

New PCB Relay Introduction

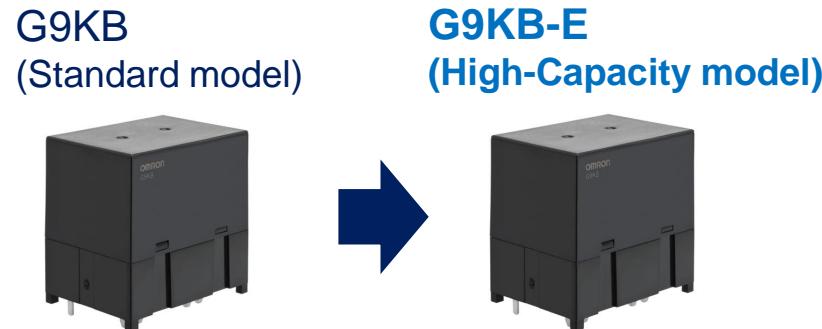
G9KB-E (High Power DC Relay)



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Overview of G9KB-E

- G9KB-E is the High-Capacity model of G9KB series enhanced **max voltage to 800 VDC** and **max current to 100 A** with the same size & weight as the Standard model. Bidirectional switching, No gas filled.
- **Ratings of 800 VDC 50 A to 600 VDC 100 A** would be especially **suitable for 15 to 40 kW battery applications** such as ESS and EV Chargers/V2X.



Max Switching Voltage	600 VDC	800 VDC
Max Switching Current	50 A	100 A
Rated Carry Current	50 A	100 A
Rated Load	600 VDC 50 A, etc.	600 VDC 100 A, etc. 800 VDC 50 A, etc.
Size & Weight	Same	

- ✓ Meeting the latest trend of **higher battery voltage & current**
- ✓ Reducing **quantity of relays** per system with bidirectional (no polar) switching capability
- ✓ **Safer & lighter weight** with no gas filled, **Saving labors** with PCB mounting



Especially suitable for 15 to 40 kW battery applications



Energy Storage (ESS)



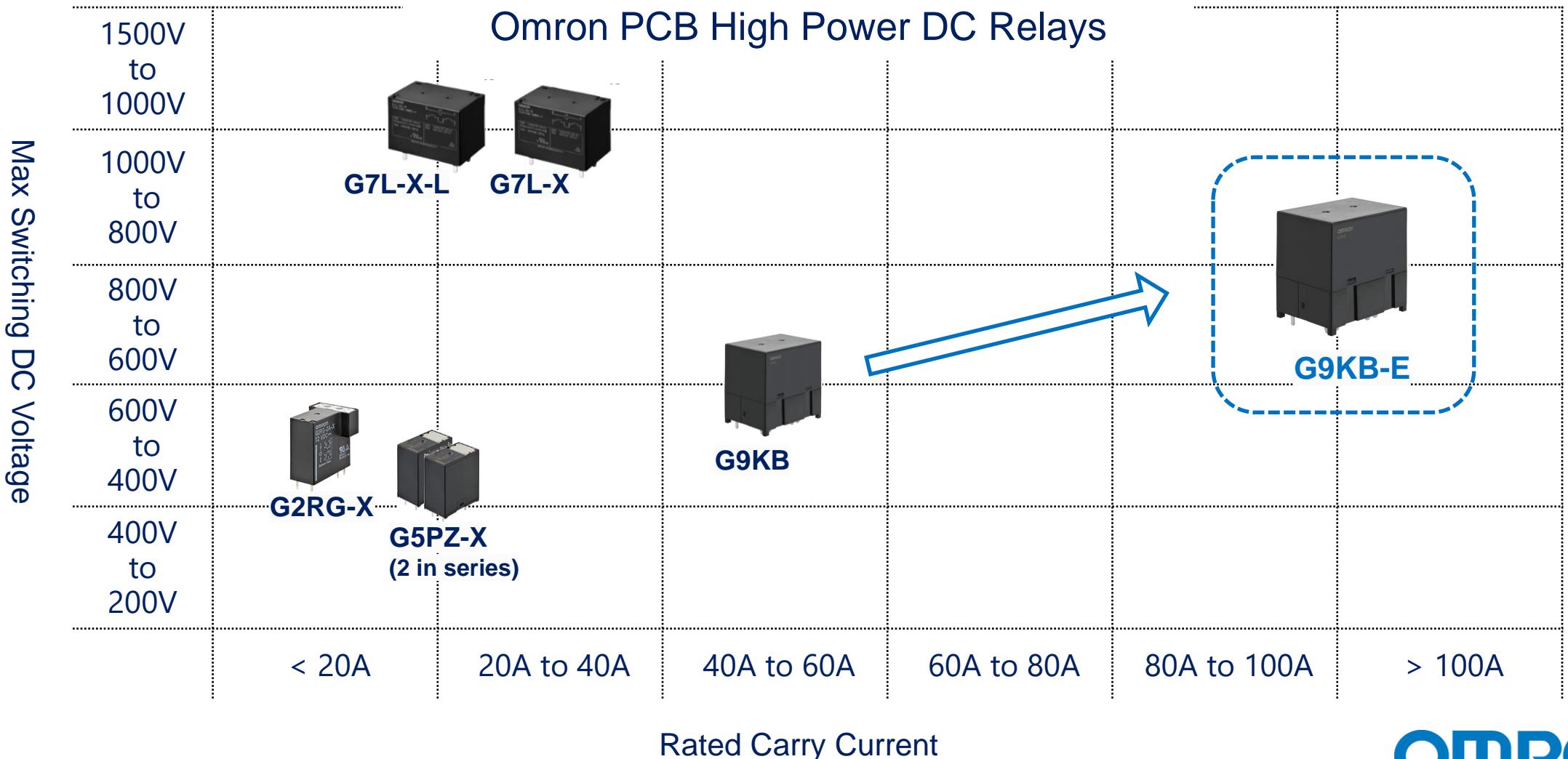
EV Chargers incl. V2X



Backup Power (UPS)

G9KB-E positioning in Product Map

- G9KB-E has the **highest carry current of 100 A over 200V DC switching voltage** and **highest switching voltage of 800 VDC over 40 A carry current** in Omron's PCB high power DC relays.



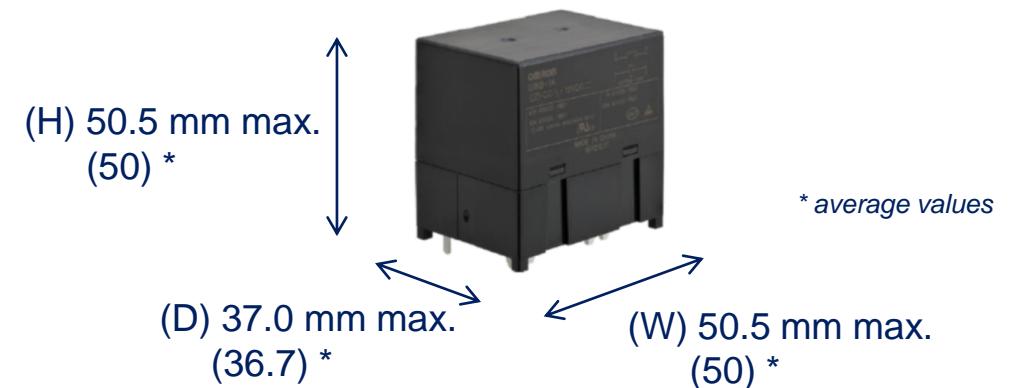
Specifications

- Rated loads of **800 VDC 50A**, and **600 VDC 100A** with **bidirectional** switching.
- The same size and terminal shapes as G9KB standard model.

Contact Form	SPST-NO (1a)
Terminal Type	PCB terminal
Max. Switching Voltage	800 VDC
Max. Switching Current	100 A
Rated Carry Current	100 A
Rated Load & Electrical Durability (Resistive)	<ul style="list-style-type: none"> • 600 VDC 100 A 100 operations • 500 VDC 100 A 300 operations • 800 VDC 50 A 10 operations • 800 VDC 18 A 6,000 operations as bidirectional ratings
Mechanical Durability	1,000,000 operations min.
Contact Resistance	5 m Ohm max.
Contact Gap	3.6 mm min.

Values are initial values at 23 deg.C except electrical durability

Ambient Temperature	-40 to +85 deg.C
Dielectric Strength	Coil to Contacts 5,000 VAC 50/60 Hz 1 min. Open Contacts 2,500 VAC 50/60 Hz 1 min.
Impulse Withstand Voltage	Coil to Contacts 10 kV (1.2 x 50 us)
Standard Certification	UL(UL60947-4-1), TUV(EN 61810-10), CQC(GB/T 21711.1)

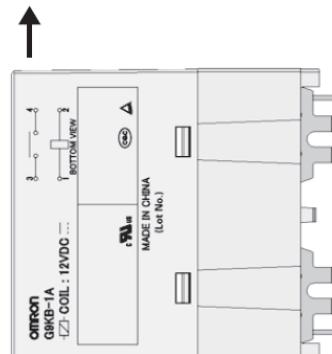
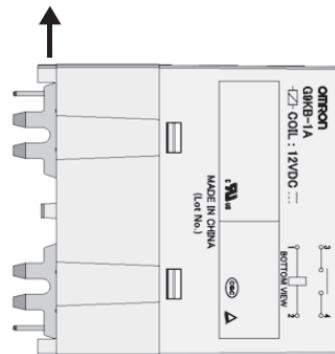
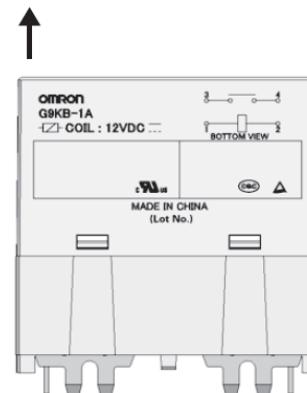
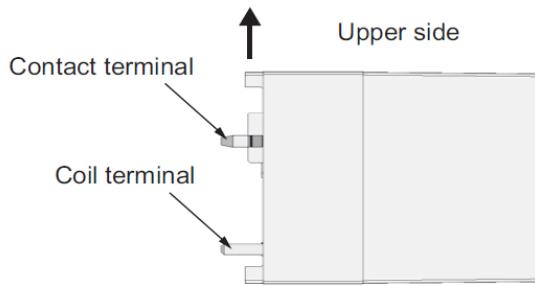


Precautions for Mounting Direction

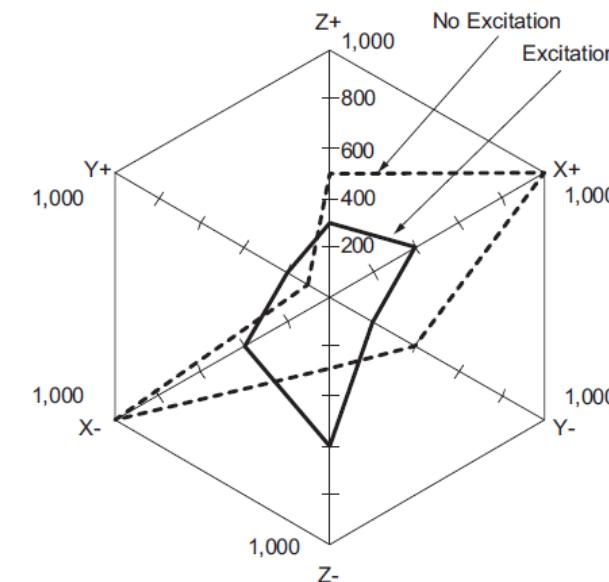
- As with G9KB standard model, G9KB-E has a **limitation for mounting direction** as illustrated below.
- Even in acceptable mounting direction, malfunction shock resistance differs depending on the direction.

Acceptable Mounting Directions

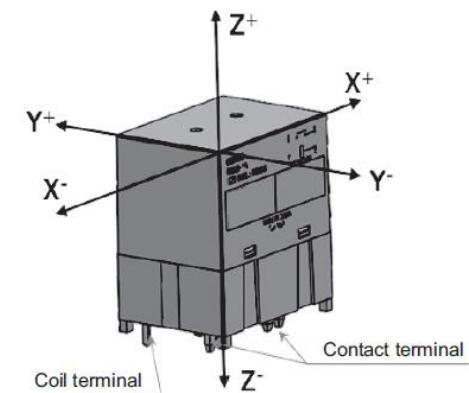
(Do NOT use in any other directions)



Malfunction Shock Resistance



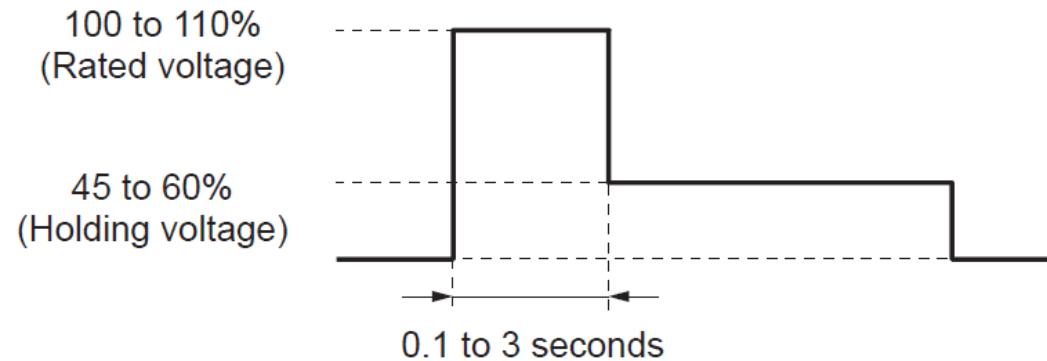
Please use on the condition
inside the left chart



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Precautions for Holding Voltage

- As with G9KB standard model, G9KB-E **MUST BE USED** at **Holding Voltage** after making.
- For the details behind holding voltage, please refer to the White Paper or ask an Omron representative.



	Applied coil voltage	Coil resistance *	Coil power consumption
Rated voltage	100 to 110%	51 Ω (12 VDC)	Approx. 2.8 to 3.4 W
Holding voltage	45 to 60%	206 Ω (24 VDC)	Approx. 0.57 to 1.1 W

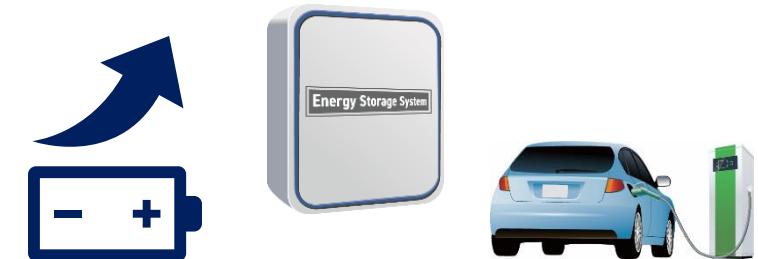
* The coil resistances were measured at a coil temperature of 23°C with tolerances of $\pm 10\%$.

Customer Benefits with G9KB-E

- G9KB-E could bring customer benefits such as **the latest trend of design with battery, reducing quantity of relays, safer design w/o hydrogen gas, lighter weight and saving in labor** (manufacturing), by replacing conventional relays or heavier contactors

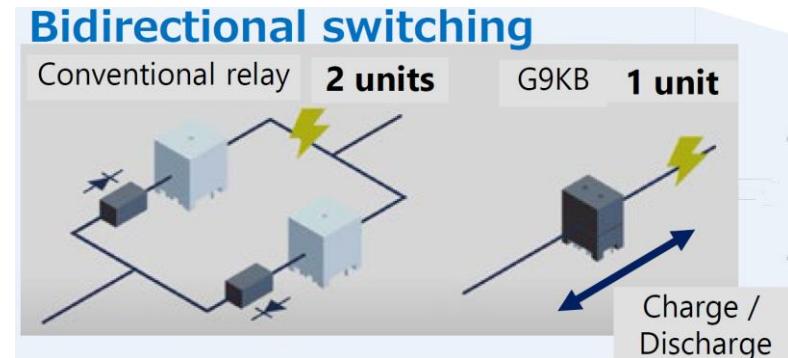
Meeting the latest trend of higher battery voltage & current

With the market trend of increasing battery voltage and/or current for more storage capacity, G9KB-E could be applicable for the latest design.



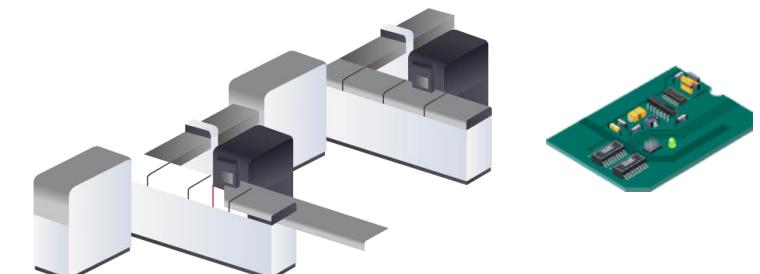
Reducing quantity of relays per system with bidirectional (non polar) switching capability

Bidirectional switching capability could replace two unidirectional relays with only one for bidirectional current applications such as ESS and V2X.



Safer & lighter weight with no gas filled, Saving labors with PCB mounting

Safer & lighter weight than other sealed relays with H2 gas filled. PCB relay could make manufacturing automatic from conventional screw terminal.



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Target Applications

- G9KB-E is primarily targeting **15 to 40 kW battery applications** such as **Energy Storage (ESS)**, **EV Chargers including V2X (bidirectional chargers)** and **Backup Power (UPS)**. Utilizing its ratings of 800 VDC 50A and 600 VDC 100A.

Battery voltage varies depending on the state of charge.

G9KB-E ratings of 800 VDC 50 A and 600 VDC 100 A (despite no rating of 800 VDC 100 A) are suitable for DC switching battery applications.

As shown in the right chart, G9KB-E would be especially suitable for **15 to 40 kW battery applications**



Energy Storage (ESS)



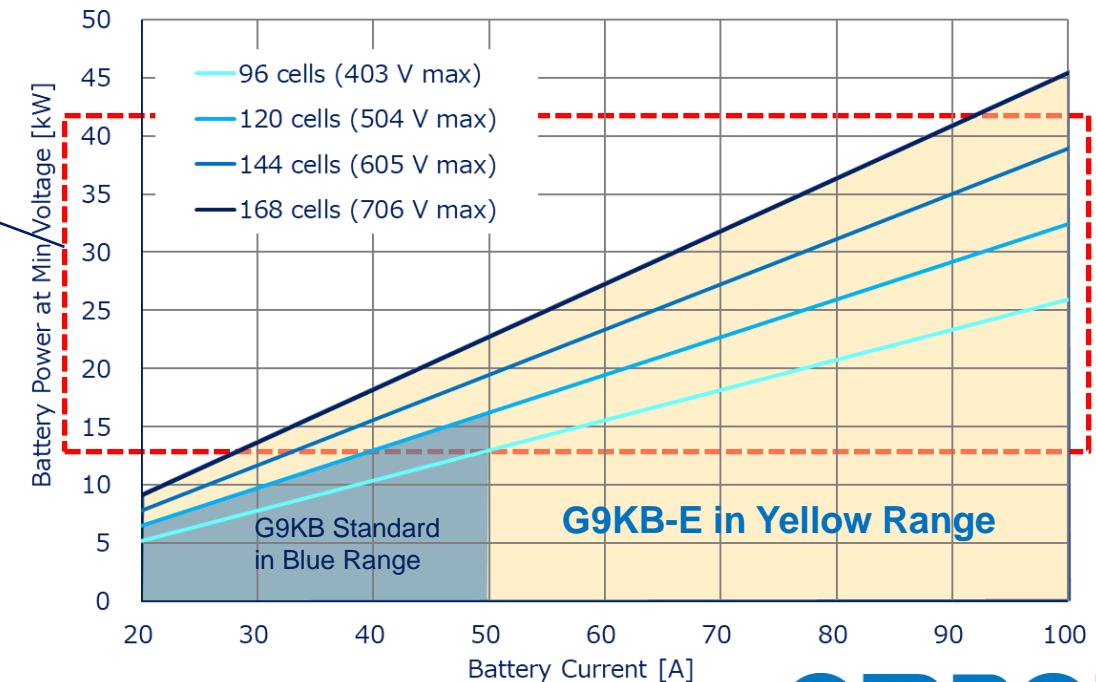
EV Chargers incl. V2X



Backup Power (UPS)

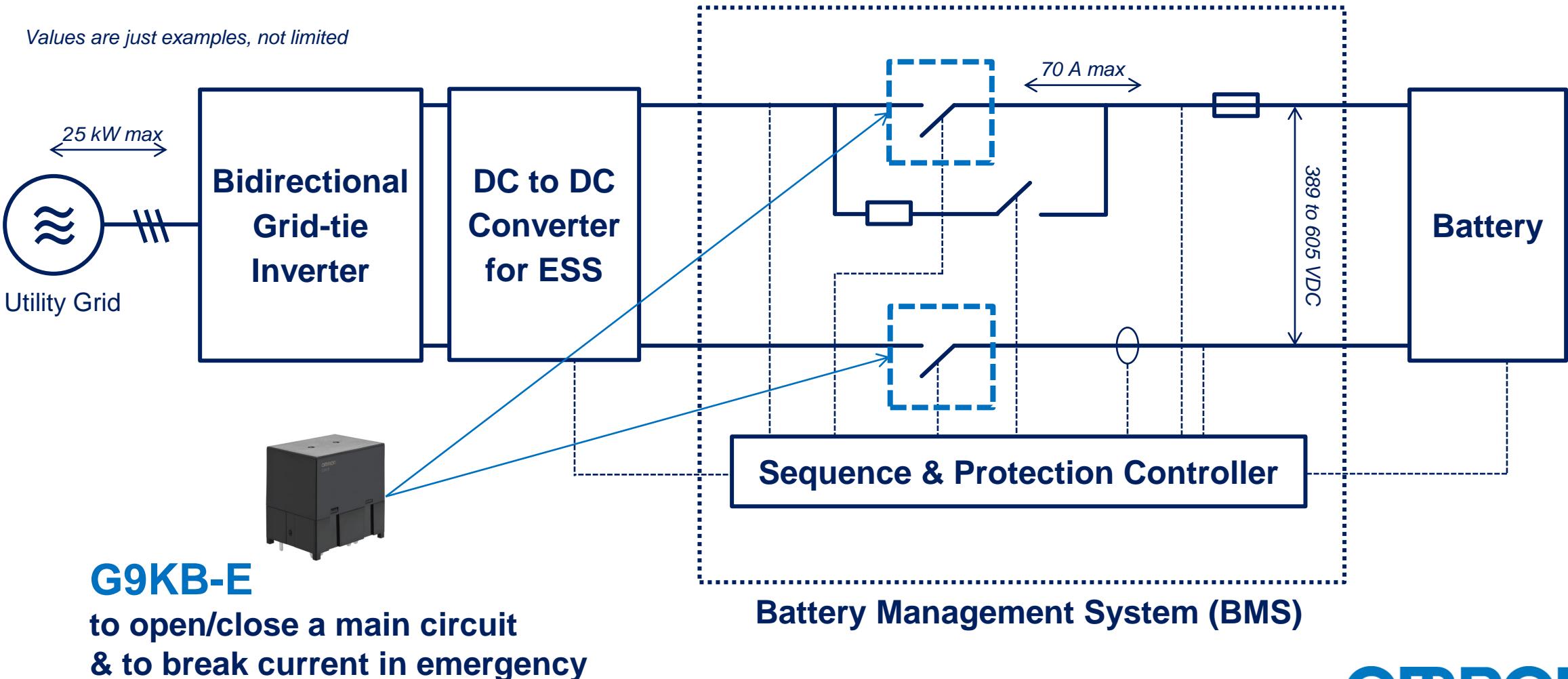
Typical Li-ion battery cell spec (just one example)

# of Cells in series	1	96	120	144	168	G9KB-E for over 600 VDC
Nominal Voltage (VDC)	3.70	355	444	533	622	
Min. Voltage (VDC)	2.70	259	324	389	454	
Max. Voltage (VDC)	4.20	403	504	605	706	
Max. Voltage + 10% margin		444	554	665	776	
				G9KB Standard	G9KB-E	



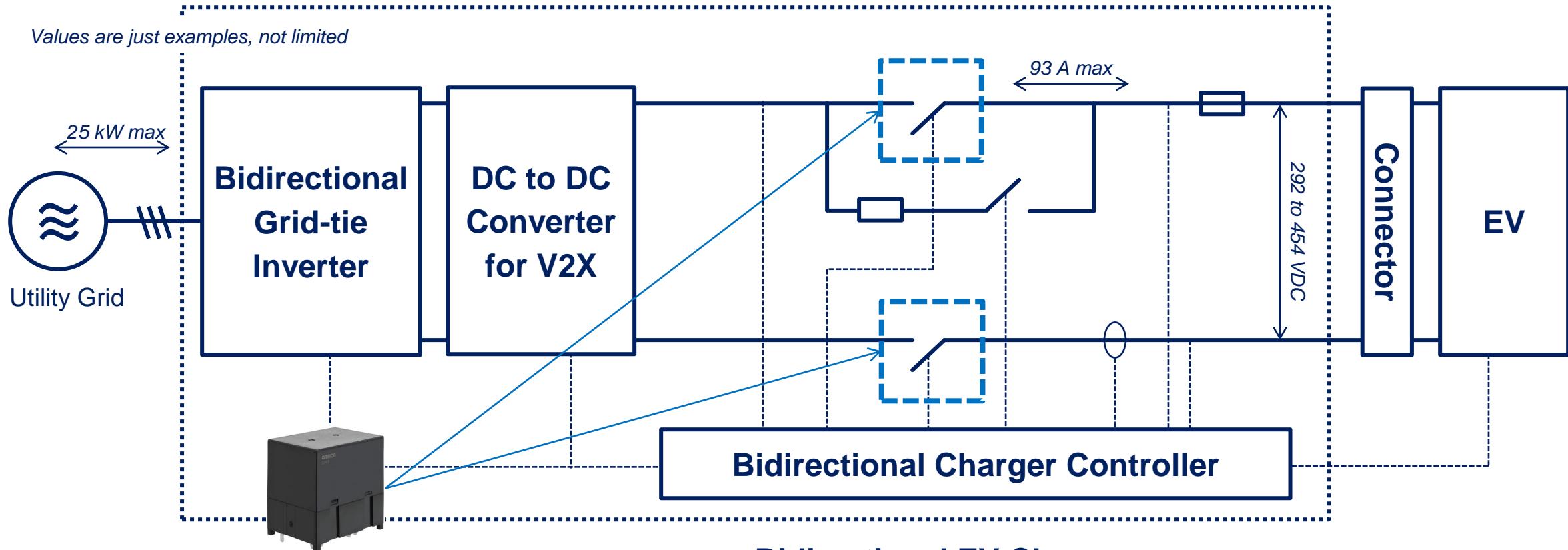
Application Case: Energy Storage System (ESS)

- G9KB-E could be applicable to **open/close a main circuit of ESS** mostly with no or low current, and to **break current in emergency**, up to 800 VDC battery voltage and up to 100 A battery current.



Application Case: EV Charger / V2X

- G9KB-E could be also applicable for **DC output EV Chargers**, especially to **Bidirectional Chargers (V2X)** functioning by switching a main circuit in a normal state and breaking current in emergency.



G9KB-E
to open/close a main circuit
& to break current in emergency

Thank You

