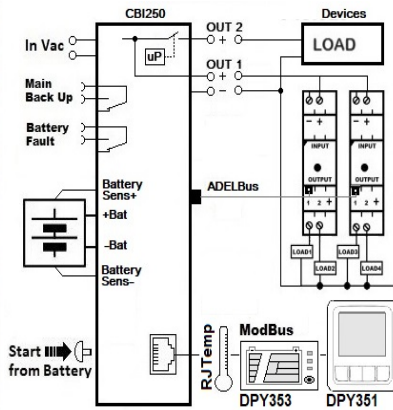# CB2501224A Charge & Testing

- **Input: Single-phase 115 – 230 - 277 Vac / 120 - 420 Vdc**
- **Output Selectable Load: 12 Vdc 12A; 24 Vdc 10A**
- **Output Battery charging: 12 Vdc 12A; 24 Vdc 10A**
- **Two load outputs: one static; one dynamic for: On/Off, Dimmer (LED, DC brush motors), Fuse Breaker, PC shutdown and more**
- **Modbus RTU for Monitoring, Configuration, History and Alarms.**
- **ADELBus: integrated monitoring and control of ADELSystem devices such as MRF10x e-Fuses and display.**
- **Suitable for the following battery types: Open Lead Acid, Sealed Lead Acid (AGM/VRLA), lead Gel, Li-Ion and NiCd/NiMH**
- **Battery Care: Automatic diagnostic of battery state-of-charge (SoC) and state-of-health (SoH).**
- **Charging curve IUoU, constant voltage and constant current.**
- **Five charging levels: Recovery, Boost, Absorption, Float (Forced trickle / Forced float / Auto float-trickle), and Refresh**
- **Battery purification for battery reinvigoration**
- **Protected against short circuit and reversed polarity**
- **Signal output (contact free) for: discharged or damaged battery, Mains or Back-up, rectifier failure**
- **Protection degree IP20 - DIN rail; Space saving**

Technical features

Thanks to the All-In-One units "DC-UPS" it is possible to optimize the power management, today implemented with two Outputs: one Dynamic and one Static. The available power is automatically shared between load and battery. Supplying power to the load is the top priority of the unit: it is not necessary to double the power of the device, because also the power going to the battery will be steered to the load if the load so requires. The maximum available current at the load output is twice the value of the device rated current In. Small and powerful "Charge and Testing" Battery Charger today also provided in option design as added Power supply Output for a load. In the same time, the device charge the battery and Provide power for the Load that normally is connected in parallel to the battery, in this way, in any condition of the battery mainly if it is completely downloaded, the load is supplied to be persevered a reliable system. A Device that Charge and detect the battery, we call "Battery Care" the concept based on algorithms that implement rapid and automatic charging, battery charging optimization during time, flat batteries recovery and real time diagnostic during installation and operation. Battery faults such as sulphated battery, battery cells in short circuit, accidental battery connection with reversed polarity, disconnection of the battery and more can easily be detected and removed with the aid of the blink code of the diagnosis LED both during the installation and normal operation. The continuous monitoring of the battery status reduces battery damage risk and allows a safe operation in a permanent and unattended system. The battery state-of-health is continuously monitored providing an early diagnostic of battery wear thus allowing a preventive maintenance to be undertaken. Each device is suited for all battery types: by means the user interface it is possible to set predefined charging profiles for Open Lead Acid, Sealed Lead Acid, Gel, NiCd/NiMH with five charging stages, Recovery, Bulk/Boost, Absorption, multimode Float and Refresh, that can be customized by the user using the Modbus RTU interface. Periodic purification can be configured to regularly exercise the battery thus helping prevent sulphation and wear. A rugged casing with bracket for DIN rail mounting provides IP20 protection degree. The CB2501224A is a feature-rich and heavy-duty unit which is extremely compact in size and very a cost-effective power management solution.

Power Management and controls

The new line CB provide two Outputs: the first is a normal output connected to the internal power supply, the second output is controlled by the internal device and it is configurable, we call "Dynamic Output". This Dynamic Output can be configured via Modbus RTU as, Soft Start, Fade-in and Fade-out, On/Off, PC shutdown and much more.

Interconnections

The CB2501224A is equipped with a CAN-based ADELBUS interface which allows the plug-and-play connection of Adelsystem devices such as electronic fuses and displays enabling their control and monitoring. Moreover, an electrically-isolated RS485-based standard Modbus RTU interface allows a PC or RTU to monitor and control the CB2501224A along with the Adelbus devices connected to it. Such integration with all the accessories provided by ADELSYSTEM allows the development of a truly independent system for electrical continuity. At the same time, it allows monitoring and control all parameters in the system by means of application tools. ADELSystem allows you to implement very simple but sophisticated monitoring and control for your energy system and opens your mind to new ways to approach your applications.

Norms and Certifications

In Conformity to: EN60950 / UL60950-1 and CSA C22.2 No. 60950-1-07 (Information Technology Equipment Safety Part1: Safety EN IEC 62368-1: 2014/AC:2015; EN54-4 Fire Detection and fire alarm systems; 89/336/EEC EMC Directive; 2014/35/UE (Low Voltage); DIN41773 (Charging cycle); Emission: IEC 61000-6-4; Immunity: IEC 61000-6-2. CE.

Climatic Data

Ambient temperature (operation)	**-25 ÷ +80°C**
De-rating T^{amb} > 60°C	**- 2.5% (In) /°C**
Ambient temperature Storage	**-40 ÷ +85°C**
Humidity at 25 °C no condensation	**95% to 25°C**
Altitude: 0 - 6000m / 0 – 20000ft	**No restrictions**
Over voltage category IEC62103, EN50178	**III Altitude < 2000m**
Over voltage category IEC62103, EN50178	**II Altitude > 2000m**
Cooling	**Auto convection**

General Data

Insulation voltage (IN/OUT)	**4000 Vac**
Insulation voltage (Input / Earth, PE)	**3000 Vac**
Insulation voltage (Out Load & Battery / Earth, PE)	**500 Vac**
Insulation voltage (Out Load & Battery / Fault System & Main or Back Up terminal)	**1000 Vac**
Modbus RTU interface insulation	**Functional only**
Leakage Current	**< 5mA**
Protection Class (EN/IEC 60529)	**IP20**

Reliability: MTBF IEC 61709	> 300000 h
Pollution Degree Environment	2
Input and output Connections: terminal Blocks Push-in type	2 mm (24–12AWG)
Signal Connections: terminal Blocks Push-in type	0.8 mm (24–20AWG)
Protection class (PE Connected)	I, with PE
Dimensions (w-h-d)	50x135x135 mm
Weight	0.95 kg

Input Data

Nominal Input Voltage Vac	100 – 240 – 277
Voltage range Vac	85 – 305
Voltage range Vdc	120 – 420
Inrush Current (Vn – In nom. Load) I²t	≤ 90 A ≤ 5 msec
Power Factor, typ. at full load	>0.95
Frequency	47 ÷ 63 Hz
Input Current (115 – 230 – 277 Vac)	5.5 – 3.0 – 2.0A
Internal fuse (not replaceable)	8.0 A
External Fuse (recommended) MCB	10 A curve C

Output Data (internal power supply)

Select Output Voltage 12 or 24 Vdc.	By dipswitch
Continuous current (without battery)	Iload=In
Continuous current (With battery) Iload= In+ Ibatt	2 x In
Max. current Output Load (Main + Battery) Iload (4 sec.)	3 x In max.
Max. current Output Load (Back Up) Iload (4 sec.)	2 x In max.
Start From Battery Without Mains (Remote Input Control)	RTCONN (cable) Push Button
Time Buffering; min (switch output off without main input)	0.5; 2.5; 10; 15; 20; 30; 45; 60; ∞
Efficiency 230 Vac 24Vdc (rated current)	≥ 93 %
Residual Ripple	≤ 80 mV$_{pp}$
Turn-On delay after applying mains voltage	1 sec. (max)
Start up with Strong Load (capacitive load)	Yes, Unlimited
Dissipation power load max (W)	< 20
Short-circuit protection	Yes
Over Load protection	Yes
Over Voltage Output protection	Yes (typ. 35 Vdc)
Overheating Thermal protection	Yes

Additional Load Output 24 Vdc (Deep Switch selection)

Output voltage (at In)	22 - 28.8 Vdc
Nominal current In = Iload	10 A ± 5% In
Threshold alarm Battery almost flat	20 – 21 Vdc batt
Protections against total discharge	19 – 20 Vdc batt

Additional Load Output 12 Vdc (Deep Switch selection)

Output voltage (at In)	10 - 14.4 Vdc
Nominal current In = Iload	12 A ± 5% In
Threshold alarm Battery almost flat	10 – 11 Vdc batt
Protection against total discharge	9 – 10 Vdc batt

Battery Output

Boost-Fast charge Switch Configuration 20°C (V/cell)	Lead Acid: 2.40 NiCd: 1.45 Li-ion: 3.65
Float Charge Switch Configuration 20°C (V/cell):	Lead Acid: 2.23; 2.25;2.27;2.30 NiCd:1.4 Li-ion: 3.45
Max.Time Boost–Bulk charge (Typ. at IN)	15 h
Min.Time Boost–Bulk charge (Typ. at IN)	1 min.
Charging current max Ibatt	In ± 5%
Charging current limiting Iadj	0.2 ÷ 100 % / Ibat

Recovery Charge 12V / 24Vdc	2 – 11.2V / 2 – 22.5V
Reverse battery protection	Yes
Battery sulphation check	Yes
Detection of shorted cells	Yes
Battery sense input for 4-wire connection	Yes
Quiescent current on battery	≤ 5 mA
Charging Curve automatic: IUoU	5 stages
Remote Input Control (RTCONN cable)	Boost /Float
Threshold alarm Battery almost flat	20 – 21 Vbatt
LVD. (Protections against total Batt. Discharge)	19 – 20 Vbatt

Signal Output (free switch contacts)

Mains or Backup Input Power	Yes
Fault	Yes
(The Outputs can be reconfigured on the project Needs)	

Type of Signal Output Contact

Dry Contact. Current can be switched (EN60947.4.1): Max: DC1: 30 Vdc 1 A; AC1: 60 Vac 1A (Resistive load) Min: 1mA at 5 Vdc (Min permissive load)

Main or Backup Input Power	C	/	NO
Fault	C	/	NO

Signal Input / Output (RJ45)

Temp. Comp. Battery (with external probe)	RJ Temp (cable) Aux 1
Remote monitoring data: Protocol:	RJ45: RJ Temp (cable) Modbus RTU, DPY351, DPY353

Functional Diagram

Service Life

Connection Diagram

ADELSYSTEM