Battery-Pack for demanding applicatior	١S
	Electrical Specification
	<ul> <li>14S/12P Lithium Corepack         <ul> <li>INR18650-35E Cells</li> <li>Other Cells on request</li> <li>2026Wh</li> <li>Voltage-Range: 58,8V</li> <li>Up to 120A DC peak discharge current</li> <li>50A continuous current (connector limit)</li> <li>20A charge current</li> <li>UN-Tested</li> <li>Grid-ability: Build a grid of up to 12 CAN- bus connected batteries to form one large logical battery</li> </ul> </li> <li>Mechanical Specification         <ul> <li>Size (L x W x H):</li> <li>268mm x 76mm x 378mm</li> </ul> </li> </ul>
	□ Weight: ~10kg
	<ul> <li>Size Connectivity</li> <li>CAN: Automotive CAN-Bus</li> <li>USB: Enable-Tool Interface</li> <li>Enable/Activation Input (e.g. from key lock)</li> </ul>
	Features:
	<ul> <li>Grid-ability</li> <li>SOC-Indication</li> <li>Multi-redundant safety features</li> <li>See Emerge BMS spec. for details</li> </ul>
	<ul> <li>SOC-calculation</li> <li>Charge-/Discharge recommendation/control interface via CAN-Bus to prevent cut-off from overload</li> </ul>

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Performance data		
Peak Power	W	3000W
Continous Power (full discharge cycle)	W	1500W (limited by a 30°C cell
		temperature increase)
Max. current (depending on BMS)	А	55A (BMS only) 120A (BMS with extended powerstage)

USB Interface					
Enable Tool NG V12.0	And the set of the sectors		ar 10		
				-	
ENGNEERING end	able tool		Logfile name	LogFile	Start
			Interval (ms)	100	Stop
BMS-Info Cell-Info Diagnosic-Info State-Mana	ger SOC Temp LOGTAB License I	P-File Toolbox			
Name	Physical Value	Unit		Description	
SOC_SOC_Raw	66			Raw SOC	
SOC_State_of_Health	100	%		State of health: (Fu	Illchargecapacity /
SOC_FCC_mAh	11398	-		Full charge capacit	ty (adaptive)
SOC_Num_Charge_Cycles	0	-		Number of charge	cycles
SOC_Remaining_Capacity_Ah	7,6024122238	-			
SOC_Remaining_Capacity_Disp	7602	-		Remaining capacit	y from coloumb cou
16.03.2015 13:15:31: Connected to HW-Type: Bat	tery Management System (BMS) SW-Versi	on: 3000382			
16.03.2015 13:15:13: Scanning for HW-Type: Batt		011. 3000302	Create Snapshot	W	rite Snapshot
			Store Parameters (ALT	(+S) Resta	rt ECU (ALT+R)
			Update		
			opulie		
Reading takes 23 ms			Conne	cted in App-Mode	Licenced Session
				<u> </u>	
Use cases		The enac	le-tool USB-inte	rface is mad	le to support
	1	the differ	rent stages of a p	roduct deve	elopment
		a) Development: Allowing the motor-			he motor-
		controller to be analyzed, measured and			
		calibrated in real-time.			
		b)	Production: with reduced complexity,		
			just allowing to write the production		
			dataset and calibrate the system		
			dataset and c	alibrate the	e system
		c)	Aftersales: Th	ne look and	feel of Enable-
			Tool can be c	ustomized a	and reduced to a
			"minimum lev	el of compl	lexity" to allow a
			quick and eas	sy support.	
		d)	Dealer and Pr	atailars: Sat	up your dealers
		u)			
			and retailers	to service y	our vehicles.
		Enable-Tool provides functions that you would			
		expect from professional automotive measurement			
	;	and calibration tools, like encryption of datasets to			
		share with the production and dealships, or			
		encrypted and signed flash-datasets and encrypted-			
		hex-files.			
Supported OS	1	Windows 7 / Windows 8			

### CAN Bus Interface

The CAN-Bus interface can be used with automotive standard tools. Baudrate can be setup from 125kbit/s to 1000kbit/s

The CAN-matrix as dbc-File is available on request.

Image: state in the s	Messages	The Datei Bearbeiten Ansicht Optionen Fenst		-
Image: state stat		₩ ₩ Netzwerke	Name ID ID-Format DLC., Sendeart Zykluszeit Sender Kommentar Nm., Gen., NmMessage GenMsgILS., Gen., Ge	
Image: Displaying the second		- CUmgebungsvariablen		
In the second se		III → EE_BCM	<sup>128</sup> BMS_Info 0x172 CAN Stand 8 Cyclic 1000 EE_BMS 1 <sup>8</sup> 0 <sup>4</sup> no <sup>4</sup> Yes <sup>4</sup> 0 <sup>4</sup> 1000 0 <sup>4</sup> 0 <sup>4</sup> Cyclic	
Ingrals Ing			BMS_Info 0x174 CAN Stand 8 Cyclic 100 EE_BMS 1* 0* no* Yes* 0* 100 0* 0* Cyclic	
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Ignals Part of the second seco		BMS_Info_04 (0x174)		
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The strength         Note:		Kector CANdb++ Editor - T:\Emerge_Engineering		
UN         UN         Instrument	ignals	Datei Bearbeiten Ansicht Optionen Fenst	ter Hilfe	-
	-	I W Netzwerke		NWM
<ul> <li>*MS_Blaining_Dev2</li> <li>in term de lingeret</li> <li>* MS_Blaining_Dev2</li> <li>* MS_Bl</li></ul>		-K Umgebungsvariablen		
Hard Market Mar		Netzknoten     EE BCM	~ BMS_Balancing_Dev2 8 Intel Unsigned 0 1 0 0 255 - <keine> Shows in bit-coded style which cell of the referring device is being balaced</keine>	<n.a.></n.a.>
# BRX_MERGING       ************************************		B . EE_BMS		<n.a.> <n.a.></n.a.></n.a.>
Part Biol Service 20 00172         PaskS Cellonage, 20 m 27         PaskS Cellonage, 21 m 27         PaskS		BCM_BmsCtrl_01 (0x160)		<n.a.></n.a.>
************************************		BMS_Info_02 (0x172)	~ 8MS_Cellvoltage_04 8 Intel Unsigned 0 0.03 0 0 5 V <keine> actual cell-voltage, cell might not be installed depending on pack configuration</keine>	<n.a.></n.a.>
Piel BMS, Mp, 05 (017)		BMS_Info_03 (0x173)     BMS_Info_04 (0x174)	~> BMS_Cellvoltage_05     8 Intel Unsigned 0 0.03 0 0 5 V <keine> actual cell-voltage, cell might not be installed depending on pack configuration     ~&gt; BMS_Cellvoltage 05 8 Intel Unsigned 0 0.03 0 0 5 V <keine> actual cell-voltage, cell might not be installed depending on pack configuration</keine></keine>	<n.a.></n.a.>
***         ***         ***         ***         ***         ***         ***         ****         ************************************		BMS_Info_05 (0x175)	~ BMS_Cellvoltage_07 8 Intel Unsigned 0 0.03 0 0 5 V <keine> actual cell-voltage, cell might not be installed depending on pack configuration</keine>	<n.a.></n.a.>
No. MS. Calculations: 11       8       Intel       Unique 4       0       0       5       V       whene       attal end-voltage climits the initial depending on park configuration       man.         No. MS. Calculation: 12       8       Intel       Unique 4       0       00.0.0       0       0.00.0       V       whene       calculation: 1400-0000; climits the initial depending on park configuration       man.         No. MS. Calculation: 14       8       Intel       Unique 4       0       1.0       0       0.00.0       V       whene       calculation: 1400-0000; climits the initial depending on park configuration       man.         No. MS. Self, Alando, Overonizati       1       Intel       Unique 4       0       1.0       0       0       1.0       -       whene       calculation: 1400-000-0000       man.       man.         No. MS. Self, Alando, Overonizati       1       Intel       Unique 4       0       1.0       0       0       1.0       -       whene       Charabits the state of the st		B~ Signate		<n.a.> <n.a.></n.a.></n.a.>
P-NBS_CENUMPLE_12       8       Red       Unique       0       0.01.0       0       5       V       where       call add-voltage.elling that the initial depending on paix configuration       4na.         P-NBS_CENUMPLE_13       8       Inel       Unique       0       0.01.0       0       5       V       where       call add-voltage.elling that the initial depending on paix configuration       4na.         P-NBS_ERNAND_QUENCIDE       1       Inel       Signed       0       0.01.0       0       0.01.0       v       velocities       call add-voltage.elling that to be initialed depending on paix configuration       4na.         P-NBS_ERNAND_QUENCIDE       1       Inel       Unique       0       1.0       0       0.0       1.0       -       velocities       call add-voltage.elling that to be initialed depending on paix configuration       4na.         P-NBS_ERNAND_QUENCIDE       1       Inel       Unique       0       1.0       0       0.0       1.0       -       velocities       call add-voltage.elling that to be initialed depending on paix configuration       4na.         P-NBS_ERNAND_QUENCID       1       Inel       Unique       0       1.0       0       0.0       1.0       -       velocities       callind voltage.elling that to be initialed depending on				<n.a.></n.a.>
Note:         Note: <td< td=""><td></td><td></td><td>~ BMS_Cellvoltage_12 8 Intel Unsigned 0 0.03 0 0 5 V <keine> actual cell-voltage, cell might not be installed depending on pack configuration</keine></td><td><n.a.></n.a.></td></td<>			~ BMS_Cellvoltage_12 8 Intel Unsigned 0 0.03 0 0 5 V <keine> actual cell-voltage, cell might not be installed depending on pack configuration</keine>	<n.a.></n.a.>
<ul> <li>NellS, Chauge, Paug, Deterction</li> <li>Paus, SER, Analog, Overonizati</li> <li>Intel</li> <li>Uniqued</li> <li>Intel</li> <li>Uniqu</li></ul>				<n.a.></n.a.>
• Note, SER, CAN, Deversinge           1         1         1			~ 8MS_Charge_Plug_Detection 2 Intel Signed 0 1 0 0 3 <keine> 1=Plug detected</keine>	<n.a.></n.a.>
NBMS_BRC_NV_Impout       1       bret       Unigned       0       1       0       0       1       0       0       1       0       0       1       0       0       1       0       0       1       0       0       0       1       0       0       0       0       1       0       0       0       1       0       0       0       1       0				<n.a.></n.a.>
Nums, SpR, Cu, Alemi       1       bred       Uniqued       0       1       0       0       1       0       - whene       Automation       40.44         Nums, SpR, Cu, Cu, Clownon, Dai       1       bred       Uniqued       0       1       0       0       1       0       - whene       Automation       40.44         Nums, SpR, Cu, Cu, Clownon, Dai       1       bred       Uniqued       0       1       0       0       1       -       whene       Characterization       40.44         Nums, SpR, Cu, Cu, Cu       1       bred       Uniqued       0       1       0       0       1       -       whene       Characterization       40.44         Nums, SpR, Cu, Cu, Cu       1       bred       Uniqued       0       1       0       0       1       -       whene       Characterization       40.44			~ BMS_ERR_CAN_Timeout 1 Intel Unsigned 0 1 0 0 1 - <keine> CAN Timeout detected</keine>	<n.a.></n.a.>
N=NBS_FRE_CV_C401_ubder_V102e         1         bete         Uniqued         0         1         0         0         1         0         veitere         Uniqued to the constraints of the constrai				<n.a.></n.a.>
N=MBS_RFR_CV_CRC       1       bed       Unigned       0       1       -       - whene       CRC-entrol incel-monology communication boat controllier       44.8         N=MS_FRC_VL_FRC_VF_Selar       1       bed       Unigned       0       1       -       - whene       CRC-entrollier       44.8         N=MS_FRC_VF_SRC_VF_Selar       1       bed       Unigned       0       1       0       0       1       -       -whene       Cancer in cell-monology       44.8         N=MS_FRC_VF_SRC_VF_Selar       1       bed       Unigned       0       1       0       0       1       -       -whene       Cancer in cell-monology       44.8         N=MS_FRC_VF_SRC_VF_Selar       1       bed       Unigned       0       1       0       0       1       -       -whene       Cancer in cell-monology       44.8         N=MS_FRC_VF_SRC_VF_SCL       1       bed       Unigned       1       0       0       1       -       -whene       Cancer in cell-monology       44.8         N=MS_FRC_VF_SRC_VF_SCL       1       bed       Unigned       0       1       -       -whene       Concer in cell-monology       44.8       44.8         N=MS_FRC_VF_SRC_VF_SCL       1				<n.a.></n.a.>
v = MBS_SB_R_Drepse/2014ers_Date         1         1         1         0         0         1         -			~ BMS_ERR_CM_CRC 1 Intel Unsigned 0 1 0 0 1 - <keine> CRC-error in cell-monitoring comunication to host controller</keine>	<n.a.></n.a.>
NBMS_ERF_Cont_Sensor_Offert       1       bred       Uniqued       0       1       0       0       1       0       0       1       0       0       1       0       0       1       0       0       1       0       0       1       0       0       1       0       0       1       0       0       0       1       0       0       0       1       0       0       0       1       0       0       0       1       0       0       0       1       0       0       0       1       0       0       0       1       0       0       0       1       0       0       0       1       0       0       1       0       0       1       0       0       1       0       0       1       0       0       1       0       0       1       0       0       1       0       0       1       0       0       1       0       0       1       0       0       1       0       0       1       0       0       1       0       0       1       0       0       1       0       0       1       0       0       1				<n.a.> <n.a.></n.a.></n.a.>
No.MS.S.FR.F. Duck.ung., Voltage,			~ BMS_ERR_Curr_Sensor_Offset 1 Intel Unsigned 0 1 0 0 1 - <keine> Offset of current measurement out of range</keine>	<n.a.></n.a.>
9         ->MS_SER_1ctem_E[trable         1         Index         1         0         0         1         -<				<n.a.></n.a.>
A BMS_SER_Voltage_Vilage_Vi				<n.a.> <n.a.></n.a.></n.a.>
• RMS_SER_Contemp. Dickupage 11         intel Uragined 0         1         intel Uragined 0         1         1         intel Uragined 0         1         1         1			~ 8MS_ERR_Output_Voltage_High 1 Intel Unsigned 0 1 0 0 1 - <keine> Voltage at charge/discharge terminal above limits</keine>	<n.a.></n.a.>
9         MSb, SLP, Yack, Voltage, Min         1         Intel         Unsigned         0         1         0         0         1         - <				<n.a.></n.a.>
• VBMS_ERR_Proventage             • To MS_ERR_Proventage             • To MS_ERR_PROV             • To MS_ERR_PR			~ BMS_ERR_Pack_Voltage_Max 1 Intel Unsigned 0 1 0 0 1 - <keine> Sum of cell voltages (pack voltage) above max</keine>	<n.a.></n.a.>
-> BMS_ERR_Temp_Powerstage_2 1 I briel Unsigned 0 1 0 0 1 - < <a href="https://www.setsub.com/wwww.setsub.com/www.setsub.&lt;/td&gt;&lt;td&gt;&lt;/td&gt;&lt;td&gt;&lt;/td&gt;&lt;td&gt;~ BMS_ERR_Powerstage 1 Intel Unsigned 0 1 0 0 1 - &lt;keine&gt; Fault signal from powerstage driver&lt;/td&gt;&lt;td&gt;&lt;n.a.&gt;&lt;/td&gt;&lt;/tr&gt;&lt;tr&gt;&lt;td&gt;-&gt;BMS_ERR_Temp_Powerstage_2 1 Intel Unsigned 0 1 0 0 1&lt;/td&gt;&lt;td&gt;&lt;/td&gt;&lt;td&gt;&lt;/td&gt;&lt;td&gt;&lt;/td&gt;&lt;td&gt;&lt;n.a.&gt;'&lt;br&gt;&lt;n.a.&gt;'&lt;/td&gt;&lt;/tr&gt;&lt;tr&gt;&lt;td&gt;&lt;/td&gt;&lt;td&gt;&lt;/td&gt;&lt;td&gt;&lt;/td&gt;&lt;td&gt;&lt;/td&gt;&lt;td&gt;&lt;n.a.&gt;&lt;/td&gt;&lt;/tr&gt;&lt;tr&gt;&lt;td&gt;Beet&lt;/td&gt;&lt;td&gt;&lt;/td&gt;&lt;td&gt;&lt;/td&gt;&lt;td&gt;\set Version MS_ERR_Temp_Powerstage_2 1 Intel Unsigned 0 1 0 0 1 - &lt;keine&gt; Temperature at powerstage sensor 2 above limits     \]&lt;/td&gt;&lt;td&gt;&lt;/td&gt;&lt;/tr&gt;&lt;tr&gt;&lt;td&gt;&lt;/td&gt;&lt;td&gt;&lt;/td&gt;&lt;td&gt;&lt;/td&gt;&lt;td&gt;~&gt; BMS_ERR_Temp.Powerstage_2 1 Intel Unsigned 0 1 0 0 1 - &lt;a href=" https:="" www.stage.sensor2.above.imits"="">https://www.stage.sensor2.above.imits</a>				
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			VAMS_ERR_Temp_Powentage_2     I Intel Unsigned 0 I 0 0 I	
			~>MS_ERQ_Temp_Powentage_2 1 Intel Unsigned 0 1 0 0 14eline> Temperature at powentage sensor 2 above limits	
			~ MS_ERQ_Temp_Powentage_21IntelUnsigned01001	

### Package / Delivery Format



Revision / History		
Version	Date	Change
V3.0	20180325	Performance data added
V2.0	20170524	CAN-bus info added
V1.0	20170227	Initial document





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