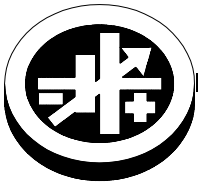


INSTRUCTION MANUAL



KEPCO An ISO 9001 Company.

**NV RAM
(EEPROM)
SAVE, CLEAR
AND RESTORE**

NON-VOLATILE MEMORY SAVE, CLEAR AND RESTORE PROCEDURES

I — INTRODUCTION

This manual documents the procedures required to save, clear and restore data stored in EEPROM (Electrically Erasable Programmable Read-Only Memory), the non-volatile memory (referred to as NV RAM) of Kepeco's EL Series Electronic Loads.

The EL Series uses two (2) types of memory to store customer data within the processor chip. The processor chip contains a volatile Random Access Memory (RAM) and a Flash (EEPROM) Memory. The Flash memory is divided into regions, Program Memory, and Variable and Settings memory. Power cycling the EL will erase all data stored in RAM memory during the power up self test. However, Flash memory must be erased or reset to the original manufacturing state by using the procedure in section IV of this document.

The EL Series uses EEPROM to store the unit's identity, calibration constants, front panel settings and certain other operating parameters. Though the command sequences for storing this information are not published, clearing NV RAM guards against the possibility that this data can be changed in the field by a sophisticated or properly trained individual.

The EL Calibration Save and Restore program must first be downloaded and installed (see Section II). Each time the

NV RAM is to be cleared, the calibration data must first be saved (see Section III), then the NV RAM can be cleared (see Section IV).

Once the Clear function is executed, the unit will no longer function and will not accept any front panel inputs until the Restore function is executed (see Section V). The Restore function restores the previously saved calibration settings. Upon request from Kepeco, the original factory calibration constants can be accessed and the unit can be restored to the original factory calibration condition.

Kepeco can provide a Certificate of Volatility which insures that the factory calibration constants of the specific unit are saved by Kepeco for a minimum of 10 years and can be forwarded to the customer after contacting Kepeco application support. If the Certificate Of Volatility is not ordered, the factory calibration constants are only available for two years after the unit was manufactured.

The NV RAM Clear feature will not function until it is enabled. It is enabled at time of order by requesting a Certificate of Volatility. If not requested at time of order, contact Kepeco application support to order a Certificate of Volatility and receive the instructions to enable the feature.

II — INSTALLING CALIBRATION DATA SAVE AND RESTORE PROGRAM

NOTE: The EL Calibration Save and Restore Program only needs to be downloaded and installed once.

1. Download the EL Calibration Save and Restore program from www.kepecopower.com/utility/ to a Windows-compatible computer, running Windows XP or later.
2. Extract zipped files into a temporary directory.

3. Click on setup to install the program by following the on-screen prompts. An icon will be saved on the desktop, and the program will stored in
c:\Program files\kepeco\el_restore.
4. When data is saved it will be stored where the program was installed. When restoring data, the EL must be connected to the same computer used to save the data.

III — SAVING CALIBRATION DATA

Once the Calibration Data Save and Restore Program has been installed (see Section II), the calibration data can be saved.

Performing this procedure generates a copy of the current values of the non-volatile memory. This copy, if used to restore the unit, does not meet the requirements of the Certificate Of Volatility of the US government. By providing the model and serial number of the unit, the factory non-volatile ram contents file can be obtained from Kepco Application Engineering support for the first two years after manufacture. If a Certificate Of Volatility is ordered for the unit, the file will be available for 10 years minimum.

1. Launch the Program from the Windows Start menu, by selecting **All programs - Kepco - calsave**.
2. When the **Kepco EL Cal Save Restore** window (Figure 1) appears, select the serial port to which the EL load is connected.

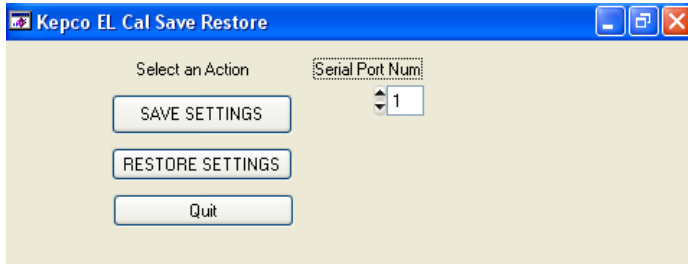


FIGURE 1. KEPSCO EL CAL SAVE RESTORE WINDOW

3. Select **SAVE SETTINGS** to save the EL calibration data.
4. If the connection is made, the **Standard Input/Output** window opens (Figure 2), showing the Identifier string

of the Kepco EL load with the message:
saving caldata, please wait ...

If there is a connection problem, an **Error** window (Figure 3) will appear, which will display: Kepco not found. Click **OK** to continue.

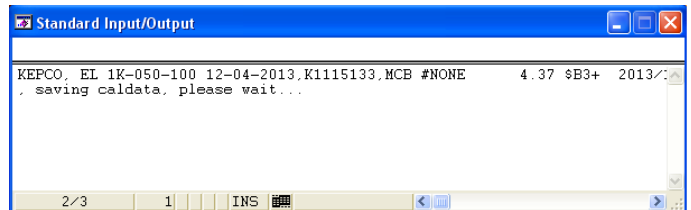


FIGURE 2. STANDARD INPUT/OUTPUT WINDOW, SAVING CALDATA

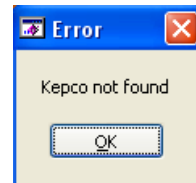


FIGURE 3. ERROR WINDOW

5. When the data has been saved, the **Cal File Saved** window opens (see Figure 4), entitled **Kepco EL xxxxxxxx** where xxxxxxxx is the serial number of the EL Load, and the message Cal File Saved is displayed. Click **OK** to end the program.

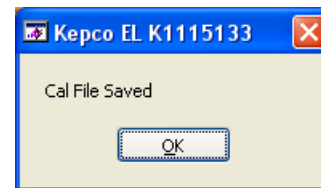


FIGURE 4. CAL FILE SAVED WINDOW

IV — CLEARING NV RAM

CAUTION:

Clearing NV RAM will render the unit inoperative until the restore procedure is executed. Calibration data must be saved prior to clearing NV RAM!

The Clear function is executed from the EL front panel. Safeguards are in place to avoid accidental or inadvertent clearing of NV RAM. Executing the Clear function initiates a series of erasures to NV RAM, including erasing unused program space, followed by rewriting the program space with multiple data patterns,

If execution of the Clear function is interrupted by a power cycle, the clear operation is completed without notifying the user.

1. Power unit off.
2. While depressing and holding the CONTROL knob, power up the unit.
3. Once unit is powered up:
VOLTS display shows **8888** (NV).
AMPS display shows **CLER** (CLER).
4. Release the CONTROL knob.
5. Press and hold LOAD pushbutton for approximately one second, then release it.
VOLTS display shows **AREE** (ARE).
AMPS display shows **YOU** (YOU).
KW display shows **SUR** (SUR).
6. Proceed to step 7 to **cancel** the clear of NV RAM. Proceed to step 8 to continue.

CAUTION:

Step 7 offers a final opportunity to abort the NV RAM clear.

To execute NV RAM clear proceed to step 8.

7. To exit without clearing, rotate CONTROL knob. The unit reverts to the normal power-up sequence without clearing NV RAM.

CAUTION:

Executing step 8 will clear NV RAM and render the unit inoperative until the Restore procedure is executed.

8. To clear NV RAM, press LOAD pushbutton, hold for approximately one second, then release LOAD pushbutton.:

VOLTS display shows **CLRG** (CLRG).

AMPS display shows **NVRM** (NVRM).

Unit performs NV RAM clear, including writing multiple patterns to prevent recovery of data, then restarts automatically.

During power on tests, the erased state of NV memory causes a rewrite of original firmware defaults, including the backup copy.

The Restore function (see Section V) must be executed before the unit can be used.

V — RESTORING NV RAM CALIBRATION DATA

The following procedure restores calibration data that has been previously saved, but can also be used to restore factory calibration. To restore factory calibration, a calibration data file specific to that particular serial no. must first be obtained from Kepco, and saved at c:\Program files\kepco\el_restore. Factory calibration data is available for two (2) years from date of purchase (10 years if a Certificate of Volatility has been ordered).

1. To restore NV RAM calibration data, launch the Program from the Windows Start menu, by selecting **All programs - Kepco - calsave**.

When the **Kepco EL Cal Save Restore** window (Figure 5) appears, select the serial port to which the EL load is connected.

NOTE: The EL must be connected to the same computer used to save the data.

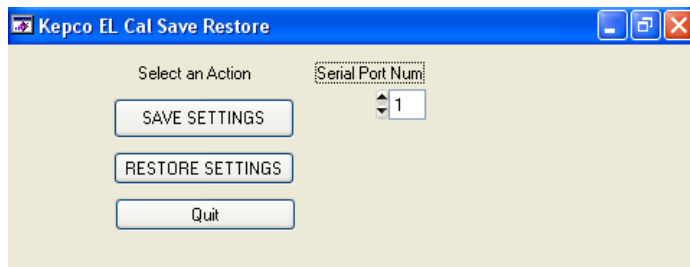


FIGURE 5. KEPSCO EL CAL SAVE RESTORE WINDOW

2. Click the **RESTORE SETTINGS** button (see Figure 5). The Restore Cal Data window opens (Figure 6). Enter the serial number of the unit to be restored and click **OK**.

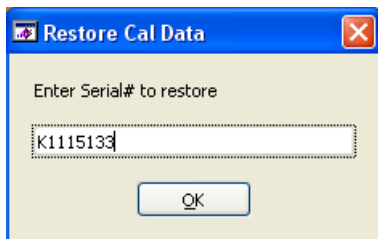


FIGURE 6. RESTORE CAL DATA WINDOW

3. The **Standard Input/Output** window opens (see Figure 7) showing that the restore process is started, listing the new settings.
4. When done, the **Cal File Restored** window opens (see Figure 8), entitled Kepco EL xxxxxxxx where xxxxxxxx is the serial number of the EL Load, and the message Cal File Restored is displayed. Click **OK** to end the program.

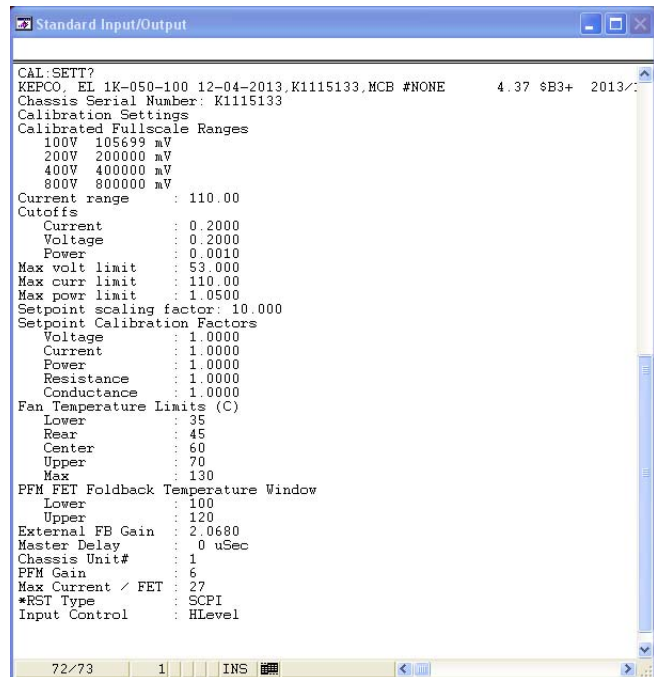


FIGURE 7. STANDARD INPUT/OUTPUT WINDOW, RESTORING CALDATA

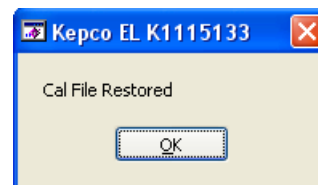


FIGURE 8. CAL FILE RESTORED WINDOW