ENEPAQ

Power In Shape
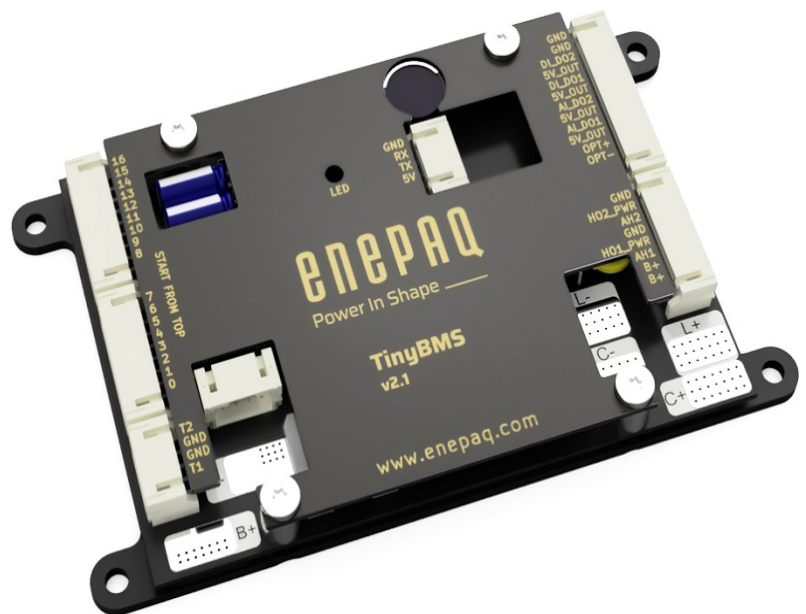
Datasheet

Tiny BMS s516 – 30A / 150A / 750A

Revision B, 2022-03-24

INTRODUCTION

BMS, or *Battery Management System*, is an essential component of every *Lithium* battery. *Enepaq Tiny BMS* supports lithium batteries of any chemistry and up to *60 V* nominal. Battery capacity from sub-*1 Ah* to *655 Ah* can be managed easily.

Tiny BMS measures individual voltages of parallel cell groups and manages switching of load and charger. During charging, cells are balanced by bleeding-off higher cells to accomplish full balance and maintain good health of battery pack.

State-of-Charge is calculated as well, and is available via communication bus to be displayed for user.

SAFETY

Various safety mechanisms are built in: disconnection of load or charger if any of the cells go out of allowed range of voltage or current, also up to two temperature points are measured and can be used for emergency disconnect or for disabling of charging if cell temperature is too low.

FLEXIBILITY

User-upgradeable firmware allows quick updates, bringing bugfixes, new features and other improvements, such as client-specific functionality. Integrated communication bus allows easy reconfiguration and streaming of real time data, while extension *I/Os* enables operation with various external peripherals: current sensors, contactors, Enable switches, *SOC* gauges and more.

FEATURES

- Integrated *150 A* power switches
- Supports *12 V* to *60 V* systems (*4s-16s*), all lithium chemistries
- All parameters are adjustable: voltage, current, temperature
- Supporting up to two external temperature sensors and one dual-range current sensor
- Dissipative balancing up to *150 mA*
- Connectivity: *UART*, *MODBUS*, *CAN* and Bluetooth
- *Event Log*, *Usage Statistics*
- Free firmware upgrades
- Programmable Inputs & Outputs
- Ultra-compact design: *95x65x9 mm*

APPLICATIONS

- Industrial equipment, robotics
- Stationary solar & wind storage
- Personal transportation

ELECTRICAL CHARACTERISTICS

Table 1: Product characteristics (all parameters rated at 25 °C if not specified otherwise)

Parameter	Comment	Min.	Typ.	Max.	Unit
Battery voltage	Operation range	9.0	-	75	V
Cell voltage	Measurement range	0.8	-	4.5	V
Discharge/Regen current (*150 A* high power *BMS* version)	Continuous	±0.8	-	±50	A
	Mounted on cool surface	±0.8	-	±60	A
	Peak (*<10* sec.)	±0.8	-	±150	A
	With external relay / contactor and current sensor	±0.8	-	±750	A
Charge current (*150 A* high power *BMS* version)	Continuous	0.8	-	30	A
	With external relay / contactor and current sensor	0.8	-	750	A
Discharge/Regen current (*30 A* low power *BMS* version)	Continuous	±0.08	-	±30	A
	Peak	±0.08	-	±60	A
Charge current (*30 A* low power *BMS* version)	Continuous	0.08	-	20	A
	Peak	0.08	-	30	A
Balancing current	Per cell, U_{cell}=4.2V	-	100	150	mA
Expansion *I/O* current	Long term	-	-	250	mA
Expansion *I/O* voltage	ADC range	0	-	75.0	V
	Logic *1*	3.0	5.0	75.0	V
	Logic *0*	0	0	1.5	V
Dimensions	Without cooling plate	-	95x65x9	-	mm
	With cooling plate	-	113x65x11	-	mm

Current consumption in active state (charging, discharging or communicating)
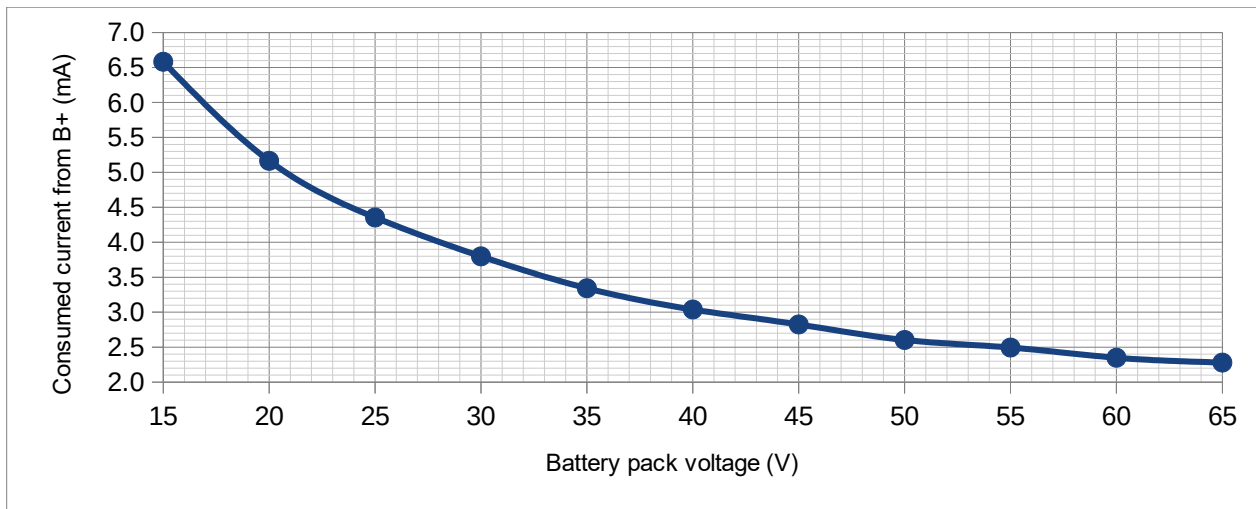

Figure 1: Current consumption from battery pack (+) in active mode (low power 30 A BMS version)
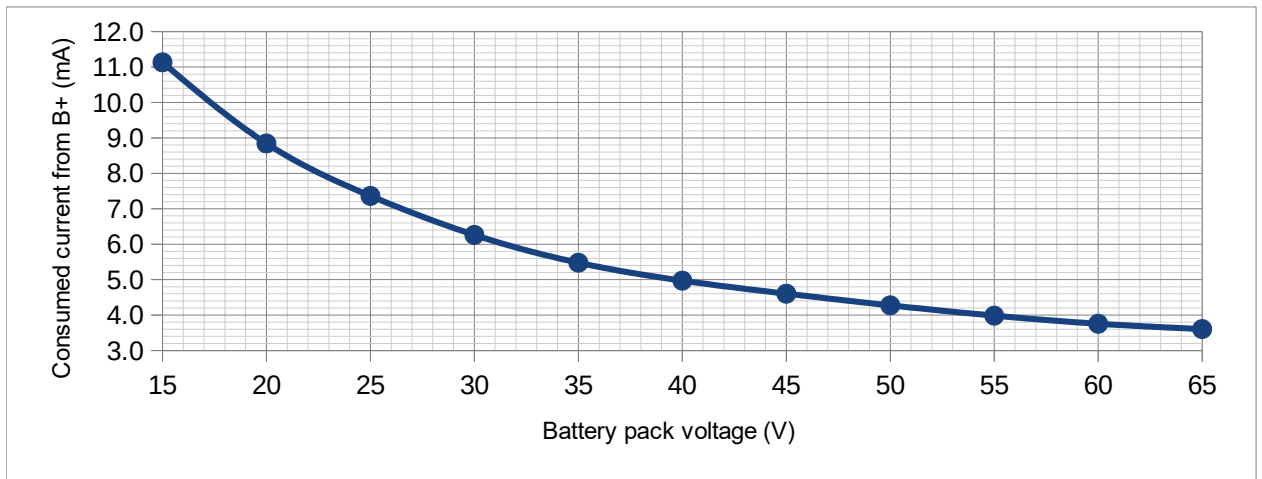
Figure 2: Current consumption from battery pack (+) in active mode (high power 150 A BMS version)

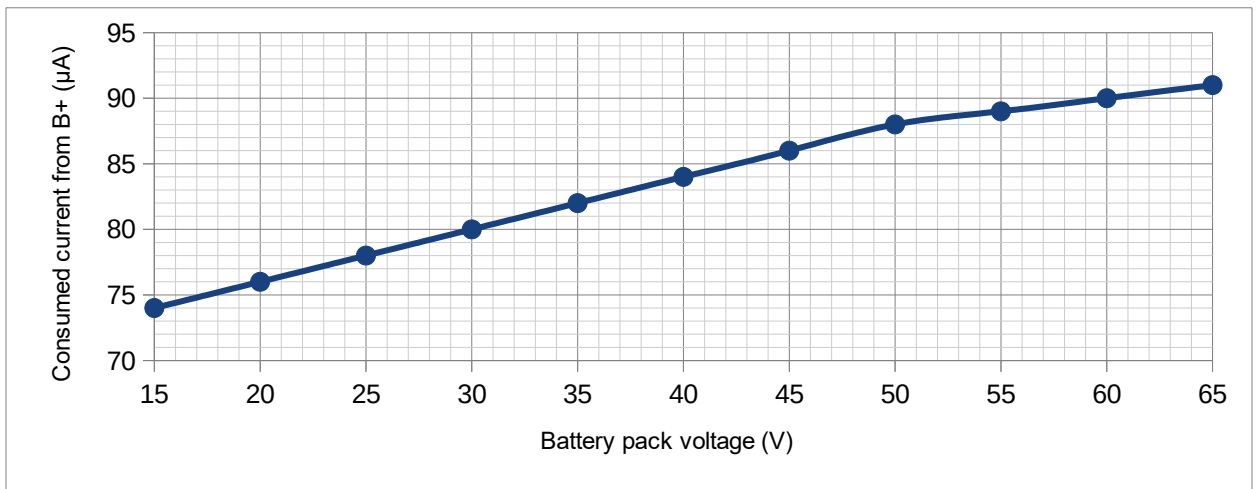**Current consumption in sleep mode**

Figure 3: Current consumption from battery pack (+) in sleep mode. Ignition enabled or load disabled due fault condition
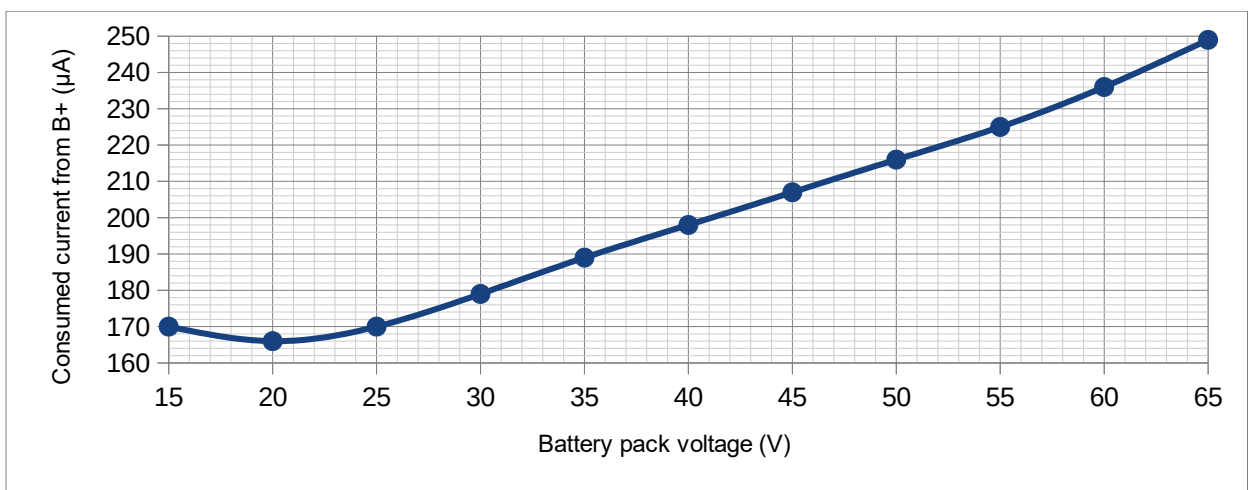

Figure 4: Current consumption from battery pack (+) in sleep mode. Ignition disabled (low power 30 A BMS version)
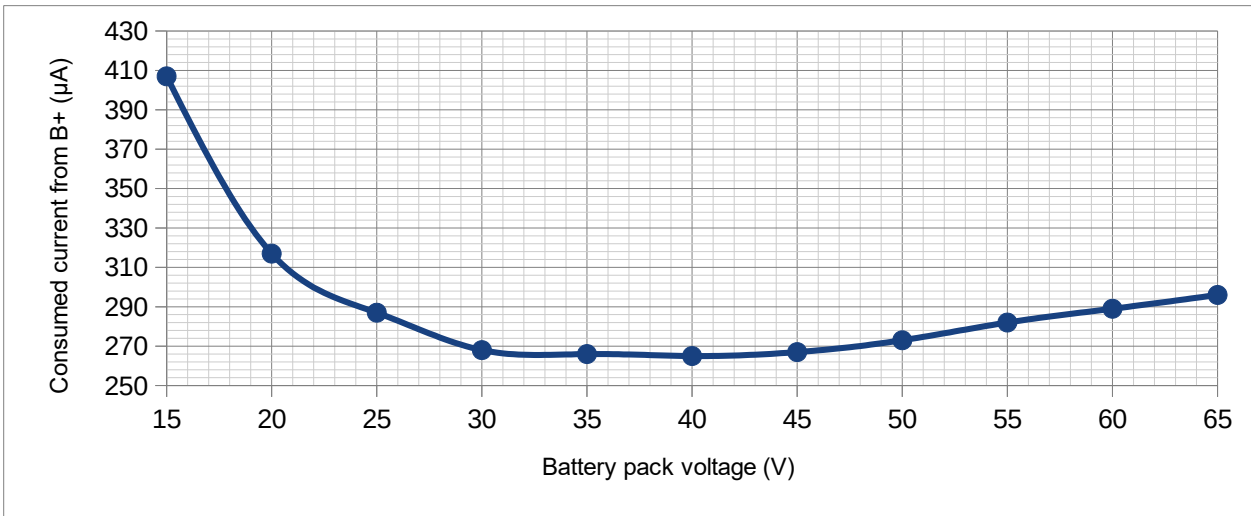
Figure 5: Current consumption from battery pack (+) in sleep mode. Ignition disabled (high power 150 A BMS version, internal current sensor)
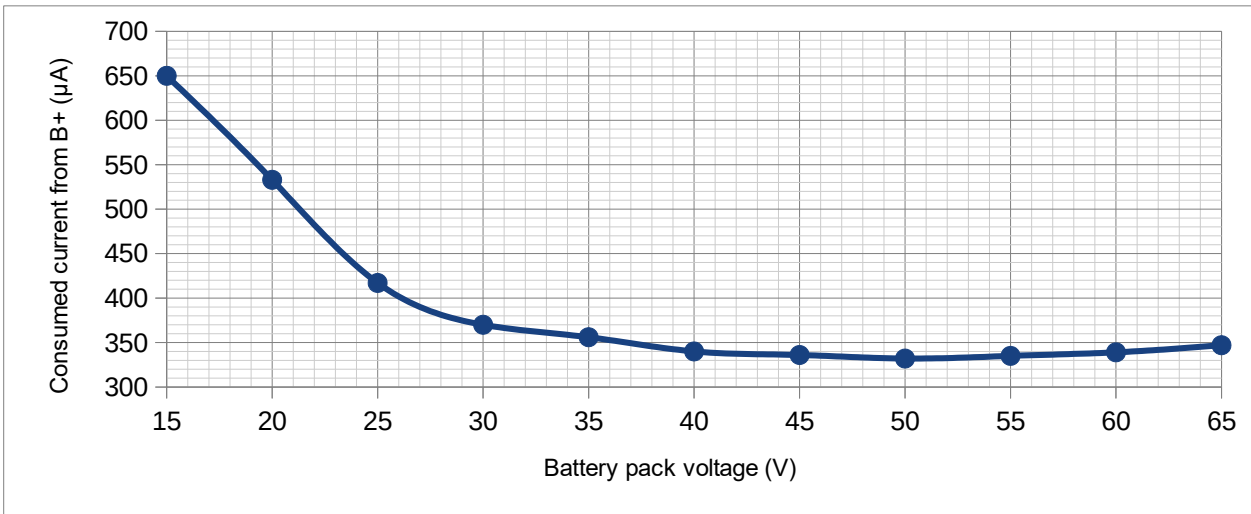

Figure 6: Current consumption from battery pack (+) in sleep mode. Ignition disabled (high power 150 A BMS version, external current sensor)

Note: These are measured approx *Tiny BMS* device current consumption values. Real current consumption may insignificantly differ from values presented above due to firmware version, *BMS* fault state, enabled features, wiring setup etc.
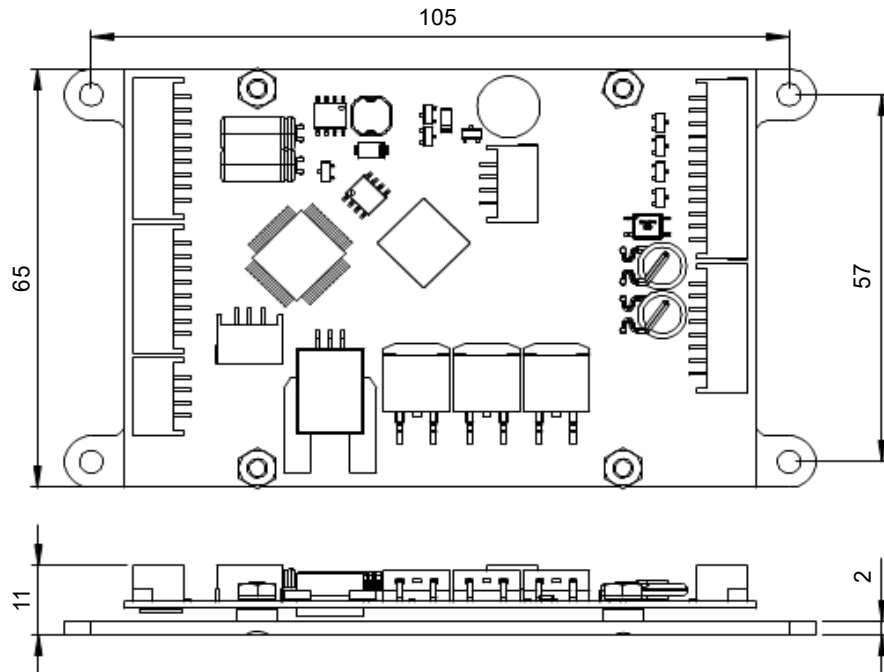
MECHANICAL DATA

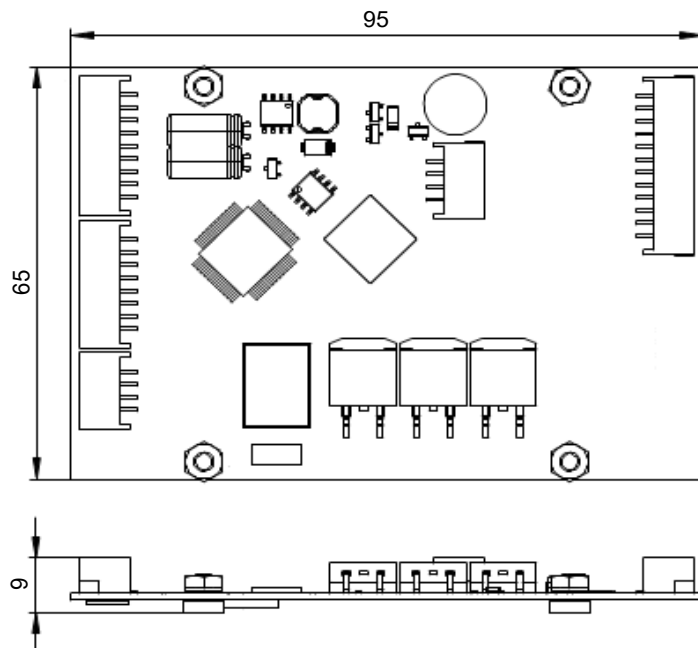*Figure 7: Mechanical dimensions (in mm) of the high power 150 A BMS module*

Figure 8: Mechanical dimensions (in mm) of the low power 30 A BMS module

Note: A simplified *STP* model is available upon request.

Note: For best results of high current handling with integrated switches, mount the *Tiny BMS* device on cool metal surface, such as enclosure of battery box.

Document revision history

Revision	Date	Description
A	2018-07-30	Initial release.
B	2022-03-24	Company rebranded to Enepaq.