"All In One" CBI series: Uninterruptible Power Supply with DC output
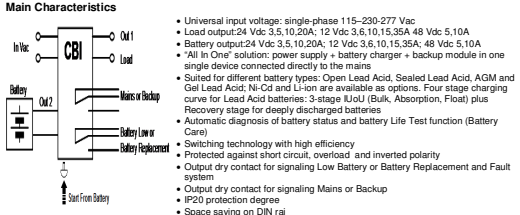
Thank you for having chosen one of our products for your work.
We are certain that it will give the utmost satisfaction and be a notable help on the job.

General Description

Thanks to "All In One" CBI series of DC-UPS, it will be possible to optimize the power management of your system with one single, extremely compact and cost-effective device, connected directly to the mains. The available power is automatically distributed between load and battery giving priority to the load. Battery can supply the load even with mains so the output power to the load can be twice the nominal power if it is required (Power Boost). When mains failure occurs, the load continues to be supplied by the battery. It is also possible to switch on the device with no mains directly from battery. The "Battery Care" algorithm performs rapid and automatic charging, battery charge optimization during time, flat batteries recovery and real time diagnosis during installation and after sales. Temperature compensation is possible to connect the temperature sensor probe. The real time auto-diagnostic system monitors battery faults such as sulfated battery, shorted cells, accidental reverse polarity connection or disconnection of the battery. Every fault is signaled by a blink code of Diagnosis Led or via Modbus (only in some models) in order to be easily detected and removed during the installation and after sales. The continuous monitoring of battery efficiency reduces risk of battery damage and allows a safe operation in permanent connection. Charging curves can be customized via Modbus (only in some models). Output dry contacts are used to signal both backup and fault conditions. A rugged casing with bracket for DIN rail mounting provides IP20 protection degree.

Main Characteristics

- Universal input voltage: single-phase 115–230-277 Vac
- Load output:24 Vdc 3,5,10,20A; 12 Vdc 3,6,10,15,35A 48 Vdc 5,10A
- Battery output:24 Vdc 3,5,10,20A; 12 Vdc 3,6,10,15,35A; 48 Vdc 5,10A
- "All In One" solution: power supply + battery charger + backup module in one single device connected directly to the mains
- Suited for different battery types: Open Lead Acid, Sealed Lead Acid, AGM and Gel Lead Acid; Ni-Cd and Li-ion are available as options. Four stage charging curve for Lead Acid batteries: 3-stage IUoU (Bulk, Absorption, Float) plus Recovery stage for deeply discharged batteries
- Automatic diagnosis of battery status and battery Life Test function (Battery Care)
- Switching technology with high efficiency
- Protected against short circuit, overload and inverted polarity
- Output dry contact for signaling Low Battery or Battery Replacement and Fault system
- Output dry contact for signaling Mains or Backup
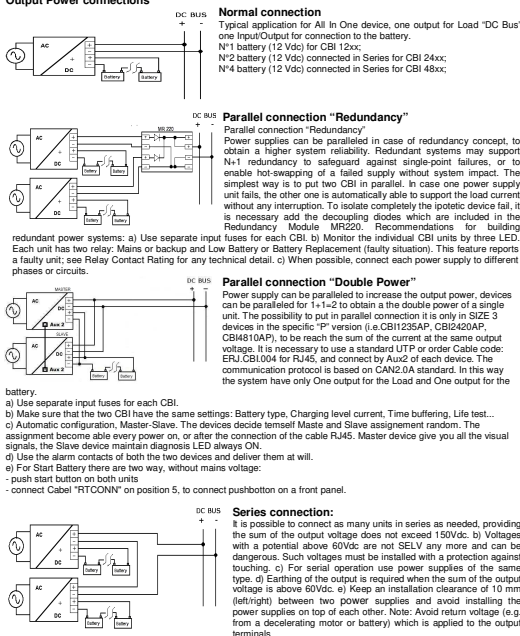- IP20 protection degree
- Space saving on DIN rai

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 or UL60950. 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 (mm²)	Stranded (mm²)	AWG	Torque (Nm)	Stripping Length	All In One	1 Phase L N PE Input AC	1 Phase L N PE Input AC
In:	0.2 – 2.5	0.2 – 2.5	24 – 14	0.5 – 0.6 Nm	7 mm	Size 1 and 2		
	4.0	6.0	30 – 10	0.8 – 1.0 Nm	7 mm	Size 3 and 4		
Out:	0.2 – 2.5	0.2 – 2.5	24 – 14	0.5 – 0.6 Nm	7 mm	Size 1 and 2		
	4.0	6.0	30 – 10	0.8 – 1.0 Nm	7 mm	Size 3 and 4		
Signal:	0.2 – 2.5	0.2 – 2.5	24 – 14	0.5 – 0.6 Nm	7 mm	All types		

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 CBI 12xx;
N°2 battery (12 Vdc) connected in Series for CBI 24xx;
N°4 battery (12 Vdc) connected in Series for CBI 48xx;

Parallel connection "Redundancy"

Parallel connection "Redundancy"
Power supplies can be paralleled in case of redundancy concept, to obtain a higher system reliability. Redundant systems may support N+1 redundancy to safeguard against single-point failures, or to enable hot-swapping of a failed supply without system impact. 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. To isolate completely the ipotetic device fail, it is necessary add the 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.

Parallel connection "Double Power"

Power supply can be paralleled to increase the output power, devices can be paralleled for 1+1=2 to obtain a double power of a single unit. The possibility to put in parallel connection it is only in SIZE 3 devices in the dedicated "P" version (i.e.CBI1235AP, CBI2420AP, CBI4810AP), to be reach the sum of the current at the same output voltage. It is necessary to use a standard UTP or other Cable code: ERJ.CBI.004 for RJ45, and connect by Aux2 of each device. The communication protocol is based on CAN2.0A standard. In this way the system have only One Output for the Load and One output for the battery.
a) Use separate input fuses for each CBI.
b) Make sure that the two CBI have the same settings: Battery type, Charging level current, Time buffering, Life test...
c) Automatic configuration, Master-Slave. The devices connect themself Maste and Slave assignement random. The assignment become able every power on, or after the connection of the cable RJ45. Master device give you all the visual signals, the Slave device maintain diagnosis LED always ON.
d) Use the alarm contacts of both the two devices and deliver them at will.
e) For Start Battery there are two way, without mains voltage:
- push start button on both units
- connect Cabel "RTCONN" on position 5, to connect pushbutton on a front panel.

Series connection:

It is possible to connect as many units in series as needed, providing the sum of the output voltage does not exceed 150Vdc. b) 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. c) For serial operation use power supplies of the same type. d) Earthing of the output is required when the sum of the output voltage is above 60Vdc. e) 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:
CBI 12xx:11 – 14,4 Vdc; 15,5 Vdc for NiCd (Without battery connected out. Voltage fixed at 12Vdc)
CBI 24xx:22 – 28,8 Vdc; 30 Vdc for NiCd (Without battery connected out. Voltage fixed at 24Vdc)
CBI 48xx:44 – 57,6 Vdc; 62 Vdc for NiCd (Without battery connected out. Voltage fixed at 48Vdc)
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 will be 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 it.
In "Power Boost Mode" the maximum current on the load output is the 2 times the rated current 2 x N (Iload = In+ Ibatt) in continuous operation, and the 3 times the rated current 3 x In (Iload = 2In+ Ibatt) for 4 seconds; after this parameter the device 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, the device give message (8 Blink), consequently means that the battery is discharging. If the Mains Input Voltage fall below a Threshold level (50% of the Typ. Vac input) the battery 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:

Size 1 | Size 2 | Size 3 | Size 4
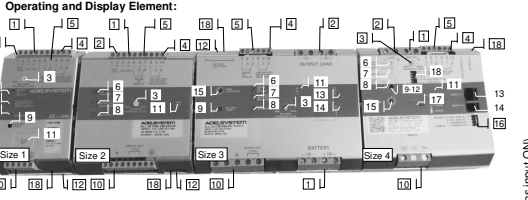
No. 1: Battery Connection Port:

Connect the battery between pin. 3 (–) and 4 (+)
One battery (12 Vdc) for CBI12xx;
Two battery (12 Vdc) connected in Series for CBI24xx;
Four battery (12 Vdc) connected in Series for CBI48xx;

No. 2: Output Load: (Size 4)

Connect this Output to the Load 1 (–). 2 (+).

No. 3: Charging Level Current:

In order to protect the battery from excessive charging currents, the device allows you to limit the maximum charge current by adjusting the trimmer. It allows you to limit from max In up to 20% of current In. To determine the maximum battery charge current, see the battery manufacturer's Data Sheet, If it is not possible, consider that on average the maximum charge current is 10% of Ah's rated battery current; The data is suitable for both Lead Acid and NiCd batteries.

No. 4, 5 Signal Ports (Output Isolated):

Connections for,
No. 5: MAINS or BACKUP: Input Mains On/Off. Contact: 5,6,7
No. 4 : LOW BATTERY, BATTERY REPLACEMENT, FAULT SYSTEM 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/Back-Up		Port N°1 - Led N°7 Fault Battery	
		5-6 Closed	5-7 Closed	8-9 Closed (OK)	8-10 Closed
Mains Input Vac	ON	■ - led off			
	OFF		■ - led On (1)	■ - led off	
The battery in BackUP it is less than 30% cap?	YES		■ - led On		■ - led off (2)
	NO		■ - led On	■ - led off	
Battery or system Fault?	YES	■ - led off		■ - led off	
	NO	■ - led off			■ - led On

Note:
(1) Contact relay Mains/Back switch at least 5 seconds after disconnection of Power.
(2) See Diagnosis Led

No. 6, 7 and 8 Display Signals

No.6: Led MAINS OR BACKUP: Input Mains On/Off
No.7: Led LOW BATTERY (capacity less than 30%), BATTERY REPLACEMENT, FAULT BATTERY or FAULT SYSTEM.
No.8: Led DIAGNOSIS: Battery charge mode, Diagnosis of the system through "blinking code" signal Light

State of Charge

Monitoring Control Chart:	State	Led DIAGNOSIS (No.8)	LED BATTERY FAULT (No.7)
Charging Type	Float	1 Blink/2 sec	OFF
	Absorption	1 Blink/sec	OFF
	Boost	2 Blink/sec	OFF
	Recovery	5 Blink/sec	OFF
Fault Battery / Fault System	Reverse polarity or high battery Voltage (over 32.5Vdc for CBI 24xxA)	1 Blink/pause	ON
	Battery No connected	2 Blink/pause	ON
	Element in Short Circuit	3 Blink/pause	ON
	Over Load or short circuit on the load	4 Blink/pause	ON
System Auto Diagnosis	Bad battery; Internal impedance Bad or Bad battery wire connection	5 Blink/pause	ON
	Life test not possible	6 Blink/pause	ON
	Boost condition; battery discharge after 4 min. of overload.	8 Blink/pause	ON
	Internal fault	9 Blink/pause	ON
	Low battery (under 18.5Vdc for CBI 24xxA) Only if started from battery, no Mains input, from Jumper N°5 or Push Bottom	10 Blink/pause	ON
	MODBUS error	11 Blink/pause	ON
	Life test not possible; Parallel mode on Slave Device	12 Blink/pause	ON
	Bad battery wire connection; Parallel mode on Slave Device	13 Blink/pause	ON
	Boost condition; battery discharge after 4 min of overload. Parallel mode on Slave Device	15 Blink/pause	ON

No. 9, 12: Start From Battery Only; No Mains Vac

No. 9: Push-bottom, for 3 sec., in the front panel for switch ON the system without the "Mains input Vac" but only the battery connected. (Not present in CBI 2410XX and CBI 485XX)
No.12: (Jumper n.5) It is also available the same function for remote start from the Battery, via RTCONN cable connected in the Push-bottom mounted on Front Panel of the external system. Standard function for all products, Size 2 only with code CBI2410A/S and CBI485A/S. Do not leave jumper in this position, otherwise the system will discharge completely the battery. Only push bottom.


No. 10: Input AC Port pin. L – N:

1 Phase Switching Power Supplies L, N, PE
Size 2 and Size 3 BRIDGE ONLY for input 115 Vac, and connect L, N, PE

No. 11: Auxiliary Output "AUX 1"

Remove the window label to find the connector.
It is possible to connect the Temperature sensor probe and apply it on the battery.The function of the probe is for temperature battery compensation. With this it is possible to active the specifications of the EN54-4 fire norm.

Battery Temperature Compensation Charge (not for NiCd)
Connecting to Auxiliary Output AUX1 the cable RJTEMP (supplied separately), the CBI will vary the voltage of battery charging depending on the temperature:

Fast charge	Float charge
+/-6mV°C x n. of Cells from -8°C to +45°C	+/-3mV°C x n. of Cells from -20°C to +45°C
+140mV/Cell ÷ -200mV/Cell compared to the value at 20°C	+120mV/Cell ÷ -120mV/Cell compared to the value at 20°C

The device stop to charge the battery If the temperature is less than -20°C or greater than +45°C. The alarm fault battery could be signalled by 7 blink code.
The sensor placed on cable RJTEMP must be applied on the battery.

No. 13: Auxiliary Output "AUX 2"

Present only in Sizes 3 and Size 4, connection MODBUS via RJ45 connector. See instruction MODBUS communications protocol. (CANBUS to be implemented).

No. 14: Auxiliary Output "AUX 3"

Present only in Sizes 4. The function is the same of Auxiliary Output "AUX 2"

No. 15: Buffering Time Setting (Size 3-4)

On models Size 3 and Size 4 is possible to set a buffering time. It can be selected by setting the desired value on the rotary switch 13. Buffering is initiated when the mains is switched OFF. The LOAD output will be ON for the selected time.

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

If the switch is in position 0, the LOAD output will be in ON state until the battery is completely discharged. Any way to prevent damage risks, the unit disconnects the batteries when a minimum voltage level is reached.
For units Size 1 or 2 you have to version with the extention CBIxxxxATBx. The LOAD output will be in ON state until the battery it is completed discharged. It is however possible to request factory customized versions with specific buffering time setting.

No. 16: 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. 17: Select Output Voltage (Size4)

Caution: Switch off the system before Setting the Jumper

Output Voltage Selection	24 Vdc	12 Output Voltage
Output Voltage Selection	12 Vdc	24 Output Voltage
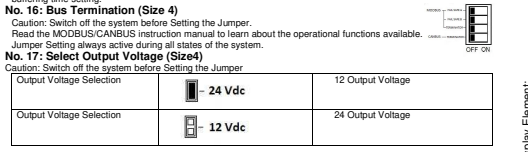
No. 18: Battery Management Configurations (Sizes 1,2,3,4)

Preliminary Operations: 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. 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. Only jumper in position 6 is Refreshed also with power ON.

⚠ Don't use Ni-Cd charging configuration in battery less than 7 Ah.

Battery Type Selection (Only for CBI485A and CBI485A/S)

Battery Type Selection	Jumper Position (Size 1)	Jumper Position (Size 2)	Jumper Position (Size 3)	Dip Switch (Size 4)	Float charge (Volt/Cell)	Fast charge (Volt/Cell)
Open Lead					2.23	2.40
AGM Low					2.25	2.40
AGM High					2.27	2.40
Gel Battery					2.30	2.40

Battery Type Selection

Battery Type Selection	Jumper Position (Size 1)	Jumper Position (Size 2)	Jumper Position (Size 3)	Dip Switch Position (Size 4)	Float charge (Volt/Cell)	Fast charge (Volt/Cell)
Open Lead					2.23	2.40
(AGM) Low					2.25	2.40
Gel Battery					2.30	2.40
NiCd					1.4V/cell (12V/10 cells) (24V/20 cells) (48V/40 cells)	1.5V/cell (12V/8 cells) (24V/16 cells) (48V/32 cells)
Li-Ion (4)					3.45 (12V/4 cells) (24V/8 cells)	3.65 (12V/4 cells) (24V/8 cells)
Custom Charging Curve (5)					Config by DPY351 or ADELViewsystem.	

Functional Setting

| Functional Setting		Function
Battery Life test ON		Jumper present or dip switch ON: Life test enabled (not for NiCd)
Fast Charge Enable (3)		Jumper present: Fast Charge enabled. It is possible remote Fast Charge enabling by RTCONN cable
"Start from Battery" (without Input Mains) (1)		Switch ON the system without the "Mains In Vac", only the battery connected. For connection to external Push button use RTCONN cable
UPS Enabling (2)		Only for CBI243ATB1 CBI245ATB1 and CBI280 RTCONN cable for connection to external Contact.

Notice:

1. Do not leave the jumper in position 5; otherwise, in Backup mode, the battery discharges completely close to Zero.
   For Size 2: must be require CBI2410A/S or CBI485A/S (/S means start with battery functions, otherwise only start with Input Mains)
2. CBI243ATB1 and CBI245ATB1 Replaces the fast charge in:
   - Contact closed: fast charge (UPS) enabled.
     It is enabled after 30 sec. Low Battery Detection
   - Contact open: Inhibit backup function. No UPS enabled.
   CBI2801224A:
   - Contact closed: fast charge (UPS) enabled
   - Contact open: Inhibit backup function. No UPS enabled.
3. Jumper present in Fast Charge means also that every 288h, the device go in "Cycling Refresh Charging". This mode continue for 85 minutes at the same buffer charge.
4. Please note that it is possible to use lithium-charging curve just with a single BMS. From the release:
   - Size1
     - 12Vdc Output: S13 R6
     - 24Vdc Output: S13 R7
   - Size2
     - 24Vdc Output: S92 R3
   - Size3
     - 12Vdc, 24Vdc, 48Vdc Output: S40 R13
   - Size4
     - Only by custom request
5. By DPY351 or ADELVIewsystem it is possible configure a Customized Charging Curve. After programming it is possible disconnect the programmer an use the device as standalone device.

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. Elements in short circuit, accidental reverse polarity connection, disconnection of the battery, 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, it is possible setting predefined curves for Open Lead Acid, Sealed Lead Acid, Gel and Ni-Cd. (option) They guarantees battery reliability in time to continuously testing the internal impedance status, avoids any possible risk of damages and grants 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 Float charge, make the test of the battery efficiency. The Battery Fault will be monitored by relay and 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 power.
Battery not connected:
If the battery is not connected no output power.
Test of quality wire connections:
During Float charge the quality (resistance) on the battery connection is checked every 60 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 Float charging mode.
Reverse Polarity check:
If the battery it is connected with inverted polarity, All In One is automatically protected.
Test of battery voltage connections:
Appropriate voltage check, for prevent connection of wrong battery types, more or less than the nominal voltage.
End of Charge check
When the battery is completely full, the device automatically switch in Float charging mode.
Check for Battery Cells in short circuit
Thanks to specific algorithms of evaluation, the CBs recognize batteries with cells in internal short circuit. In Float charge every 220 minute 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 Diagnosis Led allows to discriminate among various possible faults. Error conditions, "LED Battery Fault" ON and "LED Diagnosis" blinking with sequence; see Display Signal section.

Protection Features

On the primary side: the device is equipped whit an internally fuse. If the internal fuse is activated, it is most probable that there is a fault in the device. If it 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 In. 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.
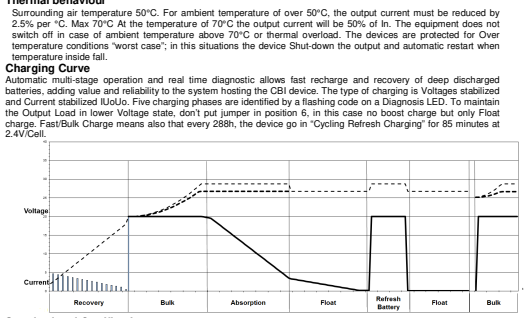
Charging Curve

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. Five charging phases are identified by a flashing code on a Diagnosis LED. To maintain the Output Load in lower Voltage state, don't put jumper in position 6, in this case no boost charge but only Float charge. Fast/Bulk Charge means also that every 288h, the device go in "Cycling Refresh Charging" for 85 minutes at 2.4V/Cell.

Standard and Certifications

Electrical Safety For Mounting:
Device assembling: UL508, IEC/EN 60950 (VDE 0805) and EN 50178 (VDE 0160). Installation according: IEC/EN 60950. Input / Output separation: SELV EN 60950-1 and PELV EN 60204-1. Double or reinforced insulation. Safety of Electrical Equipment Machines: EN 60204-1.
EMC Standards Immunity:
In According to EMC 2014/30/UE and Low voltage directive 2014/35/UE
EMC Standards Immunity:
EN 61000-4-2, EN 61000-4-3, EN 61000-6-2, EN 61000-4-4, EN 61000-4-5.
EMC Standards Emission:
EN 61000-6-4, EN 61000-6-3, EN 61000-3-2 (see data sheet for each device)
Conformity to:
EN60950 / UL60950-1 and CSA C22.2 No. 60950-1-07 (Information Technology Equipment) – Safety – Part1: General Requirement.
IEC/EN 60335-2-29 Battery chargers
Electrical safety EN54-4 Fire Detection and fire alarm systems;
DIN41773 (Charging cycle).
Approved:
Devices CBI243A, CBI245A, CBI123A, CBI126A, CBI1210A.
EN60950 / UL60950-1 and CSA C22.2 No. 60950-1-07 (Information Technology Equipment) – Safety – Part1: General Requirement.

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.

ADELSYSTEM

DC Ups - All in ONE

	12/24Vdc	12Vdc				24Vdc				48Vdc	
Input (Volt)	115 – 230 – 277Vac	115 – 230 – 277Vac	115 – 230 – 277Vac	115 – 230 – 277Vac	115 / 230 – 277Vac	115 – 230 – 277Vac	115 / 230 – 277Vac	115 / 230 – 277Vac	115 / 230 – 277Vac	115 / 230 – 277Vac	115 / 230 – 277Vac
Output (Vdc – A – W)	12-24V /15-10A /280W	12Vdc – 3A – 36W	12Vdc – 6A – 72W	12Vdc – 10A – 120W	12Vdc – 35A – 420W	24Vdc – 3A – 72W	24Vdc – 5A – 120W	24Vdc – 10A – 240W	24Vdc – 20A – 500W	48Vdc – 5A – 240W	48Vdc – 10A – 500W
Reference	CBI2801224A	CBI123A	CBI126A	CBI1210A	CBI1235A	CBI243A	CBI245A	CBI2410A	CBI2420A	CBI485A	CBI4810A
INPUT DATA											
Nominal Input Voltage	115 – 230 – 277Vac	115 – 230 – 277Vac	115 – 230 – 277Vac	115 – 230 – 277Vac	115 / 230 – 277Vac	115 – 230 – 277Vac	115 / 230 – 277Vac	115 / 230 – 277Vac	115 / 230 – 277Vac	115 / 230 – 277Vac	115 / 230 – 277Vac
Input Voltage Range	90 – 135Vac / 180 – 305Vac	90 – 305Vac	90 – 305Vac	90 – 305Vac	90 – 135Vac / 180 – 305Vac	90 – 305Vac	90 – 305Vac	90 – 135Vac / 180 – 305Vac	90 – 135Vac / 180 – 305Vac	90 – 135Vac / 180 – 305Vac	90 – 135Vac / 180 – 305Vac
Inrush Current (Vn and In Load) I²t	≤ 16 A ≤ 5msec	≤ 36 A ≤ 5msec	≤ 36 A ≤ 5msec	≤ 36 A ≤ 5msec	≤ 80 A ≤ 5msec	≤ 36 A ≤ 5msec	≤ 36 A ≤ 5msec	≤ 42 A ≤ 5msec	≤ 80 A ≤ 5msec	≤ 42 A ≤ 5msec	≤ 35 A ≤ 5msec
Frequency	47 – 63 Hz	47 – 63 Hz	47 – 63 Hz	47 – 63 Hz	47 – 63 Hz	47 – 63 Hz	47 – 63 Hz	47 – 63 Hz	47 – 63 Hz	47 – 63 Hz	47 – 63 Hz
Input Current (115 – 230Vac)	5.5 – 3A	2.8 – 1.3A	2.8 – 1.3A	2.8 – 1.3A	8.0 – 4.2A	2.8 – 1.3A	2.8 – 1.3A	3.3 – 2.2A	8.0 – 4.2A	3.3 – 2.2A	8.0 – 4.2A
Internal Fuse	6.3A	4A	4A	4A	10A	4A	4A	6.3A	10A	6.3A	10A
External Fuse (recommended)	16A	10A	10A	10A	16A	10A	10A	16A	16A	16A	16A
OUTPUT DATA											
Output Vdc /In	12Vdc 15A / 24Vdc 10A	12Vdc – 3A	12Vdc – 6A	12Vdc – 10A	12Vdc – 35A	24Vdc – 3A	24Vdc – 5A	24Vdc – 10A	24Vdc – 20A	48Vdc – 5A	48Vdc – 10A
Output Current (In)	15A / 10A	3A	6A	10A	35A	3A	5A	10A	20A	5A	10A
Dissipation Power load max (W)	28	15	18	25	68	18	25	48	68	48	68
Minimum load	No	No	No	No	No	No	No	No	No	No	No
Efficiency (50% of In)	> 91%	≥ 89%	≥ 89%	≥ 89%	> 90%	≥ 89%	≥ 89%	≥ 83%	> 90%	≥ 83%	> 90%
Short-circuit protection	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Over Load protection	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Over Voltage Output protection	Yes (Typ. 35Vdc)	Yes (Typ. 35Vdc)	Yes (Typ. 35Vdc)	Yes (Typ. 35Vdc)	Yes (Typ. 35Vdc)	Yes (Typ. 35Vdc)	Yes (Typ. 35Vdc)	Yes (Typ. 35Vdc)	Yes (Typ. 35Vdc)	Yes (Typ. 90Vdc)	Yes (Typ. 90Vdc)
Overheating Thermal Protection	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Reverse battery protection	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sulfated battery check	Yes by Deep Switch	Yes by Jumper	Yes by Jumper	Yes by Jumper	Yes by Jumper	Yes by Jumper	Yes by Jumper	Yes by Jumper	Yes by Jumper	Yes by Jumper	Yes by Jumper
LOAD OUTPUT											
Output voltage (at IN) Vdc	10 – 14.4Vdc (15.5Vdc for Ni-Cd) 22 – 28.8Vdc (31Vdc for Ni-Cd)	10 – 14.4Vdc (15.5Vdc for Ni-Cd)	10 – 14.4Vdc (15.5Vdc for Ni-Cd)	10 – 14.4Vdc (15.5Vdc for Ni-Cd)	10 – 14.4Vdc (15.5Vdc for Ni-Cd)	22 – 28.8Vdc (31Vdc for Ni-Cd)	22 – 28.8Vdc (31Vdc for Ni-Cd)	22 – 28.8Vdc (31Vdc for Ni-Cd)	22 – 28.8Vdc (31Vdc for Ni-Cd)	44 – 57.6Vdc (62Vdc for Ni-Cd)	44 – 57.6Vdc (62Vdc for Ni-Cd)
Start up with strong load (capacitive load)	Yes, Unlimited	Yes, Unlimited	Yes, Unlimited	Yes, Unlimited	Yes, Unlimited	Yes, Unlimited	Yes, Unlimited	Yes, Unlimited	Yes, Unlimited	Yes, Unlimited	Yes, Unlimited
Residual Ripple / Ripple Residuo	≤ 60 mVpp	≤ 60 mVpp	≤ 60 mVpp	≤ 60 mVpp	≤ 60 mVpp	≤ 60 mVpp	≤ 60 mVpp	≤ 60 mVpp	≤ 60 mVpp	≤ 60 mVpp	≤ 60 mVpp
Nominal Current IN = Iload	1.1 x In A ± 5%	1.1 x In A ± 5%	1.1 x In A ± 5%	1.1 x In A ± 5%	1.1 x In A ± 5%	1.1 x In A ± 5%	1.1 x In A ± 5%	1.1 x In A ± 5%	1.1 x In A ± 5%	1.1 x In A ± 5%	1.1 x In A ± 5%
Continuous current (without battery) Iload = In	15A 12Vdc / 10A 24Vdc	3A	6A	10A	35A	3A	5A	10A	20A	5A	10A
Max continuous current (with battery) Iload = In + Ibatt	30A 12Vdc / 20A 24Vdc	6A	12A	20A	70A	6A	10A	20A	40A	10A	20A
Max current Output Load: (Main Input) Iload (4sec.)	max. 45A 12Vdc / 30A 24Vdc	9A max	18A max	30A max	105A max	9A max	15A max	30A max	60A max	15A max	30A max
Max current Output Load: (Back Up) Iload (4sec.)	max. 30A 12Vdc / 20A 24Vdc	6A max	12A max	20A max	70A max	6A max	10A max	20A max	40A max	10A max	20A max
Push Button or Remote Input Control (AMP type connector) Start from Battery without main	Yes	No (1)	No (1)	No (1)	Yes	No	No	No	Yes	No	Yes
Time Buffering; (switch off output without main input)	0.5;1;3;5;10;15; 20; 30; 45;60;∞	(2)	(2)	(2)	0.5;1;3;5;10;15; 20; 30; 45;60;∞	(2)	5 min standard - Require: SW S31	0.5;1;3;5;10;15; 20; 30; 45;60;∞	5 min standard - Require: SW S31	0.5;1;3;5;10;15; 20; 30; 45;60;∞	
Threshold alarm Battery almost flat	10 – 11 Vdc batt / 20 – 21 Vdc batt	10 – 11 Vdc batt	10 – 11 Vdc batt	10 – 11 Vdc batt	10 – 11 Vdc batt	20 – 21 Vdc batt	20 – 21 Vdc batt	20 – 21 Vdc batt	20 – 21 Vdc batt	40 – 42 Vdc batt	40 – 42 Vdc batt
Protections against total discharge	9 – 10 Vdc batt / 19 – 20 Vdc batt	9 – 10 Vdc batt	9 – 10 Vdc batt	9 – 10 Vdc batt	9 – 10 Vdc batt	19 – 20 Vdc batt	19 – 20 Vdc batt	19 – 20 Vdc batt	19 – 20 Vdc batt	38 – 40 Vdc batt	38 – 40 Vdc batt
BATTERY CHARGER OUTPUT											
Boost charge (Typ. at I_N)	14.4Vdc / 28.8Vdc	14.4Vdc	14.4Vdc	14.4Vdc	14.4Vdc	28.8Vdc	28.8Vdc	28.8Vdc	28.8Vdc	57.6Vdc	57.6Vdc
Short circuit Element Detection	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Max.Time Boost–Bulk charge (Typ. at I_N)	15h	15h	15h	15h	15h	15h	15h	15h	15h	15h	15h
Min.Time Boost–Bulk charge (Typ. at I_N)	1min.	1min.	1min.	1min.	1min.	1min.	1min.	1min.	1min.	1min.	1min.
Float charge (Typ. at I_N)	13.8Vdc / 27,6Vdc	13.75Vdc	13.75Vdc	13.75Vdc	13.75Vdc	27.5Vdc	27.5Vdc	27.5Vdc	27.5Vdc	55Vdc	55Vdc
Recovery Charge	2 – 10Vdc / 2 – 20Vdc	2 – 9Vdc	2 – 9Vdc	2 – 9Vdc	2 – 9Vdc	2 – 16Vdc	2 – 16Vdc	2 – 16Vdc	2 – 16Vdc	2 – 24Vdc	2 – 24Vdc
Turn-On delay after applying mains voltage	3sec. Max	1sec. Max	1sec. Max	1sec. Max	1sec. Max	1sec. Max	1sec. Max	1.5sec. Max	1sec. Max	1.5sec. Max	1sec. Max
End of charging current (Bulk charge)	6% of charging current limiting	0.3A	0.3A	0.3A	0.3A	0.3A	0.3A	0.3A	0.3A	0.3A	0.3A
Charging max Ibatt	15A ± 5% 12Vdc / 10A ± 5% 24Vdc	3A ± 5%	6A ± 5%	10A ± 5%	35A ± 5%	3A ± 5%	5A ± 5%	10A ± 5%	10A ± 5%	5A ± 5%	10A ± 5%
Charging current Limiting I_N (I_batt)	10 ÷ 100 % / I_batt	20 ÷ 100 % / I_batt	20 ÷ 100 % / I_batt	20 ÷ 100 % / I_batt	20 ÷ 100 % / I_batt	20 ÷ 100 % / I_batt	20 ÷ 100 % / I_batt	20 ÷ 100 % / I_batt	10 ÷ 100 % / I_batt	20 ÷ 100 % / I_batt	10 ÷ 100 % / I_batt
Jumper Config.Type Battery (NiCd optional)	2.23 V/cell Open Lead, 2.25 V/cell Sealed Lead, 2.27 V/cell Sealed Lead, 2.3 V/cell gel; NiCd 1.51V										
Quiescent Current	≤100mA	≤100mA	≤100mA	≤100mA	≤100mA	≤100mA	≤100mA	≤100mA	≤100mA	≤100mA	≤100mA
Remote Input Control (AMP Type connector)	Bulk / Trickle	Bulk / Trickle	Bulk / Trickle	Bulk / Trickle	Bulk / Trickle	Bulk / Trickle	Bulk / Trickle	Bulk / Trickle	Bulk / Trickle	Bulk / Trickle	Bulk / Trickle
Charging Curve	IUoUo, Automatic, 3 stage / IUoUo, Automatico a 3 Stadi										
SIGNAL OUTPUT (RELAY)											
Main or Backup Power	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Low Battery	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fault Battery	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
AUXILIARY OUTPUT											
UPS Enabling	Yes	No	No	No	No	No	No	No	No	No	No
Temp. Charging probe	Yes RJ11	Yes RJ45	Yes RJ45	Yes RJ45	Yes RJ45	Yes RJ45	Yes RJ45	Yes RJ45	Yes RJ45	Yes RJ45	Yes RJ45
Parallel connection	No	No	No	No	No	No	No	No	Yes	No	Yes
Communication Protocol	ModBus	No	No	No	ModBus	No	No	No	ModBus	No	ModBus
CLIMATIC DATA											
Ambient Temperature operation	-25 ÷ +70°C	-25 ÷ +70°C	-25 ÷ +70°C	-25 ÷ +70°C	-25 ÷ +70°C	-25 ÷ +70°C	-25 ÷ +70°C	-25 ÷ +70°C	-25 ÷ +70°C	-25 ÷ +70°C	-25 ÷ +70°C
De rating T° (In) / De rating T° > (In)	> 50° -2.5%(In) / °C	> 50° -2.5%(In) / °C	> 50° -2.5%(In) / °C	> 50° -2.5%(In) / °C	> 50° -2.5%(In) / °C	> 50° -2.5%(In) / °C	> 50° -2.5%(In) / °C	> 50° -2.5%(In) / °C	> 50° -2.5%(In) / °C	> 50° -2.5%(In) / °C	> 50° -2.5%(In) / °C
Ambient Temperature Storage	-40 ÷ +85°C	-40 ÷ +85°C	-40 ÷ +85°C	-40 ÷ +85°C	-40 ÷ +85°C	-40 ÷ +85°C	-40 ÷ +85°C	-40 ÷ +85°C	-40 ÷ +85°C	-40 ÷ +85°C	-40 ÷ +85°C
Humidity at 25 °C	95% to 25°C	95% to 25°C	95% to 25°C	95% to 25°C	95% to 25°C	95% to 25°C	95% to 25°C	95% to 25°C	95% to 25°C	95% to 25°C	95% to 25°C
Cooling	Auto Convection	Auto Convection	Auto Convection	Auto Convection	Auto Convection	Auto Convection	Auto Convection	Auto Convection	Auto Convection	Auto Convection	Auto Convection
GENERAL DATA											
Isolation Voltage (IN / OUT)	3000Vac	3000Vac	3000Vac	3000Vac	3000Vac	3000Vac	3000Vac	3000Vac	3000Vac	3000Vac	3000Vac
Isolation Voltage(IN / PE)	1605Vac	1605Vac	1605Vac	1605Vac	1605Vac	1605Vac	1605Vac	1605Vac	1605Vac	1605Vac	1605Vac
Isolation Voltage(OUT / PE)	500Vac	500Vac	500Vac	500Vac	500Vac	500Vac	500Vac	500Vac	500Vac	500Vac	500Vac
Protection Class (EN/IEC 60529)	IP 20	IP 20	IP 20	IP 20	IP 20	IP 20	IP 20	IP 20	IP 20	IP 20	IP 20
Reliability (MTBF IEC 61709)	> 300 000 h	> 300 000 h	> 300 000 h	> 300 000 h	> 300 000 h	> 300 000 h	> 300 000 h	> 300 000 h	> 300 000 h	> 300 000 h	> 300.000 h
Pollution Degree Environment	2	2	2	2	2	2	2	2	2	2	2
Connection Terminal Blocks Screw Type	4mm (30-10 AWG) 2,5mm(24-14 AWG)	2,5mm (24-14 AWG)	2,5mm (24-14 AWG)	2,5mm (24-14 AWG)	4mm (30-10 AWG)	2,5mm (24-14 AWG)	2,5mm (24-14 AWG)	2,5mm (24-14 AWG)	4mm (30-10 AWG)	2,5mm (24-14 AWG)	4mm (30-10 AWG)
Protection class (with PE connected)	I	I	I	I	I	I	I	I	I	I	I
Dimension (w-h-d)	110x115x135 mm	65x115x135 mm	65x115x135 mm	65x115x135 mm	150x115x135 mm	65x115x135 mm	65x115x135 mm	100x115x135 mm	150x115x135 mm	100x115x135 mm	150x115x135 mm
Weight	0.85 Kg approx	0.60 Kg approx	0.60 Kg approx	0.60 Kg approx	1.55 Kg approx	0.60 Kg approx	0.60 Kg approx	0.85 Kg approx	1.55 Kg approx	0.85 Kg approx	1.55 Kg approx
Safety Standard Approval	CE	CE cULus	CE cULus	CE cULus	CE	CE cULus	CE cULus	CE	CE	CE	CE

(1) - Options to be defined by Order/S (ex: CBIXXXA/S), Push Button not available
(2) - Yes if required by order /TB1/TB2/TB3..

Optional for auxiliary Output: Temp Charging probe 1m or 3m lenght. Remote monitoring Display. Modbus/Can Bus Cable. Paralleling Cable.

All specification are subject to change without note