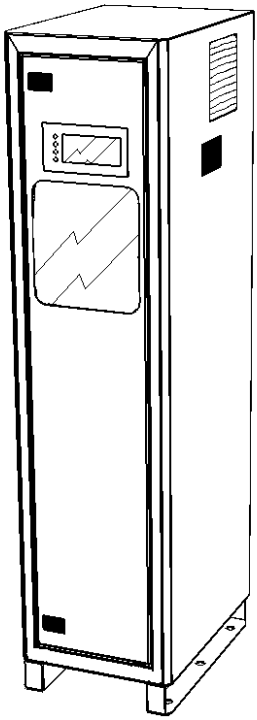
GEPA

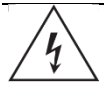


ARG-24 Series Battery Charger & Battery Group

User Guide

Contents

- Read this document's related content before montage and wiring.
- Make sure device is de-energized before wiring.
- Don't touch device terminals when it's energized.
- Montage and wiring must be done according to document by qualified person/people.
- Use dry cloth to clean the device. Don't use chemicals that may lead deformation or corrosion.
- Warranty is valid for 2 years from invoice date, batteries are excluded from warranty.
- Warranty will be violated under these conditions; unauthorized modifications, opening control box and removing warranty label.
- This device intended for use in indoor and industrial environment.
- Manufacturer or sales company is not responsible of faults if user doesn't obey recommendations at the above.



Contact with high voltage may cause electrical shock and injury.

1. General

GEPA ARG-24 Series Battery Charger & Battery Group is designed to provide DC supply in substations. Device contains battery charger and maintenance free battery group within. Also device can be used as general purpose battery charger and DC power supply.

Device keeps batteries under charge (float charge) in case of power loss to keep DC power bus alive. Battery charger controls load current and battery charge current separately, load current provided from AC supply when AC power present.

In case of high current demand battery chargers output current may not provide the demand. In this situation, needed excessive current demand will be provided from battery group. At the end of high current demand lost capacity of battery groups will be replacing by battery charger.

Maintenance programs provided to extend battery group lifespan and prevent sulfation.

2. Features

Electrical

- Microcontroller based, thyristor controlled design
- Continuous 5 A, 10 A or 20 A current output
- 18 Ah or 26 Ah battery group capacity
- Float and equalizing charge options
- Soft start feature
- Adjustable voltage output 20 – 30 V_{DC} in steps 0.1 V
- Adjustable current output 1 – 5 A / 10 A / 20 A in steps 0.1 A
- Battery charge current and load current is adjustable separately
- DC source mode, adjustable voltage output in range of 0.1 – 32 V_{DC} and current output in range of 0.1 – 7.5 A / 15 A / 30 A
- Short circuit protection at output
- Battery maintenance programs
- Fan assisted cooling system with adjustable temperature
- VRLA type batteries with 10 years of life expectancy

Mechanical

- Easy access to batter group with drawer system
- Wall or floor montage

User Interface

- Audible and visual alarms
- Comprehensive and easy menus with 2.6” graphic LCD
- 4 digit password protection against unauthorized access

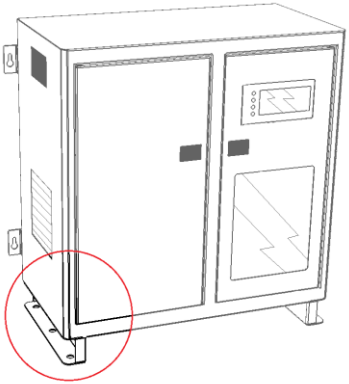
Optional Features

- 14 dry contact outputs for 13 different alarms for SCADA systems
- Battery lead supervision
- Deep discharge protection
- High/low AC input protection
- Communication with Modbus RTU protocol via RS-485

3. Montage & Wiring

3.1. Montage

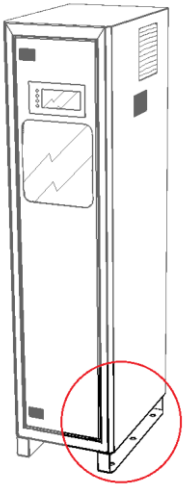
- Fix the device by screw on wall/floor.
- Leave enough distance for cooling windows.
- Device should place far from direct sunlight, high temperature and high humidity.



Montage of Square Model

If device will be mount to floor; use montage apparatus under the device, fix with wall plug and screw on floor

If device will be mount to wall; use montage apparatus on left and right of the case, fix with wall plug and screw on wall.



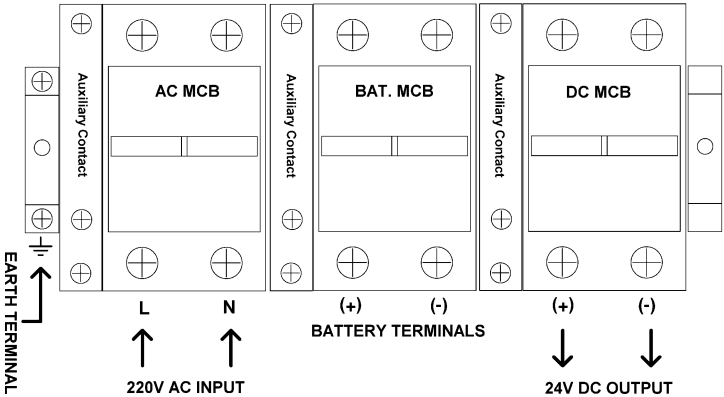
Montage of Tower Model

Use montage apparatus under device, fix with wall plug and screw on floor

3.2. Wiring

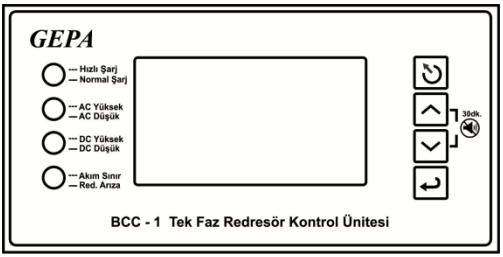
- Make sure device is de-energized before wiring.
- Make sure cables have enough current carrying capacity.
- To prevent electromagnetic noise use shielded signal cables and keep signal cables at least 10 cm away from power cables.
- Make wiring according to example at the below.

Contact with high voltage may cause electrical shock and injury.



4. Usage

4.1. Interface



BCC-1 Monophase Battery Charger Control Unit consist elements at below:

- 4 alarm LEDs,
- 2.6” graphic LCD,
- 4 buttons

4.1.1. Buttons

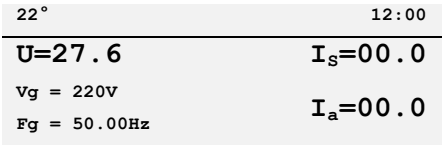
	**ESCAPE**	Used to return main page or cancel settings.
	**UP** **DOWN**	Used to change menu pages and adjust/change parameters.
	**SET**	Used to; enter to menu in main page, in other pages access to settings and confirm adjusted values.
	**MUTE**	To silence audible alarm, press UP and DOWN buttons at the same time. Audible alarm (buzzer) will be silenced for 30 minutes. After 30 minutes audible alarm will be enabling again. If it’s pressed while audible alarm is muted, timer will be start again.

4.1.2. Alarm LEDs

--- Equ. Charge — Float Charge	Equalizing charge is active. LED blinks. Float charge is active. LED lits steadily.
--- AC High — AC Low	AC input voltage is high. LED blinks. AC input voltage is low. LED lits steadily.
--- DC High — DC Low	DC output voltage is high. LED blinks. DC output voltage is low. LED lits steadily.
--- Current Limit — Common Fault	Current draw exceeded limit, battery charger has limited current draw. Battery charger has limited current draw. LED blinks. An alarm has occurred. These are; AC loss, AC high/low, DC high/low, leakage, AC MCB switch off, DC MCB switch off, overload, over temperature, fan fault and battery lead supervision. LED lits steadily.

4.2. Settings and Menu

4.2.1. Main Page (Measurement Page)



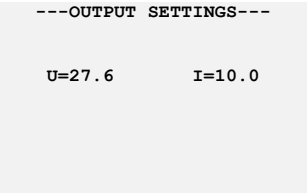
Main page shows instantaneous measurements

- In-cabinet temperature
- Clock
- **U:** DC output voltage
- **Is:** Total system current
- **Ia:** Battery group current
- **Vg & Fg:** Input voltage and frequency

To enter menu, press SET button.

To change menu pages press UP or DOWN button.

4.2.2. Output Settings



Press SET button to access output voltage (U) and use UP and DOWN buttons to adjust. Press SET button again to confirm then cursor will move to output current (I). Use UP and DOWN buttons to adjust. Press SET button to confirm then confirmation question will show. Press SET button to confirm settings or use ESCAPE button to cancel.

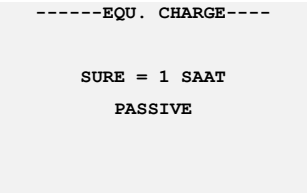
4.2.3. Equalize Charge

Equalizing charge method is used to prevent battery sulfation.

When current draw from lead-acid battery lead sulfate ($PbSO_4$) forms on battery plates. During use, small sulfate crystals are form but it doesn't cause problems. However if battery wouldn't charge for some long time, the amorphous lead sulfate converts to stable (permanent) crystalline and deposits on negative plates of battery. This leads to development of large crystals that reduce the battery's active material, which is responsible for the capacity.

Sulfated battery may measure at rated voltage; however its capacity would be quite low. This situation may lead inadequate power, leaves critical application without protection, etc. To breakdown permanent sulfation, it's advised to use over voltage charge.

If this feature would be use periodically, please read *4.2.6. Maintenance*.

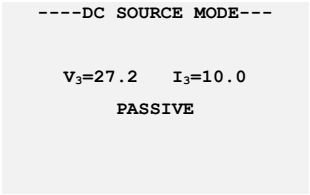


To start equalizing charge, adjust time then confirm to start the process. After confirmation, battery charger changes charge method to equalizing charge, battery group is charged at high voltage for adjusted time. When timer elapsed, charge method changes to normal charge automatically.

To stop enabled equalizing charge process, use this menu page.

4.2.4. DC Source Mode

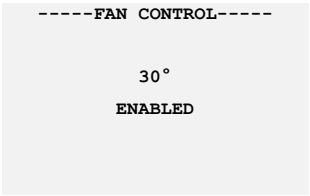
DC Source Mode must not be used while battery group is connected.
This mode can be used after disconnecting battery group.



Device is able to use as DC power source in DC Source Mode. Voltage output is adjustable in range of 0 – 32 V_{DC} and current output is adjustable in range of 0.1 A – 1.5 I_{rated}.

To enable DC source mode; press SET to adjust output voltage and current values, then select ACTIVE instead of PASSIVE. Press SET again to activate DC source mode.

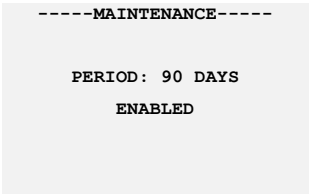
4.2.5. Fan Control



Fan is used to prevent overheating in cabinet. User is able to make fan enable or disable and adjust fan minimum working temperature.

It's important to keep in-cabinet temperature in reasonable limits.
If battery group exposes to high temperature, capacity drops and life-span shortens.

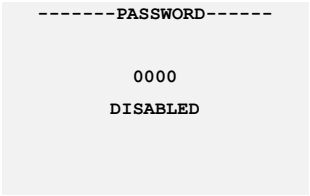
4.2.6. Maintenance



In maintenance mode; battery group will be fast charged periodically and after 5 hours of power out gages. Maintenance prevents sulfation and extends life-span.

User may adjust maintenance period and enable maintenance in this menu.

4.2.7. Password

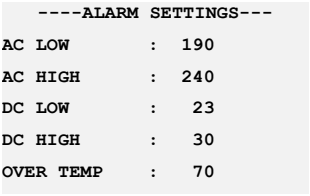


Password prevents unauthorized people access to device settings. If enabled, password will be asked before menu access.

Password forms as 4-digit number. To change password press SET button, adjust each digit then change PASSIVE to ACTIVE to active password protection.

In case of forget password;
While password is enabled and user entered password wrong for 3 times, a 4-digit code and phone number shows. Call or mail us and give the code. We'll provide you a new password to access menus.

4.2.8. Alarm Settings



User can adjust alarm thresholds in alarm settings page.

- AC input voltage high / low,
- DC output voltage high / low,
- In-cabinet temperature

4.2.9. General Settings

```
   --GENERAL SETTINGS---
AUDIBLE ALARM:DISABLE
DIL/LANGUAGE: ENGLISH
```

Device has audible alarm (an internal buzzer) to announce alarms locally. It can be enabled or disabled in this menu.

Also interface language can be changed to supported languages.

To disable buzzer temporary (30 minutes) press UP and DOWN buttons at the same time in main page.
While it's temporary disabled, repeating process again will make enable buzzer again.

4.2.10. Date/Time Settings

```
      ---DATE/TIME---

    01/01/2016     12:00
```

Date and time can be adjusted in date/time settings page.

Used format is at the below.

DD/MM/YYYY HH:MM

4.3. Default Setting Values

Output Voltage	27.6 V	**Password**	Disable, 0000
Output Current	I_{rated}	**AC Low Threshold**	190 V
Equalizing Charge	Passive	**AC High Threshold**	240 V
DC Source Mode	Passive	**DC Low Threshold**	20 V
Fan Control	Enable, 30 °C	**DC High Threshold**	30 V
Maintenance	Enable, Period: 90 days	**Temperature Threshold**	70 °C
Audible Alarm (Buzzer)	Enable		

5. Optional Features

GEPA ARG-24 Series provides some optional features. Since optional features need extra hardware, it has to be specified in order.

5.1. SCADA Contact Outputs

Device has 14 contacts for 13 different alarms. Contacts are isolated from other circuits and case. Contact terminals are accessible from front panel. Each alarm contact has status LED and it's clearly visible from front panel.

SCADA contact outputs are listed at the below:

- AC MCB switch off
- DC or battery MCB switch off
- DC (+) leakage
- DC (-) leakage
- AC loss
- DC low
- DC high
- AC high
- AC low
- Battery lead supervision
- Overload
- Over temperature
- Fan fault
- Common alarm

Common alarm contact trips when at least one alarm occurs.

5.2. Battery Lead Supervision

Battery charger continuously supervises its connection to battery group. In case of disconnection, device announces alarm audible and visible from front panel LED, LCD and related SCADA contact output. Battery lead supervision can detect faults described at the below:

- Corrosion or shedding occurs at battery plates during usage and it's unavoidable. Because of corrosion, plate may lose it conductance to battery lead. In series connected battery group even a plate loses connection, battery charger and battery group disconnects from system. In this case, battery group doesn't able to get charge or provide power.
- Battery group connects to battery charger through a multi-contact plug socket. In case of connection or cable failure battery lead supervision warns user with alarm.

5.3. Deep Discharge Protection

When battery cell voltage drops below 1.75 V, it's called deep discharge. For a 24V rated voltage battery group, deep discharge voltage is 21 V. Standard lead acid and VRLA type batteries are fragile to deep discharge and deep discharged batteries can't get charged at full capacity again.

'Deep discharge protection' is recommended to prevent this case.

When AC input not present and battery group voltage drops below minimum threshold, contactor disconnects battery group from system output and prevent deep discharge.

Battery group is reconnected to system output after AC input voltage applied and battery charger charges battery group again.

5.4. AC Protection

AC protection is used to keep battery charger AC input voltage at operational limits. When AC voltage rise above AC high threshold or drops below AC low threshold, contactor disconnects input voltage transformer and battery charger. Contactor reconnects voltage transformer output to battery charger when AC voltage stabilized in threshold limits. After reconnection, device becomes operational.

6. Technical Specifications

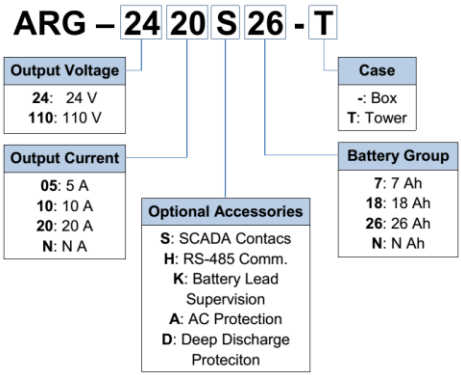
	5 A	10 A	20 A
Input Voltage	220 V_{AC} (±%20), 50 Hz (2 P+PE)		
Input Current	1.25 A_{max}	2.5 A_{max}	5 A_{max}
Input Power Consumption	250 VA_{max}	500 VA_{max}	1000 VA_{max}
Power Factor	0.63		
Output Voltage	27.6 V_{DC}		
Battery Charge Voltage	20.0 – 30.0 V_{DC}		
DC Source Mode	0.1 – 32.0 V_{DC}		
Output Current	5 A	10 A	20 A
Battery Charge Current	1 – 5 A	1 – 10 A	1 – 20 A
DC Source Mode*	0.1 – 7.5 A	0.1 – 15 A	0.1 – 30 A
Output Power	140 W_{max}	280 W_{max}	560 W_{max}
Output Filter	L – C filter		
Efficiency	>% 72		
Cooling Method	Forced cooling with fan		
Ingress Degree	IP 20**		
Operating Temperature	(-20) – (+55) °C		
Storage Temperature	(-30) – (+65) °C		
Alarm Outputs	14 NO dry contact, 5A/30V_{DC} or 5A/250V_{AC} (Cosϕ = 1)		
Dielectric Withstand	2000 V_{AC} / 50 Hz, 1 min (between all circuits and case)		

***** Device provides 1.5 I_{rated} only at DC source mode and doesn't provide continuous current more than I_{rated}.

****** IP40, IP50 and IP51 are optionally available.

7. Order Code

GEPA ARG-24 Series Battery Charger & Battery Group provides optional features. According to application, all or none is selectable for a device.



Example order codes:

ARG-2420S26-T
24V/20A output, 26Ah battery group, SCADA outputs, tower case

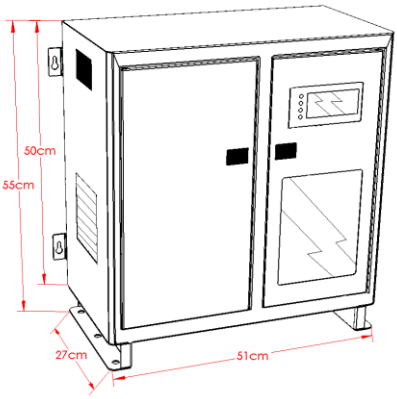
ARG-2410SD26
24V/10A output, 26Ah battery group, SCADA outputs, deep discharge protection.

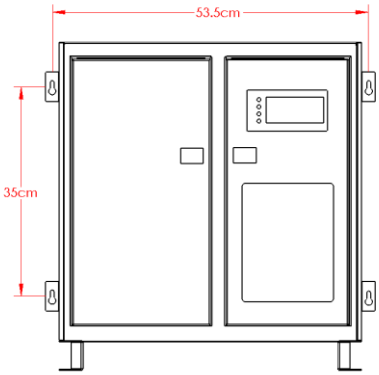
ARG-2420HKD18-T
24V/20A output, 18Ah battery group, RS-485 communication, battery lead supervision, deep discharge protection, tower case

ARG-2405SA26
24V/5A output, 26Ah battery group, SCADA outputs, AC(input voltage) protection

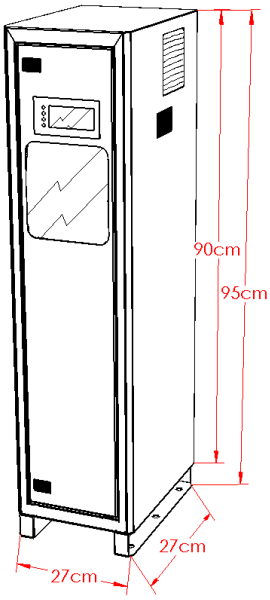
8. Dimensions

Box Case





Tower Case



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