

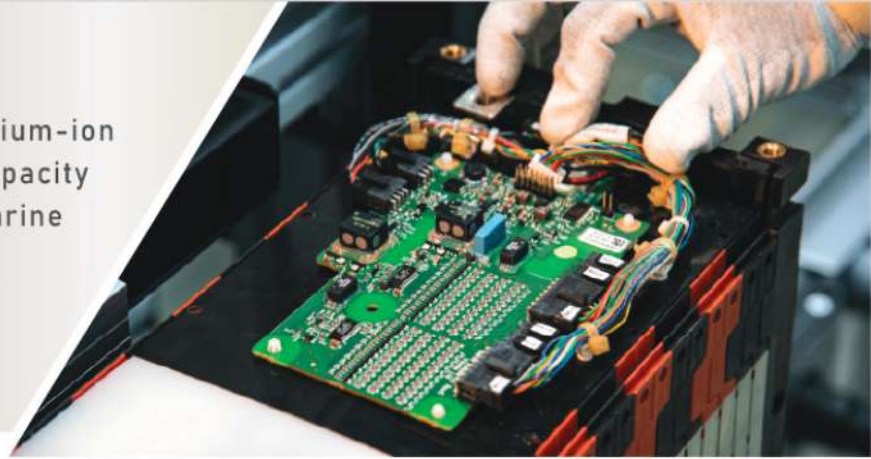


ENERGY M2 MODULES
(G-NMC)

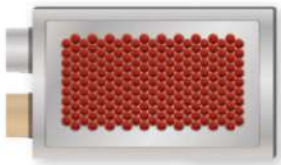
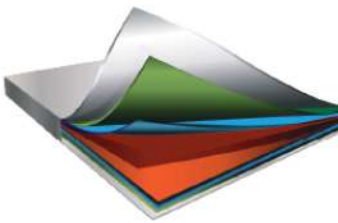
nexcharge
Exide Leclanche Energy
Private Limited



The **M2 Series** is a family of lithium-ion battery modules with scalable capacity and voltage, suitable for road, marine and other transport applications.



THE LITHIUM-ION GRAPHITE / NMC SERIES (G-NMC)



The heart of any storage system is the cell. Its quality determines the performance of the entire storage system. Leclanche's Li-Ion G-NMC cells are made of the highest quality materials, with a robust bi-cell construction, using unique, state-of-the-art processes to maximize safety and cycle life.

INDUSTRY LEADING SAFETY AND RELIABILITY

Unique features such as the bi-cell laminate design, integrated with a ceramic separator, make Leclanche's G-NMC cells capable of withstanding abuse without catastrophic, thermal runaway occurring.

HIGH ENERGY DENSITY

The G-NMC technology used by Leclanche provides a 25% energy density advantage over LFP chemistries allowing a greater payload or a longer range.

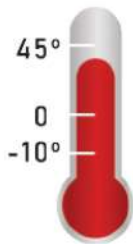
8,000 CYCLES

8,000 Cycles 1C charge / discharge at 80% DoD & RT, 4,500 Cycles 1C charge / discharge at 100% DoD & RT, Leclanche's G-NMC cells typically quadruples the cycle life of most competitors and is ideal for long term investments and low-maintenance energy storage systems.

1C CHARGE AND 3C DISCHARGE

The design and quality of the G-NMC cells permit a constant discharge of up to 3C and 1C charging. The cells are capable of 5C for a 10 second pulsed discharge.





UP TO 100% DEPTH OF DISCHARGE

The Leclanche's G-NMC cells can be operated at up to 100% Depth of Discharge (DoD). If the battery is depleted completely through each cycle, the lifetime will be 4,500 cycles.

WIDE TEMPERATURE RANGE (-10°C* TO 45°C)

The Leclanche's G-NMC cells perform well across a broad range of temperatures (-10°C to 45°C). The G-NMC cells out perform LFP at lower temperatures.

* -10°C in discharge only, lower temperature limit for charge is 0°C

THE M2 MODULES



Leclanche pouch cells represent the highest quality, safety and cycle life. The M2 modules enable best performance of the cells while providing:

- Rugged and resilient (50g acc. and 4kV isolation tested) housing for high quality pouch cells.
- Faster pack assembly - Less time connecting individual cells and integrating battery management.
- Choice of capacity, voltage and size.
- Better thermal management - Each module is designed using careful thermal analysis to ensure even temperature distribution and heat sinking across all cells in the module.
- All modules have built-in battery management electronics to simplify installation.
- 37 separate G-NMC configurations based on 14 module sizes (see table on page 7).
- Parallel string connections are also supported for higher pack capacities.
- Modules can be liquid cooled with conductive cooling plates or force air cooled.

NEXCHARGE VALUE PROPOSITION

- › Engineered to rigorous standards by our partner in Switzerland, our cells are manufactured in a state-of-the-art production facility in Germany.
- › Our modules, packs and racks are produced in Gujarat, India. Nexcharge battery products offer unrivalled safety, quality and durability.

THE ADVANCED BATTERY MANUFACTURING FACILITIES

- › Testing and certification done at cell level and module level as per highest safety standard
- › ISO 9001:2015 Quality Management System (QMS)
- › ISO 14001:2015 Environmental management system (EMS)
- › ISO 45001:2018 Occupational health and safety management system (OHSMS)

Note: Applied for above certifications



THE ENERGY M2 BATTERY MODULE FOR MOBILITY (G-NMC)

BATTERY SYSTEM

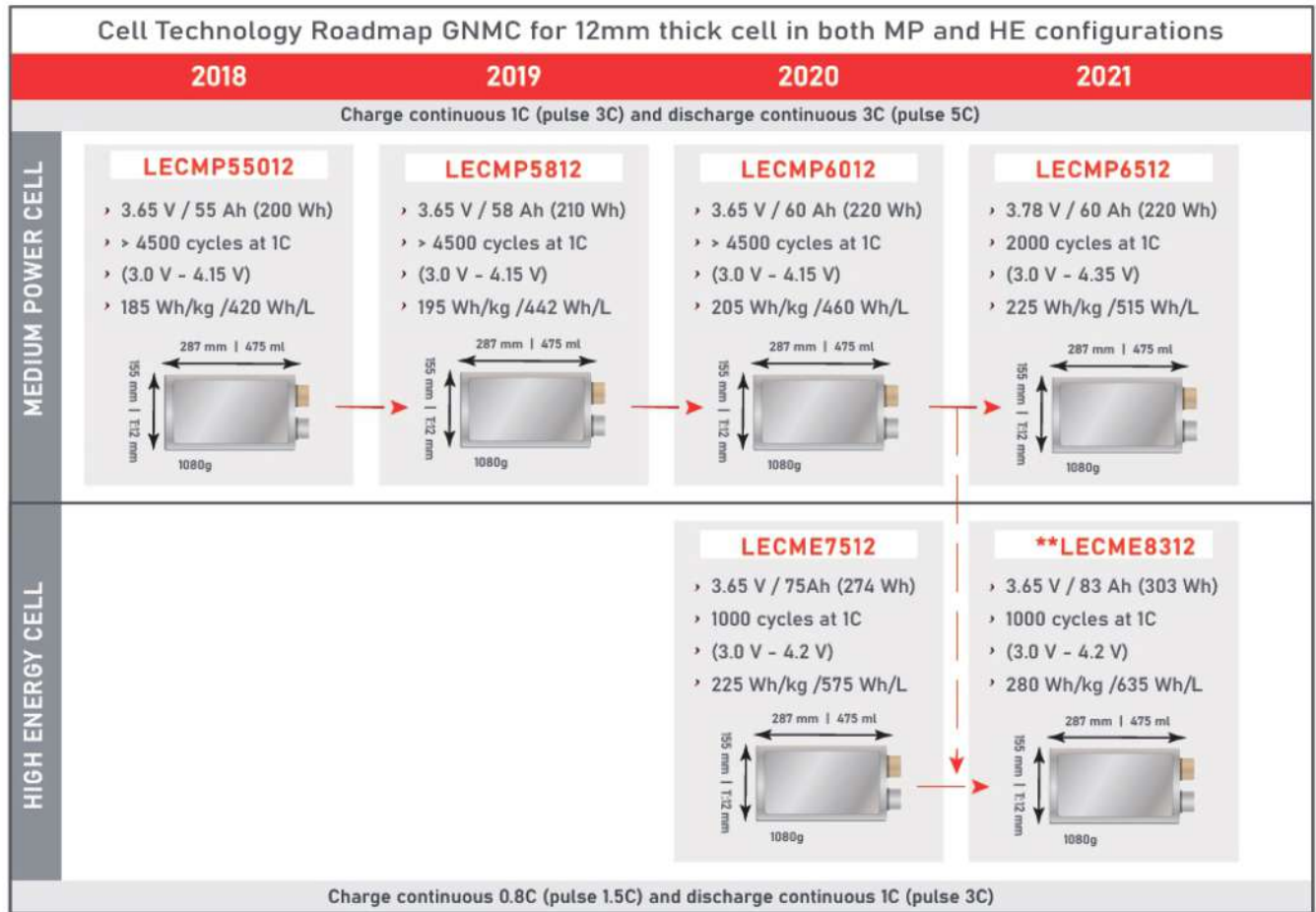
Cell chemistry	G-NMC
Cell voltages	3.65V nominal
Nominal cell capacity	60 Ah
Specified cycles	
(1C/1C @23°C at 80% DoD)	8,000 cycles
(1C/1C @23°C at 100% DoD)	4,500 cycles
Maximum calendar lifespan (@23°C)	10 years

BATTERY MANAGEMENT

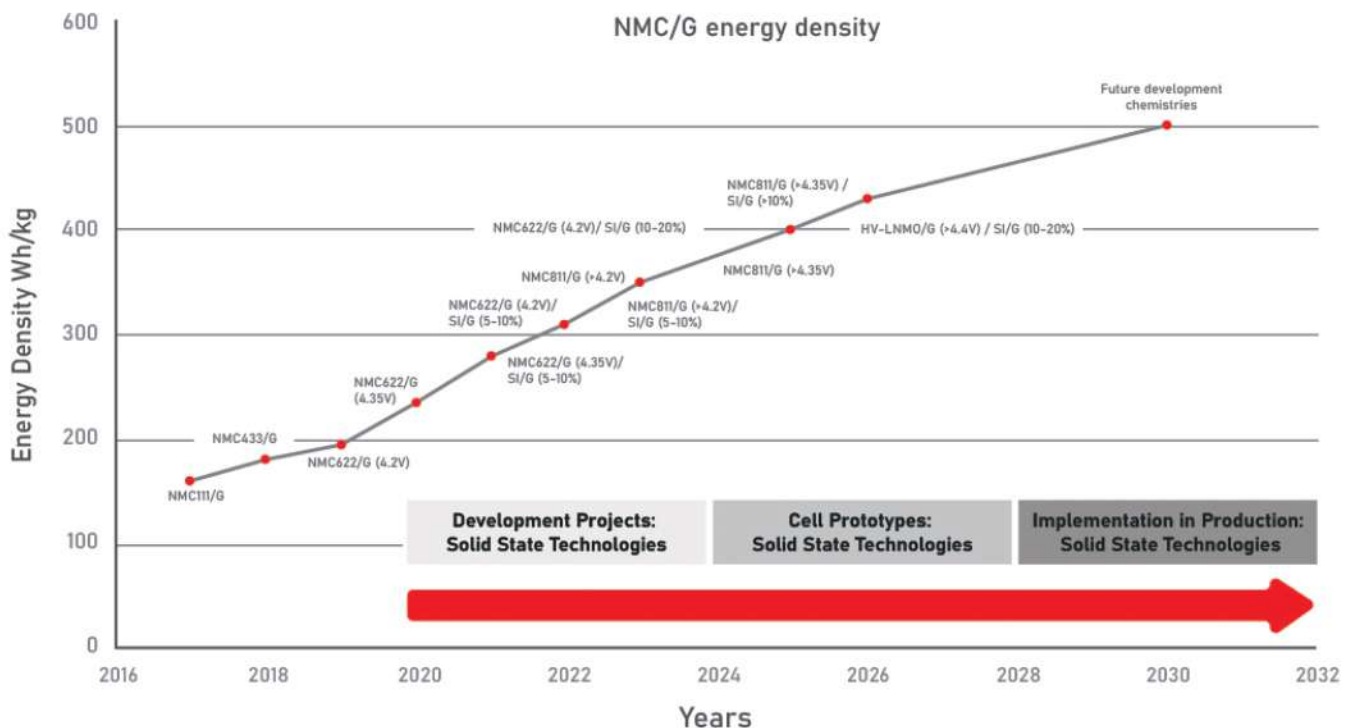
Max. voltage	1,000 V
External communications (from BCU)	2x CAN bus
Isolation monitoring	Yes
Multi string configurations	Yes



R&D ROADMAP G/NMC CELLS



ROADMAP FOR ENERGY DENSITY INCREASE: GRAPHITE/NMC TECHNOLOGY



MODULE TYPE	NO. OF CELLS	CAPACITY (Ah)	ENERGY (kWh)	VOLTAGE			WIDTH (mm)	HEIGHT (mm)	LENGTH (mm)	WEIGHT (kg)
				NOMINAL (V)	MIN (V)	MAX (V)				
11s3p	33	180	7.23	40.15	33	46.2	175	334	537	48.84
* 16s2p	32	120	7.01	58.4	48	67.2	175	334	522	47.56
8s4p	32	240	7.01	29.2	24	33.6	175	334	522	47.56
* 4s8p	32	480	7.01	14.6	12	16.8	175	334	522	47.56
* 15s2p	30	120	6.57	54.75	45	63	175	334	493	44.9
6s5p	30	300	6.57	21.9	18	25.2	175	334	493	44.9
5s6p	30	360	6.57	18.25	15	21	175	334	493	44.9
14s2p	28	120	6.13	51.1	42	58.8	175	334	463	42.14
7s4p	28	240	6.13	25.55	21	29.4	175	334	463	42.14
4s7p	24	420	5.26	14.6	12	16.8	175	334	463	42.22
24s1p	24	60	5.26	87.6	72	100.8	175	334	404	36.82
12s2p	24	120	5.26	43.8	36	50.4	175	334	404	36.82
3s8p	24	480	5.26	10.95	9	12.6	175	334	404	36.82
8s3p	24	180	5.26	29.2	24	33.6	175	334	404	36.82
6s4p	24	240	5.26	21.9	18	25.2	175	334	404	36.82
4s6p	24	360	5.26	14.6	12	16.8	175	334	404	36.82
22s1p	22	60	4.82	80.3	66	92.4	175	334	375	34.16
11s2p	22	120	4.82	40.15	33	46.2	175	334	375	34.16
7s3p	21	180	4.60	25.55	21	29.4	175	334	360	32.78
3s7p	21	420	4.60	10.95	9	12.6	175	334	360	32.78
20s1p	20	60	4.38	73	60	84	175	334	345	31.5
10s2p	20	120	4.38	36.5	30	42	175	334	345	31.5
5s4p	20	240	4.38	18.25	15	21	175	334	345	31.5
4s5p	20	300	4.38	14.6	12	16.8	175	334	345	31.5
* 16s1p	16	60	3.50	58.4	48	67.2	175	334	286	26.08
8s2p	16	120	3.50	29.2	24	33.6	175	334	286	26.08
4s4p	16	240	3.50	14.6	12	16.8	175	334	286	26.08
14s1p	14	60	3.07	51.1	42	58.8	175	334	257	23.42
7s2p	14	120	3.07	25.55	21	29.4	175	334	257	23.42
12s1p	12	60	2.63	43.8	36	50.4	175	334	227	20.76
* 6s2p	12	120	2.63	21.9	18	25.2	175	334	227	20.76
4s3p	12	180	2.63	14.6	12	16.8	175	334	227	20.76
3s4p	12	240	2.63	10.95	9	12.6	175	334	227	20.76
11s1p	11	60	2.41	40.15	33	46.2	175	334	212	19.38
10s1p	10	60	2.19	36.5	30	42	175	334	198	18.1
5s2p	10	120	2.19	18.25	15	21	175	334	198	18.1
8s1p	8	60	1.75	29.2	24	33.6	175	334	168	15.34
4s2p	8	120	1.75	14.6	12	16.8	175	334	168	15.34

* Note: Above highlighted modules are in mass production