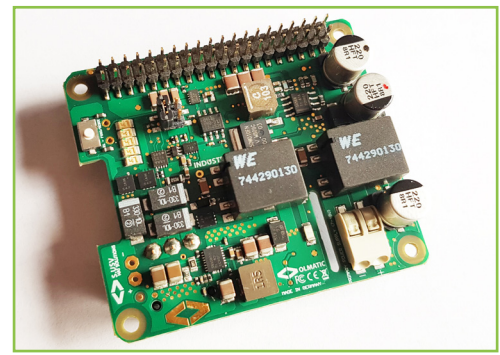


S.USV INDUSTRIAL - INTELLIGENT ENERGY MANAGEMENT MODULES WITH UPS FUNCTION
FOR SINGLE BOARD COMPUTERS AND EMBEDDED SYSTEMS
THE KEY TO INTRODUCING IN THE INDUSTRY 4.0



PRODUCT DESCRIPTION

The S.USV industrial closes the gap between single-board computers/embedded systems and Industry 4.0. The intelligent energy management module with uninterruptible power supply is equipped with the latest technology and designed for state-of-the-art industrial applications of your single-board computer and embedded systems.

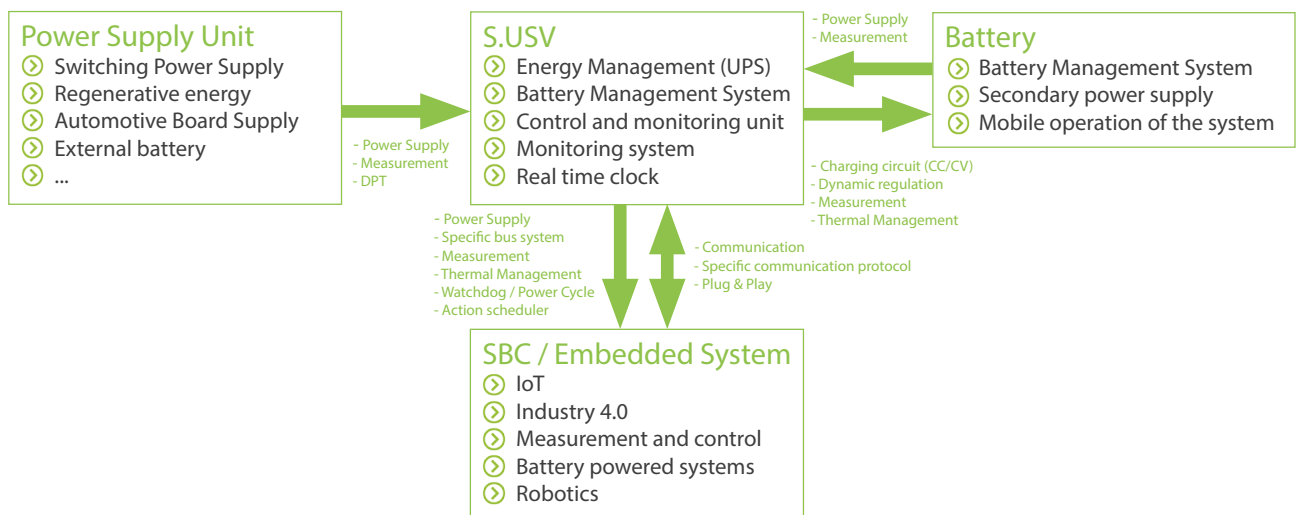
The S.USV industrial is also an intelligent power bank and can be operated purely by battery if required. The latest state-of-the-art LiFePO4 accumulators, specially designed for the extended temperature range of the Industry, are used for this purpose. For the safety and guarantee of a stable and long service life, intelligent Battery-Management-Systems have been implemented, which in addition to the Thermal Management also provides a comprehensive Monitoring-System. The automated Dynamic-Power-Tracking-System enables a self-sufficient supply of your systems in the extended voltage range of 7-48 volts (regenerative energies, automotive area, and more). The charging circuit is adapted and controlled in accordance with the available power via the active energy source.

The module is a fully functional plug & play solution. The implemented Monitoring-System carries out a continuous review of all relevant performance data in order to safely shut down the embedded system in case of misconduct and thus prevent data loss. Through the detailed analysis of the collected 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.

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.

All these functions are automated. In addition, you have the option of checking and controlling all operating states or switching processes via software and specific bus systems.

BLOCK DIAGRAM



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
- ⊗ specific bus systems
- ⊗ Bootloader for live firmware updates
- ⊗ integrated Real Time Clock
- ⊗ uninterruptible power supply
- ⊗ start and operate purely on battery
- ⊗ Monitoring system: Performance/Dynamic-Power-Tracking (DPT)
- ⊗ optimized for self-sufficient use via regenerative energy sources
- ⊗ Efficiency up to 91%
- ⊗ integrated LiFePO4 battery with dynamic regulation
- ⊗ Battery Management Controller
- ⊗ Battery Management System
- ⊗ Thermal Management
- ⊗ Power input with extended voltage range (7-48V/5A)
- ⊗ Backup input (7-48V/5A) for safe supply via additional power source
- ⊗ Additional +5V/5A power output for external peripherals
- ⊗ Protection Circuit: RPP, SCP, OLP, OCP, OVP, UVP, OTP, ODP, RCP
- ⊗ Watchdog - Power cycle/Heartbeat functionality
- ⊗ ESD protected 2-channel 10-bit A/D converter for external analog-digital measurements
- ⊗ automatic fan switching (optional)
- ⊗ timed and event based on and off switching of the system - Action Scheduler
- ⊗ Supply Switch (On/Off Button/File Safe Shutdown)
- ⊗ LED status display
- ⊗ Battery-Hot-Swap

TECHNICAL SPECIFICATION

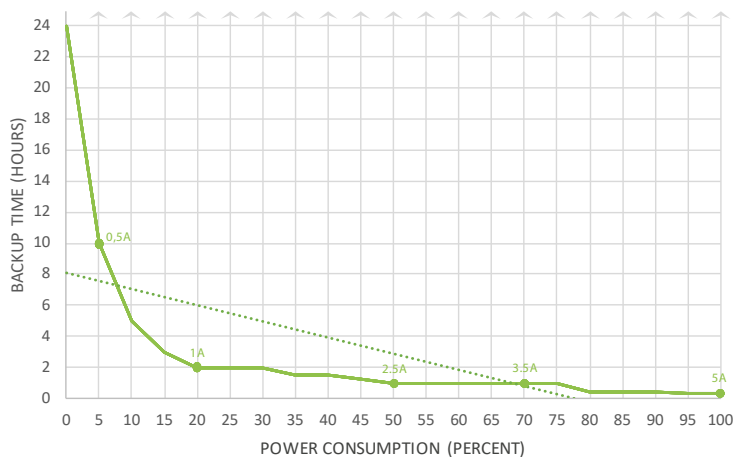
Input voltage - Primary	+7-48V			
Input voltage - Backup line	+7-48V			
Performance specifications		primary	secondary (battery operation)	charging circuit
	Max. Input current	5A	-	-
	Max. Output current	5A	5A	1A
	Max. Output voltage	+5V	+5V	+3.65V
Power consumption	average <4W / max. 25W			
Efficiency	up to 91%			
Ripple	<50 mVss			
Backup time	3400mAh = 0.5A ~ 10h / 2.5A ~ 1h / 5A ~ 0.25h (see Backup time)			
Protection Circuit	RPP, SCP, ICL, 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 +75°C			
Dimensions	65x56,5x9,0mm (WxDxH)			

Battery data		3400mAh - LiFePO ₄ battery	
	Nominal voltage	3.2V	
	Operating voltage	2.5 - 3.65V	
	Capacity	3400mAh	
	Internal impedance	≤20mΩ	
	Constant charge/discharge current	1C/5C	
	Working temperature	-20-75°C	
	Connection cable	UL1571#28	
	Connector	DF63-3S-3.96C	
Dimension	90 x 51 x 11 mm		

larger capacities on request

Backup time

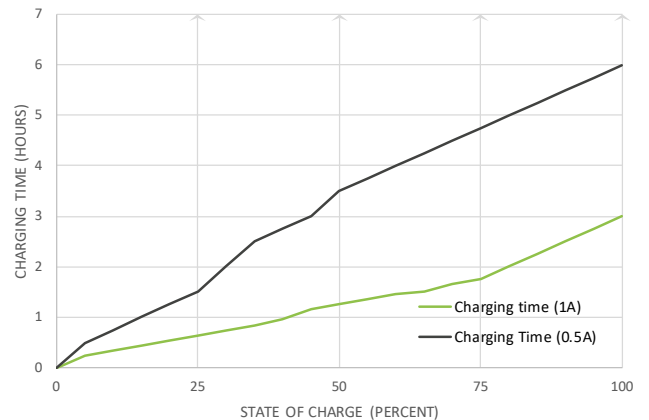
Backup time - 3400mAh



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

Charging time

Charging time - 3400mAh



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 ² C, GPIO	I ² C, GPIO	I ² C, GPIO	I ² 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)