

EZA11K-320240

Quick Manual

Practical Volume III

BEFORE USING THE POWER SUPPLY UNIT (Common)

Be sure to read this instruction manual thoroughly before using this product. Pay attention to all cautions and warnings before using this product. Incorrect usage could lead to an electrical shock, damage to the unit or a fire hazard.

DANGER!

Never use this product in locations where flammable gas or ignitable substances are present.

INSTALLATION WARNING

- When installing, ensure that work is done in accordance with the instruction manual. When installation is improper, there is risk of electric shock and fire.
- Installation shall be done by Service personnel with necessary and appropriate technical training and experience. There is a risk of electric shock and fire.
- Do not cover the product with cloth or paper etc. Do not place anything flammable around. This might cause damage, electric shock or fire..

WARNING on USE

- Do not touch this product or its internal components while circuit in operation, or shortly after shutdown. You may receive a burn.
- While this product is operating, keep your hands and face away from it as you may be injured by an unexpected situation.
- There are cases where high voltage charge remains inside the product. Therefore, do not touch even if they are not in operation as you might get injured due to high voltage and high temperature. You might also get electric shock or burn.
- Do not make unauthorized changes to this product nor remove the cover as you might get an electric shock or might damage the product. We will not be held responsible after the product has been modified, changed or dis-assembled.
- Do not use this product under unusual condition such as emission of smoke or abnormal smell and sound etc. Please stop using it immediately and shut off the product. It might lead to fire and electric shock. In such cases, please contact us. Do not attempt repair by you, as it is dangerous for the user.
- Do not operate and store these products in environments where condensation occurs due to moisture and humidity. It might lead fire and electric shock.
- Do not drop or apply shock to this product. It might cause failure. Do not operate these products mechanical stress is applied.

CAUTION on MOUNTING

- Confirm connections to input/output terminals are correct as indicated in the instruction manual before switching on.
- Input voltage, Output current, Output power, ambient temperature and ambient humidity should be kept within specifications, otherwise the product will be damaged, or cause electric shock or fire.
- Do not use this product in special environment with strong electromagnetic field, corrosive gas or conductive substances and direct sunlight, or places where product is exposed to water or rain.
- Mount this product properly in accordance with the instruction manual, mounting direction and shall be properly be ventilated.
- Please shut down the input when connecting input and output of the product.
- The power supply may cause damage when it intake conductive material, dust and liquid. When use this product, please be careful to prevent entry of those materials to inside the product by using filter etc.
- Do not use this product in environments where causes the salt damage.

CAUTION on USE

- Product individual notes are shown in the instruction manual. If there is any difference with common notes individual notes shall have priority.
- Before using this product, be sure to read the catalog and instruction manual. There is risk of electric shock or damage to the product or fire due to improper use.
- Input voltage, Output current, Output power, ambient temperature and ambient humidity should be kept within specifications, otherwise the product will be damaged, or cause electric shock or fire.

- If the built-in fuse is blown, do not use the product even after replacing the fuse as there is risk of abnormality inside. Be sure to request repair to our company.
- For products without built-in protection circuit (element, fuse, etc.), insert fuse at the input to prevent smoke, fire during abnormal operation. As for products with built-in protection circuit, depending on usage conditions, built-in protection circuit might not work. It is recommended to provide separate proper protection circuit.
- For externally mounted fuse do not use other fuses aside from our specified and recommended fuse.
- This product was made for general purpose electronic equipment for standard industrial use and is not designed for applications requiring high safety (such as extremely high reliability and safety requirements. Even though high reliability and safety are not required, this product should not be used directly for applications that have serious risk for life and physical safety. Take sufficient consideration in fail-safe design (such as providing protective circuit or protective device inside the system, providing redundant circuit to ensure no instability when single device failure occurs).
- When used in environments with strong electromagnetic field, there is possibility of product damage due to malfunction.
- When used in environment with corrosive gas (hydrogen sulfide, sulfur dioxide, etc.) , there is possibility that they might penetrate the product and lead to failure.
- When used in environments where there is conductive foreign matter or dust, there is possibility of product failure or malfunction.
- Provide countermeasure for prevention of lightning surge voltage as there is risk of damage due to abnormal voltage.
- Connect together the frame ground terminal of the product and the ground terminal of the equipment for safety and noise reduction. If these grounds are not connected together, there is risk of electric shock.
- Parts with lifetime specifications (built-in fan, electrolytic capacitor) are required to be replaced periodically. Set the overhaul period depending on the environment of usage and perform maintenance. Also, note that there are cases when EOL products cannot be overhauled.
- Take care not to apply external abnormal voltage to the output. Especially, applying reverse voltage or overvoltage more than the rated voltage to the output might cause failure, electric shock or fire.
- Do not use in special environment such as places directly exposed to sunlight, dew condensation, moisture, rain, strong electro-magnetic field, or corrosive gas (hydrogen sulfide, sulfur dioxide).
- This product has a built-in fan for air-cooling. Do not block the air intake and exhaust.
- The output of this product is considered to be a hazardous energy level (The voltage is 2V or more and the power is 240VA or more). It must not be made accessible to users. Protection must be provided for Service Engineers against indirect contact with the output terminals and/or to prevent tools being dropped across them. While working on this product, the DC input power must be switched off and the input and output voltage should be zero.
- When short the output during operation, there is damage inside the converter.
- When change abrupt in Input voltage during operation, there is a Risk of damage inside the converter.
- When use the Electric storage device, Please refer to the manual of electric storage device and use the appropriate protection device.

 **Note**

- There is a possibility machining traces remain on sheet metal of product.
- Consider storage of the product at normal temperature and humidity avoiding direct exposure to sunlight at environment with minimal temperature and humidity changes. Storage of product at high temperature, high humidity and environments with severe changes in temperature and humidity might cause deterioration, and occurrence of condensation in the product.
- When disposing product, follow disposal laws of each municipality.
- Published EMI (CE, RE) or immunity is the result when measured in our standard measurement conditions and might not satisfy specification when mounted and wired inside end-user equipment. Use the product after sufficiently evaluating at actual end-user equipment.
- Catalogue, contents of the instruction manual may be changed without a prior notice. Refer to latest catalogue or instruction manual.
- Reproduction or reprinting the instruction manual or its portion is forbidden without our permission.

Over view of Quick manual Practical Volume III

Quick Manual Practical Volume III explains how to check the input / output current and voltage on the high voltage (grid) side and low voltage (battery) side of EZA11K, and how to check the details of alarms that occurred during operation of EZA11K.

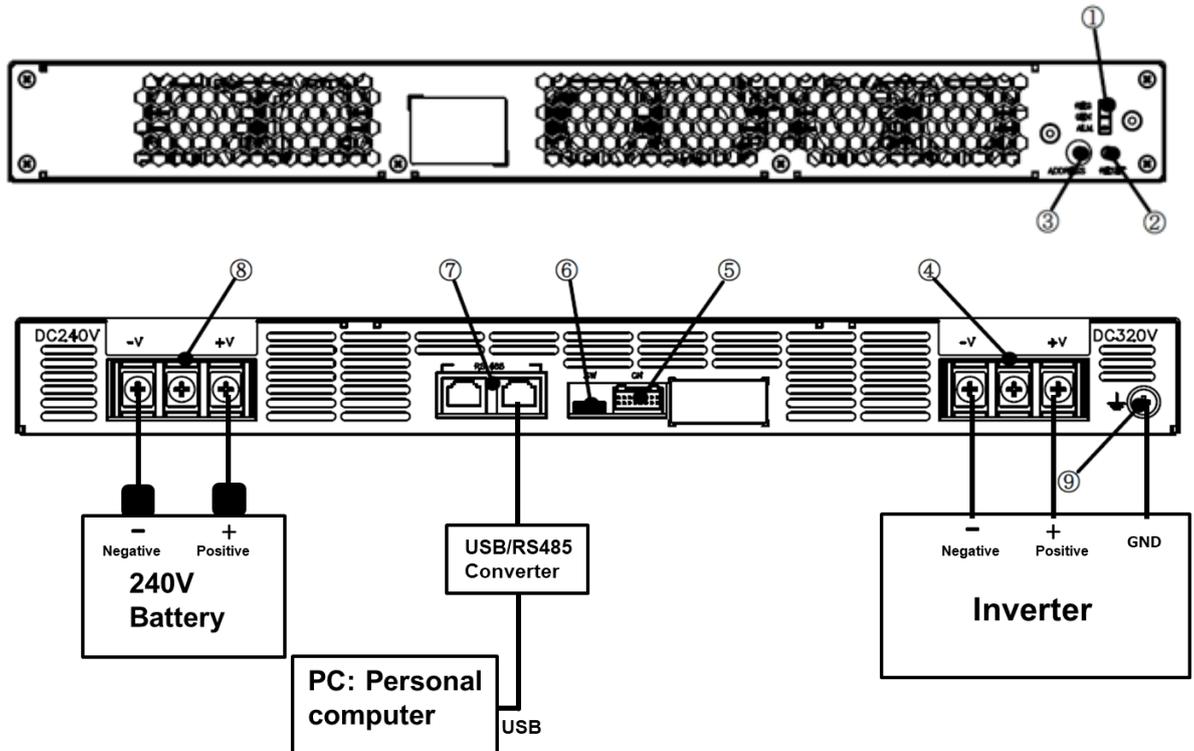
EZA11K uses a circuit that does not start unless a predetermined voltage (pre charge) is applied to both the high and low voltage sides. However, if the "Grid Ramp Up" or "Battery Ramp Up" function is used after adjusting the usage conditions, it is possible to start even if either the high voltage side or the low voltage side is 0V. This manual will explain that too.

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- 1) Construction of communication environment with RS-485**
- 2) Alarm confirmation using CNVCommCC**
- 3) Checking the operation status using CNVCommCC**
- 4) Startup from grid side 0V using "Grid Ramp Up (Grid bus ramping up)"**
- 5) Starting from 0V on the battery side using "Battery Ramp Up (Battery bus ramping up)"**

1) Construction of communication environment with RS-485

The connection diagram for controlling EZA2500 with RS-485 is shown below. Since it is also described in Quick Manual basic version, if you have already referred to it, proceed to the next chapter.



- ① LED of Indicator
- ② RESET :Tactile Switch
- ③ ADDRESS : Rotary Switch
- ④ Grid Signal connector (DC320V HVDC Terminal)
DC320V HVDC Power Supply Input Output Terminal: -V, NC*, +V (The fuse is connected to +V) from the left
- ⑤ CN : External Signal Connector
- ⑥DIP SW
- ⑦ RS-485 : Serial Interface Connector
- ⑧ Battery Signal connector (DC240V LVDC Terminal)
DC240V Power Supply Input Output Terminal: -V, NC*, +V (The fuse is connected to +V) from the left
- ⑨ Ground terminal(M5 Screw)

NC*: No internal connection.



Select the DC / AC inverter with a regenerative function that can apply the specified voltage to the grid side of EZA even when EZA is stopped, and that can be used for DC⇒AC and AC⇒DC.



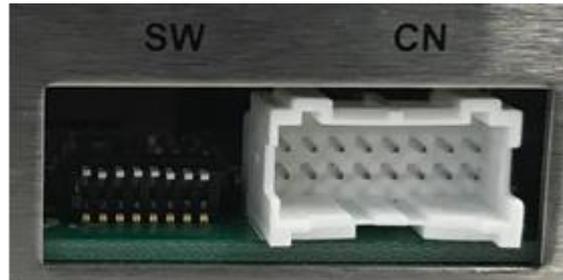
When connecting a DC input power source such as a PV inverter to the grid side, enable "Grid Ramp Up" of EZA. For details on "Grid Ramp Up", refer to section 4) in this manual.

The setting procedure is shown below.

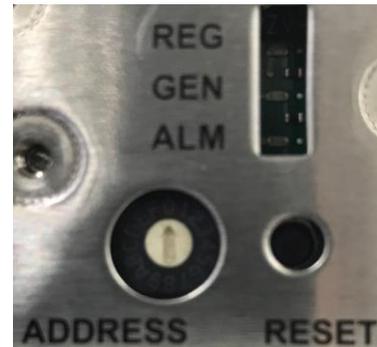
① Setting communication conditions for DIP switch and RS-485.

Set the EZA to operation via RS-485 and the address on RS-485 to "0", the communication speed to 19.2 kbps.

Set the terminal voltage on both the grid side and the battery side of the EZA to 0 V, and then, as shown in the photo below, set all the DIP switch to OFF (pushed up) on the back.



Set the rotary switch on the front panel as shown in the picture below.



For details, refer to the instruction manual p10 and the communication manual p6.

※ The factory setting is the above setting.

② Restart the control board.

Set the terminal voltage on the EZA grid side and battery side to 0 V at the same time, and then apply a voltage of DC120 V or more again. At this time, do not apply a voltage exceeding the upper limit of the specification.



The control board reads the values of DIP switch and rotary switch at restart.



The control board is also restarted by applying DC120V or more to either the battery or grid side. (Do not apply a voltage exceeding the upper limit of the specification.)

③ Check that communication is possible.

Start up the personal computer on which CNVCommCC is installed, and confirm that it can communicate with the personal computer and EZA according to the operation manual of CNVCommCC distributed together.

2) Alarm confirmation using CNVCommCC

If an alarm occurs while EZA is running, it can be confirmed via RS485.

The following describes how to check the alarm contents using the CNVCommCC GUI software

① Start CNVCommCC.

Start CNVCommCC and confirm that it can communicate with EZA.

② Checking the details of the alarm.

① Click "Main" tab and click "READ" of "[02] Converter status" to display the current status of EZA.

② Click "READ" in "[09] Alarm" to display the details of alarm that has occurred. Click "v" to display the second line and below.

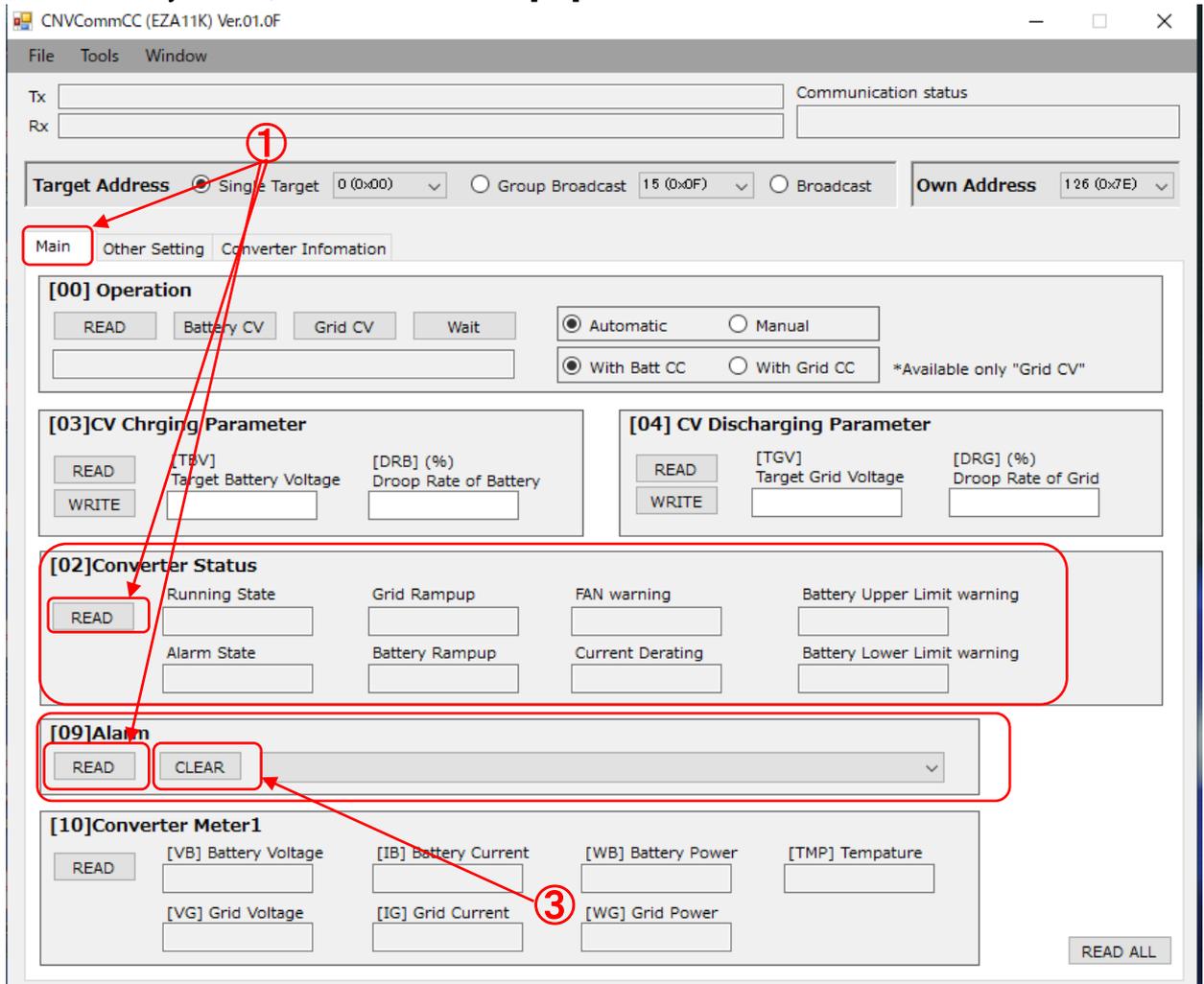
The screenshot shows the CNVCommCC (EZA11K) Ver.01.0F GUI. The interface includes a menu bar (File, Tools, Window), Tx/Rx fields, and communication status. The main area is divided into several sections:

- [00] Operation:** Includes buttons for READ, Battery CV, Grid CV, and Wait. It also has radio buttons for Automatic/Manual and With Batt CC/With Grid CC.
- [03] CV Charging Parameter:** Includes buttons for READ and WRITE, and input fields for Target Battery Voltage (TBV) and Droop Rate of Battery (DRB).
- [04] CV Discharging Parameter:** Includes buttons for READ and WRITE, and input fields for Target Grid Voltage (TGV) and Droop Rate of Grid (DRG).
- [02] Converter Status:** This section is highlighted with a red box. It contains a 'READ' button and several status indicators: Running State, Grid Rampup, FAN warning, Battery Upper Limit warning, Alarm State, Battery Rampup, Current Derating, and Battery Lower Limit warning.
- [09] Alarm:** This section is also highlighted with a red box. It contains a 'READ' button, a 'CLEAR' button, and a dropdown arrow.
- [10] Converter Meter1:** Contains buttons for READ and several input fields for Battery Voltage (VB), Battery Current (IB), Battery Power (WB), Temperature (TMP), Grid Voltage (VG), Grid Current (IG), and Grid Power (WG).

Red arrows and boxes indicate the steps: ① points to the 'Main' tab and the 'READ' button in the '[02] Converter Status' section. ② points to the 'READ' button and the dropdown arrow in the '[09] Alarm' section.

③ Clear the alarm.

- ① Click the "Main" tab and click "READ" of "[02] Converter status". The current status of EZA will be displayed. If the alarm has occurred, it will be displayed whether it is a heavy alarm or a light alarm. Check which alarm is occurring with "[09] Alarm".
- ② Refer to p14-16 of the EZA11K instruction manual and remove the cause of the alarm that has occurred.
- ③ For heavy alarm, click "CLEAR" in "[09] Alarm" to clear the alarm.



When controlling from the external signal connector CN, if pin 7 remains shorted, it will not restart even if a clear operation is performed. To restart, it is necessary to open pin 7 once and short again. (Note that this is different from the operation of EZA2500.)



Clearing the alarm is necessary in the case of a heavy alarm (the red LED is lit in the front panel). In addition to the above operations, the alarm can be cleared by pressing the RESET switch on the front panel or shorting the CN pin 11 to SG.



In the case of light alarm, if the cause of the alarm is removed, the clear operation is unnecessary and the system will restart automatically.

3) Checking the operation status using CNVCommCC

It is possible to check the operating status during EZA waiting and operating via RS485. The following describes how to check the alarm contents using CNVCommCC.

① Start CNVCommCC.

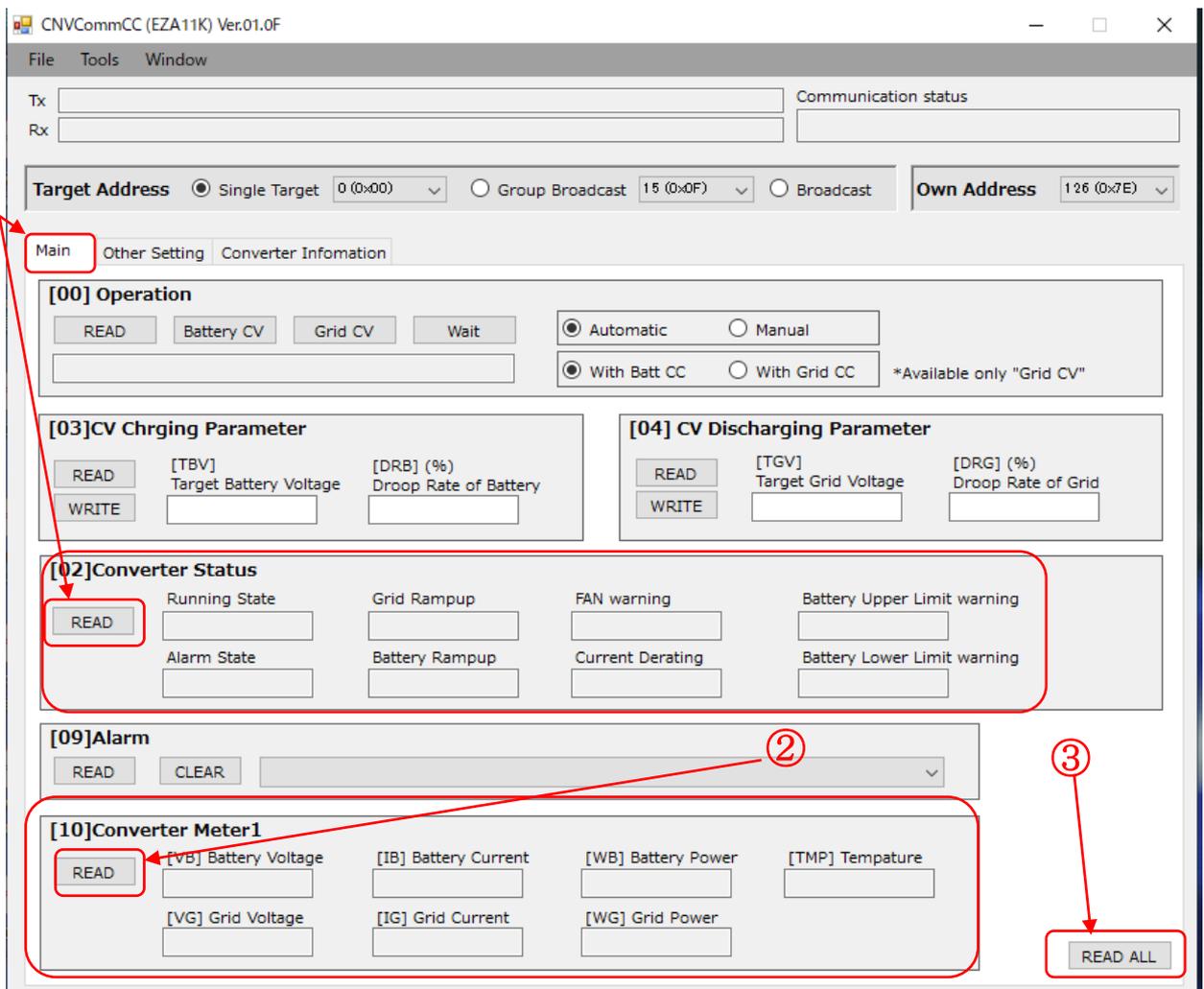
Start CNVCommCC and confirm that it can communicate with EZA.

② Checking the details of the Converter Status.

① Click "Main" tab and click "READ" of "[02] Converter status" to display the current status of EZA..

② Click "READ" in "[10] Converter Meter 1" to display the details of voltage, current, power and internal temperature of the battery side and grid side at the time of clicking.

③ To update and display all parameters on the screen, click "READ ALL" at the bottom left of the screen.



③ Check converter information.

- ① To display the current rotation speed of each air cooling fan of EZA at the time of click and 5VS (Internal 5V Line voltage of EZA), click "Converter Information" tab and click "READ" in "[11] Converter Meter 2"
- ② To display the current and voltage rating values on the grid side and battery side of EZA11K, click "READ" in "[14] Nominal Value".
- ③ To display the firmware version of the communication board and control board of EZA11K, click each "READ" in "[15] [16] Firmware Version".
- ④ By clicking "READ ALL" in the lower left of the screen, all the above values will be updated and displayed at the time of clicking.



The displayed voltage and current values include errors.



Refer to "External Function (RS-485)" on page 1 of the specification sheet for the accuracy of the displayed voltage and current values.

4) Startup from grid side 0V using "Grid Ramp Up (Grid bus ramping up)"

Before starting up EZA11K, you must apply voltages higher than "Under Grid Volts (UGV)" and "Under Battery Volts (UBV)" to the grid side (HVDC side) and the battery side (LVDC side), respectively.

Otherwise, the main converter cannot be started, and even if a start command is input, the alarm is output and it does not start.

However, when "Grid bus ramp up" is enabled, if the voltage on the grid side (high voltage side) is from 0V to less than 90% of the "grid low voltage threshold (UGV)" (For example, if UGV is 230V, it is less than 207V), EZA discharges small power to the grid side, EZA discharges small power to the grid side even if the voltage on the grid side (HVDC/high voltage side) is less than the "Under Grid Volts (UGV)". And when the grid bus voltage rises above UGV, EZA will start normal operation.

In order to start with "Grid Ramp Up", it is necessary that the voltage higher than the "Under Battery Volts (UBV)" is applied to the battery side (LVDC/low voltage side).

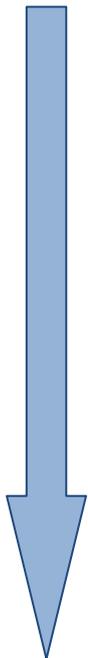
During "Grid Ramp Up", it is necessary to connect only a capacitive load of 15000 μ F or less to the grid side.

The "Grid Ramp Up" function is disabled when shipped from the factory. To enable it, you need to set bit 3 of the CCF parameter to "1".

The following explains how to enable "Grid Ramp Up" function using CNVCommCC..

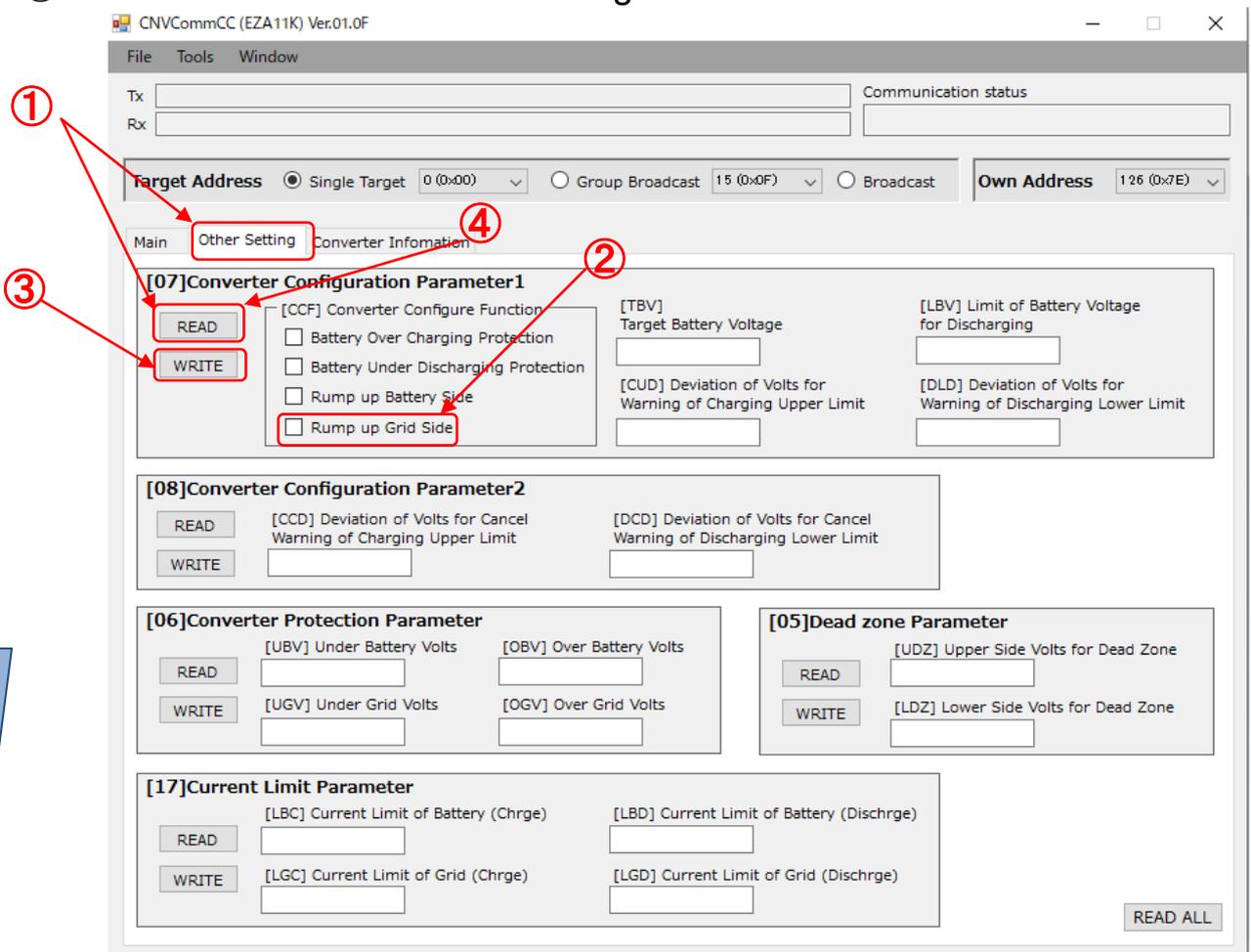
① Start CNVCommCC.

Start CNVCommCC and confirm that it can communicate with EZA



② Enable "Grid Ramp Up" function.

- ① Click the "Other Settings" tab and click "READ" in [07] Converter Configuration Parameter 1 to display the current setting of CCF parameters.
- ② Check the check box for "Rump up Grid Side" in the [CCF] Converter Configure Function.
- ③ Click "WRITE" to write the settings to EZA.
- ④ Click "READ" to confirm the writing.



③ Start with "Grid Ramp Up".

The "Grid Ramp Up" of EZA11K is necessary the following.

- ① The battery side (LVDC/low voltage side) is applied the voltage higher than the "Under Battery Volts (UBV)"
- ② There is no load for the grid side(HVDC/high voltage side) except a capacitive load of 15000 μ F or less.
- ③ Starting in Automatic Grid CV Mode.
- ④ Starting in Automatic Grid CV with Battery CC Mode.

- ⑤ Starting in Manual Grid CV Mode.
- ⑥ Starting in Manual Grid CV with Battery CC Mode.

When the start command is inputted to the EZA11K in the above situations, the "Grid Ramp Up" sequence is entered. And the normal operation starts after less than about 15 seconds.



When the normal operation starts, the fans rotate.



CN pin 3 Converter Operation Good Signal "PG" is output (becomes short to SG) when the EZA11K receives a start command, and at the same time it enters the "Grid Ramp Up" sequence



You can confirm that the main converter has started successfully with "Grid Ramp Up" by either of the following: (1) Monitor the voltage on the grid side. (2) No alarm is output even after 15 seconds have passed since the start command was sent. (3) Even after 15 seconds or more, CN pin 3: Converter Operation Good Signal "PG" is shorting to SG.



You can confirm that the main converter has started successfully with Inquire Converter Status command. EZA responds the bitmap table via RS485. and looking at the status of bit7. Bit 7 is set to "1" during Grid Ramp Up, and is set to "0" when completed. If a heavy alarm is not issued when bit7 becomes "0", it can be determined that Grid Ramp Up has been completed normally. Refer to p19, EZA11K communication manual.

"Grid Ramp Up" is necessary when starting up the system using only the battery voltage, such as the standalone solar + storage battery systems and the automatic transport vehicles.

However, if a power conditioner or inverter is left connected, the current of the "Grid Ramp Up" sequence will be sucked into it and "Grid Ramp Up" may fail.



5) Starting from 0V on the battery side using "Battery Ramp Up (Battery bus ramping up)"

Before starting Up EZA11K, you must apply voltages higher than "Under Grid Volts (UGV)" and "Under Battery Volts (UBV)" to the grid side (HVDC/high voltage side) and the battery side (LVDC/low voltage side), respectively.

Otherwise, the main converter cannot be started, and even if a start command is input, the alarm is output and it does not start.

However, by using the function of "Battery Ramp Up (Battery bus ramping Up)", EZA11K can start even when the battery side is under "Under Battery Volts (UBV)". To use this function, the grid side should be over "Under Grid Volts (UGV)".

"Battery Ramp Up" can be enabled with the CCF parameter. The factory setting is valid.

"Battery Ramp Up" is the function that forcibly charges the capacitive device and boosts the voltage on the battery side. Enable this when connecting a storage element of 15,000 μ F or less that can be charged from 0V, or when there is no load.

The following explains how to set the "Battery Ramp Up" using CNVCommCC.

① Start CNVCommCC.

Start CNVCommCC and confirm that it can communicate with EZA.



② Set "Battery Ramp Up"

- ① Click "Other Setting" tab.
- ② Check the box for "Rump Up Battery Side" in "[07] Converter Configuration Parameter 1" and click "WRITE".
- ③ Click "READ" of "[07] Converter Configuration Parameter 1", and if the check box in the "Rump Up Battery Side" box is checked, the setting is saved. After that, the function of "Battery Ramp Up" is enabled.

File Tools Window

Tx _____ Communication status _____
Rx _____

Target Address Single Target 8 (0x00) Group Broadcast 15 (0x0F) Broadcast Own Address 126 (0x7E)

Main **Other Setting** Converter Information

[07] Converter Configuration Parameter1

READ [CCF] Converter Configure Function _____
WRITE Battery Over Charging Protection
 Battery Under Discharging Protection
 Rump up Battery Side
 Rump up Grid Side

[TBV] Target Battery Voltage _____ [LBV] Limit of Battery Voltage for Discharging _____
[CUD] Deviation of Volts for Warning of Charging Upper Limit _____ [DLD] Deviation of Volts for Warning of Discharging Lower Limit _____

[08] Converter Configuration Parameter2

READ [CCD] Deviation of Volts for Cancel Warning of Charging Upper Limit _____ [DCD] Deviation of Volts for Cancel Warning of Discharging Lower Limit _____
WRITE _____

[06] Converter Protection Parameter

READ [UBV] Under Battery Volts _____ [OBV] Over Battery Volts _____
WRITE [UGV] Under Grid Volts _____ [OGV] Over Grid Volts _____

[05] Dead zone Parameter

READ [UDZ] Upper Side Volts for Dead Zone _____
WRITE [LDZ] Lower Side Volts for Dead Zone _____

[17] Current Limit Parameter

READ [LBC] Current Limit of Battery (Chrg) _____ [LBD] Current Limit of Battery (Dischrg) _____
WRITE [LGC] Current Limit of Grid (Chrg) _____ [LGD] Current Limit of Grid (Dischrg) _____

READ ALL

I need to note that unlike EZA2500, "Battery Ramp Up" of EZA11K is limited by a capacitive load of 15000 μ F or less.



