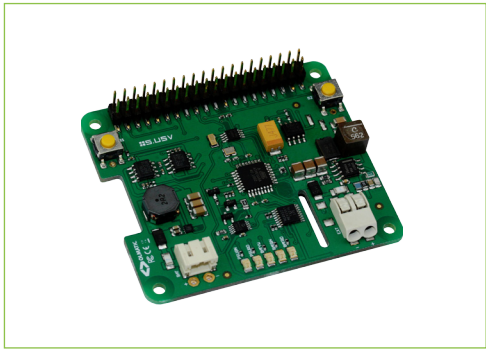


**S.USV - INTELLIGENT ENERGY MANAGEMENT MODULES WITH UPS FUNCTION**  
**FOR SINGLE BOARD COMPUTERS AND EMBEDDED SYSTEMS**  
 INTEGRATED BY CUSTOMIZED ADJUSTMENTS AND SPECIFIC BUS SYSTEMS



**PRODUCT DESCRIPTION**

The S.USV modules are intelligent energy management modules for an energy-saving and uninterruptible power supply of all single-board computers and embedded systems. In addition, the module provides additional functions and measurement/control systems to meet the high requirements and industrial specifications.

The modules are fully functional Plug & Play solutions. The implemented monitoring system carries out a continuous review of all relevant performance data in order to safely shut down the systems in case of misconduct and thus prevent data loss. For example, if the power supply to the systems falls below a specifically defined voltage threshold, the S.USV modules automatically switch to battery mode and maintain the functionality of the systems for a user-settable period of time, thereby bridge the power sink or shut down the systems safely in the event of a long-term power outage.

Through the detailed analysis of the collected performance data, the system can be operated highly efficient and energy-saving. EcoSmart® - Energy Efficient: Energy-saving and environmentally friendly power supply through high efficiency across the entire load range and intelligent power management systems.

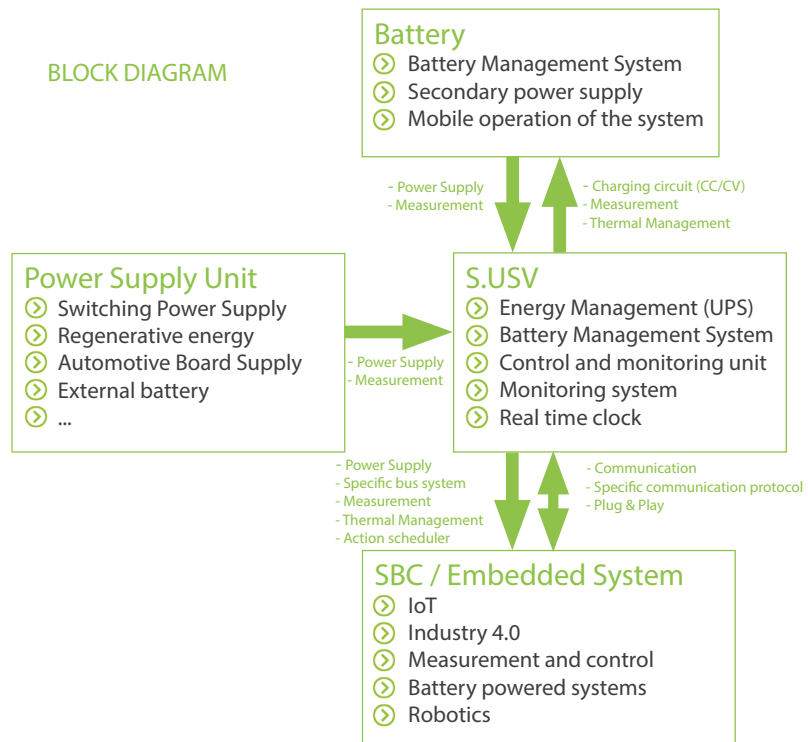
All these functions are automated. In addition, the operator has the option of checking and controlling all operating states or switching processes via specific software solutions.

All modules are customizable and, through specific bus systems/communication protocols and modular design, allow variable integration with mechanical and electrical conditions in a variety of specific application systems.

**FUNCTION OVERVIEW**

- ⊕ HAT compliant energy management modules
- ⊕ Integration capability in all SBCs and embedded systems
- ⊕ customized adjustments
- ⊕ custom communication protocols
- ⊕ Plug & Play
- ⊕ specific software solutions
- ⊕ uninterruptible power supply
- ⊕ Power input with extended voltage range (+ 7-24V)
- ⊕ Monitoring system (Performance / Power monitoring)
- ⊕ integrated LiPo battery with configurable charging control (300mA / 500mA / 1000mA)
- ⊕ Battery Management Controller
- ⊕ Battery Management System
- ⊕ integrated Real Time Clock
- ⊕ time-controlled and event-based switching on and off the systems - Action scheduler
- ⊕ Supply Switch (On/Off Button / File Safe Shutdown)
- ⊕ LED status display
- ⊕ Bootloader for live firmware updates
- ⊕ Battery-Hot-Swap

**BLOCK DIAGRAM**



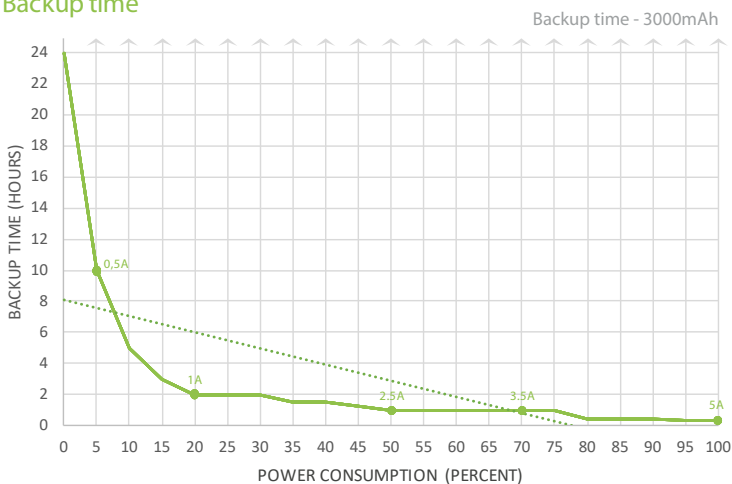
### TECHNICAL SPECIFICATION

Input voltage - Primary	+7-24V			
Performance specifications		primary	secondary (battery operation)	charging circuit
	Max. Input current	3.5A	-	-
	Max. Output current	3.5A	3.5A	1A
	Max. Output voltage	+5V	+5V	+4.2V
Power consumption	average <4W / max. 25W			
Efficiency	up to 91%			
Ripple	<50 mVss			
Backup time	3000mAh = 0.5A ~ 10h / 2.5A ~ 1h / 5A ~ 0.25h (see Backup time)			
Protection Circuit	SCP, OLP, OCP, OVP, UVP, OTP, ODP, RCP			
Safety/EMC	EMC Directive 2014/30/EU, IEC 62368-1:2014, IEC 61140:2016			
Temperature range	-20°C to +60°C			
Dimensions	65x56,5x9,0mm (WxDxH)			

Battery data		300mAh - LiPo battery	3000mAh - LiPo battery
	Nominal voltage	3.7V	3.7V
	Operating voltage	3.0- 4.2V	3.0 - 4.2V
	Capacity	300mAh	3000mAh
	Internal impedance	≤60mΩ	≤30mΩ
	Constant charge/discharge current	2C/15C	1C/2C
	Working temperature	-20-60°C	-20-60°C
	Connection cable	UL1571#28	UL1571#28
	Connector	Würth 620 002 113 322	Würth 620 002 113 322
	Dimension	30.0 x 20.0 x 6.7 mm	60.0 x 50.0 x 9.0 mm

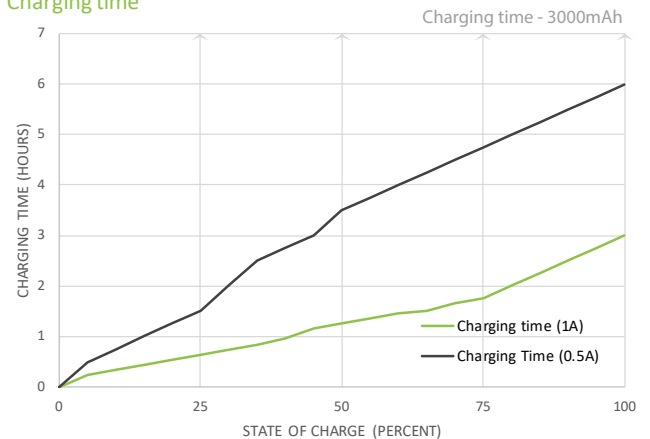
larger capacities on request

#### Backup time



(The measured backup time may vary depending on electrical conditions)

#### Charging time



**S.USV - MODEL OVERVIEW / COMPARISON CHART**  
**ALREADY AVAILABLE MODULES**

	<i>S.USV pi basic mobile</i>	<i>S.USV pi advanced S.USV tinker S.USV UPs</i>	<i>S.USV pi advanced mobile S.USV tinker mobile S.USV UPs mobile</i>	<i>S.USV pi industrial S.USV tinker industrial S.USV UPs industrial</i>
Plug & Play	√	√	√	√
Starting process via battery (mobile)	√	x	√	√
Primary power supply/Output power	5 Volt/3500 mA	7-24 Volt/3500 mA	7-24 Volt/3500 mA	7-48 Volt/5000 mA
Backup Line (Backup input for secured supply)	x	x	x	7-48 Volt/5000 mA
Secondary power supply/ Output power (battery operation)	5 Volt/3500 mA	5 Volt/3500 mA	5 Volt/3500 mA	5 Volt/5000 mA
Interfaces	I <sup>2</sup> C, GPIO	I <sup>2</sup> C, GPIO	I <sup>2</sup> C, GPIO	I <sup>2</sup> C, GPIO
ID EEPROM	√	√	√	√
Monitoring - System	√	√	√	√
LiPo - Battery (300 mAh)	√	√	√	x
LiFePO4 - Battery (3400 mAh)	x	x	x	√
Battery Management	√	√	√	√
Battery Monitoring	√	√	√	√
Real Time Clock	√	√	√	√
Supply Switch	√	√	√	√
Customizable	√	√	√	√
Extern-Voltage-Monitoring	x	x	x	√
Dynamic-Power-Tracking	x	x	x	√
Thermal Management	x	x	x	√
Additional +5V/5A Power Output	x	x	x	√
Extended Protection Circuit	x	x	x	√
Watchdog	x	x	x	√
Power Cycle/Heartbeat	x	x	x	√
ESD protected 2-channel 10-Bit A/D converter	x	x	x	√
Automatic fan switching (optional)	x	x	x	√
Compatibility	All Raspberry Pi models	All Raspberry Pi models All Asus tinker models All UP Boards	All Raspberry Pi models All Asus tinker models All UP Boards	All Raspberry Pi models All Asus tinker models All UP Boards
Dimension	65x56,5x9,0mm (WxDxH)	65x56,5x9,0mm (WxDxH)	65x56,5x9,0mm (WxDxH)	65x56,5x9,0mm (WxDxH)