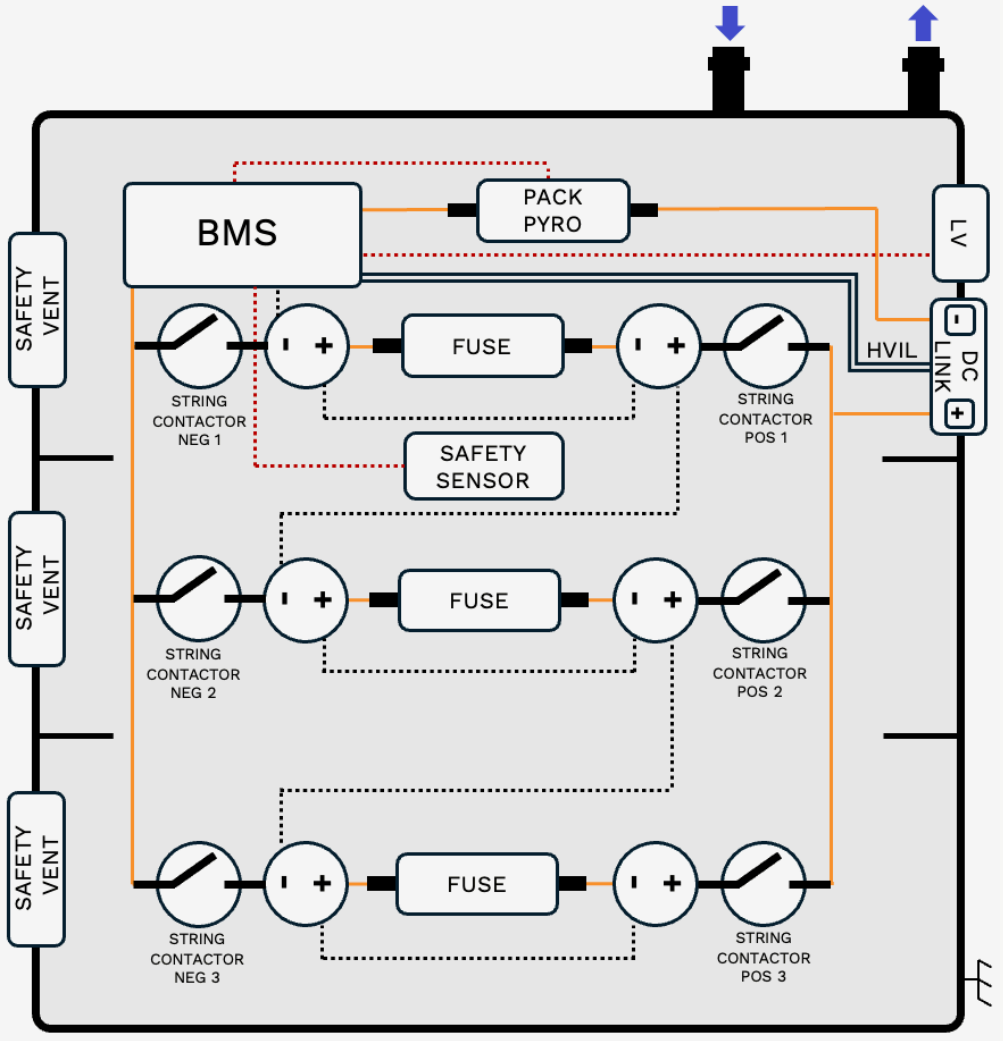


Bars drawn to scale from zero. Same commercially available nickel-chemistry cells in both cases.

06 · PACK ARCHITECTURE

Inside Magnus III.
Every string independently protected.

Each of the three strings carries its own positive and negative contactors and fuse, so a single string can be isolated. A pack pyro disconnect, safety sensor, and HV interlock all report to a single BMS.



VEHICLE INTERFACES

HIGH VOLTAGE
DC link, up to 920 VDC / 500 A

LOW VOLTAGE
Public CAN, KL30, KL30C

COOLANT
WEG inlet and outlet

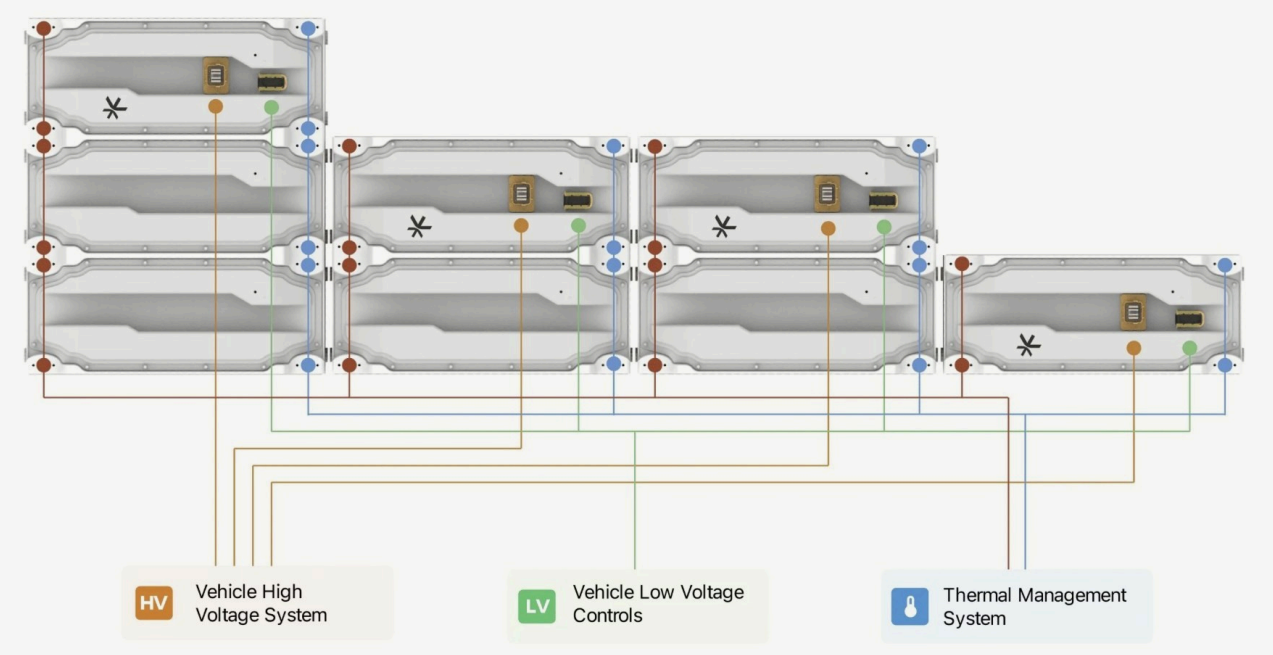
ENCLOSURE RATING
IPXXB / IP6K9K / IP67

CHASSIS GROUND
M6 × 1.0

07 · SYSTEM ARCHITECTURE

Mix and match. Built for redundancy.

Each Magnus string carries its own battery management and ties into the vehicle's high-voltage bus, low-voltage controls, and thermal loop through common harness points.



DISTRIBUTED BMS ARCHITECTURE

Enables system redundancy

FLEXIBLE PACK CONFIGURATION

Single & multi-string packs can be intermixed

COMMON ACROSS PLATFORM

COMMUNICATIONS	DURABILITY	THERMAL	CHARGE TIME
SAE J1939	3000+ cycles	WEG 50/50	70% recovery < 30 min

08 · COMPLIANCE & SUPPLY CHAIN

Domestic by design.
Qualified for regulated markets.

SUPPLY CHAIN

Domestic magnesium. US-made cells. One roof.

Production Magnus systems start with domestically sourced magnesium and cells manufactured in the United States. From raw magnesium to finished system, every step of our production process happens under one roof in the US, backed by a non-FEOC supply chain customers can trace and defend.

DESIGNED TO QUALIFY UNDER

BABA
Federally funded surface transportation

NDAA
DoW battery procurement

Non-FEOC
Commercial battery supply chains

SAFETY

PASSIVE PROPAGATION RESISTANCE
Cell fault tolerant
At max temperature & SOC.
Active systems disabled.

FUNCTIONAL SAFETY
ISO 26262
Up to ASIL D (SEooC)

CYBERSECURITY
ISO 21434
Developed in accordance

CERTIFICATION & TESTING

Commercial Vehicle

TESTED
UN 38.3
ECE R100-3

Rail

TESTED
IEC 62619
IEC 62928

DESIGNED TO
IEC 62620
APTA PR-PS-WP-007-24

Marine

TYPE APPROVAL
Lloyd's Register
LR-TS-01, LR-TS-05

TESTED
IEC 62619

DESIGNED TO
IEC 62620
ASTM F3353

MgCarbonit™ Alloys

PASSED
FAA Fire Test
Handbook Ch. 25

CABIN SAFETY
Meets the FAA flammability standard for magnesium in aircraft cabin interiors

Magnus removes the sourcing risk.

info@estes.energy