

CBI All in One DC UPS Power Solutions



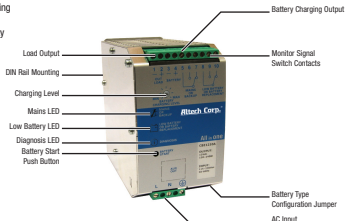
CBI All in One UPS Power Solutions combine the requirements for several applications in just one device which can be used as power supply unit, battery charger, battery care module or backup module. The available power is automatically distributed among load and battery, while supplying power to the load always is the first priority. The maximum available current of the load output is two times the value of the device's rated current.

If the device is disconnected from the main power source, the battery will supply the load until the battery voltage reaches 1.5 V per cell. This prevents the battery from deep discharge. CBI devices provide microprocessor controlled battery charging. Using algorithms, the battery's condition will be detected and based on that, an appropriate charging mode is chosen. The real-time diagnostics system will continuously monitor the charging progress and indicate possibly occurring faults such as elements in short circuit, accidental reverse polarity connection or disconnection of the battery by the battery fault LED and a flashing code of the diagnosis LED.

CBI All in One UPS Power Solutions are suitable for open/sealed lead acid-, lead gel- and optionally Ni-Cd batteries. By using the battery-select-jumper, it is possible to set predefined charging curves for those battery types. The available charging options are recovery-, boost- and trickle charge. All CB devices are built in a rugged metal case with a DIN rail mounting bracket.

Features:

- Power supply, battery charger, battery care module and backup module in one device
- Three charging modes
- Compact, rugged metal case
- Available in 12VDC, 24VDC and 48VDC
- Suitable for most common battery types
- Adjustable charging current
- Easy battery diagnosis and fault identification either by LED or external devices connected to fault
- Status contacts
- High efficiency up to 91% through switching technology
- Several output protection features such as short circuit, overload, deep battery discharge etc.
- DIN rail mounting
- Small size
- 3 year warranty



Battery Selection Chart

Battery type	1.2 Ah	3.2 Ah	7.2 Ah	12 Ah
Load 1.5 A	20	60	200	400
Load 3 A	8	30	120	240
Load 5 A	3	15	55	100
Load 7.5 A	2	10	30	60
Load 10 A	-	7	20	45
Load 12 A	-	3	12	30
Load 15 A	-	-	9	20
Load 20 A	-	-	7	13

BUFFERING
(MINUTE) TIME

All In One: Uninterruptible Power Supply Output Vdc

Thank you for having chosen one of our products for your work.

We are certain that it will give the utmost satisfaction and be a notable help on the job.



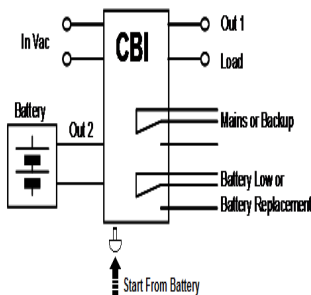
General Description

Thanks to the All In One units (DC-UPS), it will be possible to optimize power management. The available power is automatically allocated between load and battery, supplying power to the load is the first priority of the unit thus it is not necessary to double the power, because also the power going to the battery will go to the load if the load so requires. The maximum available current on the load output is 2 times the value of the device rated current I_n . We call "Battery Care" the concept based on algorithms that implement rapid and automatic charging, battery charge optimization during time, flat

batteries recovery and real time diagnostic during installation and operation. The Real Time Auto-diagnostic system, monitoring battery faults such as, battery Sulfated, elements in short circuit, accidental reverse polarity connection, disconnection of the battery, they can easily be detected and removed by help of Blink Code of Diagnosis Led; during the installation and after sell. The continuous monitoring of battery efficiency, reduces battery damage risk and allows a safe operation in permanent connection. Each device is suited for all battery types, by means of jumpers it is possible setting predefined curves for Open Lead Acid, Sealed Lead Acid, Gel and Ni-Cd. They are programmed for two charging levels, boost and charge, but they can be changed to single charging level by the user. A rugged casing with bracket for DIN rail mounting provide IP20 protection degree. They are extremely compact and cost-effective.

Main Characteristics

- Input: Single-phase 115 – 230 – 277 Vac
- Output Load: power supply: 24Vdc; 10 A
12Vdc; 15 A
- Output Battery: charging 24Vdc; 10 A
12Vdc; 15 A
- Modbus Connection
- Suited for the following battery types: Open Lead Acid, VRLA (AFM), Gel, and Ni-Cd.
- Automatic diagnostic of battery status. Charging curve IUoUO, constant voltage and constant current Battery Life Test function (Battery Care)
- Switching technology
- Four charging levels: Boost, Absorption, Trickle and Recovery
- Protected against short circuit, Over Load and inverted polarity
- Signal output (contact free) for discharged or damaged battery
- Signal output (contact free) for mains or Back-UP
- Protection degree IP20 - DIN rail; Space saving



Safety and warning notes

WARNING – Explosion Hazard Do not disconnect Equipment unless power has been switched off or the area is known to be non-hazardous.



WARNING – Explosion Hazard. Substitution of components may impair suitability for class I, Division 2.

WARNING – Switch off the system before connecting the module. Never work on the machine when it is live. The device must be installed in according with UL508. The device must have a suitable isolating facility outside the power supply unit, via which can be switched to idle. Danger of fatal Injury!

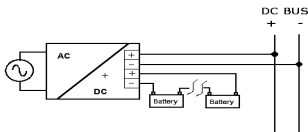
Connection (terminal and wiring):

Cable Connection: The following cable cross-sections may be used:

Solid (mm ²)	Stranded (mm ²)	AWG	Torque (Nm)	Stripping Length	1 Phase L N PE Input AC	1 Phase L N PE Input AC
In: 4.0	6.0	30 – 10	0.8 – 1.0 Nm	7 mm		
Out: 4.0	6.0	30 – 10	0.8 – 1.0 Nm	7 mm		
Signal: 0.2 – 2.5	0.2 – 2.5	24 – 14	0.5 – 0.6 Nm	7 mm		

The connection is made by the screw type 2.5 mm² or 4.0 mm² terminal blocks. Use only copper cables that are designed for operating temperatures of > 75 °C. Wiring terminal shall be marked to indicate the proper connection for the power supply.

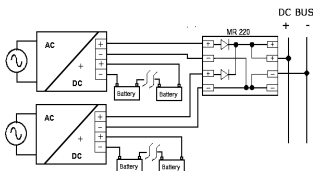
Output Power connections:



Normal connection

Typical application for All In One device, one output for LOAD "DC Bus", one Input/Output for connection to the battery.

- N°1 battery (12 Vdc) for 12V;
- N°2 battery (12 Vdc) connected in Series for 24V;

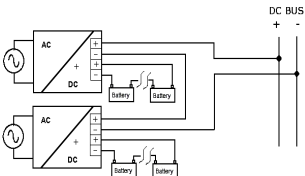


Parallel connection "Redundancy"

Power supplies can be paralleled for 1+1 redundancy to obtain a higher system availability. Redundant systems require a certain amount of extra power to support the load in case one power supply unit fails. The simplest way is to put two CBI in parallel. In case one power supply unit fails, the other one is automatically able to support the load current without any interruption. This simple way to build a redundant system has two major disadvantages:

- The faulty power supply can not be recognized.
- The Diagnosis LED will give the informations about the status of the Load and the Battery (see Display Signals for more data).

It does not cover failures such as an internal short circuit in the secondary side of the power supply. In such a -virtually nearly impossible - case, the defective unit becomes a load for the other power supplies and the output voltage can not be maintained any more. This can only be avoided by utilizing decoupling diodes which are included in the Redundancy Module MR220. Recommendations for building redundant power systems: a) Use separate input fuses for each CBI. b) Monitor the individual CBI units by three LED. Each unit has two relay: Mains or backup and Low Battery or Battery Replacement (faulty situation). This feature reports a faulty unit; see Relay Contact Rating for any technical detail. c) When possible, connect each power supply to different phases or circuits.



Serial connection:

- It is possible to connect as many units in series as needed, providing the sum of the output voltage does not exceed 150Vdc.
- Voltages with a potential above 60Vdc are not SELV any more and can be dangerous. Such voltages must be installed with a protection against touching.
- For serial operation use power supplies of the same type.
- Earthing of the output is required when the sum of the output voltage is above 60Vdc.
- Keep an installation clearance of 10 mm (left/right) between two power supplies and avoid installing the power supplies on top of each other. Note: Avoid return voltage (e.g. from a decelerating motor or battery) which is applied to the output terminals.

Output Load (Mains INPUT ON)

The output LOAD in normal mode, Mains INPUT Vac Voltage present, follow the charging battery dc output voltage. The minimum and maximum range stabilized are the following:

- Dip Switch selection 12V:11 – 14,4 Vdc; (Without battery connected out. Voltage fixed at 12Vdc)
- Dip Switch selection 24V:22 – 28.8 Vdc; (Without battery connected out. Voltage fixed at 24Vdc)

Thanks to the All In One units, it will be possible to manage the power. The available power, is automatically allocated between load and battery: supplying power to the load is the first priority of the unit; thus it is not necessary to double the power, and also the power available for the battery will go to the load if the load requires so:

in "Power Boost Mode" the maximum current on the load output is the 2 times the rated current $2 \times I_n$ ($I_{load} = I_n + I_{bat}$) in continuous operation is 3 times the rated current $3 \times I_n$ ($I_{load} = 2I_n + I_{bat}$) for 4 seconds; after this parameter the devices is electrically protected against overload and short circuit.

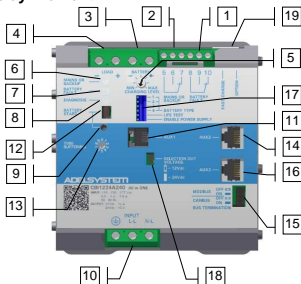
- In "Power Boost Mode", if the current of the battery generate current to the load for a time more than 4 minutes and $V_{bat} < 25V$, the device give message (8 Blink), consequently means that the battery it is going to unloading.
- If the Mains Input Voltage fall below a Threshold level (50% of the Typ. Vac input) the battery it is immediately connected to the Output Load, without any interruption.
- voltage dips: In this situation the voltage in the output load it is the same of the battery.
- **To Avoid deep battery discharge**, the battery will supply the load until battery voltage reaches 1.5 V/cell. Below this level the device automatically switches off to prevent Deep discharge and battery damage.

Output LOAD In Buffer Mode (Mains INPUT OFF)

Some example of buffering time depending on LOAD Output in function to the Ah of the battery.

Buffering Time	BATT1.2 Ah	BATT 3 Ah	BATT7.2 Ah	BATT12 Ah	BATT100 Ah
Load 1.5 A	20 min	60 min	200 min	400 min	/
Load 3 A	8 min	30 min	120 min	240 min	/
Load 5 A	3 min	15 min	55 min	100 min	/
Load 7.5 A	2 min	10 min	30 min	60 min	/
Load 10 A	No	7 min	20 min	45 min	20 h
Load 12 A	No	3 min	12 min	30 min	600 min
Load 15 A	No	No	9 min	20 min	400 min
Load 20 A	No	No	7 min	13 min	240 min

Operating and Display Element:



No. 10: INPUT Mains AC Port pin L – N:



1 Phase Switching Power Supplies PE L N

No. 3: BATTERY Connection Port:

Connect the battery to the BATTERY (-) and (+)
One battery (12 Vdc) for 12V
Two battery (12 Vdc) connected in Series for 24V

No. 4: Output LOAD:

Connect this Output to the LOAD (-) and (+)

No. 1, 2 Signal Ports (output Isolated):

Connections for

No. 2: MAINS OR BACKUP: Input Mains On/Off. Contact: 5,6,7

No. 1: BATTERY FAULT Fault connections systems. Contact: 8,9,10

Relay Contact Rating:

Max.DC1: 30 Vdc 1 A; AC1: 60 Vac 1A : Resistive load (EN 60947-4-1)

Min.1mA at 5 Vdc: Min. permissive load

Signal Output port true table:	Port N°2 Led N°6 MAINS OR BACKUP		Port N°1 Led N°7 BATTERY FAULT	
	5-6 Closed	5-7 Closed	8-9 Closed OK	8-10 Closed
MAINS Input Vac	ON	■ - led off	■ - led off	
	OFF		■ - led off	
The BATTERY in BACKUP it's less than 30% cap?	YES	■ - led On (1)	■ - led off	■ - led On
	NO	■ - led On	■ - led off	
BATTERY or system FAULT?	YES	■ - led off		■ - led On (2)
	NO	■ - led off	■ - led off	

Note:

(1) For better efficiency of the system, filter relay MAINS OR BACKUP with a delay of at least 5 seconds before give alarm Mains Lost, example: connection to PLC.

(2) See Diagnosis Led

No. 6, 7 and 8 Display Signals

No.6: Led MAINS OR BACKUP: Input Mains On/Off

No.7: Led BATTERY FAULT (capacity less than 30%), Fault connections systems, Battery replacement.

No.8: Led DIAGNOSIS Battery charge mode, diagnosis of the system through "blinking code" signal.

Monitoring Control Chart:	State	LED Diagnosis (No.8)	LED Battery Fault (No.7)
Charging Type	Trickle	1 Blink/2 sec	OFF
	Absorption	1 Blink/sec	OFF
	Boost	2 Blink/sec	OFF
	Recovery	5 Blink/sec	OFF
Auto diagnosis of the system	Reverse polarity or high battery Voltage (over 32.5Vdc for 24V)	1 Blink /pause $\underline{\quad}$	ON
	Battery No connected	2 Blink/pause $\underline{\quad}$	ON
	Element in Short Circuit	3 Blink/pause $\underline{\quad}$	ON
	Over Load or short circuit on the load	4 Blink/pause $\underline{\quad}$	ON
	Bad battery; Internal impedance Bad or Bad battery wire connection.	5 Blink/pause $\underline{\quad}$	ON
	Life test not possible	6 Blink/pause $\underline{\quad}$	ON
	Bad thermal sensor	7 Blink/pause $\underline{\quad}$	ON
	Boost condition: battery discharge after 4 min. of overload.	8 Blink/pause $\underline{\quad}$	ON
	Internal fault or illegal configuration jumper	9 Blink/pause $\underline{\quad}$	ON
	Low battery (under 18.5Vdc for 24V) Only if started from battery, no Main input. Form Input N°12 or Push Bottom	10 Blink/pause $\underline{\quad}$	ON
	MOD BUS error	11 Blink/pause $\underline{\quad}$	

No. 9, 12: BATTERY START, No MAINS Vac



No. 9: Push-button, for 3 sec., in the front panel for switch ON the system without the "MAINS input Vac" but only the battery connected.

No.12: It is also available the same function for remote Start from the battery, via RTCONN cable with 2 poles connector to put in Input N°12 and use with a Push button or a normally open contact. Do not insert a jumper in this position, penalty discharge completely the battery close to Zero in BACKUP.

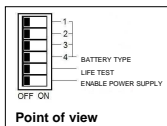
No. 17: Battery Management Configurations

One device for all battery types.

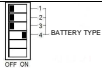
Completely automatic, all devices are suitable to charge most batteries types thank to User Selectable charging curves. They can charge open lead acid, sealed lead acid, Gel and Ni-Cd batteries. It is possible to change or add other charging curves connecting the device to a portable PC.

Caution: Switch off the system before Setting the jumper.

For Battery Type Selection always refer to the data of the manufacturer of the batteries.




Battery Type Selection	Deep Switch Position	Trickle/Float charge (Volt/Cell)	Fast/Bulk charge (Volt/Cell)
Open Lead		2.23	2.40
VRLA (AGM) "1"		2.25	2.40
Gel Battery "2"		2.30	2.40
Ni-Cd "3" (1)		10% I _{max} Trimmer	1.70-(12V); 1.5-(24V)

Option "4"			
Do not use other configurations for Battery Management			


Note (1):

In Ni-Cd. The End-of-charge is determined by negative ΔV detection of battery voltage (-5mV/cell). If no negative ΔV but only a "flat" profile is detected fast charge is terminated after 10 min. General end-of-charge timeout set to 16 hours. Trickle charge current is regulated at 10% of max current set by the trimmer on the front panel in position N°5. In order to detect end-of-charge negative ΔV , charging current must be set at least at 30% of nominal battery capacity (0,3 C); with lower values of charging current negative ΔV detection is not guaranteed.

Jumper Setting always active during all states of the system.

Functional Setting	Function	
Battery LIFE TEST		ON position = LIFE TEST enabled

Caution: Switch off the system before Setting the Jumper.

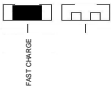

Functional Setting	Function	
ENABLE POWER SUPPLY		ON position = function POWER SUPPLY enabled

ENABLE POWER SUPPLY function

With this feature enabled, there is always voltage on the Output BATTERY even if is the battery is not present, in this way you don't have voltage dips, the Battery Care is guaranteed but the controls on the battery are limited. **Be careful: don't reverse the battery polarity.**



No. 19: Other Battery Management Configurations

Jumper Setting always active during all states of the system.

Functional Setting	Function	
FAST CHARGE Enable		Fast charge enabled. Only for Lead or Gel battery.
OPTION		Future implementation

No. 18: SELECTION OUT VOLTAGE

Caution: Switch off the system before Setting the Jumper.

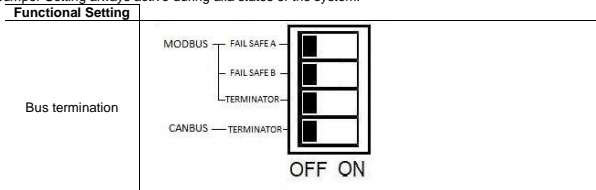
Functional Setting	Function	
Output Voltage selection		12V Output Voltage
Output Voltage selection		24V Output Voltage Default setting

No. 15: BUS TERMINATION

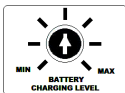
Caution: Switch off the system before Setting the Jumper.

Read the MODBUS/CANBUS instruction manual to learn about the operational functions available.

Jumper Setting always active during all states of the system.



No. 5: CHARGING LEVEL Current:



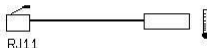
It is possible to set the maximum recharging current for the batteries by trimmer (Battery Charging Level). The current adjustment goes from 20% ÷ 100% of In. Set the maximum charging current between 10% and 20% of the battery capacity.

No. 11: Auxiliary Output “AUX 1”

RJ 11 behind the label, remove the window label to find the connector.

It is possible to connect:

- Temperature sensor, for ambient temperature charging compensation. With this it is possible to activate the specifications of the EN54-4 firing norm.



Compensation Recharges in temperature

Connecting to RJ11 AUX1 Auxiliary Output the cable RJTEMP11 (supplied separately), the CBI will vary the voltage of battery charging depending on the temperature:

Fast Charge	Trickle charge
$\pm 5\text{mV}/^{\circ}\text{C} \times \text{n. of Cells}$ from -8°C to $+60^{\circ}\text{C}$	$\pm 3\text{mV}/^{\circ}\text{C} \times \text{n. of Cells}$ from -20°C to $+60^{\circ}\text{C}$
$+140\text{mV}/\text{Cell} \div -200\text{mV}/\text{Cell}$ compared to the value at 20°C	$+120\text{mV}/\text{Cell} \div -120\text{mV}/\text{Cell}$ compared to the value at 20°C

If the temperature is less than -20°C or greater than $+60^{\circ}\text{C}$ alarm is signalled with code 7 blink.

The sensor placed on cable RJTEMP11 must be applied on the battery.

If the sensor is not connected or if the sensor is defective, the Led Low Batt is on and the led Diagnosis continues to show the status of the battery: trickle charge, fast charge or recovery charge.

No. 13: TIME BUFFERING Setting

Time buffering is enabled when the Input main is switched OFF. It is possible to set by the position of the rotate switch TIME BUFFERING.

The output LOAD time ON depending on position of the Switch.

Switch positions:

Switch position	0	1	2	3	4	5	6	7	8	9
Time Buffering (min.)	∞	0.5	2	5	10	15	20	30	45	60

If the switch is in 0 position the Time Buffering maintains ON state until the battery is completely discharged. Anyway to prevent risk of damage, the product disconnects the batteries when a minimum voltage level is reached.

No. 14: Auxiliary Output “AUX 2”

Connection MODBUS/CANBUS via RJ45 connector. See instruction for MODBUS communication protocol. (CANBUS to be implemented)

No. 15: Auxiliary Output “AUX 3”

Connection MODBUS/CANBUS via RJ45 connector. See instruction for MODBUS communication protocol. (CANBUS to be implemented)

Battery Care

The Battery Care philosophy is based on algorithms that implement rapid and automatic charging, battery charge optimization during time, flat batteries recovery and real time diagnostic during installation and operation. The Real Time Auto-diagnostic system, monitoring battery faults such as, elements in short circuit, accidental reverse polarity connection, disconnection of the battery, they can easily be detected and removed by help of Blink Code of Diagnosis Led; during the installation and after sell. Each device is suited for all battery types, by means of jumpers it is possible to setting predefined curves for Open Lead Acid, Sealed Lead Acid, Gel and Ni-Cd. They guarantee battery reliability in

time by continuously testing the internal impedance status, avoids any possible risk of damages and grants also a permanent, reliable and safe connection of the battery to the power supply. The system, through a battery stimulation circuit with algorithms of evaluation of the detected parameter, is able to recognize sulphated batteries or batteries with a short-circuited element.

Battery Test: Automatic. Every 60 sec. check battery connection. Every 220 minute in trickle charge, make the test of the battery efficiency. The fault is signaled with relay BATTERY FAULT commutation and DIAGNOSIS led blinking.

Diagnostic Type Checks

Check for accidental disconnection of the battery cables:

All In One detects accidental disconnection and immediately switched off the output BATTERY.

Battery not connected:

If the battery is not connected no output BATTERY.

Test of quality wire connections:

During trickle charge the quality (resistance) on the battery connection is checked every 20 sec. This to detect if the cable connection has been properly made.

Battery in Open Circuit or Sulphated:

Every 220 minute. All In One tests of internal impedance, in trickle charging mode.

Reverse Polarity check:

If the battery it is connected with inverted polarity, All In One is automatically protected.

Test of battery voltage:

Appropriate voltage check, to prevent connection of wrong battery types, more or less than the nominal voltage.

End of Charge check:

When the battery it is completely full, the device automatically switch in trickle charging mode.

Check for Battery Cells in short circuit :

Thanks to specific algorithms of evaluation, the CBI recognize batteries with cells in internal short circuit.

In trickle charge every 2 hours test of element in short circuit.

Diagnosis of battery and device:

All CBI devices support the user during installation and operation. A Blink code of Led DIAGNOSIS allows to discriminate among various possible faults.

Error conditions, "Led BATTERY FAULT" ON and "Led DIAGNOSIS" blinking with sequence; see Display Signal section.

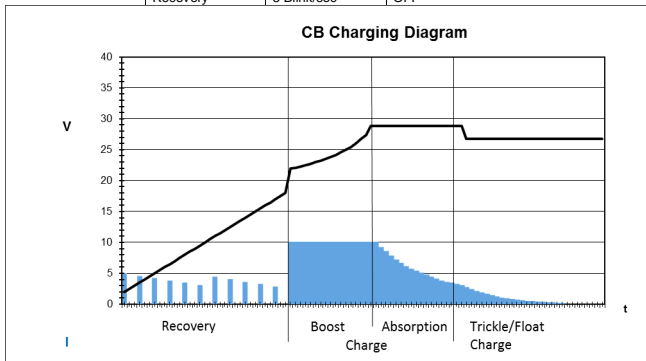
Charging Curve:

Automatic multi-stage operation and real time diagnostic allows fast recharge and recovery of deep discharged batteries, adding value and reliability to the system hosting the CBI device. The type of charging is Voltages stabilized and Current stabilized IUoUo.

Four charging modes are identified by a flashing code on a Diagnosis LED.

To maintain the Output Load in lower Voltage state, don't put jumper FAST CHARGE, in this case no boost charge but only Float charge.

	State	Diagnosis LED	Battery Fault LED
Charging Type	Trickle-Float	1 Blink/2sec	OFF
	Absorption	1 Blink/sec	OFF
	Boost-Bulk	2 Blink/sec	OFF
	Recovery	5 Blink/sec	OFF



Option "4"		BATTERY TYPE
Do not use other configurations for Battery Management		

Note (1):
In Ni-Cd. The End-of-charge is determined by negative ΔV detection of battery voltage (-5mV/cell). If no negative ΔV but only a "flat" profile is detected fast charge is terminated after 10 min. General end-of-charge timeout set to 16 hours. Trickle charge current is regulated at 10% of max current set by the trimmer on the front panel in position N°5. In order to detect end-of-charge negative ΔV , charging current must be set at least at 30% of nominal battery capacity (0,3 C); with lower values of charging current negative ΔV detection is not guaranteed.

Jumper Setting always active during all states of the system.

Functional Setting	Function
Battery LIFE TEST	ON position = LIFE TEST enabled

Caution: Switch off the system before Setting the Jumper.

Functional Setting	Function
ENABLE POWER SUPPLY	ON position = function POWER SUPPLY enabled

ENABLE POWER SUPPLY function

With this feature enabled, there is always voltage on the Output BATTERY even if is the battery is not present, in this way you don't have voltage dips, the Battery Care is guaranteed but the controls on the battery are limited. **Be careful: don't reverse the battery polarity.**

No. 19: Other Battery Management Configurations

Jumper Setting always active during all states of the system.

Functional Setting	Function
FAST CHARGE Enable	Fast charge enabled. Only for Lead or Gel battery.
OPTION	Future implementation

No. 18: SELECTION OUT VOLTAGE

Caution: Switch off the system before Setting the Jumper.

Functional Setting	Function
Output Voltage selection	12V Output Voltage
Output Voltage selection	24V Output Voltage Default setting

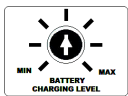
No. 15: BUS TERMINATION

Caution: Switch off the system before Setting the Jumper. Read the MODBUS/CANBUS instruction manual to learn about the operational functions available.

Jumper Setting always active during all states of the system.

Functional Setting	Function
Bus termination	MODBUS - FAIL SAFE A MODBUS - FAIL SAFE B TERMINATOR CANBUS - TERMINATOR

No. 5: CHARGING LEVEL Current:

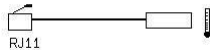


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No. 11: Auxiliary Output "AUX 1"

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- Temperature sensor, for ambient temperature charging compensation. With this it is possible to activate the specifications of the EN54-4 firing norm.



Compensation Recharges in temperature

Connecting to RJ11 AUX1 Auxiliary Output the cable RJTEMP11 (supplied separately), the CBI will vary the voltage of battery charging depending on the temperature:

Fast Charge	Trickle charge
+/-5mV/°C x n. of Cells from -8°C to +60°C	+/-3mV/°C x n. of Cells from -20°C to +60°C
+140mV/Cell ÷ -200mV/Cell compared to the value at 20°C	+120mV/Cell ÷ -120mV/Cell compared to the value at 20°C

If the temperature is less than -20°C or greater than +60°C alarm is signalled with code 7 blink.

The sensor place on cable RJTEMP11 must be applied on the battery. If the sensor is not connected or if the sensor is defective, the led Low Batt is on and the led Diagnosis continues to show the status of the battery: trickle charge, fast charge or recovery charge.

No. 13: TIME BUFFERING Setting

Time buffering it is enabled when the Input main is switched OFF. It is possible setting by the position of the rotate switch TIME BUFFERING.

The output LOAD time ON depending on position of the Switch.

Switch position	0	1	2	3	4	5	6	7	8	9
Time Buffering (min.)	∞	0.5	2	5	10	15	20	30	45	60

If the switch is in 0 position the Time Buffering maintain ON state until the battery it is completed discharged. Anyway to prevent risk of damage, the product disconnect the batteries when a minimum voltage level is reached.

No. 14: Auxiliary Output "AUX 2"

Connection MODBUS/CANBUS via RJ45 connector. See instruction for MODBUS communication protocol. (CANBUS to be implemented)

No. 15: Auxiliary Output "AUX 3"

Connection MODBUS/CANBUS via RJ45 connector. See instruction for MODBUS communication protocol. (CANBUS to be implemented)

Battery Care

The Battery Care philosophy is base on algorithms that implement rapid and automatic charging, battery charge optimization during time, flat batteries recovery and real time diagnostic during installation and operation. The Real Time Auto-diagnostic system, monitoring battery faults such as, elements in short circuit, accidental reverse polarity connection, disconnection of the battery, they can easily be detected and removed by help of Blink Code of Diagnosis Led; during the installation and after sell. Each device is suited for all battery types, by means of jumpers it is possible setting predefined curves for Open Lead Acid, Sealed Lead Acid, Gel and Ni-Cd. They guarantees battery reliability in

time by continuously testing the internal impedance status, avoids any possible risk of damages and grants also a permanent, reliable and safe connection of the battery to the power supply. The system, through a battery stimulation circuit with algorithms of evaluation of the detected parameter, is able to recognize sulphated batteries or batteries with a short-circuited element.

Battery Test: Automatic. Every 60 sec. check battery connection. Every 220 minute in trickle charge, make the test of the battery efficiency. The fault is signalled with relay BATTERY FAULT commutation and DIAGNOSIS led blinking.

Diagnostic Type Checks

Check for accidental disconnection of the battery cables:

All In One detects accidental disconnection and immediately switched off the output BATTERY.

Battery not connected:

If the battery is not connected no output BATTERY.

Test of quality wire connections:

During trickle charge the quality (resistance) on the battery connection is checked every 20 sec. This to detect if the cable connection has been properly made.

Battery in Open Circuit or Sulphated:

Every 220 minute. All In One tests of internal impedance, in trickle charging mode.

Reverse Polarity check:

If the battery it is connected with inverted polarity, All In One is automatically protected.

Test of battery voltage:

Appropriate voltage check, to prevent connection of wrong battery types, more or less than the nominal voltage.

End of Charge check:

When the battery it is completely full, the device automatically switch in trickle charging mode.

Check for Battery Cells in short circuit :

Thanks to specific algorithms of evaluation, the CBI recognize batteries with cells in internal short circuit.

In trickle charge every 2 hours test of element in short circuit.

Diagnosis of battery and device:

All CBI devices support the user during installation and operation. A Blink code of Led DIAGNOSIS allows to discriminate among various possible faults. Error conditions, "Led BATTERY FAULT" ON and "Led DIAGNOSIS" blinking with sequence; see Display Signal section.

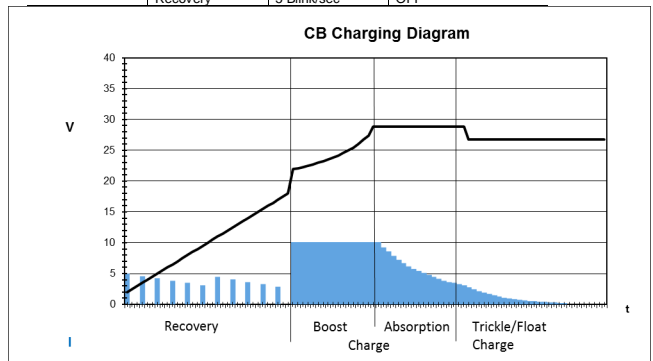
Charging Curve:

Automatic multi-stage operation and real time diagnostic allows fast recharge and recovery of deep discharged batteries, adding value and reliability to the system hosting the CBI device. The type of charging is Voltages stabilized and Current stabilized IUoUo.

Four charging modes are identified by a flashing code on a Diagnosis LED.

To maintain the Output Load in lower Voltage state, don't put jumper FAST CHARGE, in this case no boost charge but only Float charge.

	State	Diagnosis LED	Battery Fault LED
Charging Type	Trickle-Float	1 Blink/2sec	OFF
	Absorption	1 Blink/sec	OFF
	Boost-Bulk	2 Blink/sec	OFF
	Recovery	5 Blink/sec	OFF



Protection Features

On the primary side: the device is equipped with an internally fuse. If the internal fuse is activated, it is most probable that there is a fault in the device. If happen, the device must be checked in the factory.

On the secondary side BATTERY and LOAD: The device is electrically protected against short circuits and overload.

Inversion polarity: the module it is automatically protected against inversion of battery polarity and connection of load inverted.

Over current and output short circuit: the unit limits the output current (see the technical data).

Deep discharge : not possible. The unit disconnects the battery when a minimum voltage level is reached.

Thermal behaviour

Surrounding air temperature 50°C. For ambient temperature of over 50°C, the output current must be reduced by 2.5% per °C. Max 70°C. At the temperature of 70°C the output current will be 50% of I_n . The equipment does not switch off in case of ambient temperature above 70°C or thermal overload. The devices are protected for Over temperature conditions "worst case"; in this situations the device Shut-down the output and automatic restart when temperature inside fall.

Standards and Certification

Electrical Safety: UL508, IEC/EN 60950 (VDE 0805) and EN 50178 (VDE 0160).

Assembling device: IEC/EN 60950.

Input / Output separation: SELV EN 60950-1 and PELV EN 60204-1. Double or reinforced insulation.

EMC Standards Immunity:

EN 61000-4-2, EN 61000-4-3, EN 61000-4-4, EN 61000-4-5.

EMC Standards Emission:

EN 61000-6-4, EN 61000-6-3, EN 61000-3-2

Standards Conformity:

Safety of Electrical Equipment Machines: EN 60204-1.

CE The CE mark in According to EMC 2004/108/EC and Low voltage directive 2006/95/EEC

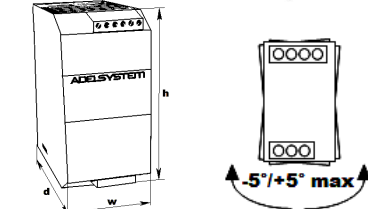
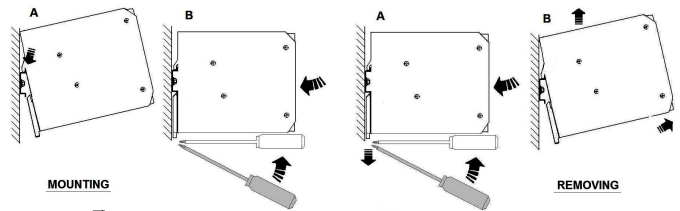
Norms and Certifications


In Conformity to: IEC/EN 60335-2-29 Battery chargers; EN60950 / UL1950; Electrical safety EN54-4 Fire Detection and fire alarm systems; 89/336/EEC EMC Directive; 2006/95/EC (Low Voltage); DIN41773 (Charging cycle); Emission: IEC 61000-6-4; Immunity: IEC 61000-6-2. CE.

Rail Mounting:



All modules must have a minimum vertical and horizontal distance of 10 cm to this power supply in order to guarantee sufficient auto convection. Depending on the ambient temperature and load of the device, the temperature of the housing can become very high!



	D	E
1	ADELSYSTEM	
2	DC UPS All In one	Multivoltage 12 – 24Vdc
3		
4	Input (Volt)	115 – 230 – 277Vac
5	Output (Vdc – A – W)	12Vdc – 15A – 270W 24Vdc – 10A – 270W
6	Model	CBI2801224A
7	INPUT DATA	
8	Nominal Input Voltage / Tensione d'ingresso nominale	115 – 230 – 277Vac
9	Input Voltage Range / Campo di funzionamento	90 – 135Vac 180 – 305Vac
10	Inrush Current (Vn and In Load) I _t / Corrente di Inserzione	≤ 16 A ≤ 5msec
11	Frequency /Frequenza di Ingresso	47 – 63 Hz ±6%
12	Input Current (115 – 230 – 275Vac) / Assorbimento	5.5 – 3 – 2A
13	Internal Fuse / Fusibile Interno (non sostituibile)	6.3A
14	External Fuse (recommended)/ Fusibile Esterno raccomandato	16A (MCB curve B)
15	OUTPUT DATA	
16	Output Vdc / I _n / Tensione di uscita Vdc / I _n	12Vdc – 15A 24Vdc – 10A
17	Minimum load / Carico minimo	No
18	Efficiency (50% of In) / Rendimento tipico	≥ 91%
19	Short-circuit protection / Protezione contro il corto circuito	Yes
20	Over Load protection / Protezione sovraccarico	Yes
21	Over Voltage Output protection / Protezione sovratensione in uscita	Yes
22	Reverse battery protection / Protezione inversione batteria	Yes
23	Detection of element in short circuit / Rilevazione elemento in corto circuito	Yes
24	BATTERY CHARGER OUTPUT / USCITA CARICA BATTERIA	
25	Boost – Bulk charge (Typ. at I _n) / Carica Veloce (1)	14.4Vdc (12Vdc) 28.8Vdc (24Vdc)
26	Max.Time Bulk charge (Typ. at I _n) / Tempo massimo Carica Veloce	15h
27	Min.Time Bulk charge (Typ. at I _n) / Tempo minimo Carica Veloce	1 min.
28	Trickle-Float charge (Typ. at I _n) / Carica di mantenimento (1)	13.8Vdc (12Vdc) 27.6Vdc (24Vdc)
29	Recovery Charge / Carica di recupero	2 – 10 Vdc (12Vdc) 2 – 20 Vdc (24Vdc)
30	Switching on after applying mains voltage / Accensione con tensione di rete	3 sec. Max
31	End of charging current Bulk - Absorption to Float - Trickle	6% of Charging current Limiting
32	Start up with capacitive load / Start up con carichi capacitivi	Yes, Unlimited
33	Residual Ripple / Ripple Residuo	≤ 60mVpp
34	Charging max. I _{bat} / Corrente max. di Carica	15A ± 5% (12Vdc) 10A ± 5% (24Vdc) T<40°C (In)
35	Charging current Limiting I _n (I _{reg}) / Limitazione Corrente di Carica	Yes, 10 ± 100 % / In
36	Quiescent Current / Consumo da batteria max.	≤100mA
37	JUMPER CONFIGURATION	
38	Battery Type / Tipo Batteria	2.23/2.25V Lead; 2.3 Gel; 1.5 Ni-Cd(20 elem.)
39	Battery Voltage 12/24 Vdc / Selezione Tensione di Batteria 12/24 Vdc	Yes
40	Power Supply Function / Funzione Alimentatore	Yes
41	Boost Charge Enable / Abilitazione Carica Rapida	Yes
42	Characteristic Curve / Caratteristiche di Carica	I _{UoUo} - 4 stage
43	SIGNAL OUTPUT (RELAY) / SEGNALAZIONE RELÉ USCITA	
44	Main or Backup Power	Yes
45	Low Battery and Fault Battery	Yes
46	AUXILIARY OUTPUT (RJ 11 CONNECTION) FOR:	
47	Temp. Charging probe / Carica Compensata in Temperatura	Yes
48	AUXILIARY OUTPUT (RJ 45 CONNECTION) FOR:	
49	Connection MODBUS/CANBUS	Yes
50	Connection MODBUS/CANBUS	Yes
51	CLIMATIC DATA	
52	Ambient Temperature operation / Temperatura Ambiente di Lavoro	-25 – +70°C
53	De rating T ³ > (In) / De rating T ³ > (In)	> 50° -2.5% (In)/°C
54	Automatic De rating / De rating Automatico	Yes
55	Ambient Temperature Storage / Temperatura max. Magazzino	-40 – +85°C
56	Humidity at 25 °C / Umidità	95% to 25°C
57	Cooling / Raffreddamento	Auto Convection
58	GENERAL DATA	
59	Isolation Voltage (IN / OUT) / Tensione di Isolamento (IN / OUT)	3000Vac
60	Isolation Voltage(IN / PE) / Tensione di Isolamento(IN / TERRA)	1605Vac
61	Isolation Voltage(OUT / PE) / Tensione di Isolamento(OUT/TERRA)	500Vac
62	Protection Class (EN/IEC 60529) / Protezione Classe	IP 20
63	Reliability (MTBF IEC 61709) / Affidabilità	> 300 000 h
64	Pollution Degree Environment / Grado d'inquinamento ambientale	2
65	Connection Terminal Blocks Screw Type / Dimensione morsetti	6mm(30-10AWG) 2.5mm(24-14AWG)
66	Protection class (with PE connected) / Grado di protezione (con cavo di terra collegato)	I, with PE connected
67	Dimension (w-h-d)/Dimensioni (l-h-p) mm	115x115x135 mm
68	Weight / Peso	1.10 kg approx
69	Safety Standard Approval / Conformità ed Approvazioni	CE
70		