KRAFT POWERCON

Technical Description

ControlKraft Touch Panel

7, 10, 12 and 15 inch
FlexKraft

77-107.0290 GB Rev.E

Program CKT-07 VER. 1.0.0.6 and higher
Program CKT-10 VER. 1.0.0.6 and higher
Program CKT-15 VER. 1.0.0.6 and higher

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Contents

This description applies to software version
CKT-07 VER. 1.0.0.6 and higher. For 7 inch
CKT-10 VER. 1.0.0.6 and higher. For 10 inch
CKT-15 VER. 1.0.0.6 and higher. For 12 and 15 inch

Slight differences can exist between the program versions.

Specifications are subject to change without notice.

1 General

This description is for a remote Control Box with a programmable controller with touch display and control via Modbus serial communication RS-485.

The ControlKraft Touch Panel series can control up to ten rectifiers. The ControlKraft Touch with 7 inch display controls up to three rectifiers, 10 inch up to eight rectifiers, 12 and 15 inch up to ten rectifiers.

This description shall be used together with User manual 77-107.0222 Rev.H or higher and Technical Description 77-107.0223 Rev.H or higher.

Figure 1. Control cabinet for 7 inch

Figure 2. Control cabinet for 10 and 12 inch

Figure 3. Control cabinet for 15 inch

1.1 Rectifier configuration

When delivered from factory, the rectifier configuration is pre-set at the factory.
Default Modbus address is the same as the rectifier's serial number that can be found on the rating label.
Default in the ControlKraft Touch "Home" screen the left most rectifier has the lowest modbus address.
This configuration is to enable option serial communication.
If serial communication is not properly set up the remote control box will not work.
Other configurations, see 77-107.0223 Rev.H or higher.

If, for any reason any doubt occur on the settings especially for this function, the settings are, at delivery, with one rectifier as follows:

SET menu

```
REMOTE CONTROL : YES
START RAMP  :0000.5 S
PROGRAMMODE :    NO
```

CFG\USER menu: (Default password=00001)

```
PROTOCOL : MODBUS RTU
ADDRESS  :     000001     (Address may be different, see first paragraph above)
BAUDRATE :   38.4KBPS
COMMLOSTMODE:CONTINUE     (Choose mode as per 77-107.0223 Rev.H or higher)
COMMLOSTTIME: 003.0
POWERONMODE:   REMOTE     (Choose mode as per 77-107.0223 Rev.H or higher)
```

It is also possible to check protocol, address and baud rate in the DUTY menu under COMMUNICATION

```
██ COMMUNICATION ███
PROTOCOL : MODBUS RTU
ADDRESS  :     000001     (Address may be different, see first paragraph above)
BAUDRATE :   38.4KBPS
```

2 ControlKraft Touch Panel FlexKraft

The ControlKraft Touch Panel is powered from 24 VDC and has a RS-485 serial communication I/O for controlling of rectifiers and a USB serial communication I/O for program updates.

2.1 Technical data

Parameter	Value	Comment
Supply voltage	24 VDC (18-32 VDC)	
Supply current	0.4-0.9A @ 24VDC.	Depends on display size
Internal Fuse	2.0 AT	5x20mm
Communication	RS485	Modbus RTU, 38400 Bit/s
Program update I/O	USB	For standard USB stick
Storage temperature	-20 - +70 ºC	
Operating temperature	-10 - +60 ºC	
Degree of protection, assembled Control Box.	IP54	
Air humidity	Max 85% RH	Non-condensing
Weight	2.4 kg	
Cooling	None, self-convection	
Altitude	Max 1000m above sea level	
Duty	Continuous	

Table 1. Technical data

3 How to use

3.1 Menu tree

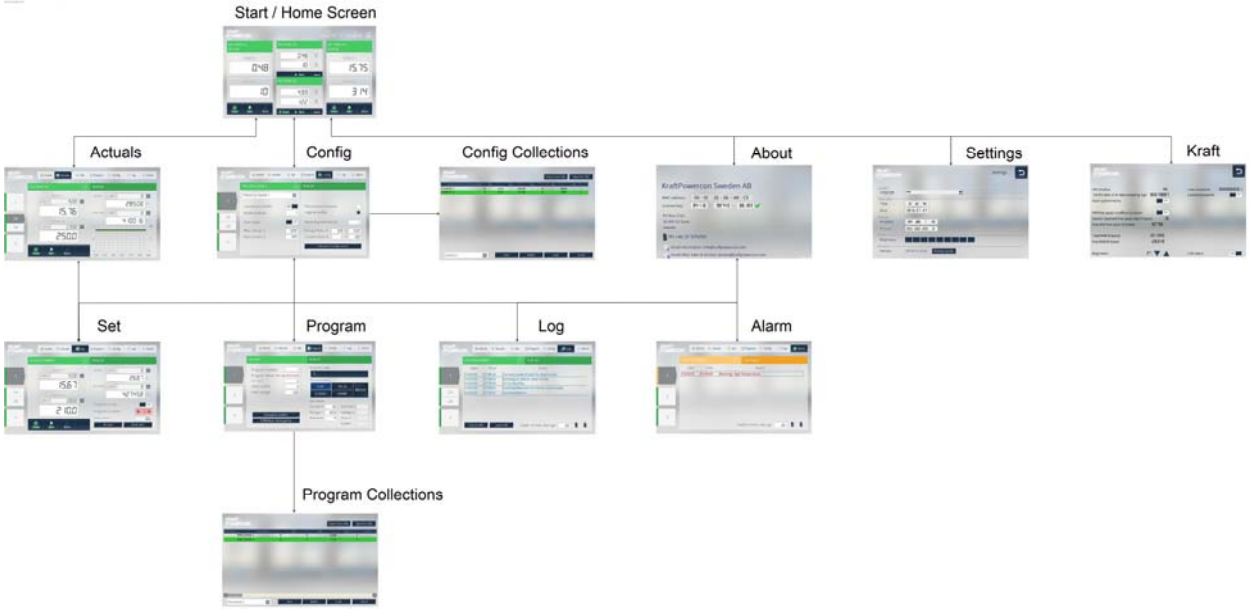


Figure 4. Menu tree

3.2 Home screen

On the Home screen there is information of status, actual voltage and current.

For 7 inch **For 10 inch** **For 12 and 15 inch**

Figure 5. Home screens

The touch buttons that can be accessed from the Home screen are Power, Start, Block. Pressing on the “headers” (area with process name and status) in every rectifier open the other screens in the ControlKraft Touch Panel, e.g. the Actual screens or the Set screens (their functions are described further on in this document).

The text “Local Mode!” is shows instead of buttons “Power”, “Start” and “Block”. It indicates that the rectifier works in the local mode and the ControlKraft Touch can only read values from this rectifier.

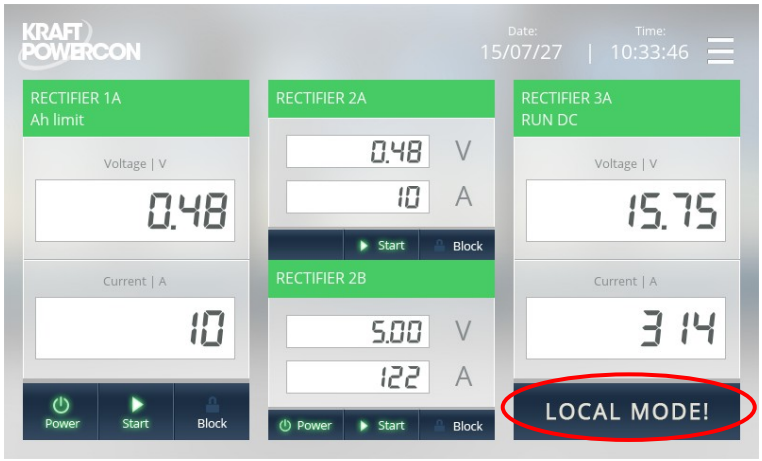


Figure 6. Local mode icon

The Home screen has a menu on the top right corner. This menu gives access to Settings, Kraft and About screens.

Figure 7. Menu on the Home screen

3.3 Navigation

The navigation between screens is carried out by touching the navigations panels. There are two different panels.

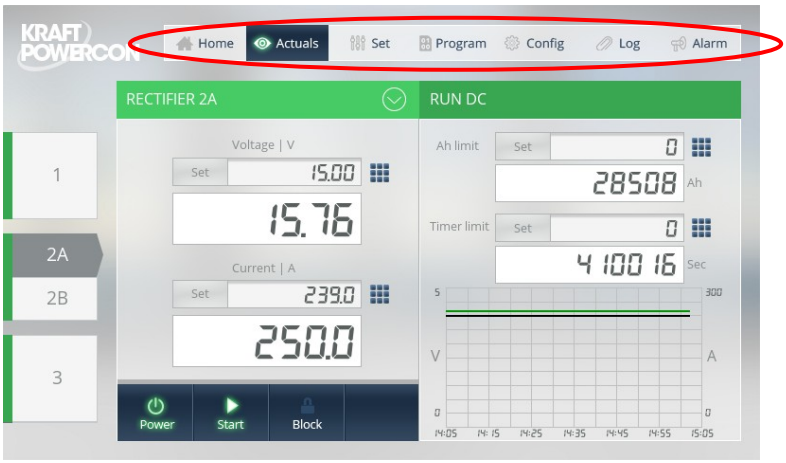
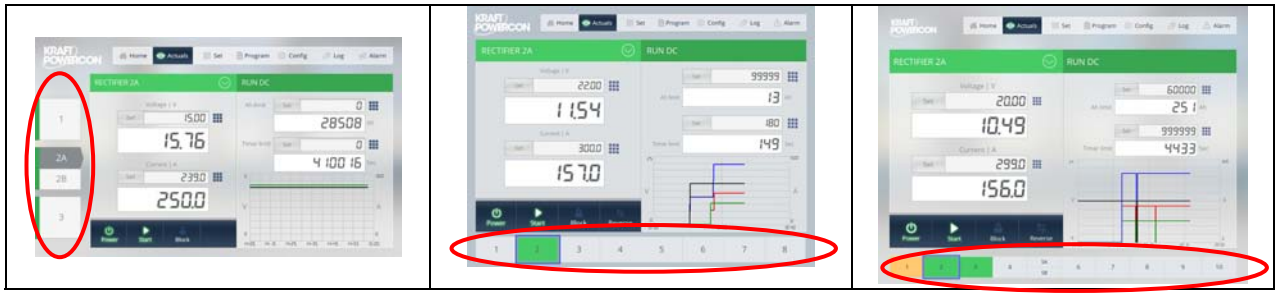


Figure 8. The Navigation panel

The first panel, at the top of the screen, is for switching between different screens in the current selected rectifier.

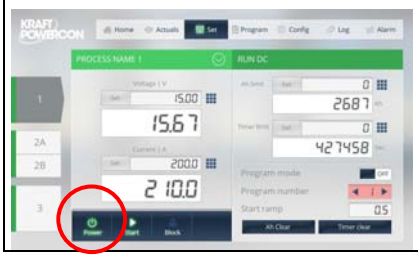


For 7 inch **For 10 inch** **For 12 and 15 inch**

Figure 9. The rectifier selection panel

Rectifier selection panel is for selecting desired rectifier, or A-/B-side if the rectifier works in dual mode, the selection panel can be found on the left side of the screen for 7 inch panels or at the bottom of the screen for 10, 12 and 15 inch panels.

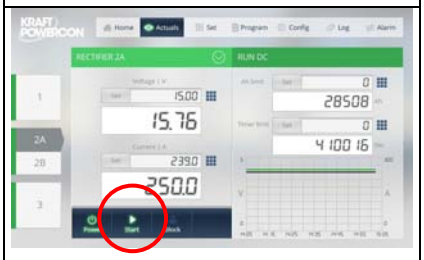
3.4 On/Off

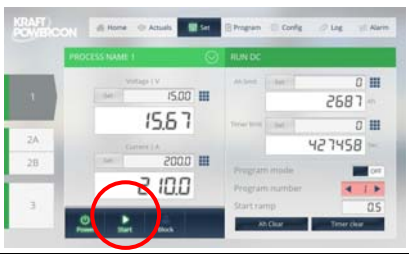


On/Off action can be performed from the Home, Actuals and Set screens.
The rectifier is turned on by touching ”Power”, when turned on, the rectifier enters Stand-By mode.
The rectifier is turned off by touching ”Power” again.

For further reference on the functions above, please read User manual 77-107.0222.

3.5 Start/stop





This action can be performed from the Home, Actuals and Set screens.

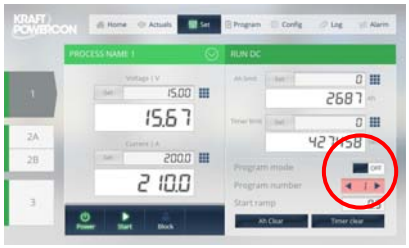
Operation of the rectifier is started by touching ”Start”.
The arrow and the text “Start” will be highlighted when the Start is activated.

Operation of the rectifier is stopped by touching ”Start” again.

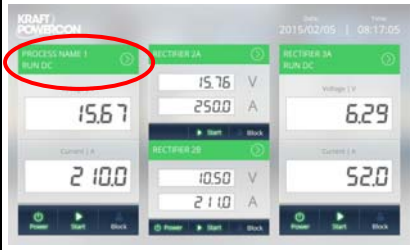
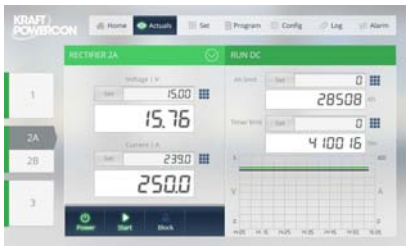
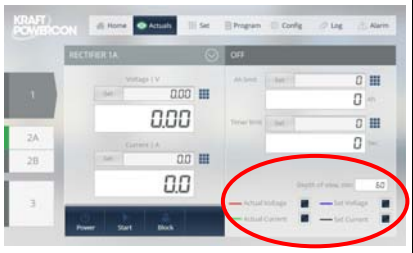
It is possible to activate Start when the rectifier is in power OFF/Stand-By mode but the rectifier will not start until Power is activated

For further reference on the functions above, please read User manual 77-107.0222.

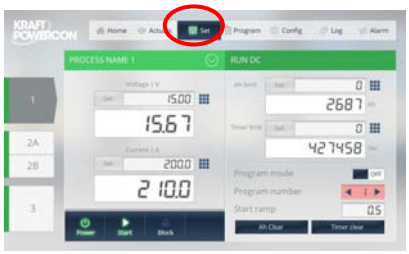
3.6 Run program

	To run a program in the rectifier, perform the following steps from Set screen: • Switch to “Program mode”: On • Choose a “Program number” from 1 to 4 • Start the program execution by pressing “Start” button To stop the program execution press “Start” again.

3.7 Show actuals and settings for current and voltage

	This action is commenced from the Home screen. Show actuals and settings by touching ”Process name” on the desired rectifier. Control Box goes to Actuals screen.
	The Actuals screen shows the following values; • Actual values for voltage and current for the selected rectifier • Set values for voltage and current for the selected rectifier • Ah and Process Timer Limits • Ah and Process Timer counters • A graph with actual and set values (the content of the graph will vary depending on the rectifier)
	Touching the graph will show the graph configuration controls: • Time depth for x-axis in the graph • Show the actual voltage • Show the actual current • Show the set voltage • Show the set current

3.8 Setting current and voltage



This action is commenced by touching Set on the navigation panel.

Set screen shows the following information:

- Set Voltage and Current
- Actual Voltage and Current
- Set value for Start Ramp, displayed in seconds
- Selected program

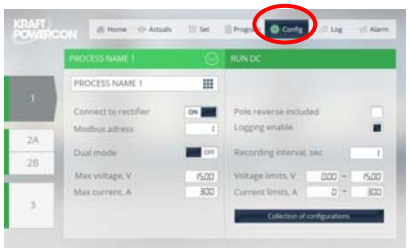
The touch buttons available on this screen are:

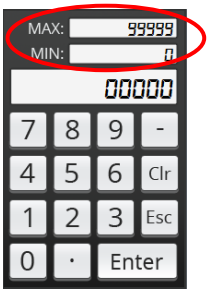
- “Power”, turn on/off the rectifier.
- “Block”, sets the rectifier in run or block mode.
- “Start”, starts and stops the rectifier.
- “Ah clear”, clears Ah counter.
- “Timer clear”, clears Process Timer counter.

To alter set values, press in the field of the desired set value, enter a new value on the onscreen keypad, and then press Enter button.

For further reference on the functions above, please read User manual 77-107.0222.

3.9 Configure the panel

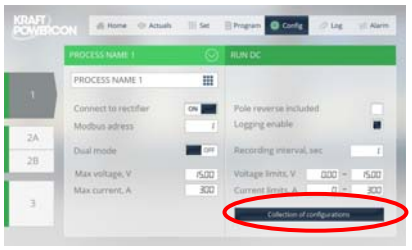
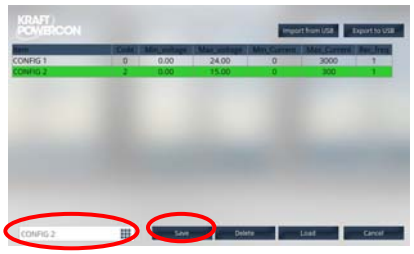




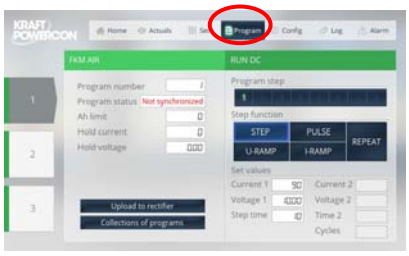
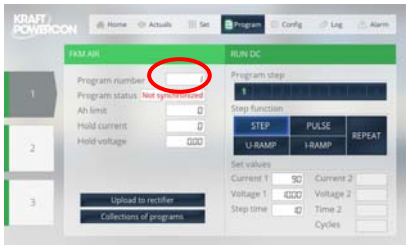
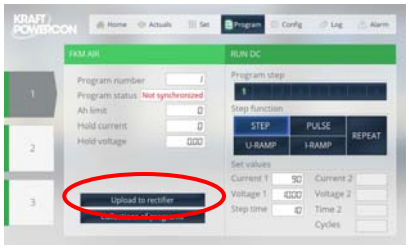
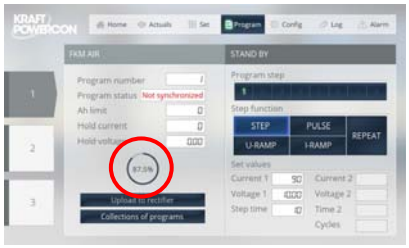
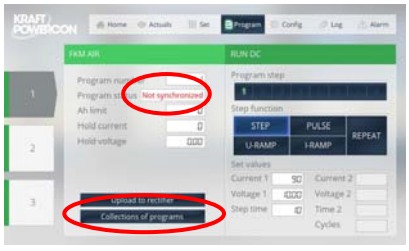
This action is commenced by touching Config on the navigation panel.

Config screen allows to configure the following parameters:

- Process name – Custom name for the process or the rectifier
- Connect to rectifier – Activates the communication between the ControlKraft Touch and the rectifier
- Modbus address – The rectifiers Modbus address
- Dual mode – Activates dual mode if rectifier configured as dual-2 mode
- Max Voltage – Rectifiers maximum voltage
- Max Current – Rectifiers maximum current
- Pole reverse – Shall be checked if rectifier is equipped with pole reverse option
- Logging enable – Whether the monitored data for the chosen rectifier shall be saved to a log file or not
- Recording interval – How often monitored data is logged and saved in the panel
- Voltage limits – The voltage range that can be entered from the keyboard. This limits the values that can be entered on the keyboard. See picture on the left.
- Current limits – The current range that can be entered from the keyboard. This limits the values that can be entered on the keyboard. See picture on the left.

	Note! Parameters: Modbus address, Dual mode, Max Voltage and Max Current can be found in CFG->USER menu on the rectifier.
	For loading and saving configurations press the button “Collection of configurations”.
	To save current configuration to the memory, write the configuration name and press the button “Save”.
	To load a configuration; select the desired configuration and press the button “Load”. To delete a saved configuration; select the configuration from the list and press “Delete”.
 	In the “Collection of configurations” screen, it is possible to export and import configurations to/from a connected usb drive. To activate this options; insert usb drive. The buttons “Import from USB” and “Export to USB” will change their colour. For export to USB press “Export to USB” button. The panel shows the message with exporting results. For import from USB press “Import from USB” button. The panel shows the message with importing results. Note. The panel exports the set of configurations to the file em1.emi For importing configurations from USB, the panel will look for the file em0.emi on the connected USB drive.

3.10 Programming

<table>
<tr><td>  </td><td>This action is commenced by touching Program on the navigation panel.</td></tr>
<tr><td>  </td><td>The program creation begins with choosing a Program number.</td></tr>
<tr><td> 
 
  </td><td>A program consisting of up to eight program steps can be entered. For each step, one of the following program functions can be entered:
• Step
• U-Ramp
• I-Ramp
• Pulse
• Repeat

For descriptions on the individual program functions, see User manual 77-107.0222.

To upload program to the rectifier memory, press the button “Upload to rectifier”. The panel shows the uploading progress.

The “Program status” option shows whether the selected program is identical to the program in the rectifier or not. If program is identical with the program in the rectifier, the “Program status” will show “Synchronized”.

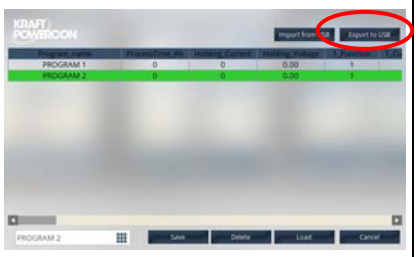
To run the program, press “Set” on the navigation panel to go to the Set screen, and then select program number and run the program, see 3.6 Run program for further reference.

To load and save the program to/from memory, press “Collections of programs” button.</td></tr>
<tr><td>  </td><td>The screen “Collections of program” shows saved programs in the internal flash memory.

To save the current program to the memory, write the program name and press the “Save” button.</td></tr>
</table>

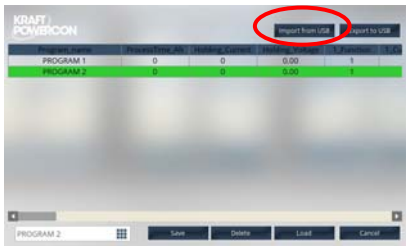
To load a program, select the program from the program list and press the “Load” button.

To delete a saved program, select the program from the list and press “Delete”.



In the screen “Collections of program” it is possible to import and export collection of the programs to/from the USB drive.

To activate these options, insert usb drive. The buttons “Import from USB” and “Export to USB” will change their colour.



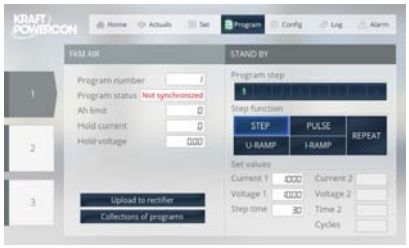
For export to USB press “Export to USB” button. The panel shows a message with exporting results.

For import from USB press “Import from USB” button. The panel show a message with importing results.

Note.
The panel exports the program collection to the file em3.emi

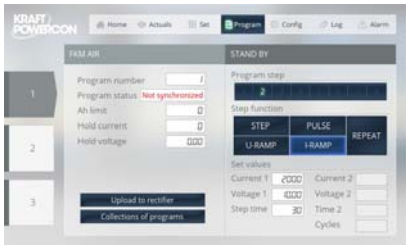
For import of the program collection, the panel will look for the file em2.emi on the connected USB drive.

3.10.1 Program Examples

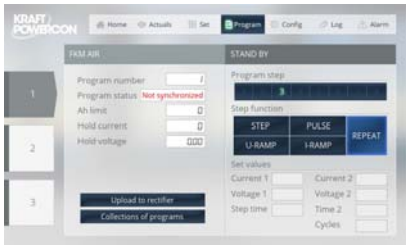


An example of a simple program is given here, with the steps described below;

Program step 1 – The function is “Step”.
- Voltage 1 is 10V
- Current 1 is 1000A
- Step Time is 30 seconds.



Program step 2 – The function is “I-Ramp”.
- Voltage 1 is 10V
- Current is ramped up to 2000A,
- Step time is 30 seconds.

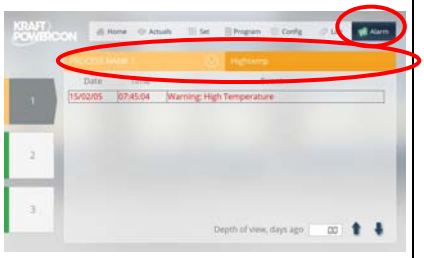


Program step 3 – The function is “Repeat”.
The program proceeds immediately to step 1.

For more detailed programming descriptions, see Technical Description 77-107.0223.

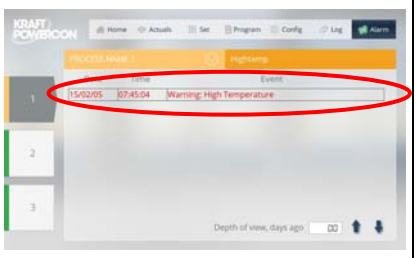
To upload the program see 3.10 Programming

3.11 Alarm log function

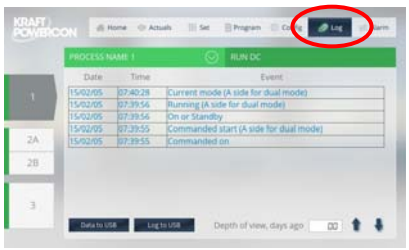


Alarm action is commenced from the navigation panel.
The rectifier Alarm log screen is viewed by pressing ”Alarm”.

If there is an alarm or warning, this can be seen by the blinking red or yellow event indicator showing as background on the process name.



On the Alarm log screen, the occurred alarm events can be viewed in chronological order.



Log action is commenced from the navigation panel.
The Log screen is viewed by pressing “Log”

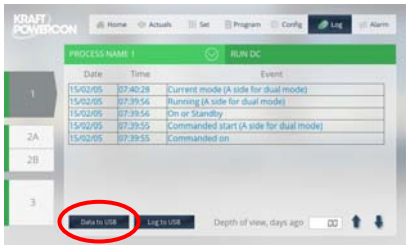
In this screen every status events is listed in chronological order.

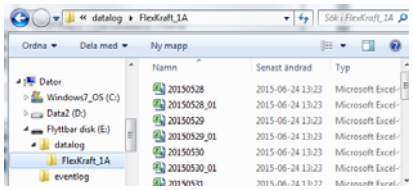
In the Log screen it is possible to export the event log by pressing the “Log to USB” button.

The program creates the directory “eventlog” in the root of the USB drive and save event logs to it.

All exported files are in a csv file format.

3.12 Data log





In the Log screen it is possible to export logged data by pressing the “Data to USB” button.

Exported data are:

- Status
- Control register
- Warnings
- Alarms
- Output Voltage
- Output Current
- Set Voltage
- Set Current
- Process Time
- Ah Counter

The programm creates the directory “datalog” in the root of the USB drive and subdirectory for each rectifier. The data logs saves to the corresponding subdirectory.

All exported files are in a csv file format.

The data log file contains a raw data from the rectifier. Values in the columns “Output Voltage” and “Set Voltage” must be divided by 100 to receive the right voltage values. Values in the columns “Output Current” and “Set Current” must be divided by 10 to receive the right current values, if the option “CURR. HIRES” is set to “ON” in the corresponded rectifier.

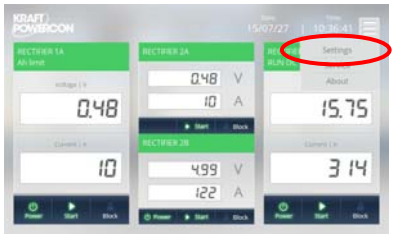
	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Date	Time	Millisecond	Status Register	Warnings Register	Alarms Register	Output Voltage	Output Current	Process Time	Ah Counter	Control Register	Set Voltage	Set Current
2	2015-06-03	16:54:46	540	2956	0	0	521	8	187527	8166	3	500	8
3	2015-06-03	16:54:47	520	2956	0	0	521	8	187527	8166	3	500	8
4	2015-06-03	16:54:48	590	2956	0	0	521	8	187529	8166	3	500	8
5	2015-06-03	16:54:49	620	2956	0	0	521	8	187530	8166	3	500	8
6	2015-06-03	16:54:50	510	2956	0	0	521	8	187531	8166	3	500	8
7	2015-06-03	16:54:51	570	2956	0	0	521	8	187532	8166	3	500	8
8	2015-06-03	16:54:52	640	2956	0	0	521	8	187533	8166	3	500	8
9	2015-06-03	16:54:53	640	2956	0	0	521	8	187534	8166	3	500	8

Figure 10. Data log with raw data

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Date	Time	Millisecond	Status Register	Warnings Register	Alarms Register	Output Voltage	Output Current	Process Time	Ah Counter	Control Register	Set Voltage	Set Current
2	2015-06-03	16:54:46	540	2956	0	0	5,21	8	187527	8166	3	5	8
3	2015-06-03	16:54:47	520	2956	0	0	5,21	8	187527	8166	3	5	8
4	2015-06-03	16:54:48	590	2956	0	0	5,21	8	187529	8166	3	5	8
5	2015-06-03	16:54:49	620	2956	0	0	5,21	8	187530	8166	3	5	8
6	2015-06-03	16:54:50	510	2956	0	0	5,21	8	187531	8166	3	5	8
7	2015-06-03	16:54:51	570	2956	0	0	5,21	8	187532	8166	3	5	8
8	2015-06-03	16:54:52	640	2956	0	0	5,21	8	187533	8166	3	5	8
9	2015-06-03	16:54:53	640	2956	0	0	5,21	8	187534	8166	3	5	8

Figure 11. Data log with corrected data

3.13 Settings

	The Settings screen is entered by touching the Settings in the dropdown menu.
	The Settings screen shows the following information; • Interface language • Time • Date • IP address • Network mask • Brightness The available touch button is the “Firmware update”. To change the setting, touch on the desired cell and enter a new value.

3.14 About

	This action is commenced by touching the Kraft Powercon logo on any of the different screens. On this screen there can be found contact information, License and available software update.

3.15 License Key

	If the panel does not have a license key, the About screen is displayed with a prompt to enter license key. Enter the License Key to unlock the functionality of the ControlKraft Touch. Note! The ControlKraft Touch comes with a preinstalled license key. If the license key is lost, contact KraftPowercon service.

4 Installation

4.1 Connection to Flex Kraft

The ControlKraft Touch Panel 7 inch can be supplied from FlexKraft internal power supply. This requires the FlexKraft to be equipped with the option “Interface PCB” (A12) for the 24 VDC supply voltage. All FlexKraft rectifiers that shall be controlled must be equipped with the option “Serial control via RS-485” (A4).

The FlexKraft rectifier must be set to Modbus and 38400 Bit/s.

The ControlKraft Touch Panel is connected to the control module in FlexKraft rectifiers.

Examples of cable types, see User guide 77-107.0222 Rev H or later.

NB Please not that cables must have a circular cross section so that the cable lead-through seals correctly.

To open the ControlKraft Touch box for 7, 10 and 12 inch, press the button on the bottom of the box, see figure 7.

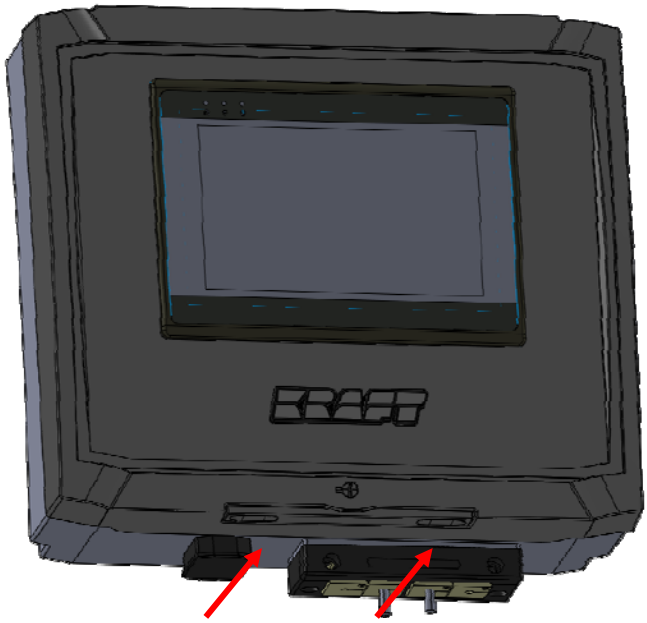


Figure 12. Open lock in 7, 10 and 12 inch panels

To open the ControlKraft Touch box 15 inch remove the screws indicated in figure 8 from the back cover.

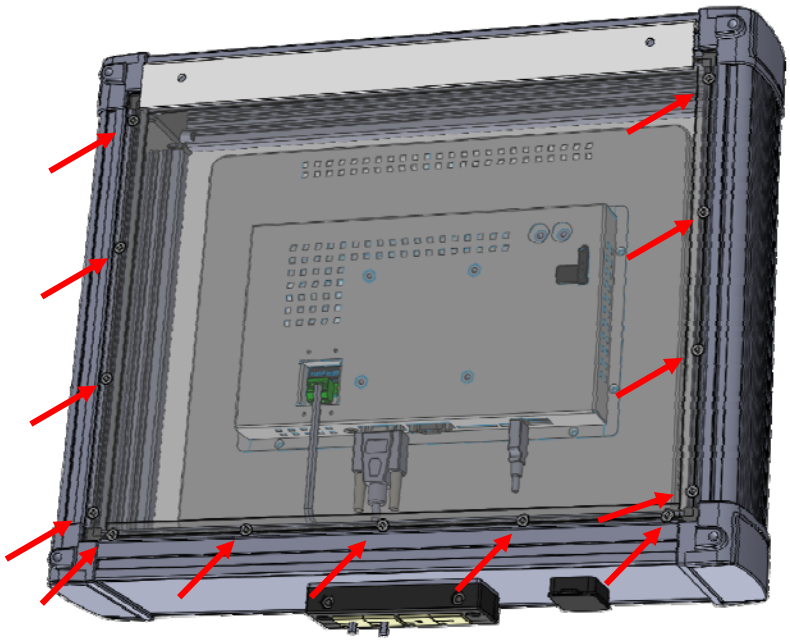


Figure 13. Open lock in 15 inch panel

Terminals X1 and X2 are situated inside the plastic box (metal box for 15 inch) and must be connected through feed-through.

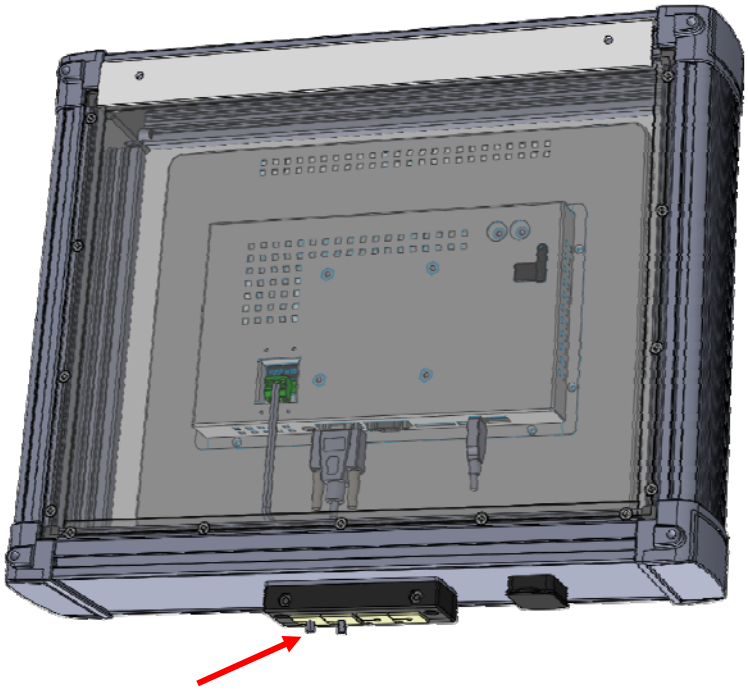


Figure 14. The cable feed-through

4.2 Connection of 24 VDC

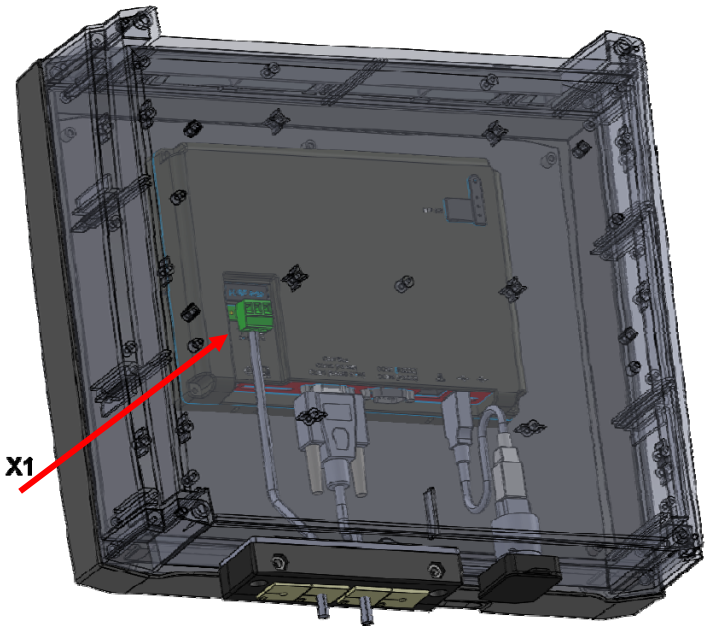


Figure 15. 24 VDC connection

The 24 VDC supply is connected from X1 to the first FlexKraft Master Control module A12:X2:1(24 VDC) and A12:X2:2(0 V). See in Technical Description 77-107.0223 GB Rev.H or later, chapter “Remote FlexKraft panel”.

The ControlKraft Touch can be connected to an external 24VDC power supply with minimum of 1A output current.

Conductor area for 24 VDC supply, minimum 0.75 mm^2 for ControlKraft Touch, at distances over 30m the conductor area must be increased.
The terminals accept conductor size 0.5-2.5 mm^2.
Contact service at KraftPowercon if there are any questions.

NB Please not that cables must have a circular cross section so that the cable lead-through seals correctly.

4.3 Connection of RS-485

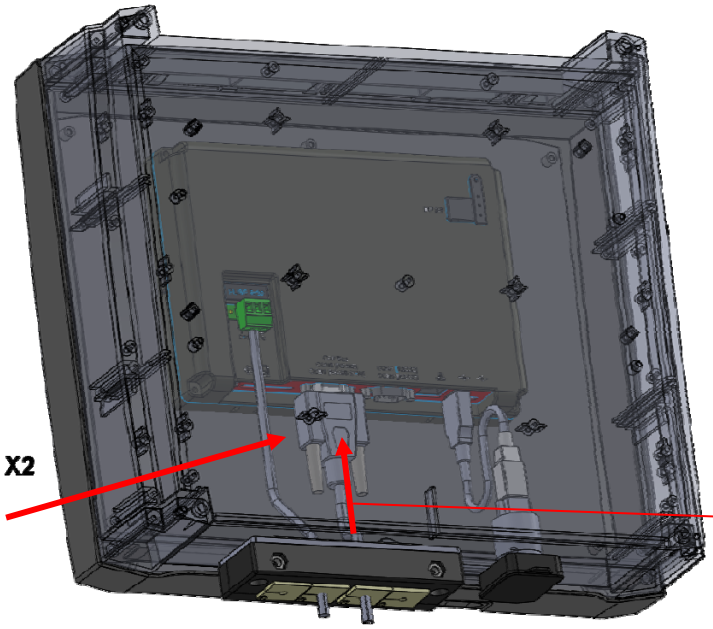


Figure 16. RS485 connection

The RS-485 serial communication is connected from X2 to FlexKraft Control module A4:X1:1 and A4:X1:2, RS-485 converter.

D-SUB Pin	D-SUB Symbol	A4:X1 Pin	Symbol in User manual 77-107.0222
1	DATA-	1	A
2	DATA+	2	B
5	GND	3	0

Table 2. RS485 connection between devices

For Modbus communication use pins 1 and 2 in 9 pin D-sub connector. Com 1 / Com 3 on the panel.

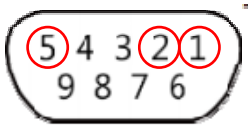


Figure 17. COM1/COM3 [RS485]/CAN Bus 9 Pin, Female, D-sub

The pinout on the D-sub connector is shown in Figure 17.

The termination resistance shall be mounted between pins 1 and 2 on the D-sub connector and the resistance shall be 220 Ohm.

Use shielded, twisted pair cable. See specification and examples in 77-107.0222 GB Rev.H or later, chapter “Control cables RS-485”.

The last rectifier in the chain must be terminated. See 77-107.0222 GB Rev.H or later, chapter “Control cables RS-485”.

4.4 Rectifier equipment

Rectifiers that are delivered together with ControlKaft Touch are equipped with option A4 RS-485 for communication and option A12 I/O for 24VDC supply..

Technical description FlexKraft 77-107.0223 GB Rev.H or later for more information.

4.5 Environmental Considerations

- Make sure that the displays are installed correctly and that the operating limits are followed. Avoid installing units in environments where severe mechanical vibration or shocks are present.
- Do not operate the unit in areas subject to explosion hazards due to flammable gases, vapors or dusts.
- Do not install the unit where acid gas, such as SO2 exists.
- This device should be mounted in the upright position and for use on a flat surface enclosure.
- Conform to UL508 (ISBN 0-7629-0404-6) machine safety for use in Pollution Degree 2 Environment.

4.6 Installation of ControlKraft as aftermarket option.

Rectifier equipment check:

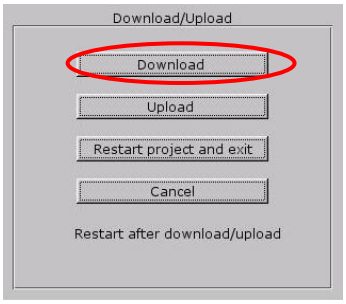
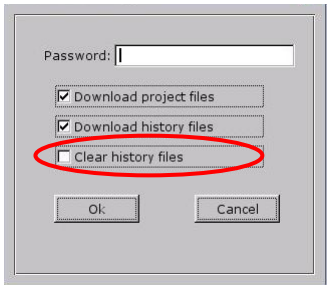
- Check that the rectifier is equipped with A4 RS-485 PCBA.
- In case of 24VDC feed from the rectifier, check that the A12 I/O PCBA is fitted and has the right version for the ControlKraft Touch size used.
- Contact KraftPowercon sevice departement if there is any questions or doubts.

This is normally checked when orderin a ControlKraft Touch from KraftPowercon as after sales part.

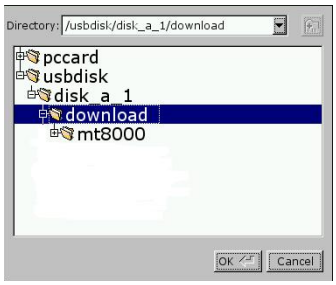
Installation as previous chapters.

5 Service

5.1 Update program

<table>
<tr>
<td> 
</td>
<td>This action is commenced by touching the “Update” button in the About screen.</td>
</tr>
<tr>
<td> 
</td>
<td>Insert USB-drive with the firmware.</td>
</tr>
<tr>
<td> 
</td>
<td>In the opened window press the button “Download”.</td>
</tr>
<tr>
<td> 
</td>
<td>Enter password that comes with the firmware update.

Note!
If “Clear history files” is checked, the ControlKraft Touch removes all settings, logs and License Key!!!

Contact with service to obtain your License Key.</td>
</tr>
<tr>
<td> 
</td>
<td>Select the folder with the firmware update and press the “OK” button. After update, the panel reboots itself.</td>
</tr>
</table>

5.2 Update USB connector

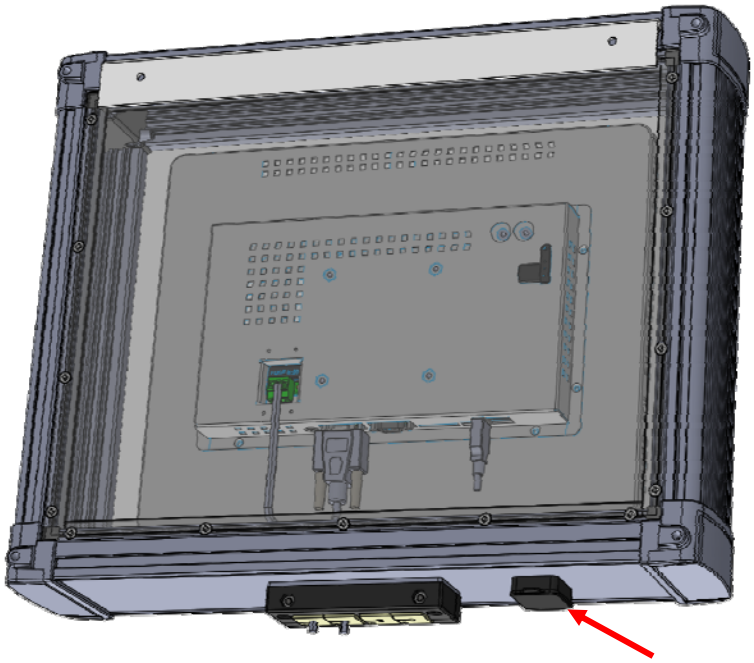


Figure 18. USB terminal for program upgrade

6 Warranty

KraftPowercon Sweden AB provides a warranty as stated in the order acknowledgement or contract. The warranty covers defects in design, materials and manufacturing. Defects that can be shown to have arisen as a consequence of incorrect use and/or maintenance are not covered. If a fault develops during the warranty period, KraftPowercon Sweden AB or local representative must be contacted before any work is undertaken on the ControlKraft Touch.

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7 Appendices

The appendices are on the pages that follow.

7.1 Circuit diagram ControKraft Touch