BMZ
THE INNOVATION GROUP

MAGNUS+

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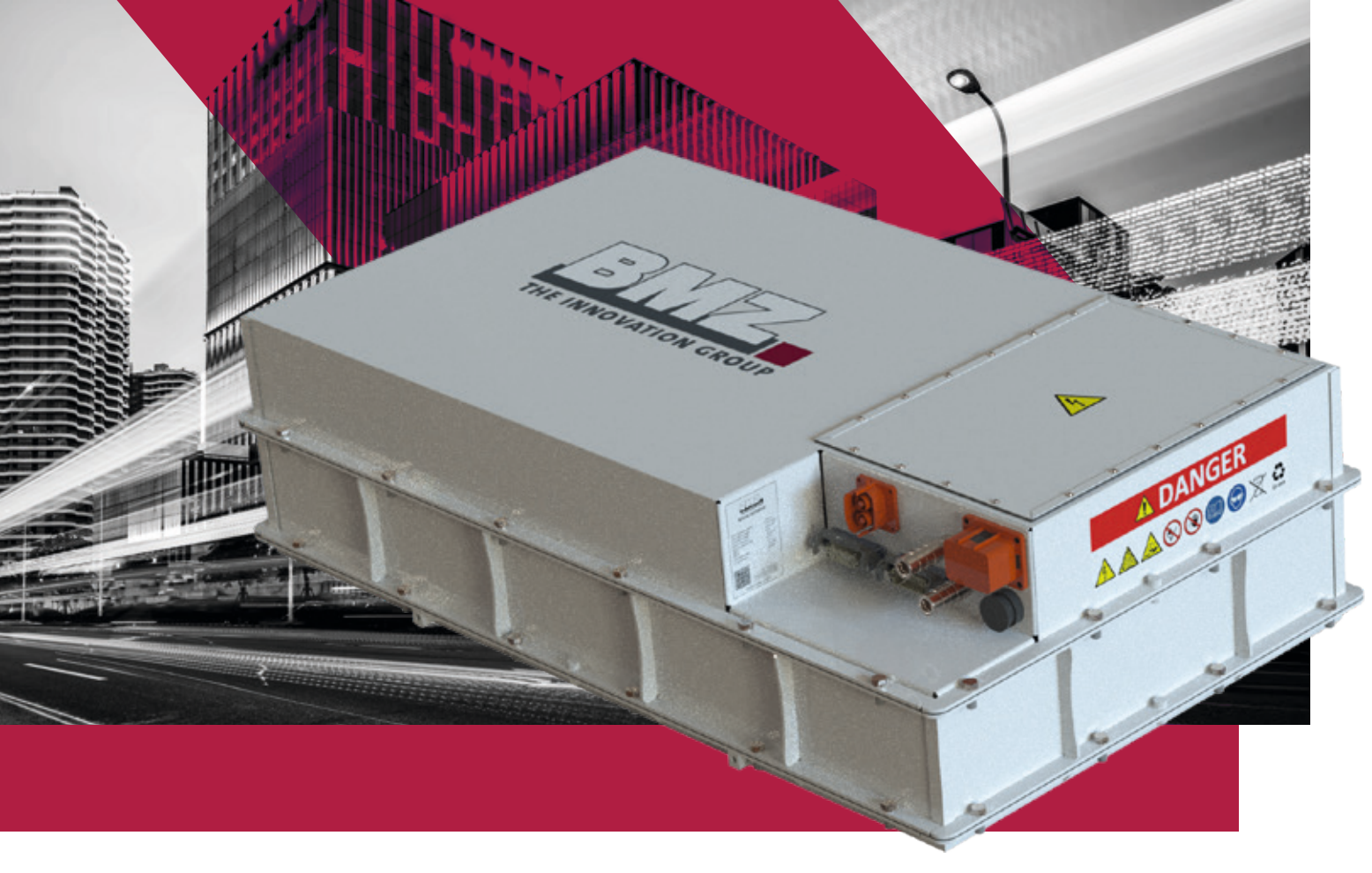
Latest Generation of the Commercial E-Mobility Battery

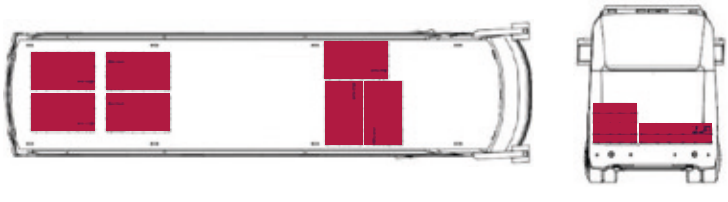


E-MOBILITY | DRIVE SYSTEMS | ENERGY STORAGE SYSTEMS | POWER- AND GARDENTOOLS | INDUSTRIAL | MEDICAL

Lithium-Ion Battery System
FOR COMMERCIAL E-MOBILITY

TECHNICAL INFORMATION

168S BATTERY PACK	
Application	Vehicles: M2, N2, M3, N3
Max. dimension	371 x 800 x 1356 mm
Weight	450 kg
Nominal Capacity @ 25°C (1/3C discharge)	116 Ah
Nominal Energy @ 25°C (cell usage 2,75V ... 4,35V) (1/3C discharge)	72,4 kWh
Nominal Voltage (1/3C discharge)	624 V
Energy density	161 Wh/kg
Output Voltage (90% DOD, OCV)	566 V ... 702 V
Maximum Output Voltage (100% DOD)	725 V
External low voltage supply	12V and 24V
Max. continuous / pulse discharge current @ 25°C	**Amphenol socket UPC R 012A LS1 (Option 1):** 200A / 350A @ 60s, 500A @ 30s, 700A @ 10s **Harting Socket Han 24HPR (Option 2):** 200A / 350A @ 60s, 400A @ 30s, 500A @ 10s
Max. continuous / pulse charge current @ 25°C	140A / 175A @ 30s, 350A @ 10s
Certification, approvals	UN 38.3, R100.02, R10.06
Location of the battery in the vehicle	Possibility of installing batteries in the entire range of application height and orientation as below
Compliance with the charging standard	IEC61851-23
Temperature range for discharge	-30 °C ... + 55 °C -20 °C ... + 55 °C (with the cooling / heating system off)
Temperature range for charge	-30 °C ... + 55 °C (with the cooling / heating system on)
Humidity	30% to 98% non-condensation
Heat exchange system	Yes based on liquid it's possible to heat and cool the battery
Minimum required active cooling power of BTMS (Battery Thermal Management System) for single battery pack	1800 W
Minimum required heating power of BTMS (Battery Thermal Management System) for single battery pack	1800 W
Maximum fluid pressure	3,2 bar
Recommended fluid	GlysantinG30 50/50
Flow rate of fluid	5,0 l/min
Liquid (inlet and outlet) connector (battery side)	Quick connector type 2309, 3/8' RQC 2309KLIW17MVX



168S BATTERY PACK

Communication	CAN Bus 29-bit ID, 1000 kbit/s, 500 kbit/s, 250 kbit/s
Communication standard	SAE J1939 compatible with MBMS art. 607095-00
Parallel connection of batteries	Yes , up to 2 battery packs w/o external Master BMS unit up to 9 battery packs with external Master BMS unit (art. 042170-00)
Battery mounting method	Bottom surface of the battery as shown in Fig. 1. compatible with art. 607095-00
Pre-charge	Yes up to 1,5 mF (optional) for HV socket Option 1 No for HV socket Option 2
Housing material	Stainless Steel
Color	RAL 9016 as standard for HV socket Option 1 RAL 9005 as standard for HV socket Option 2
Protection class	IP 65
LV connector (battery side)	Harting 09 20 016 3101 + 09 20 016 3001 + 09 20 016 0301 (compatible with art. 607095-00)
HV connector (battery side)	**Option 1:** 25 ... 70mm2 diameter of HV cable - Amphenol UPC R 012A LS1 (compatible with art. 607095-00) **Option 2:** 25 ... 70mm2 diameter of HV cable - Harting Han 24HPR (09400240311 + 09140240371+ 09140013102 + 09110006222 + 09140009950 + 09140023102 + 09320006204)
MSD socket	Yes – Amphenol MSD (MSDF000F + MSDM000)
Main contactors	Gigavac GV241MAB
High Voltage Interlock	Yes
Possibility to assign a battery ID by coding the inputs on the low voltage connector (BT_IN)	Yes, via inputs ID_0 ... ID_3 (Fig. 2)
BMS features	CAN bus SAE J1939 + DM1, BDU control, BTMS control, Remote diagnostic system, Adaptive DOD, Warranty scenarios settings
Warranty	up to **10-year**
Energy throughput warranty	up to **396 000 kWh** per single battery pack

BATTERY DIMENSIONS

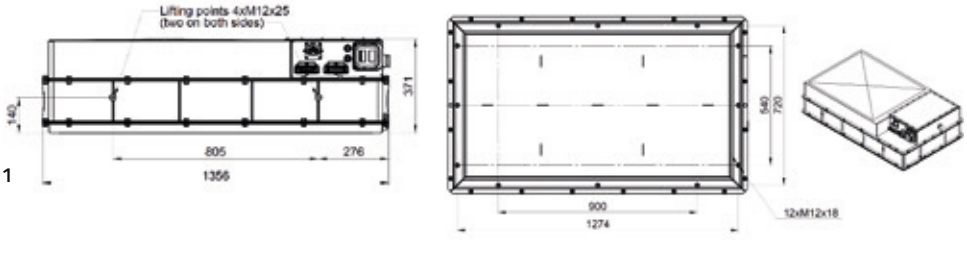
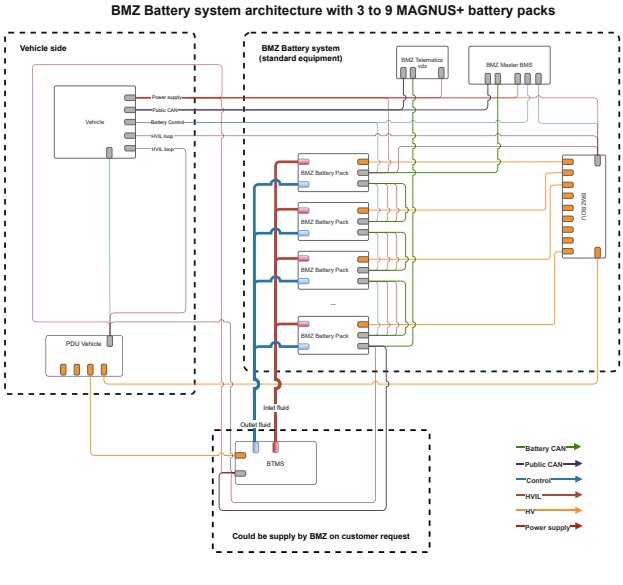
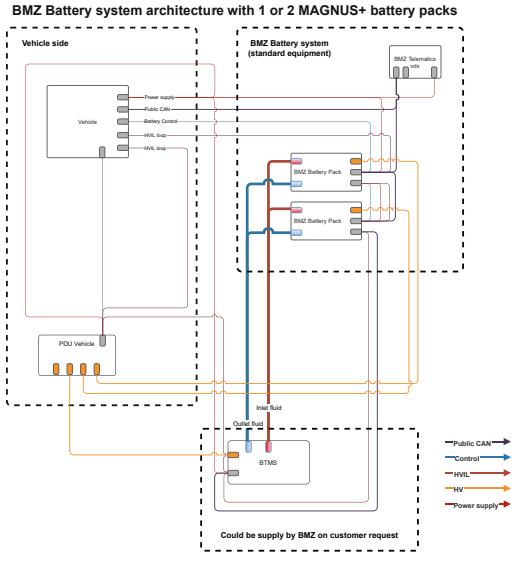


Fig. 1

SIMPLIFIED ELECTRICAL DIAGRAM





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BATTERY THERMAL MANAGEMENT SYSTEM

TECHNICAL INFORMATION

Battery Thermal Management System			
BTMS system	**rooftop: BSPL AC07_4 rear compartment: BSPL AC06_4**	**BSPL AC07_7**	**BSPL AC07_10**
Amount of BMZ Magnus+ batteries	1 - 2	3 - 5	5 - 9
Cooling power, kW	4	7	14
Heating power, kW	7	7	14
BTMS operating modes	Active cooling (refrigerant circuit) Passive cooling (water radiator) Heating (PTC heater)		
Max. current consumption	11A @ 700Vdc, 36A @ 24Vdc	13A @ 700Vdc, 46A @ 24Vdc	23A @ 700Vdc, 56A @ 24Vdc
BTMS location ont the vehicle	rooftop and rear compartment		
BTMS dimension, mm (W x L x H)	rooftop: 600 x 1300 x 320, rear compartment: 260 x 1300 x 370	rooftop and rear compartment: 600 x 1300 x 320 (compatible with Magnus+ battery fixation points)	
CAN communication	SAE J1939 - compatibility with BMZ battery system		
Information visible via CAN communication	Leackage information (no leackage, small, medium, high), Fluid level (%), Ambient temperature, Power indicator, High Voltage input level, High Voltage current consumption, Coolant flowrate, Service check indicator, Inlet / Outlet liquid temperature, extended diagnostic and DM1 messages		
Inputy high voltage range, Vdc	400 - 750		
Input low voltage range, Vdc	16-32		
Maximum fluid flow rate, l/min	20	45	
BTMS weight (w/o fluid)	80 kg	85 kg	90 kg
Fluid	GlysantinG30 50/50		
Refrigerant	R134a		
Max. coolant pressure	2 bar		
Max. allowable piping pressure drop	30 kPa	25 kPa	17 kPa
Ambient temperature	-30 ... +50 °C		
Additional features	Fully integration with BMZ Magnus+ battery system, HVIL function, Remote diagnostic, Integrated Capacitor discharge circuit & surge protection, Master/slave configuration (max. 2 units)		

Supply directly from HV circuit.

Compatible with Magnus+ fixation points.

Possibility of installation on the roof and rear compartment.

MAGNUS+ BATTERY SYSTEM

Number of Magnus+	1	2	3	4	5	9
Energy (100% DoD)	72 kWh	145 kWh	217 kWh	290 kWh	362 kWh	652 kWh
Weight	450 kg	900 kg	1 350 kg	1 800 kg	2 250 kg	4 050 kg
Capacity (100% DoD)	116 Ah	232 Ah	348 Ah	464 Ah	580 Ah	1 044 Ah
Chemistry	Li-ion NMC					
Max. Output Voltage (100% DoD)	724 V	724 V	724 V	724 V	724 V	724 V
Output Voltage @ 90% DoD	566 V ... 702 V	566 V ... 702 V	566 V ... 702 V	566 V ... 702 V	566 V ... 702 V	566 V ... 702 V
BDU main fuse type	BDU is not required		Adler EV AE7 seriers - up to 600A			
Discharge power max. (10s)*	450 kW	900 kW	900 kW	900 kW	900 kW	900 kW
Discharge power (cont.)*	125 kW	250 kW	375 kW	450 kW	450 kW	450 kW
Charge power (10s)*	220 kW	440 kW	660 kW	880 kW	900 kW	900 kW
Charge power (cont.)*	85 kW	170 kW	255 kW	340 kW	425 kW	450 kW
Thermal management	Yes based on liquid (heat and cool). Full compatibility with BSPL BTMS systems.					
Operating temperature range	-30 ... +55 °C					
Guaranteed energy throughput @ 80% DoD	200 000 kWh	400 000 kWh	600 000 kWh	800 000 kWh	1 000 000 kWh	1 800 000 kWh
Warranty	up to 10-year					
BMS features	Remote diagnostic system, parallel connection, battery addressing itself, pre-charge, insulation monitor, adaptive DoD, warranty scenarios settings, full control via CANbus, DM1 messages compatibility with SAE J1939, BTMS control, BDU control					

*Depending on SOC, temperature, fuse type

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BATTERY THERMAL MANAGEMENT SYSTEM

Any questions?

Contact us, we will be pleased to advise you.

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