ADVANCED USER
Human Machine Interface

Revision number	Document changes	Date
V1	Creation	November 17
V2	Add interface version	December 17
V3	Add interface version	March 18
V4	New document format	March 18
V5	Add interface version	April 18
V6	Upgrade diagram	May 18

1. GENERAL

The purpose of this manual is to provide information to use the Cinergia interface as an **advanced User**: introduce at the final user with advanced functionalities using the user password provided. It is important for the user to have this manual nearby and familiarize with it to operate efficiently with the converter.

The advanced functionalities are:

- Save new operating Limits values (on Limits Tab)
- Configure, send and save new Alarm values (on Alarm Config Tab)
- Operate with *Factory Values* and *Default Values* button (on Limits and Alarm Config Tab)
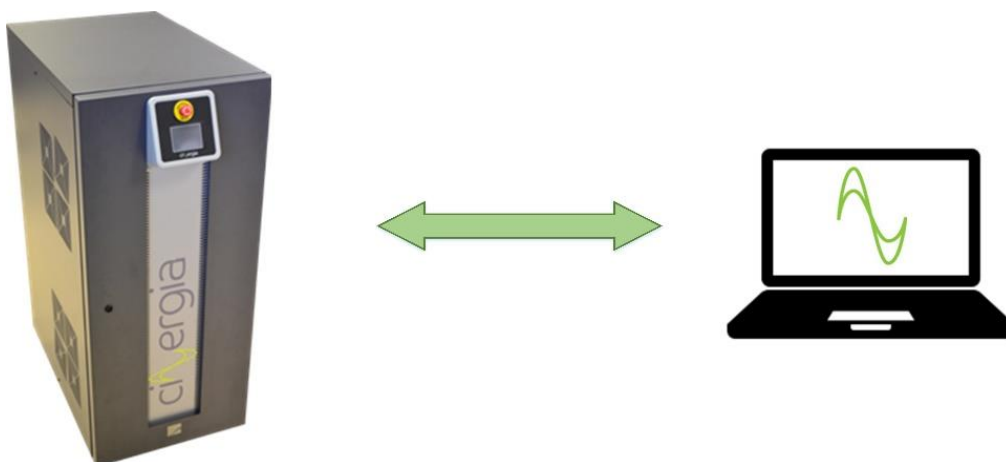
> **Contact CINERGIA to get the ADVANCED USER PASSWORD for your unit. Each unit has a unique, non-transferable and exclusive password.**

This document tries to be easy to understand, created with schematics and real pictures of the equipment with parts marked with letters and numbers which you can find the explanation just below the picture.

Cinergia is in constant development to deliver always the best service to you, so it is possible to find some discrepancy between this manual and the real converter itself. Don't hesitate to contact us and ask for the latest version of the documentation.

CINERGIA believes that the use of the User Password must be limited to the responsible of the equipment or the technical manager and head of the Laboratory. For this reason, the password will be sent directly to the distributor. If the final customer wants to use this optional, please contact to your distributor.

This manual is valid for the following versions:

1.511K,
1.512K,
1.0619,
1.0620

2. HUMAN MACHINE INTERFACE

CINERGIA delivers, within the scope of the supply, a Human Machine Interface software that communicates with the equipment using MODBUS protocol. This application is compatible on Windows 10/Windows 7/Windows XP. The software can be installed by executing Setup.exe file in Administrator Mode and following the instructions of the application.

To connect Cinergia units to a PC, follow these steps:

- Connect a standard RJ45 Ethernet cable to terminal X13. The unit can be connected directly either to a computer or to a router (wired or wireless). If the CINERGIA unit is connected through a router, several computers could be connected to the unit at the same time.
- Check the IP address of CINERGIA unit in the LCD Touchscreen following these steps:
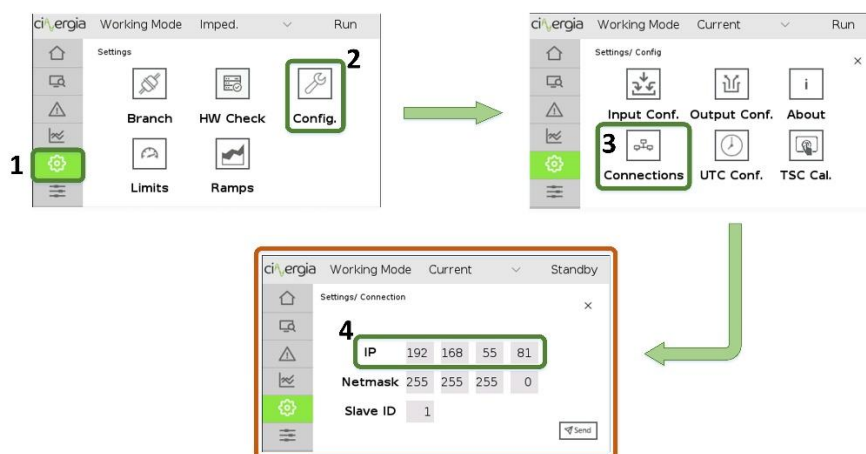
- Check the computer's Ethernet configuration panel and make sure that both the computer and the CINERGIA unit are in the same subnetwork. For instance, if the CINERGIA unit IP address is 192.168.55.81 the computer Ethernet configuration shall be:
    a) Computer IP address: 192.168.55.XXX (XXX can be any address different from 81 and different from any other device in the same network)
    b) Subnet mask: 255.255.255.0
    c) Gateway and DNS configuration are not needed for a connection with a CINERGIA unit
- Run the graphical user interface delivered by CINERGIA, write the IP address of the unit to be connected and press the Connect button.
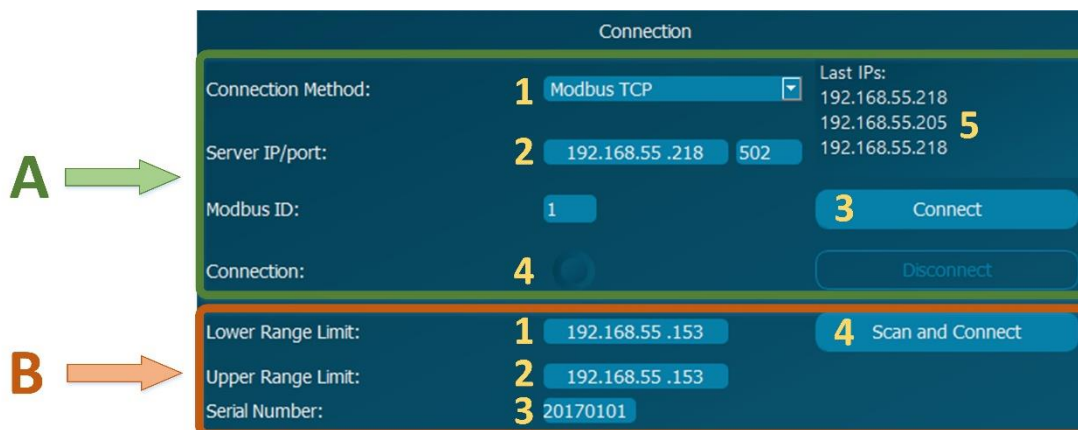
There are two different ways to connect the unit to the PC via Modbus TCP:

A- Known the IP address of the equipment. This IP address is displayed in the LCD touchscreen as it is explained in the LCD touchscreen schematic displayed above.

   1- Define the connection (Modbus TCP)
   2- Introduce the IP address
   3- Press Connect
   4- Once the equipment is connected, the LED will indicate it
   5- There is a register of 3 IPs which the interface has connected to the equipment

B- Known the serial number of the equipment and the range of IPs that the equipment is located. The serial number is written in the front of the equipment with the specification data. If the equipment has a serial number such as 20170101-1, the number to introduce must be without the hyphen: 201701011. This method is useful when the user, for example, does not know the exact IP of the equipment but knows that the range of IPs is, for example, from 192.168.55.150 to 192.168.55.250

   1- Introduce the lower IP range
   2- Introduce the upper IP range
   3- Introduce the serial number (without hyphen)
   4- Press *Scan and Connect*. It may last a few seconds to scan all the IPs

If there is an error when trying to run Cinergia application, please check the compatibility mode of your computer. For instance, in a Windows 7 computer, right click CINERGIA application → Properties; go to Compatibility panel and check the box Run this program in compatibility mode; and select the operating system of your computer.

The document *Connecting CNG+ units to a PC v3* details how to connect the equipment. Please read this document to make sure that the parameters are introduced properly.

For instance, for a Windows 7 computer:
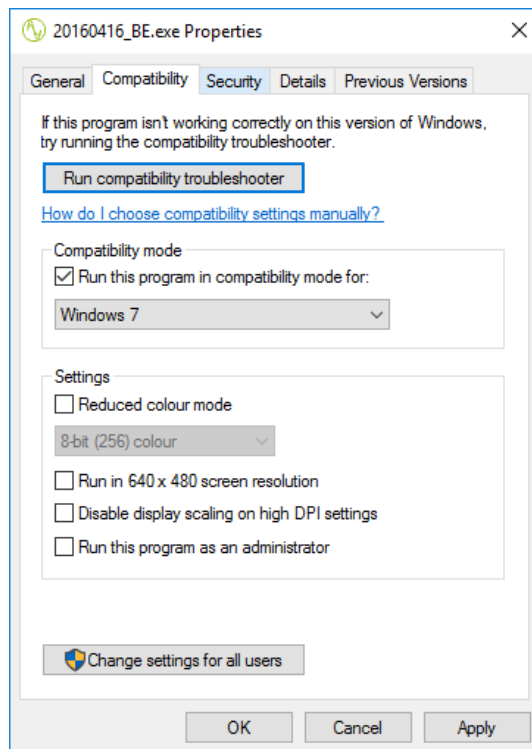
The interface delivered by Cinergia has a correct visualization with screens configured with a minimal resolution of 1366x768 (16:9)

2.1. Optional Communications

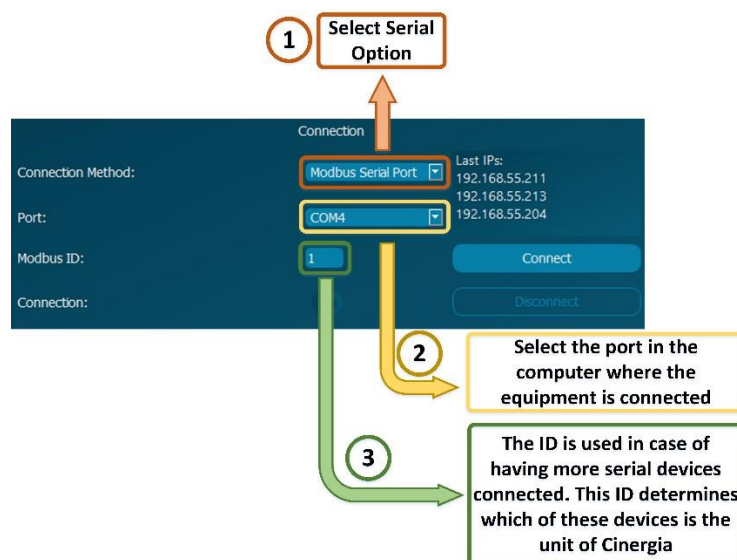There is an optional which is to connect the CNG unit using series connection (RS485, RS232) or CAN protocol and it has an additional cost.

3. ADVANCED FUNCIONALITIES

Once the user is connected to the equipment through the interface, it is necessary to go to the LIMITS and ALARM CONFIG tab to operate the Advanced User functionalities.

The advanced functionalities are:
- Save new operating *Default Limits Values* (on Limits Tab)
- Configure, send and save new *Alarm Values* (on Alarm Config Tab)
- Recover *Factory Values* (on Limits and Alarm Config Tab)

CINERGIA believes that the use of the User Password must be limited to the responsible of the equipment or the technical manager and head of the Laboratory. For this reason, the password will be sent directly to the distributor. If the final customer wants to use this optional, please contact to your distributor.

Once, the user has introduced the USER Password the equipment will remaining active for 1 hour to change any values for any user. Once the user has changed the new values, introducing a 0 on the Request Password on Alarm Tab, this option will be disabled.

If the User Password has been introduced less than an hour ago, it is possible that for further requests the equipment does not require to introduce the password again.

As a security measure, if a WRONG User Password is entered three (3) times in a one (1) minute period, the equipment will disable and block this option during ten (10) minutes. In this case, the customer has to wait for ten (10) minutes to introduce a new correct password. It has to wait more than thirty (30) minutes to introduce three (3) new opportunities.

If there is any discrepancy between this document and the manual, the information of the present document will prevail.

3.1. Limits: save new Default Limits Values

The equipment is trying to operate up to the limit value configured, but in any case, the equipment won't go on Alarm if the *realtime* value is higher than this configured limit.
The limit register is only used for the parameters that the equipment is or could be controlling.

3.1.1. Standard User

As a <u>Standard User</u>, the user can define the limits of the equipment in this tab. The converter has its own *Default Limits Values*, but it is possible to introduce new ones.
These values sent by the user will be erased and substituted for the *Default Values*, when the converter is switched off.

When the equipment is sent by CINERGIA, the *Default Limits Values* are the same as a *Factory Limits Values*.

When the converter is switched off and on again, these limits will be erased and substituted for the Default ones.

The procedure for the user to send a new limit values is:
1) **Go to LIMITS tab.**
2) **Introduce the new *Limit Values* on each site.**
3) **Press *Send Limits* button of each sector.**
4) **To be sure that the equipment is changing their internal values, you can press *Refresh Limits* button. In this case, the internal Limit Values charged on the equipment will appear at each site.**

The condition for these new limits is that they must be lower (in case of maximum limits) or higher (in case of minimum limits) than the Factory ones, otherwise the equipment will introduce the Factory limits.

The condition for these new limits is that they must be lower (in case of maximum limits) or higher (in case of minimum limits) than the ALARM config values, otherwise the equipment will introduce the factory limits.

3.1.2. Advanced User

As an Advanced User, the user can save new limits of the equipment in this tab as its own *Default Values Limits*. In this case, the converter will change its own internal Default Limit Values with the new limits values sent it by the user.

These new values will remain on the equipment after switched off and on process.

When the converter is switched off and on again, these limits will be remaining on the equipment. It is possible to save limits in the equipment in the EEPROM memory, but a password is required.

When the converter has to burn the EEPROM to save new values, the equipment must be in Standby or Alarm state. In other cases, the equipment could generate an alarm of HEARTBEAT or could not burn the EEPROM.

To save these new limits on the equipment, an Advanced Password is required by the user.

The procedure for the user to send and save new limit values is:
1) **Go to LIMITS TAB**
2) **Introduce the new *Limit Values* on each site and**
3) **Press *Send Limits* button of each sector.**
4) **To be sure that the equipment is changing their internal values, you can press *Refresh Limits* button. In this case, the internal Limit Values charged on the equipment will appear at each site.**
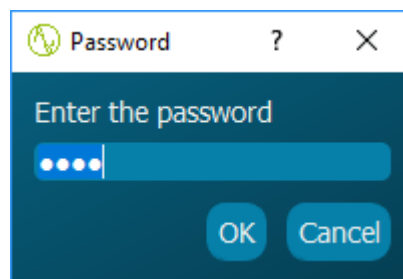
5) Press *Burn EEPROM* button (red button) to save these values internal on the equipment. The user password is required.
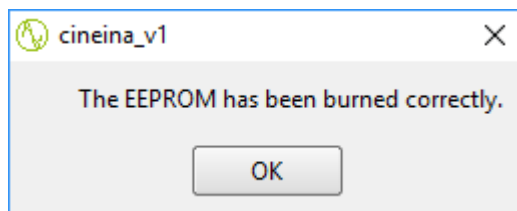
6) First, a popup appears asking you about to burn the EEPROM. In affirmative case, press *YES*.
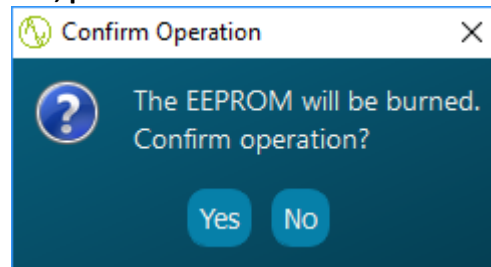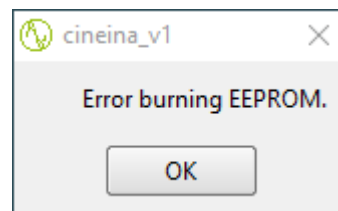
7) Another popup appears asking the User password: Introduce the User Password and press *OK*.

8) If the save operation has been done successfully, the popup X.1 will appear and the EEPROM has been burned correctly with the new values.
In case of some problem, the popup X.2 will appear, the EEPROM has not been burned correctly and the new values has not been saved.

X.1   X.2

9) If the Error burning EEPROM message appears, retry the same procedure again. If the error persists, please review that the equipment is working properly.

Once, the user has introduced the USER Password the equipment will remaining active during 1 hour to change any values for any user. Once the user has changed the new values, introducing a 0 on the Request Password on Alarm Tab, this option will be disabled.

If the User Password has been introduced less than an hour ago, it is possible that for further requests the equipment does not require to introduce the password again.

The condition for these new limits is that they must be lower (in case of maximum limits) or higher (in case of minimum limits) than the Factory ones, otherwise the equipment will introduce the Factory limits.
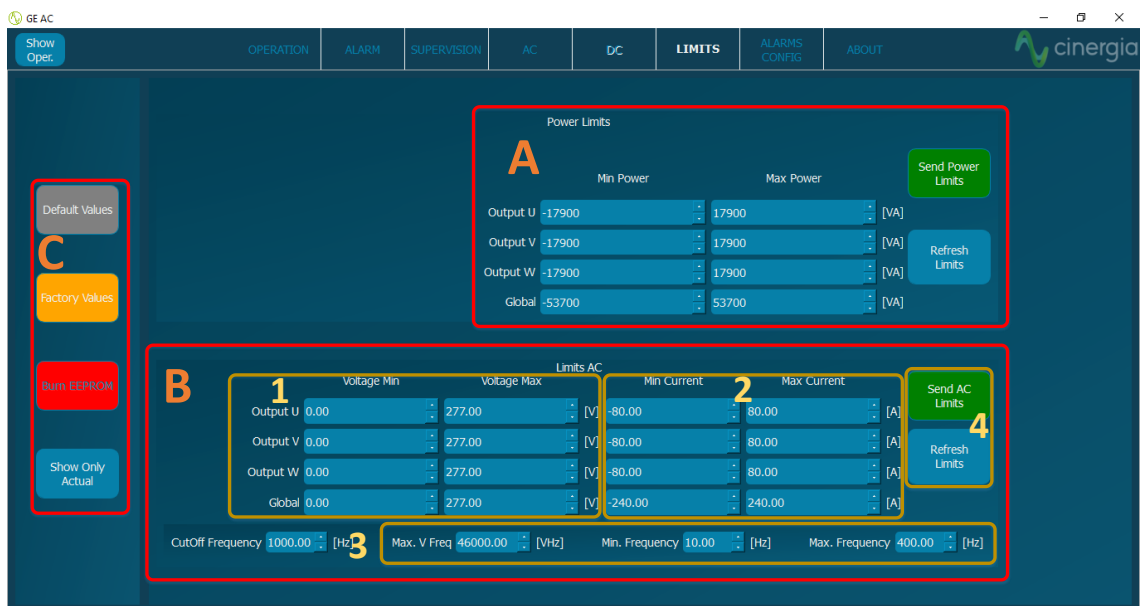
The condition for these new limits is that they must be lower (in case of maximum limits) or higher (in case of minimum limits) than the ALARM config values, otherwise the equipment will introduce the factory limits.

Depending on the connection mode of the equipment (AC or DC), this tab will automatically change and the parameters that will appear will be the ones according to the mode.

3.1.3. AC Limits

- **A:** Power Limits. The user can set the maximum and minimum limits for each phase. Once the limits are ready, press *Send Power Limits*. By pressing *Refresh Limits*, the converter will deliver the actual limit values.

    If the user introduces limit values higher the accepted ones, the converter will set the maximum allowed values. By pressing *Refresh Limits*, the user will know which are the values of the converter in that moment.

- **B:** Voltage and current limits section.
    1. Voltage limits. The user can set the maximum and minimum limits for each phase.
    2. Current limits. The user can set the maximum and minimum limits for each phase. These current limits are used in current mode (positive and negative) and in power mode (positive but not negative).

        The minimum and maximum upper and lower current limits are, respectively, 1A and -1A

    3. Set the limits for the frequency parameters.

4. Once the limits are ready, press *Send AC Limits*. When the user presses *Refresh Limits*, the converter will return the actual limit values. This last button is useful to realise if the introduced limits are higher that the allowed ones.
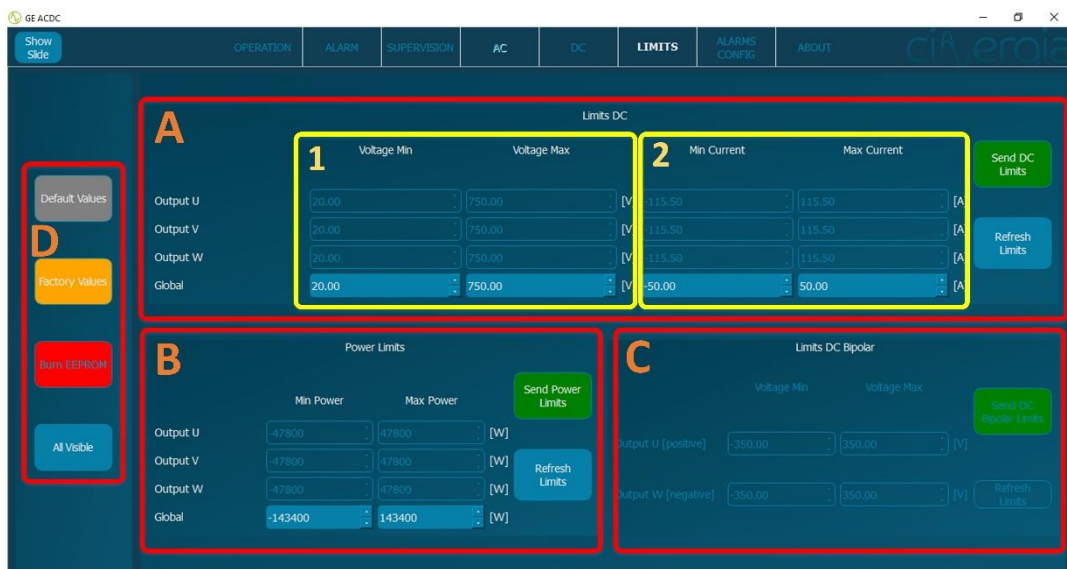
> **If the equipment is in RUN mode with a value that is outside the range of the new introduced limits, it will change the actual setpoint. For example, if the converter is in current mode with a value of 20A and the user introduces (and sends) a limit of 15A, the equipment will go to 15A and remain there. If the limit is only introduced in one channel, it is going to be that channel the one which go to that limit.**

- **C:** These buttons allow the user to operate with the values of the limits.
    - *Default Values.* The user can define default values that will remember the equipment as long as it is switched on and lower than the *Factory Values*.
    - *Factory Values.* The equipment has its own factory values depending on the rated power. This button will make these parameters appear in the visible windows.
    - *Burn EEPROM.* To save the sent values to the equipment and make it remember them even it is switched off, the EEPROM can be burnt. This step requires a password.
    - *All Visible.* This button unfreeze all the windows so that the user can set the *Default Values*. Remember that the limits are not introduced to the equipment until *Send Limits* buttons of each window (A and B) are pressed.

> **When the converter is switched off and on again, these limits will be erased and substituted for the factory ones. It is possible to save limits in the equipment in the EEPROM memory, but a password is required**

3.1.4. DC Limits

The interface will freeze or unfreeze (illuminate) the available parts where the user can introduce the parameters depending on the connection mode (parallel or independent).

- **A:** Voltage and current limits section.
  1. Voltage limits. The user can set the maximum and minimum limits for each phase (independent connection) or for the global (parallel connection). Please note that the maximum voltage is the same if the equipment is in parallel or independent.
  2. Current limits. The user can set the maximum and minimum limits for each phase (independent connection) or for the global (parallel connection). The current in parallel mode is 3 times the current for each channel in independent connection.

The minimum and maximum upper and lower current limits are, respectively, 1A and -1A

- **B:** Power limits. The user can set the maximum and minimum limits for each phase (independent connection) or for the global (parallel connection). The power in parallel mode is 3 times the power for each channel in independent connection.

- **C:** Bipolar limits. This part of the tab will be illuminated when the equipment is in bipolar connection. The maximum voltage in unipolar is 750V whereas that in bipolar is ±350V. This is the reason that bipolar connection is required a new part to send voltage limits (current limits are the same than in unipolar). The user can introduce new voltage limits as long as they are lower, in case of maximum limits, or higher, in case of minimum limits, than the factory one.
  This tab in bipolar connection is the following:

Each part (**A**, **B** and **C**) has two different buttons explained in the following lines. It is important that, for example, voltage limits must be sent, the buttons to use are the ones in the **A** part.
  - *Send DC Limits*. Once all the limits are introduced in the corresponding part, press this button and the parameters will be sent to the converter.
  - *Refresh Limits*. This button will show the limits values that are in the converter in that moment.

If the equipment is in RUN mode with a value that is outside the new introduced limits, it will change the actual setpoint. For example, if the converter is in voltage mode with a value of 500V and the user introduces (and sends) a limit of 300V, the equipment will go to 300V and remain there. If the limit is only introduced in one channel, it is going to be that channel the one which go to that limit.

- **D:** These buttons allow the user to operate with the values of the limits.
  - *Default Values.* The user can define default values that will remember the equipment as long as it is switched on and lower than the *Factory Values*.
  - *All Visible.* This button unfreezes all the windows so that the user can set the *Default Values*. Remember that the limits are not introduced to the equipment until *Send Limits* buttons on each window (A, B and C) are pressed.
  - *Factory Values.* The equipment has its own factory values depending on the rated power. This button will make these parameters appear in the visible windows. *Read **section 3.3** for more information.*
  - *Burn EEPROM.* To save the sent values to the equipment and make it remember them even it is switched off, the EEPROM can be burnt. This step requires a password.

When the converter is switched off and on again, these limits will be erased and substituted for the factory ones. It is possible to save limits in the equipment in the EEPROM memory, but a password is required.

3.2. Alarms: Configuration and send new values

This tab sets the alarms of the equipment. The difference between Limit and Alarm is that the equipment can work during a certain time above the limits, but if there is some value that goes further than some alarm parameter or from the stablished time, the equipment will go to alarm state.

⚠️ **To send and save Alarms in the equipment and in the EEPROM memory, a password is required.**

ℹ️ **Depending on the connection mode of the equipment (AC or DC), this tab will automatically change and the parameters that will appear will be the ones according to the mode.**

ℹ️ **The minimum and maximum upper and lower current alarms are, respectively, 1A and -1A.**

3.2.1. Standard User

As a <u>Standard User</u>, the user ONLY can read the internal values of the alarm parameters. The user cannot do anything else in this tab. The converter has its own *Default Alarm Values*.

When the equipment is sent by CINERGIA, the *Default Alarm Values* are the same as a *Factory Alarm Values*.

3.2.2. Advanced User

As an <u>Advanced User</u>, the user can configure, send and save new operative alarm of the equipment in this tab as its own *Alarm Values*. In this case, the converter will change its own current values with the new Alarm values sent it by the user.

These new values will remain on the equipment after switched off and on process, ONLY if the Burn EEPROM process has been done successfully. In any other case, when the converter is switched off and on again, these alarms will be erased and substituted for the factory ones.

⚠️ **If the user has done the Burn EEPROM process successfully, when the converter is switched off and on again, the Alarms sent I by the user will be remaining on the equipment.**

⚠️ **When the converter has to burn the EEPROM to save new values, the equipment must be in Standby or Alarm state. In other cases, the equipment could generate an alarm of HEARTBEAT or could not burn the EEPROM.**

To send and save these new alarms on the equipment, an Advanced Password is required by the user.

The procedure for the user to configure, send and save new alarm values is:
1) **Go to ALARMS CONFIG TAB**
2) **Press the *Request Password* button (second blue one).**

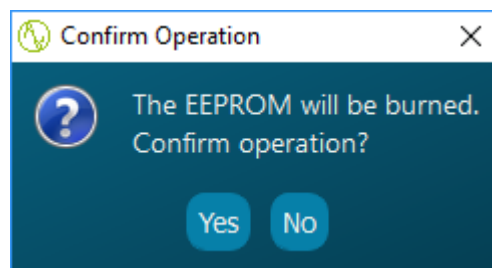3) **First, a popup appears asking the User password: Introduce the User Password and press *OK*.**

Password   ?   ×

Enter the password

●●●●

OK   Cancel
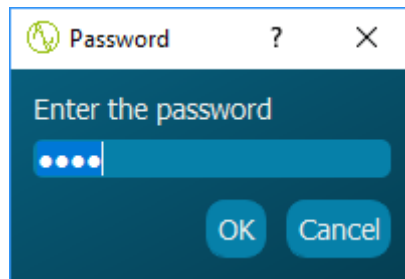
4) **Introduce the new *Alarm Values* on each site and**
5) **Press *Send Alarm* button of each sector.**
6) **To be sure that the equipment is changing their internal values, you can press *Refresh Alarms* button. In this case, the internal Alarm Values charged on the equipment will appear at each site.**
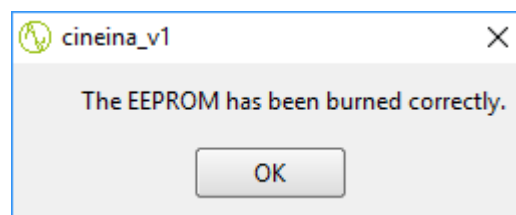
Default Values

Factory Values

Burn EEPROM

All Visible

Request Password

7) **Press *Burn EEPROM* button (red button) to save these values internal on the equipment. The user password is required.**

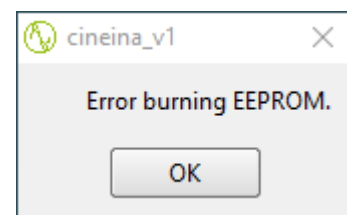8) **A popup appears asking you about to burn the EEPROM. In affirmative case, press *YES*.**

Confirm Operation   ×

? The EEPROM will be burned. Confirm operation?

Yes   No

9) **If the save operation has been done successfully, the popup X.1 will appear and the EEPROM has been burned correctly with the new values.**
In case of some problem, the popup X.2 will appear, the EEPROM has not been burned correctly and the new values has not been saved.

cineina_v1   ×

The EEPROM has been burned correctly.

OK

X.1

cineina_v1   ×

Error burning EEPROM.

OK

X.2

10) **If the Error burning EEPROM message appears, retry the same procedure again. If the error persists, please review that the equipment is working properly.**

⚠ **Once, the user has introduced the USER Password the equipment will remaining active during 1 hour to change any values for any user. Once the user has changed the new values, introducing a 0 on the Request Password on Alarm Tab, this option will be disabled.**

⚠ **If the User Password has been introduced less than an hour ago, it is possible that for further requests the equipment does not require to introduce the password again.**

> ⚠️ **The condition for these new limits is that they must be lower (in case of maximum limits) or higher (in case of minimum limits) than the Factory ones, otherwise the equipment will introduce the Factory limits.**
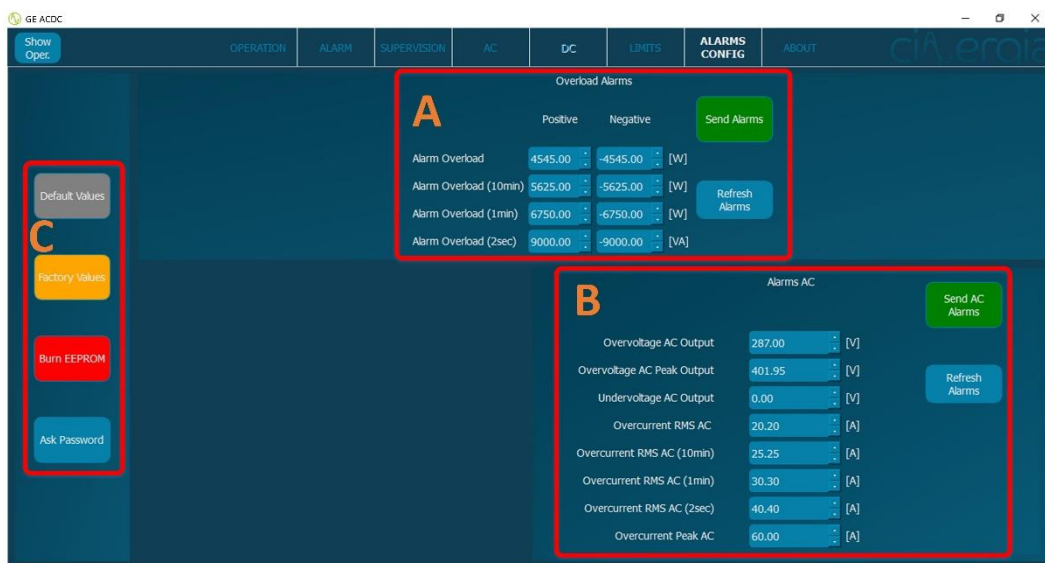
> ⚠️ **The condition for these new limits is that they must be lower (in case of maximum limits) or higher (in case of minimum limits) than the ALARM config values, otherwise the equipment will introduce the factory limits.**

> ℹ️ **Depending on the connection mode of the equipment (AC or DC), this tab will automatically change and the parameters that will appear will be the ones according to the mode.**

3.2.3. Alarms AC (User Password required)

- **A:** Set the overload alarms and once the values are ready press *Send Alarms* button. If the user presses *Refresh Alarms*, the parameters that the converter has in that moment will appear in the window.
- **B:** Set the AC alarms and once the values are ready press *Send AC Alarms* button. If the user presses *Refresh Alarms*, the parameters that the converter has in that moment will appear in the window.
- **C:** These buttons allow the user to operate with the values of the limits.
    - *Default Values.* The user can define default values that will remember the equipment as long as it is switched on and lower than the *Factory Values*.
    - *Factory Values.* The equipment has its own factory values depending on the rated power. This button will make these parameters appear in the visible windows. This step requires a password. *Read **section 3.3** for more information.*
    - *Burn EEPROM.* To save the sent values to the equipment and make it remember them even it is switched off, the EEPROM can be burnt. This step requires a password.
    - *Ask Password.* A popup message will appear asking the password. This allows to burn eeprom.

3.2.4. Alarms DC (User Password required)

- **A:** Set the overload alarms and once the values are ready press *Send Alarms* button. If the user presses *Refresh Alarms*, the parameters that the converter has in that moment will appear in the window.
- **B:** Set the DC alarms and once the values are ready press *Send DC Alarms* button. If the user presses *Refresh Alarms*, the parameters that the converter has in that moment will appear in the window.
- **C:** These buttons allow the user to operate with the values of the limits.
    - *Default Values.* The user can define default values that will remember the equipment as long as it is switched on and lower than the *Factory Values*.
    - *All Visible.* This button unfreezes all the windows so that the user can set the *Default Values*. Remember that the limits are not introduced to the equipment until *Send Limits* buttons on each window (A, B and C) are pressed.
    - *Factory Values.* The equipment has its own factory values depending on the rated power. This button will make these parameters appear in the visible windows. *Read **section 3.3** for more information.*

Burn EEPROM. To save the sent values to the equipment and make it remember them even it is switched off, the EEPROM can be burnt. All this step requires a password.

3.3. Factory Values

On *Limits* Tab and *Alarms Config* Tab, there is a Button called *Factory Values* (orange button). This button provides the user to recovery the original values of Limits and Alarms of the equipment (as Cinergia sent it).

3.3.1. Standard User

As a <u>Standard User</u>, it is not possible to recovery the *Factory Values*.

When the equipment is sent by CINERGIA, the *Default Values* are the same as a *Factory Values in both sector: Limits and Alarms*.

3.3.2. Advanced User

As an <u>Advanced User</u>, the user can recovery the Factory Values and upload the values on the equipment. To save these values, the user has to press Burn EEPROM and repeat the same process as described on Limits or Alarm section.

These values will remain on the equipment after switched off and on process, ONLY if the Burn EEPROM process has been done successfully. In this case, when the converter is switched off and on again, these alarms will be erased and substituted for the factory ones.

⚠️ **If the user has done the Burn EEPROM process successfully, when the converter is switched off and on again, the Factory Alarms will be remaining on the equipment.**

⚠️ **When the converter has to burn the EEPROM to save new values, the equipment must be in Standby or Alarm state. In other cases, the equipment could generate an alarm of HEARTBEAT or could not burn the EEPROM.**

To recovery, send and save these new Alarms or Limits on the equipment, an Advanced Password is required by the user.
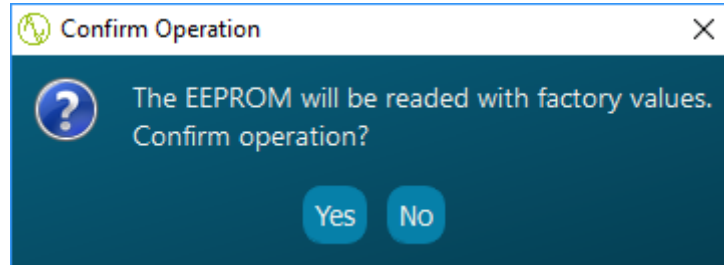
⚠️ **When the customer is recovering the *Factory Values* on LIMITS or ALARMS CONFIG Tab, the equipment is recovering the values on both. It is NOT possible to recovery ONLY one of these values.**
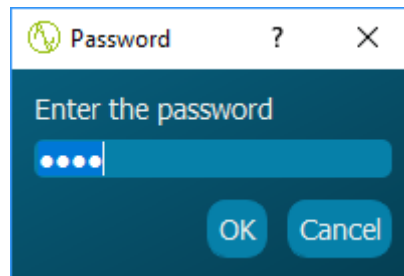
3.3.1. Recovery Factory Limits Values

The procedure for the user to recovery the Factory Limits (originals) values is on LIMITS Tab:

1) **Go to LIMITS Tab**
2) **Press the *Factory Values* button (orange one) on LIMITS Tab.**
3) **First, a popup appears asking you about to read the EEPROM. In affirmative case, press *YES*.**
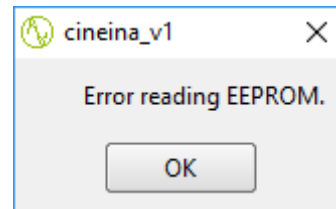

4) **Then, a popup appears asking the User password: Introduce the User Password and press *OK*.**

5) **If the read operation has been done successfully, the popup X.1 will appear and the values on LIMITS Tab has been uploaded with the Factory Values.**
   In case of some problem, the popup X.2 will appear.
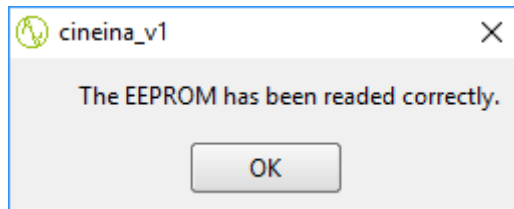
X.1   X.2

6) **If the Error reading EEPROM message appears, retry the same procedure again. If the error persists, please review that the equipment is working properly.**
7) **To be sure that the equipment is changing their internal values, you can press *Refresh Limits* button. In this case, the internal Limit Values charged on the equipment will appear at each site.**
8) **To save the new values on the equipment, please follow the instructions on section 3.1.2.**
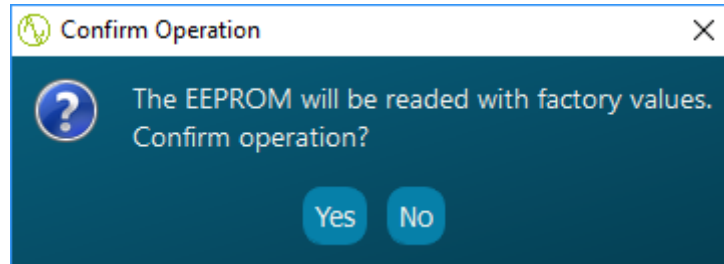
 When the customer is recovering the *Factory Values* on LIMITS or ALARMS CONFIG Tab, the equipment is recovering the values on both. It is NOT possible to recovery ONLY one of these values.
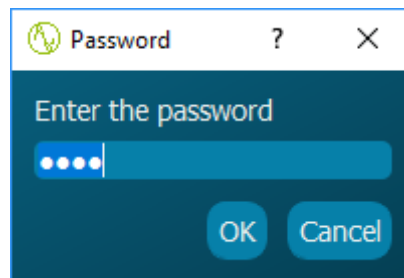
3.3.2. Recovery Factory Alarms Values

The procedure for the user to recovery the Factory Alarms (originals) values is on ALARMS CONFIG Tab:

1) **Go to ALARMS CONFIG Tab**
2) **Press the *Factory Values* button (orange one) on ALARMS CONFIG Tab.**
3) **First, a popup appears asking you about to read the EEPROM. In affirmative case, press *YES*.**

4) **Then, a popup appears asking the User password: Introduce the User Password and press *OK*.**

5) **If the read operation has been done successfully, the popup X.1 will appear and the values on LIMITS Tab has been uploaded with the Factory Values.**
   In case of some problem, the popup X.2 will appear.
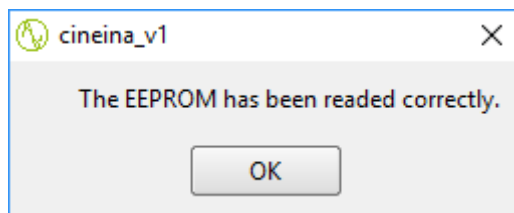
X.1   X.2
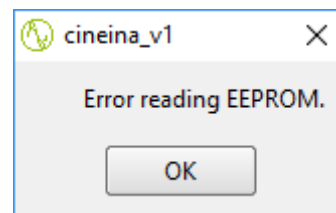
6) **If the Error reading EEPROM message appears, retry the same procedure again. If the error persists, please review that the equipment is working properly.**
7) **To be sure that the equipment is changing their internal values, you can press *Refresh Alarms* button. In this case, the internal Alarm Values charged on the equipment will appear at each site.**
8) **To send these values and save internally, please follow the instructions on section 3.2.2.**

⚠ **Once, the user has introduced the USER Password the equipment will remaining active during 1 hour to change any values for any user. Once the user has changed the new values, introducing a 0 on the Request Password on Alarm Tab, this option will be disabled.**

If the User Password has been introduced less than an hour ago, it is possible that for further requests the equipment does not require to introduce the password again.

When the customer is recovering the *Factory Values* on LIMITS or ALARMS CONFIG Tab, the equipment is recovering the values on both. It is NOT possible to recovery ONLY one of these values.

3.4. Default Values

On *Limits* Tab and *Alarms Config* Tab, there is a Button called *Default Values* (grey button). This button provides the user to recovery the last internal burned values of Limits and Alarms of the equipment.
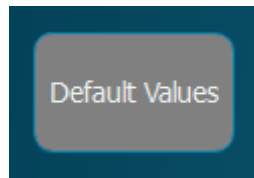
A User password is NOT required for this action.

3.5. About

This tab shows the characteristics of the equipment. It is very important to get acquainted with this tab because in case of problems with the equipment, CINERGIA will require this information to success with the reparation.

- **A:** Basic description parameters of the equipment. This basic information will be very useful to Cinergia in case of problems with the equipment. If this happens, please make a screenshot of this tab.
- **B:** Optional of the converter. By entering the password delivered by Cinergia, it is possible to unblock the available optional of the equipment. The OPTIONAL will be indicated with a LED so, for example, in the figure above the only activated optional is the *Multichannel or separated Branch Control*. It has an additional cost. In case to get the activation code, introduce it, press *Send* and do not get any result, please make a screenshot of this tab to send it to Cinergia.
- **C:** Interface version. This information will also be useful to Cinergia in case of problems.

In case of problems with the converter, please make a screenshot of this tab and send it to Cinergia.