BMZ
THE INNOVATION GROUP

MAGNUS+

Latest Generation of the Commercial E-Mobility Battery

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

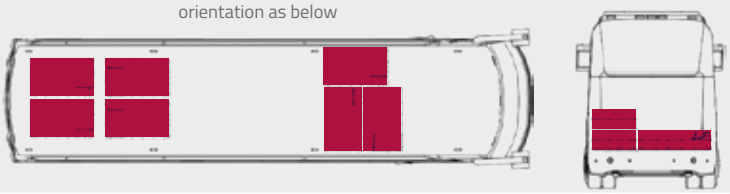
MAGNUS+ BATTERY SYSTEM

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. charge Voltage	730 V	730 V	730 V	730 V	730 V	730 V
Min. battery Voltage	520 V	520 V	520 V	520 V	520 V	520 V
BDU main fuse type	BDU is not required		Adler EV AE7 seriers - up to 600A			
Max. discharge power (30s)*	350 kW	700 kW	700 kW	700 kW	700 kW	700 kW
Max. continuous discharge power*	150 kW	300 kW	400 kW	400 kW	400 kW	400 kW
Max. charge power (10s)*	200 kW	400 kW	600 kW	700 kW	700 kW	700 kW
Max. continuous charge power*	78 kW	156 kW	234 kW	312 kW	390 kW	400 kW
Thermal management	Yes based on liquid (heat and cool)					
Operating temperature range	-30 ... +55 °C					
Warranty	up to 8 years subject to energy throughput					
BMS features	Remote diagnostic system, parallel battery pack interconnection, single / individual battery disable-mode feature (in case of battery failure), battery addressing itself, pre-charge control, insulation monitor, adaptive and static DOD function, automatic performance profile selection (aligning to selected warranty scenario), full control via CANbus + DM1 messages compatibility with SAE J1939, BTMS control, energy throughput and consumption calculation, BDU control, equalizing between battery packs					

*Depending on SOC, temperature, fuse type in BDU

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
Cell type / Cathode chemistry	Prismatic / NMC
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)	580 V ... 700 V
Output Voltage (100% DOD, OCV)	520 V ... 739 V
Maximum Charge Voltage @ 99% DOD (excluding recuperation)	730 V
External low voltage supply	12V and 24V (8 – 30 Vdc)
Max. continuous / pulse discharge current @ 25°C	**Amphenol socket UPC R 012A LS1 (HV socket option 1):** 220 A / 500A @ 30s or 700 A @ 10s[1] **Harting Socket Han 24HPR (HV socket option 2):** 220 A / 400A @ 30s or 500 A @ 10s[1]
Max. continuous / pulse charge current @ 25°C	132A / 350A @ 10s
BOL Internal resistance @ 25°C, 50% SOC	< 140 mOhm
Certification, approvals	UN 38.3, R100.03, 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
Operating temperature range for discharge and charge	-30 °C ... + 55 °C with cooling and heating system turned on
Humidity	30% to 98% non-condensation
Altitude	up to 2000 m
Withstand Voltage	depends of version: 2500 Vdc @ 60 sec or 5000 Vdc (3500 Vac) @ 60 sec
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	1400 W
Maximum fluid pressure	3,2 bar
Recommended fluid	Glysantin G30 or G40 or G48 mixed with 50% clean water
Flow rate for single Battery Pack	5 – 10 l/min
Liquid (inlet and outlet) connector (battery side)	Quick connector type 2309, 3/8' RQC 2309KLIW17MVX for HV socket option 1 Hansa-Flex SKM 13 IR 2 FS VA for HV socket option 2

[1] Only one of the discharge pulse current can be configured (30 seconds or 10 seconds). By default battery pack is configured for 30 seconds pulse. 10 seconds discharge pulse current is available on special request.

168S BATTERY PACK

Communication	CAN Bus 29-bit ID, 1000 kbit/s, 500 kbit/s, 250 kbit/s
Communication standard	SAE J1939 including DM1 messages
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
Battery mounting method	Bottom surface of the battery as shown in Fig. 1.
Pre-charge	Yes up to 3mF (optional) for HV socket option 1 No - for HV socket option 2
Housing material	Stainless Steel – 1.4301
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 **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)
Insulation resistance monitoring	No – external measurement necessary
CAN bus separation	No

BATTERY DIMENSIONS

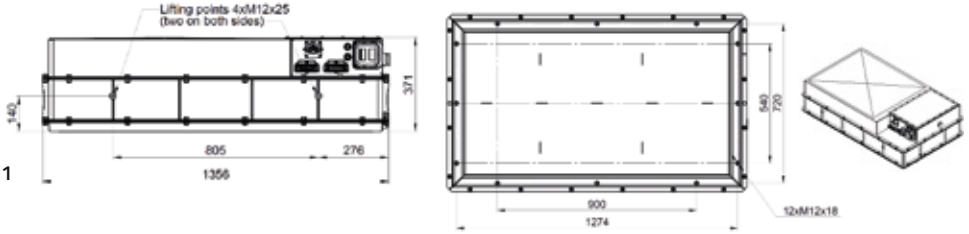
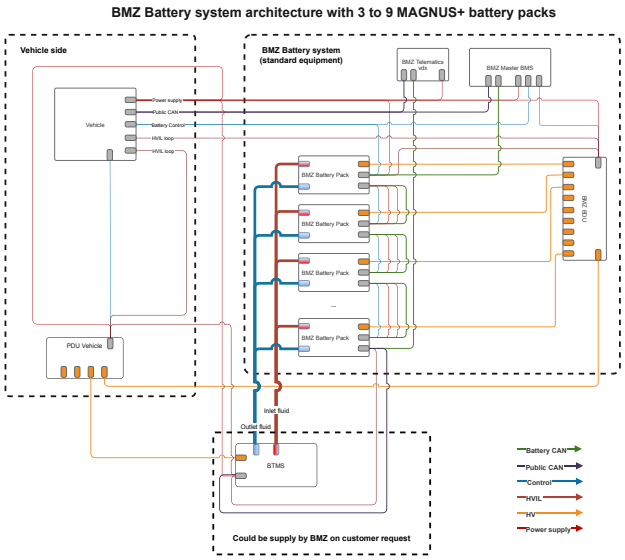
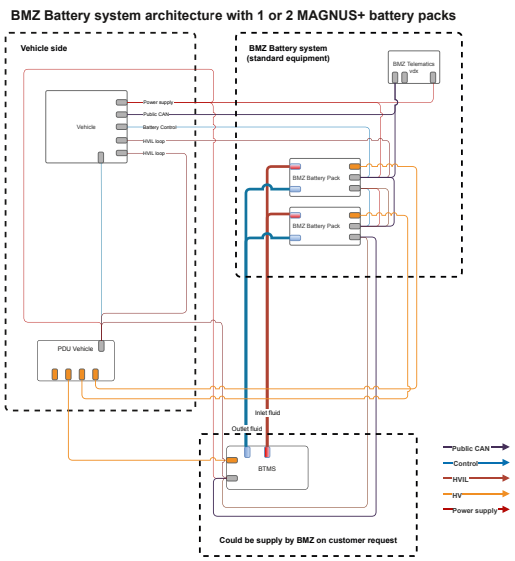


Fig. 1

SIMPLIFIED ELECTRICAL DIAGRAM





MAGNUS+
ORDERING INFORMATION

MAGNUS+ BATTERY VARIANTS AND TYPICAL APPLICATION:

Article Number	Product Description	Typical application
615631-00 	**168S2P 624V 116Ah 72,4kWh** LiNiMnCoO2 Electric Vehicle Battery Pack, Amphenol UPC, hydraulics Rectus, without precharge	Electric buses and Electric Vehicles (cat. MN2 – MN3) equipped with more than 2 battery packs
615677-00 	**168S2P 624V 116Ah 72,4kWh** LiNiMnCoO2 Electric Vehicle Battery Pack, Amphenol UPC, hydraulics Rectus, with precharge	Hybrid vehicles and Electric Vehicles (cat. MN2 – MN3) equipped with 1 or 2 battery packs
616081-00 	**168S2P 624V 116Ah 72,4kWh** LiNiMnCoO2 Electric Vehicle Battery Pack, Harting Han24HPR, hydraulics ISO16028, without precharge	Electric buses and Electric Vehicles (cat. MN2 – MN3) equipped with more than 2 battery packs where HV connector Amphenol UPC cannot be used
616733-00 	**168S2P 624V 116Ah 72,4kWh** LiNiMnCoO2 Electric Vehicle Battery Pack, Amphenol UPC, hydraulics Rectus, without precharge, isolation 3,5kV	Trolley buses and Rail vehicles equipped with more than 2 battery packs
616734-00 	**168S2P 624V 116Ah 72,4kWh** LiNiMnCoO2 Electric Vehicle Battery Pack, Amphenol UPC, hydraulics Rectus, with precharge, isolation 3,5kV	Trolley buses and Rail vehicles equipped with 1 or 2 battery packs
616735-00 	**168S2P 624V 116 Ah 72,4 kWh** LiNiMnCoO2 Electric Vehicle Battery Pack, Harting Han 24HPR, hydraulics ISO16028, without precharge, isolation 3,5kV	Trolleybuses and Rail vehicles equipped with more than 2 battery packs where HV connector Amphenol UPC cannot be used

Any questions?

Contact us, we will be pleased to advise you.

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