Conext CL Firmware 2.6.4 Upgrade Procedure

Important Safety Instructions

READ AND SAVE THESE INSTRUCTIONS - DO NOT DISCARD

This important safety instructions must be followed during the installation and maintenance of the Conext CL three phase transformer less grid tie inverters.

Read these instructions carefully and look at the equipment to become familiar with the device before trying to install, operate, service or maintain it. The following special messages may appear throughout this bulletin or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

The addition of this symbol either to a **Danger** or **Warning** safety label indicates that an electrical hazard exists which will result in personal injury if the instructions are not followed.

⚡ ⚠ DANGER

DANGER indicates an imminently hazardous situation, which, if not avoided, will result in death or serious injury.

⚠ WARNING

WARNING indicates a potentially hazardous situation, which, if not avoided, can result in death or serious injury.

Schneider Electric

⚠ CAUTION

CAUTION indicates a potentially hazardous situation, which, if not avoided, can result in moderate or minor injury.

NOTICE

NOTICE is used to address practices not related to physical injury. The safety alert symbol shall not be used with this signal word.

⚡ ⚠ DANGER

RISK OF FIRE, ELECTRIC SHOCK, EXPLOSION, AND ARC FLASH

This firmware upgrade procedure is in addition to, and incorporates by reference, the installation and operation manual for the Conext™ CL 18000NA, 25000NA, 20000E and 25000E photovoltaic grid tie inverters. Before referring this firmware upgrade procedure you must read the relevant product manuals. Unless specified, information on safety, specifications, installation, and operation is as shown in the primary documentation received with the product. Ensure you are familiar with that information before proceeding.

Failure to follow these instructions will result in death or serious injury.

⚡ ⚠ DANGER

RISK OF ELECTRIC SHOCK, EXPLOSION, AND ARC FLASH

The Conext CL enclosures contain exposed conductors and parts operating at lethal voltage and at high enough energy to create an arc flash. Electrocution or severe burns may result.
To reduce the risk of electric shock or arc flash, do not open any enclosure covers unless you are qualified to do so, or properly equipped with appropriate personal protective equipment, and have locked out and tagged out all sources of energy and verified that the inverter is de-energized.
Do not open any enclosure covers if moisture is present (rain or heavy dew).

Failure to follow these instructions will result in death or serious injury.

NOTICE

RISK OF STATIC ELECTRICITY DAMAGE

Wear static protection gear, and use anti-static tools and procedures when servicing the inverter. Inverter electronics can be destroyed by static charge.

Failure to follow these instructions can result in damage to equipment.

Abbreviations and Acronyms

Term	Definition/description
AC	Alternating Current
APPL	Application
COMM	Communication
CTRL	Control
DC	Direct Current
DUI	Device User Interface
DSP	Digital Signal Processing
FW	Firmware
LCD	Liquid Crystal Display
LED	Light Emitting Diode (indicator light)
PV	Photovoltaic

Introduction

Overview

This document describes the procedure for upgrading the firmware in the Conext CL photovoltaic grid tie inverters of the following models:

- Conext CL 18000NA (part number : PVSCL18NA).
- Conext CL 25000NA (part number : PVSCL25NA).
- Conext CL 20000E (part number : PVSCL20E).
- Conext CL 25000E (part number : PVSCL25E).

Prerequisites

The below mentioned procedures should be performed only by a trained technician.

1. Make sure both AC and DC are connected to inverter and PV voltage on the inverter is more than 300V and ensure uninterrupted power supply to the inverter during the upgrade process.

2. Ensure inverter is in working condition and contains valid date and time. Refer to **Troubleshooting** section if date and time is incorrect.

3. Recommended USB drives are:

   a) Sandisk - refer to http://www.sandisk.com/home/usb-flash/cruzer-blade.

   b) Toshiba (4GB) - refer to http://us.toshiba.com/computers/storage/usb-flash/usb-2/thn-u202w0080u4.

   c) Kingston- refer to http://www.kingston.com/us/usb/personal_business/dtse9h.

  d) Transcend (TS4GJF350): refer to http://www.transcend-info.com/Products/No-375.

4. Do not disconnect USB flash drive until successful completion of the firmware upgrade procedure.

5. If inverter is not in operational condition, refer to **Troubleshooting** section for recovery steps.

6. While verification is in progress, the user should not press any key on the DUI unless there is a message on the DUI requesting such action.

7. For using same USB flash drive in multiple inverters, ensure enough free memory space for storing log files. If memory is full connect the USB flash drive to a PC and copy log files to PC & remove from flash drive to keep enough memory before using in next inverter.

Firmware Upgrade Procedure

Conext CL Backup and Restore Upgrade procedure

Please follow the below steps to upgrade the Conext CL firmware.

1. Extract "CL_Firmware_V02.06.04_Upgrade.zip" and related files to USB flash drive and make sure USB flash drive has the following files and folder structure as shown in Figure 1-1 on page 1–4.

Note: For more reliable upgrade process, USB flash drive may be formatted as FAT 32 before copying the firmware files.

2. Always copy only the contents of .zip file to USB main directory as shown in Figure 1-1 on page 1–4.

Name	Date modified
FW_Bundle	03-08-2016 12:02
DUI	03-08-2016 12:02
Ctrl_Loader_Files	03-08-2016 12:02
fs_upgrade_lux_script_lite.lux	14-06-2016 15:55
loader.hex	30-05-2016 02:45
CONEXT CL FIRMWARE 02.06.04 UPGRADE PROCEDURE.pdf	03-08-2016 12:11

Figure 1-1 USB flash drive contents screen

⚡ ⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, FIRE OR ARC FLASH

A voltage of 1000 VDC and AC grid voltage will be present inside the wiring box. Ensure to use all the necessary PPE.

Failure to follow these instructions will result in death or serious injury.

3. Turn OFF the DC switch and AC breaker.
4. Open the wiring box cover and connect the USB drive to the USB device socket.
5. Turn ON the DC switch and AC breaker.
6. After inverter boots up successfully, inverter display will be ON and OFF for 7 times in succession to indicate start of firmware upgrade process. Inverter should go to offline state, if it is online.

Note: This process will take approximately 30 seconds.

7. Inverter reboots, once the above process completed.
8. After successful boot up, inverter LCD display should show below message as shown in Figure 1-2 on page 1–5 and Grid LED and Fault LED should blink ON and OFF.

Note: This process will take maximum10 minutes.

Copy Logs to USB In progress..

Backup and Restore Script STEP 1/3 in progress

→

Copy Logs to USB Completed..!!!!

Checking for control loader update..!!
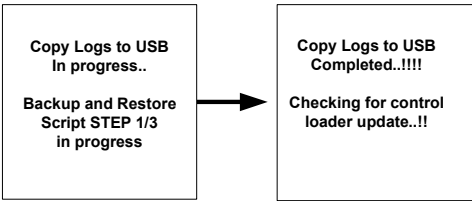
Figure 1-2   Copy Logs to USB completed screen

9. If inverter has old control boot loader, new control boot loader files will be upgraded and the LCD should display message as shown in Figure 1-3 on page 1–5.

Note: This process will take approximately 3 minutes.

Copying Control Loader in Progress!

Backup and Restore Script STEP 1/3 in progress..!

→

Copied Control Loader Successfully

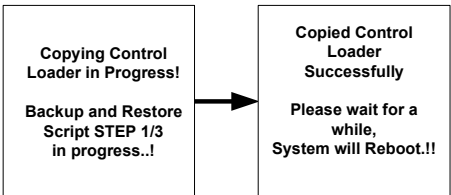**Please wait for a while, System will Reboot.!!**

Figure 1-3   Control boot loader files copied screen

10. Once Control Boot loader files are copied successfully, inverter goes for reboot to upgrade new control processor boot loader. These status can be monitored on DUI as standard firmware upgrade sequence of DUI screens as shown in Figure 1-4 on page 1–6.

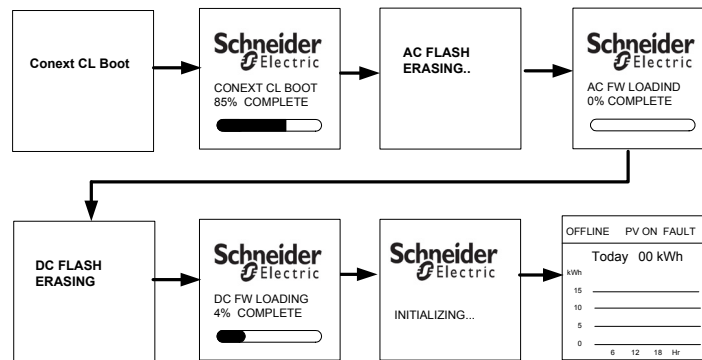Note: This process will take approximately 9 minutes.

Figure 1-4   DUI screen

11. LCD should display the message as shown in Figure 1-5 on page 1–6, if control processor boot loader is already upgraded.
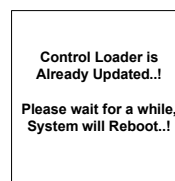

Figure 1-5   Control boot loader upgraded screen

12. After system boots up, inverter back light will be **ON** and **OFF** for **5** times to copy of firmware image from USB sub folder to main root directory of USB.
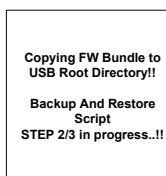
Figure 1-6   Firmware file copy screen

Note: This process will take approximately 25 seconds.

13. After successful copy of new firmware to USB root directory, the inverter initiates programming of Comm boot loader. Comm boot loader programming status can be seen on DUI screens as shown in Figure 1-7 on page 1–7.

Note: This process will take approximately 20 seconds.
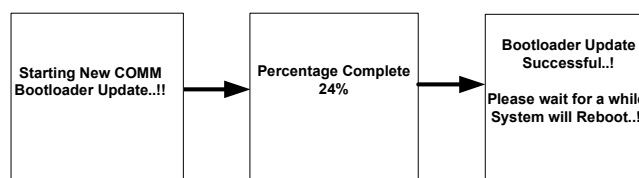

Figure 1-7   Comm boot loader programming screen

14. Once above screen popped up, inverter goes for reboot and boots up with new Comm boot loader.

15. Once rebooted, firmware upgrade will continue as shown in Figure 1-8 on page 1–7.

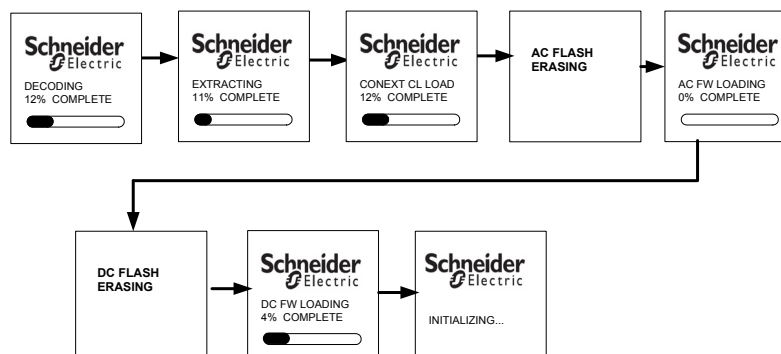Note: This process will take approximately 20 minutes.

Figure 1-8   Firmware upgrade screen

16. After successful upgrade, inverter shows initializing screen for a short duration. While showing initializing screen the display back light will be ON and OFF 5 times and reboots the inverter.
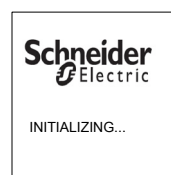
Figure 1-9 Initializing screen

Note: During this process LCD display back light should be ON and OFF and all LEDs like Grid LED, PV LED and Fault LED are continuously ON untill the restore process is completed.

Note: This process will take maximum 10 minutes.

17. After inverter comes up from boot, LCD should display "FW_UPDATE_COMPLETED" message on screen as shown in Figure 1-11 on page 1–8. All LEDs like Grid LED, PV LED and Fault LED are blinking with period of 1 second for 30 times to indicate firmware upgrade process completed.
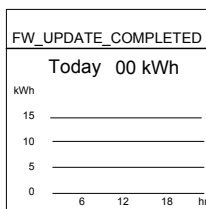

Figure 1-10 Firmware upgrade completed screen

18. Check all Comm and Control application and boot loader version information from DUI under "Inverter Info" screen, it should match with new firmware released versions as given:

APPL Info:

COMM APPL: Ver 02.06.04

CTRL DCAC: Ver 02.06.04

CTRL DCDC: Ver02.06.04

BOOT Info:

COMM BOOT: Ver02.04.11
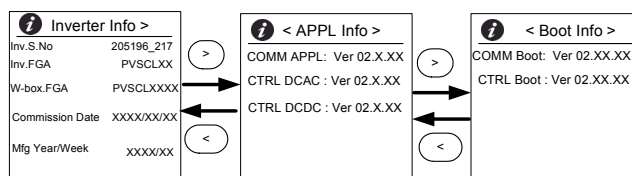
CTRL BOOT: 02.02.03

Figure 1-11 Inverter Info screen

19. Inverter should start working with new firmware retaining the old configuration and Logs. Check Energy related data in DUI as a basic check.

20. All these operations status will be captured in log file and stored in USB under inverter serial number folder as shown in the example below.

Removable Disk:\\ SerialNo(ZX12346789)\copy_statuslog.txt

21. Un-plug the USB flash drive from this inverter and use it for other inverter as required. If firmware upgrade is not successful or script execution is aborted in between, Before using it again, insert USB drive into a computer, copy the file 986-2188-02-06BN04.bdl from root directory of USB to FW_bundle folder and delete the 986-2188-02-06BN04.bdl file from the root directory.

Note: In case of failure in full execution of Backup and Restore procedure, refer to **Conext CL Backup and Restore Upgrade Procedure Failure condition.**

Firmware Verification Procedure Using Script

THIS FIRMWARE VERIFICATION SCRIPT WORKS FOR HEALTHY INVERTERS ONLY

The firmware update verification process using a firmware verification script performs the following steps:

1. Get the current system version information, which includes COMM Application, COMM Bootloader, DCAC Application, DCDC Application and Control Bootloader versions.

2. Perform verification against the following base version:

COMPONENT NAME	EXISTING VERSION LOADED
COMM Application	02.06.04
COMM Bootloader	02.04.11
DCAC Application	02.06.04
DCDC Application	02.06.04
Control Bootloader	02.02.03

3. If all installed versions match with the versions mentioned in step 2.2, the system shows success on the DUI.
Note: This firmware verification script is used to verify firmware version 02.06.04 and later firmware versions.
This firmware verification script is available as a separate package and is not part of the regular FW releases.

Verify the updated Conext CL firmware version using the firmware verification script

1. Ensure uninterrupted power supply to the inverter throughout the firmware update verification process using the firmware verification script.

2. The USB drive should have the following files and folder structure in order to use this Lux script.
Folder PATH listing for volume MSC:0:
MSC:0:\

| FW_Verification_Script.lux
Folder description:
FW_Verification_Script.lux => Lux script for FW verification

3. Please insert the USB drive which has the contents mentioned in step 2. Once the USB drive is inserted, the LCD display backlight will switch ON and OFF 5 times to indicate the start of the script execution.

4. After the USB drive is inserted, the Lux script starts executing, it gets all system information and it verifies the versions of these 5 components. During this verification process, the LCD display backlight will switch ON and OFF, the 3 LEDs (Grid, PV and Fault) will blink ON and OFF and the following screen will be displayed, until this process is completed.
   Note: This process will take approximately 60 seconds. Please wait until this script completes this operation.

5. After the FW verification process is completed, if it is successful, the following screen will be displayed on the LCD and the Grid LED and PV LED will blink ON and OFF for 20 seconds.


6. After the FW verification process is completed, if it failed, the following screens will be displayed on the LCD and the Fault LED will be ON for 60 seconds. The DUI will show only one failure message at a time depending on the firmware component that is not matching with the version mentioned in "Perform verification against the following base version:" on page 1–9.
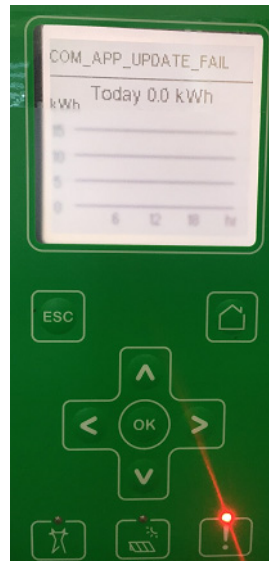
a) If the Control Bootloader is not updated, the following screen will be displayed.
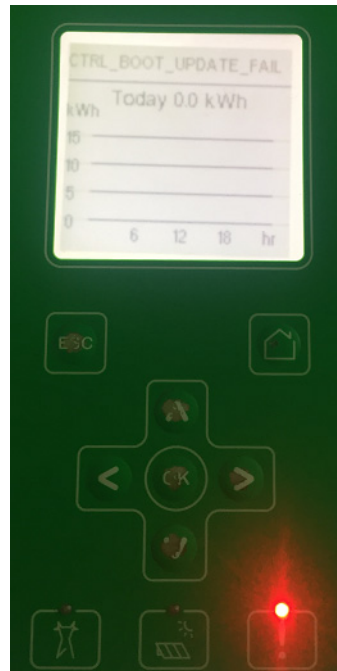
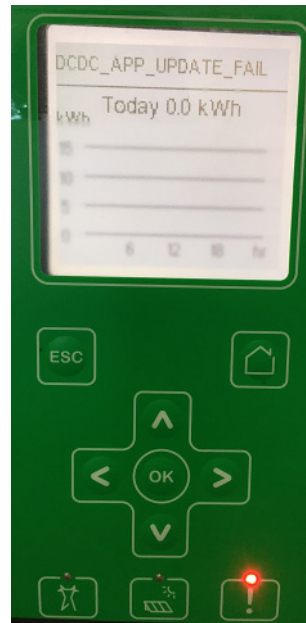b) If the COMM Bootloader is not updated, the following screen will be displayed.
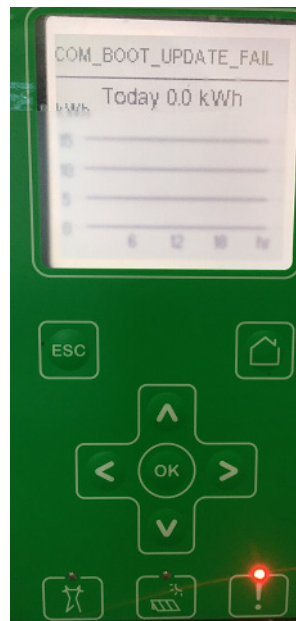
c)   If the COMM Application is not updated, the following screen will be displayed.

d)   If the DCAC Application is not updated, the following screen will be displayed.

e) If the DCDC Application is not updated, the following screen will be displayed.

7. The results of all these operations will be captured in a log file and stored on the USB drive under an inverter serial number subfolder as shown below.

   The log file will be dynamically named
   <inverter_serial_number>_FW_Verify_VER_02_06_04.txt".
   A sample log file is attached here for reference.
   MSC:0:\ ZX1444014266 \ ZX1444014266_FW_Verify_VER_02_06_04.txt

   ZX1444014266_FW_Verify_VER_02_06_04.txt
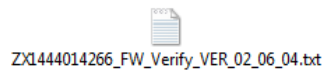
   Refer to the "Appendix" section on page 14.

8. Please check the log file mentioned in step 7 for the results of all firmware verification operations.

9. After successful verification of FW versions, the user can disconnect the USB drive from this inverter and use it for other inverters as required.

Appendix

2017/01/18 11:32:04,Firmware Update Verifying w.r.t 02.06.04.

2017/01/18 11:32:04,Firmware Update Verified Successfully w.r.t 02.06.04.

===

FW App Version Details:

ComAppVersion:Ver02.06.04, DCDC-App-Version:Ver02.06.04, DCAC-App-Version:Ver02.06.04

FW Boot Version Details:

ComBootVersion: Ver02.04.11,CtrlBootVersion: Ver02.02.03,

===

2017/01/18 11:32:25,Firmware Update Verification Completed w.r.t 02.06.04.

Troubleshooting

This section describes the issues which may occur during or occurred before the firmware upgrade procedure, and their recommended solutions.

Error Messages

1. "**S-Record bad error**"

Note: Make sure to have the following USB flash drives.

   a) USB flash drive 1: Firmware image file 986-2188-02-05-BN24.bdl.
   b) USB flash drive 2: Extracted version of CL_Firmware_V02.06.04_Upgrade.zip files.

Follow the below instruction to recover the device from S- Record bad error:

   c) Power cycle the inverter (both AC and DC).
   d) When PV and Grid LEDs are ON perform NAND 1 format by pressing below keys (ESC, ESC, ESC and RIGHT ARROW) within 10 sec.
   e) Confirm DUI/LCD shows the NAND 1 format message.
   f) Upgrade with old/previous firmware (986-2188-02.05.24) by using USB flash drive 1.

Note: This process will take maximum 20 minutes.

   g) Once the firmware upgrade is successful and inverter is in working condition, follow the **Conext CL Backup and Restore Upgrade procedure**. Use a USB flash drive 2.

2. **"Initializing"** OR **"COMM PROCESSOR ERR1, Firmware not found:: Upgrade Firmware"**

Note: Make sure to have the following USB flash drives

a) USB flash drive 1: CL_Config_Firmware_V00_01_02.bdl.

b) USB flash drive 2: Firmware image file 986-2188-02-05-BN24.bdl.

c) USB flash drive 3: Extracted version of CL_Firmware_V02.06.04_Upgrade.zip files.

Please follow the steps to recover the inverter from the above errors.

d) Ensure uninterrupted power supply to the inverter throughout the Recovery Firmware Upgrade Process.

e) Power cycle the inverter (both AC and DC).

f) When Grid LED & PV LED start glowing steady, immediately press the "ESC" button 3 times and press the "HOME" button 1 time within 10 sec and confirm below mentioned LCD messages are appeared in sequence as shown in Figure 1-12 on page 1–15.

Note: Repeat the above steps from d to f, if LCD does not display "CONEXT CL BOOT LOW LEVEL NAND FORMATTED" message.
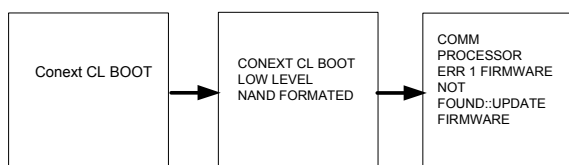
Figure 1-12   Low level format screen

g) Restart or power cycle the inverter.

h) Plug USB flash drive 1 (CL_Config_Firmware_V00_01_02.bdl) into the inverter.

i) Check that the LCD displays the firmware upgrade progress (decoding, extracting and so on).

j) After config firmware upgraded successfully, the following screen will appear on DUI (Refer to Figure 1-13 on page 1–15).
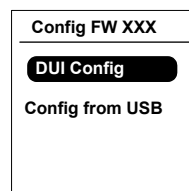

Figure 1-13   DUI Config screen

Note 1: This firmware upgrade process takes around 2-3 minutes.

Note 2: If USB flash drive is connected to unit after step j, DUI may display "PRESS OK TO UPGRADE FIRMWARE" message. **Do not press OK. Wait for 15 seconds**, display will come back to DUI Config screen as shown in Figure 1-13 on page 1–15. Then proceed with next step.

Note 3: If inverter is not showing the above DUI configuration screen, power cycle the inverter and repeat the steps above starting with step d.

k) Select the DUI Config as shown in Figure 1-13 on page 1–15.

l) Note down the Serial number, MAC and FGA details from the inverter label as shown in Figure 1-14 on page 1–16.
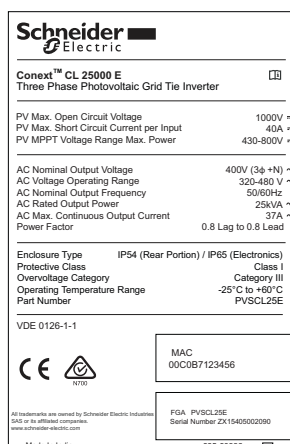
Figure 1-14 Inverter label

m) Please follow the below instructions step by step provided on DUI screens to generate configuration file using DUI.

Note: DUI screen password is "**1234**".
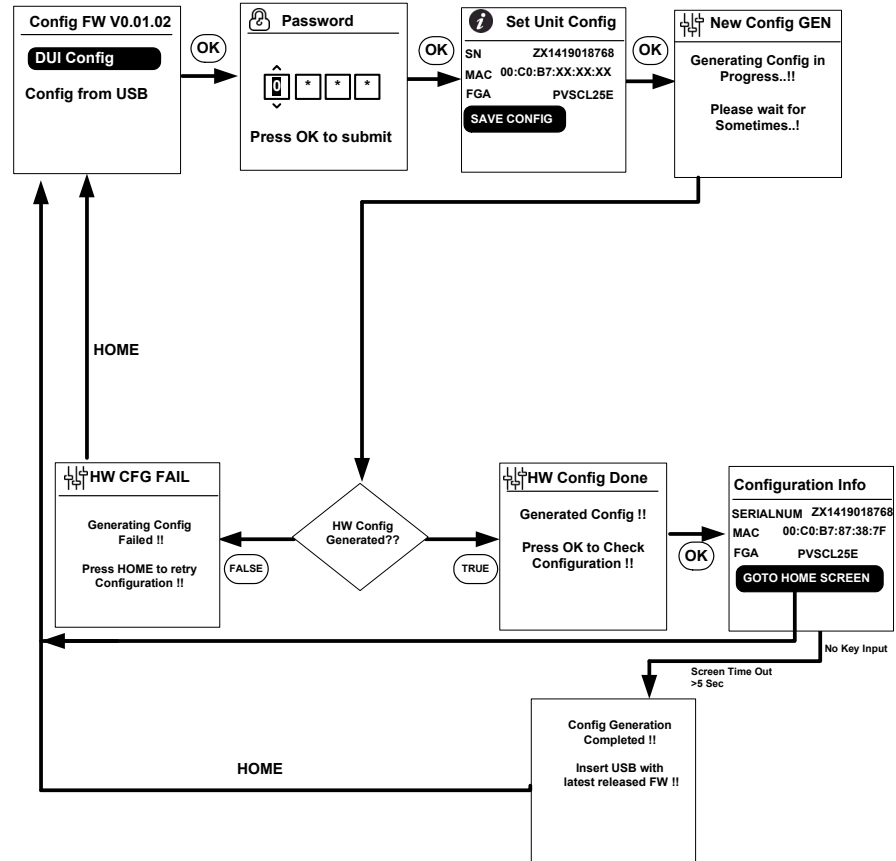
Figure 1-15   Configuration Info screen

n)   Once hardware configuration is generated user can check the same details on **Configuration Info** screen as shown in Figure 1-15 on page 1–17.

o)   Configuration Info screen is displayed for some time. User can check the details entered are correct or not. If any data needs a correction select "GOTO HOME SCREEN" and press OK to go to Home screen and enter data appropriately. Otherwise wait for screen to time out.

p)   After hardware configuration settings file is generated, all logging information related to the operations will be logged into a file named "SerialNumber_configlog.txt" which will be saved in the USB flash drive.

q)   After **Configuration Info** screen appears, display shows a message to upgrade firmware appropriately.

r)   Unplug USB flash drive 1 (CL_Config_Firmware_V00_01_02.bdl) from the inverter and plug USB flash drive 2 (986-2188-02-05-BN24.bdl) into the inverter.

s)   The DUI displays ask for upgrade confirmation and "Press OK To Upgrade Firmware". Refer to Figure 1-4 on page 1–6 which shows upgrade process.

t) Once firmware is upgraded successfully the inverter DUI shows the first time configuration screen. User needs to configure the inverter appropriately as shown in Figure 1-16 on page 1–18. Once configured, the inverter will reboot and be ready for operation.
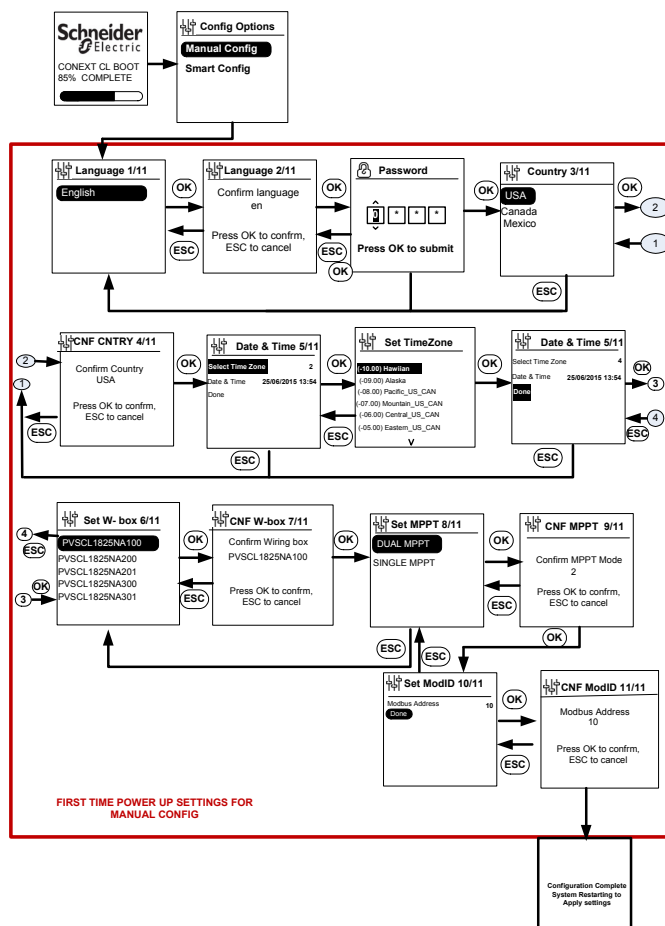

Figure 1-16   Configuration Info screen

u) Once inverter is ready and in working condition, unplug USB flash drive 2 (986-2188-02-05-BN24.bdl) from the inverter, plug USB flash drive 3 into the inverter and follow the **Conext CL Backup and Restore Upgrade procedure** to upgrade the inverter firmware to the latest version.

Note: After successful upgrade of new firmware, "Today Energy" on DUI shows very high value instead of showing only today's generated value. This is because of Low Level Format done on Comm processor. Due to that Energy data cleared on Comm processor and not on DSP processor. After a day changes both Comm and DSP should sync automatically and shows day wise data on DUI.

Note: If user don't want to see this high value, user can reset energy on both sides using RESET ENERGY option on DUI. Due to this reset energy operation, we lose total energy generated value till date.

3. The Date/Time is completely off /RTC issues /Time reset 1900.

If the Date/Time is lost or reset to 1900 user needs to correct the time as shown in Figure 1-17 on page 1–19.
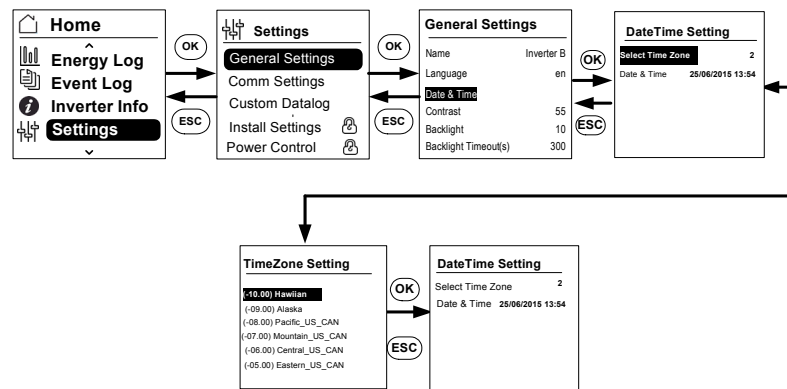

Figure 1-17   Date and Time setting screen

a) Navigate to LCD menu (**Home--> Settings--> General Settings --> Date and Time**).

b) Enter the Time zone correctly and adjust the Date and Time appropriately.

c) Restart the inverter by navigating the menu (**Home--> Diagnostics--> Reboot Inverter**).

d) After reboot confirm the date and time is correct.

e) Once inverter is ready and in working condition follow the **Conext CL Backup and Restore Upgrade procedure** to upgrade the inverter firmware to the latest version.

f) If time is not set or again time is lost contact Schneider Electric Customer Support.

4. Low Level Format Failed Condition.

While performing the low level NAND format and if the LCD shows the message " Low level NAND format failed" please contact Schneider Electric Customer Support.

5. Conext CL Backup and Restore Upgrade Procedure Failure condition

a) Unplug the USB flash drive.

b) Copy the full contains of the USB flash drive and save it (for backup).

c) Format the USB flash drive.

d) Repeat the steps as given in **Conext CL Backup and Restore Upgrade procedure**.

e) Share the backup copy to Schneider Electric Customer Service.

Contact Information: solar.schneider-electric.com.
For country-specific details, please contact your local Schneider Electric Sales Representative or visit the Schneider Electric Solar Business website at http://solar.schneider-electric.com/tech-support/