



# Capacitor reforming unit Option

For Emotron FDU2.x and VFX2.x AC drives



Instruction  
English

# Capacitor reforming unit Option

For Emotron FDU2.x and VFX2.x AC drives

## Instruction

Document number: 01-6480-01

Edition: r2

Date of release: 2022-08-15

© Copyright CG Drives & Automation Sweden AB 2022

CG Drives & Automation retain the right to change specifications and illustrations in the text, without prior notification. The contents of this document may not be copied without the explicit permission of CG Drives & Automation Sweden AB.

# Contents

<b>1.</b>	<b>Introduction .....</b>	<b>3</b>
<b>2.</b>	<b>Ways of reforming .....</b>	<b>4</b>
<b>3.</b>	<b>Emotron capacitor reforming unit .....</b>	<b>4</b>
<b>4.</b>	<b>Instructions.....</b>	<b>5</b>
4.1	Reforming capacitors on FDU/VFX AC drives 300A and larger (multiple PEBB's).....	5
4.2	Reforming capacitors for wall mounted drives.....	8
<b>5.</b>	<b>Charge process.....</b>	<b>9</b>



# 1. Introduction

All frequency AC drives with electrolytic type DC link capacitors needs to be reformed if they have been without any connection to the nominal mains for more than 2 years.

If this reforming process is not performed the capacitors may be damaged or can explode when the AC drive is connected to mains or when started to operate.



## **General Safety Warning!**

**Here described work may only be performed by trained personnel with the appropriate safety training and electrical education.**

**Take all necessary safety precautions before you start work. Be sure that you have the correct equipment and be aware of the high voltage up to 690VAC or 1000VDC which will be present on terminals, parts of the AC drive or to the AC drive connected cables and equipment.**

**In many countries around the world it is by law prohibited to perform “live” measurements at these voltage levels. A safe way to perform measurements is that the measurement equipment is connected and disconnected during power off.**

**Be aware that the DC-voltage is stored in the capacitors and that you need to wait at least 5 minutes before you can touch the terminals.**

**Always measure the voltage at the DC-terminals of the charge unit before you start to work on the terminals!**

**Never switch on the power supply to the AC drive if the charge unit is connected!**

---

## 2. Ways of reforming

To reform capacitors it is needed to charge the capacitors in a controlled way with a limited current to the nominal voltage and let them stay charged for a specific time.

The best way to do this is a DC-supply with adjustable voltage and current limitation.

An easier way is the use of a so called charge unit. This procedure is described in this document.

If you have the possibility to use an adjustable DC supply the process is nearly the same, the difference is, that you have to increase the voltage slowly and have a look to the remaining current if the voltage is stable. Voltages for DC supply are 1,41x nominal AC voltage. ( $565V_{DC}$  for 400V units and  $976V_{DC}$  for 690V units).

## 3. Emotron capacitor reforming unit

We recommend using the Emotron capacitor reforming unit

*Table 1 Part number and dimension*

<b>Part number</b>	<b>Description</b>	<b>Dimensions</b>
01-6487-00	Capacitor reforming unit kit	250x145x105 mm

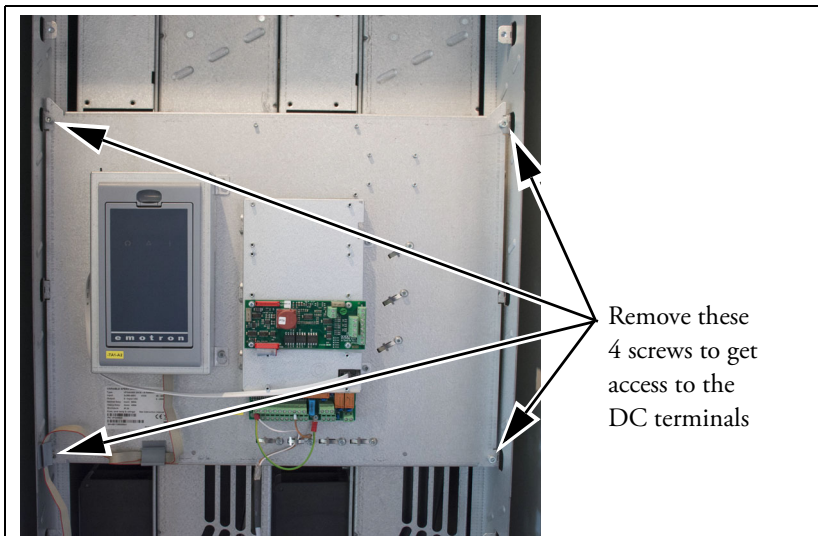
## 4. Instructions

### 4.1 Reforming capacitors on FDU/VFX AC drives 300A and larger (multiple PEBB's)

Reforming the capacitors needs to be done on each module (PEBB =Power Electronic Building Block) separate.

Because of the used HCB circuit it is needed to connect the charge unit direct to the DC power terminals of each PEBB.

1. If the PEBB's are mounted in a cabinet the front cover must be dismantled to get access to these terminals.
2. The terminals are located behind the metal plate where the control board and option boards are mounted.  
This plate needs to be removed to get access.  
Dismount the screws on the corners of the plate and hang out the plate. See picture.



*Fig. 1 Remove the 4 screws to access the DC terminals.*

- Position of the DC terminals



*Fig. 2 Position of the DC terminals*

3. Remove the metal plate and connect the charge unit to the DC terminals.



**Warning!**

**Be aware that the DC-voltage is stored in the capacitors and that you need to wait at least 5 minutes before you can touch the terminals.**

**Always measure the voltage at the DC-terminals of the charge unit before you start to work on the terminals!**

---



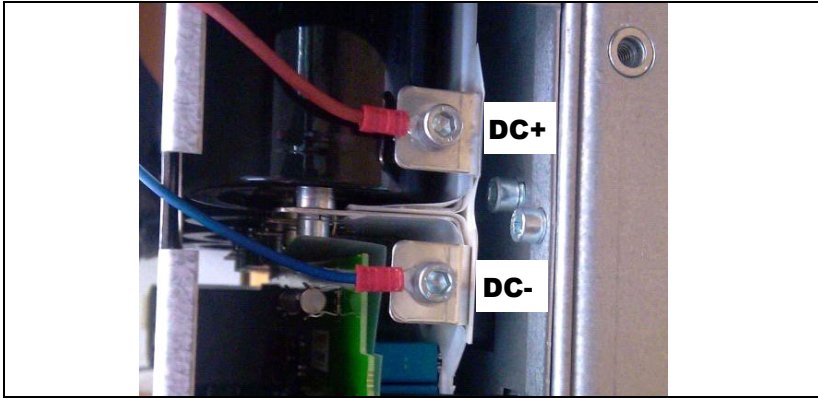
**Warning!**

**The terminals are not marked with DC+ and DC-, make sure that the DC+ is connected to the upper terminal and DC- to the lower terminal.**

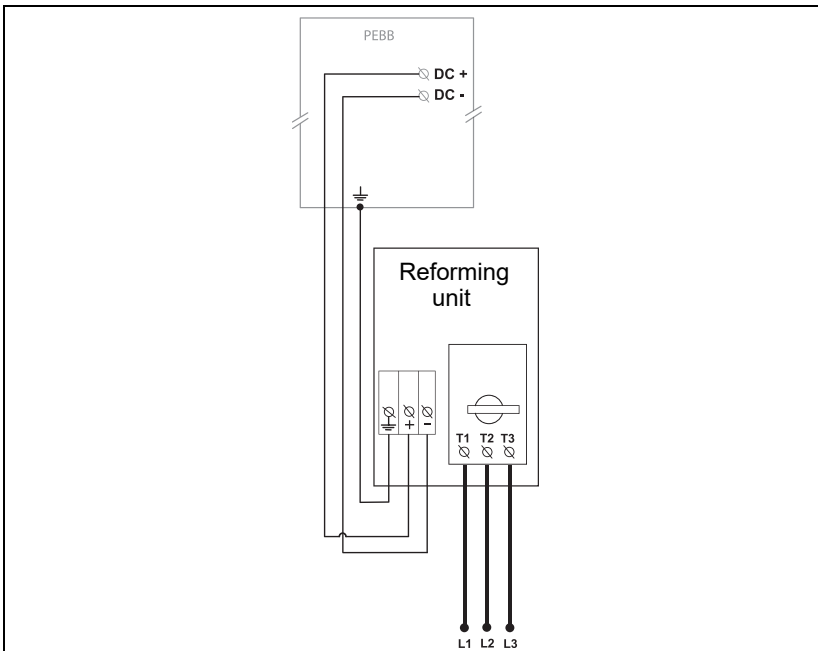
---



4. Connect the cables, to DC+ and to DC- according to picture and the cable connection drawing below.



*Fig. 3 Position of DC terminals, upper terminal = DC+ and the lower terminal = DC-.*



*Fig. 4 Cable connections, principle drawing.*

## 4.2 Reforming capacitors for wall mounted drives

You can use the reforming option also for frame sizes B-FA / C2-FA2 / C69-F69 / C2(69)-D2(69) and connect the DC+ and DC- wires of this reforming unit to two (2) of the drive outputs (e.g. U and W). The DC link capacitors will then indirectly be charged via the freewheeling diodes in the IGBT modules which together form a rectifier bridge "looking from the outside in" towards the DC link capacitors.

**WARNING: when using this method, MAKE SURE that:**

1. No other connections (mains wiring / IO wiring / etc) are present on, or made to, the unit which is going to be reformed. The same is of course valid when the reforming process is ongoing.
2. During the reforming of the DC link capacitors, the unit is not switched in RUN. Check that no I/O wiring is connected and maybe to be 100% sure you could even remove/disconnect the drive Control panel to prevent this happens accidentally by pressing the RUN key on the panel.
3. You take all safety information and warnings, as mentioned in the Reforming option instruction, also in account when using this method.

Be aware that the DC-voltage applied to the DC link capacitor bank is stored in the capacitors and that you need to wait at **least 5 minutes** after disconnecting power, before you can dismantle the reforming set-up and touch the terminals.

## 5. Charge process

---



**Warning!**

**Make sure that the PEBB/Drive is disconnected from all possible power sources!**

**Never connect more than 1 PEBB/Drive at the same time to the charge unit!**

---

1. Connect the charge unit to the DC terminals as described earlier.
2. Connect the charge unit to at max. with 16A secured 400V<sub>AC</sub> or 690V<sub>AC</sub> supply depending on the nominal AC drive voltage.
3. Switch on the PKZM (Motor-protective circuit breaker) on the charge unit for at least 1h per PEBB/Drive.
4. Switch off the charge unit.
5. Wait at least for 5 minutes to let the capacitors discharge.
6. Ensure by measuring the DC voltage on the + and – terminals of the charge unit that the DC capacitors are discharged.
7. Disconnect the charge unit from PEBB/Drive.
8. Repeat process for each PEBB/Drive.

---

**NOTE! For AC drives that has not been connected to mains for more than 3 years, the reforming time shall be increased for 30 min per year!**

---



# CG Drives & Automation

[www.cgglobal.com](http://www.cgglobal.com) / [www.emotron.com](http://www.emotron.com)