

Operating instructions

For types:

Type KSQ 1225	1*channel 25A/10V
Type KSQ 1250	1*channel 50A/10V
Type KSQ 3025	1*channel 25A/30V
Type KSQ 1224	4*channel 6.0A/7.5V (range switchable to 4.0A/12V)
Type KSQ 1216	4*channel 4.0A/7.5V (range switchable to 2.5A/12V)
Type KSQ 1210	4*channel 2.5A/7.5V (range switchable to 1.5A/12V)
Type KSQ 1204	4*channel 0.4A/7.5V



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Foreword

Congratulations on the purchase of your Kirchner constant current power supply.

Kirchner constant current sources are designed with a wealth of experience in electrochemical applications directly for the needs of electrodeposition.

Before **commissioning**, please read chapter 4 - from page 14.

You can **get started quickly** in chapter 4 - from page 4.

The most important information on ongoing operation and necessary maintenance can be found in chapter 12 Maintenance and inspection - from page 41.

If you have any questions, comments, criticism or praise, please contact us at.

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1. Quick guide

Select / Confirm:

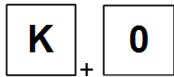


Press the K button for "Channel" to select a function:



Press the "Arrow" button to confirm a value or exit the currently selected function.

Functions / Menus



Main display of the current operating status:

Current, voltage and remaining coating time



Setting channel 1 to 4

Each channel individually provided with current and time.

...



BEEPER

The warning buzzer can be switched on or off by pressing the "Channel" button and then the "5" button.



AH counter

Ah currently flowing (the channels can be reset individually to 0 Ah by pressing buttons 1, 2, 3 or 4).



Protection potential

All KSQ power sources have an automatic protection potential. When the preset coating time has elapsed, 1/32 of the preset current flows automatically.

This function can be switched on/off using the "Channel" + "7" button.



PRE set function

KSQ1204 / KSQ1210 / KSQ1216

Save up to 4 pairs of values (current & time)



Settings

Setting all functions of the power source

1

Press and hold button 1 for 3 seconds:
Reload memory location 1 and start coating

2

Press and hold button 2 for 3 seconds:
Reload memory location 2 and start coating

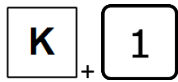
3

Press and hold button 3 for 3 seconds:
Reload memory location 4 and start coating

4

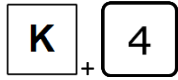
Press and hold button 4 for 3 seconds:
Reload memory location 4 and start coating

Channel selection



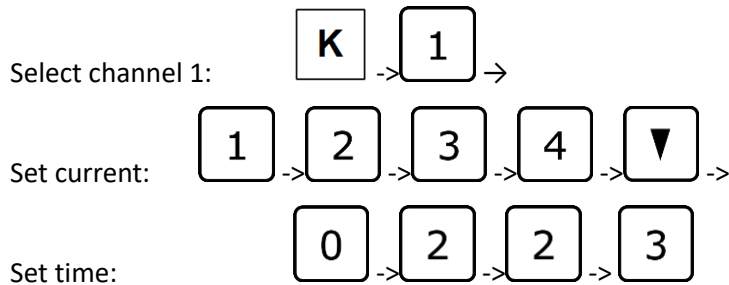
Select channel 1 or channel 2 or channel 3 or channel 3

.....

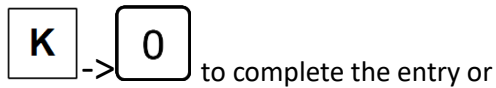


Example for specifying values on a channel:

Set current and time e.g. 1234 mA and 2 hours 23 minutes on channel 1:



To continue:



to complete the entry or



to continue entering values for the next channel.

If no button is pressed for 15 seconds, your KSQ returns to mode 0. All entered values are automatically accepted and the selected current is set at the terminals.

Input of current and time:

Press the "Channel" button and the desired channel number. The corresponding channel flashes and the current set in this channel can be changed.

Then press the arrow button. A time of up to 98 hours and 59 minutes can be entered, which then runs back to zero.

For manual operation, 99 hours and 99 minutes or more is entered. In this position, the time is not decremented automatically so that the appliance can be used for as long as required without the power being switched off.

You can then switch to the next channel using the arrow key or by entering "Channel" and the desired channel number again. Current and time entries alternate.

If a channel is not used, the value >0000< must be entered in the current range in order to suppress the flashing of the LCD display (see under error messages).

You can return to operating mode by pressing "Channel" and "0" or if no button is pressed for 15 seconds.

Each channel can carry a current of 1mA up to a maximum of current

- (KSQ 1204 .. 400 mA)
- (KSQ 1210 .. 2500 mA)
- (KSQ 1216 .. 4000 mA)
- (KSQ 1224 .. 6000 mA)
- (KSQ 1225 .. 25000 mA)
- (KSQ 1250 .. 50000 mA)
- (KSQ 3025 .. 25000 mA)
-

be programmed.

If more than the device-specific max. current is entered, the output is automatically set to the maximum permissible current.

If more than the maximum current of a single channel mA is to be drawn from the device, 2 or more channels can be connected in parallel. To do this, the corresponding + outputs and - outputs of the required channels must be connected with measuring cables or wires. This can be done directly at the terminals or at the bath.

2. Special functions

Start of KSQ / power failure:

Electricity
consumption was under
broken, if mis-
gular process check
Continue with button
K

Whenever your KSQ power supply is restarted or in the event of a power failure, the display will show a message about the power interruption.

This ensures that an unnoticed power failure is detected during the process.

The message is acknowledged by pressing the "K" button
All processes continue to run normally in the background.

In the event of a power failure, the data entered is retained in the ERAM.

The timer stops so that the appliance continues to work as if without interruption when the power returns. However, the bath is not supplied with power during the power failure.

Display in multi-channel device coating mode:

Ψ	K1	2500mA	99h99min
P	K2	2500mA	99h99min
I	K3	2500mA	99h99min
	K4	2500mA	99h99min

In the first display column, the functions

Ψ = Warning tone on

(in the event of a line break or after the timer has expired)

P = Protection potential (on/off)

(1/32 of the coating current after the timer has expired)

I or E = internal or external control section

(Control of the KSQ via the analog interfaces on the rear)
displayed.

Ψ	K1	Voltage limit
P	K2	2500mA !--X--!
I	K3	channel off
	K4	Timer expired

The second display area shows the current status of the coating.

The channel number and the currently set current are always displayed.

The coating time still running and the voltage applied to the terminals are detected in 5-second intervals.

Display - Voltage limit

If the required current cannot be output at the respective channel with the specified maximum voltage or the maximum permissible voltage of the KSQ unit

Line break display

If the KSQ detects a line break on a channel, a line break message is shown on the display instead of the current voltage:

!---x--! and the display backlighting starts to flash.

To prevent the display from flashing when a channel is not in use, the channel must be set to 0000mA. The display then shows

Channel off.

When the coating timer for a coating has expired, the display also starts to flash.

Timer expired.

Display in coating mode single-channel device:

Ψ	Current 17589 mA
P	Time 99h99min
I	Voltage 2.2 V
	!--X--!

In the first display column, the functions

Ψ = Warning tone on

(in the event of a line break or after the timer has expired)

P = Protection potential (on/off)

(1/32 of the coating current after the timer has expired)

I or E = internal or external control section

(Control of the KSQ via the analog interfaces on the rear) displayed.

The second display area shows the current status of the coating.

The channel number and the currently set current are always displayed.

The coating time still running and the voltage applied to the terminals are detected in 5-second intervals.

Display - Voltage limit

If the required current cannot be output at the respective channel with the specified maximum voltage or the maximum permissible voltage of the KSQ unit

Line break display

If the KSQ detects a line break on a channel, a line break message is shown on the display instead of the current voltage:

!---x--! and the display backlighting starts to flash.

To prevent the display from flashing when a channel is not in use, the channel must be set to 0000mA. The display then shows

Channel off.

When the coating timer for a coating has expired, the display also starts to flash.

Timer expired.

LED display flashes in quick succession and warning tone sounds:

*	K1	2500mA	!--X--!
P	K1	Timer expired	
I	K1	2500mA	99h99min
	K1	2500mA	99h99min

The warning indicator or the display flashes to signal the following statuses:

Line break **!--x--!** or
 Timer expired

The alarm beeps for 5 seconds every minute and can be switched off with the key combination **K+5**.

Continuous operation - switch off the timer:

The timer function is stopped by entering 99h99min. The device continuously supplies the set current. The timer can be stopped separately for each channel.

protection potential:

The protective potential can be switched on or off with the key combination K+7. (KSQ1225 with K+8) A P is then shown on the display. The protective potential is always 1/32 of the set coating current and prevents components from discoloring or passivating after the end of coating.

Limiting the maximum voltage

In the settings menu of channel 4, the maximum voltage emitted by your KSQ can be limited within a range of 2.5V to 7.5V (KSQ1204 up to max. 12V) / (KSQ1225 up to max. 10V).

This prevents contact points from burning at the start of the coating process on very small components or delicate fixtures. This function always affects all channels simultaneously.

Ampere-hour measurement:

Entering "K+6" displays the ampere hours that have flowed per channel.

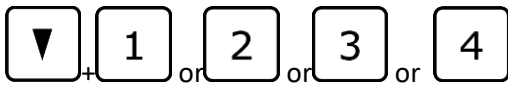
To delete the displayed values at the start of a new period

button 1 for channel 1, 2 for channel 2 and so on.

Pre-set function:

The PRE-Set menu can be called up with the K+8 button. Here it is possible to save a single frequently used time/current value for each individual channel.

Save the values with arrow key + "Number" of the channel. The current set current/time value pair is saved.



Calling up the stored current/time value pair

The stored value pairs can be called up again by pressing buttons 1 to 4 in normal operating mode.



3. Settings menu 9

You can change the **settings** by pressing the key combination **K+9**

Different functions of the galvanic rectifier are set by pressing buttons 1 to 4 (dipstick button **V** for menus 5 & 6).

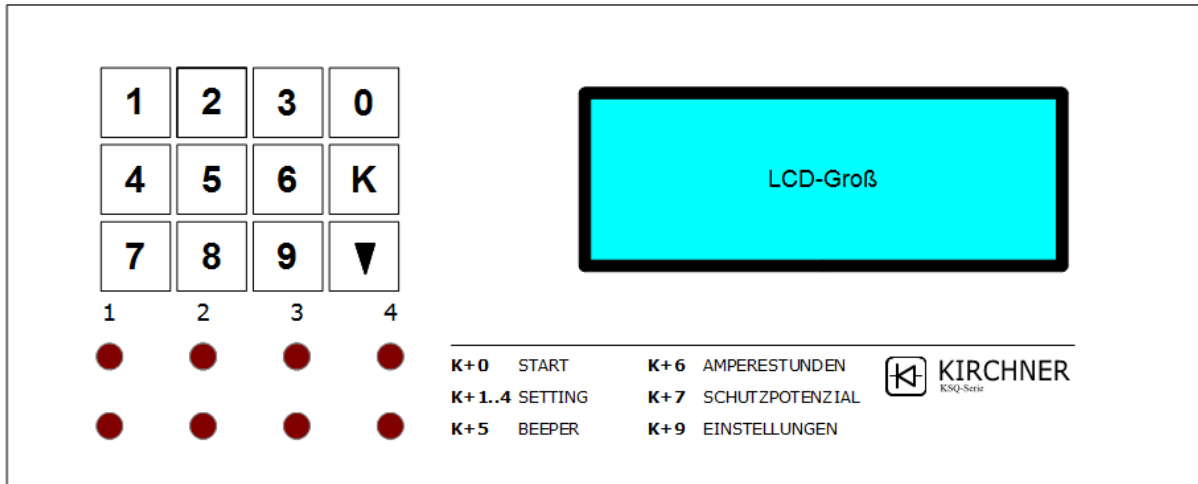
* 1 Control intern P 2 Baud rate=19200 I 3 Language German V 4 Limit4A/7.5V	Button 1: Choice between internal control and external control of the KSQ unit via the analog inputs
* 1 Control intern P 2 Baud rate=19200 I Language German V 4 Limit4A/7.5V	Button 2 Selection of the communication speed via the internal RS232 INTERFACE - from version 2_18.bin fixed 19200 baud
* 1 Control intern P 2 Baud rate=19200 I Language German V 4 Limit4A/7.5V	Button 3 Setting the menu language between German and English
* 1 Control intern P 2 Baud rate=19200 I Language German V 4 Limit4A/7.5V	Button 4 Voltage boost function. Here it is possible to change the working area of the unit. KSQ1210 between 2.5A / 7.5V and 1.5A 7 12V KSQ1216 between 4A / 7.5V and 2.5A 7 12V This function is particularly relevant when higher output voltages are required.

Switch between the 1st and 2nd page of the settings menu with the arrow button **V**

2nd page Settings with buttons 5 to 8

* 5 Contrast (++) P 6 Time is hh:mm I 7 Set mA >->->->->" V 8 Ext. norm. Rng	Button 5 Display contrast function. The contrast of the display can be adjusted in 5 stages by repeatedly pressing button 5.
* 5 Contrast (++) P 6 Time is hh:mm I 7 Set mA >->->->->" V 8 Ext. norm. Rng	Button 6 Hours/minutes/999 hours function. The galvanic rectifiers have 3 time modes. hours:minutes:seconds or in a minutes:seconds mode. <ul style="list-style-type: none"> - hh:mm:ss - Mode max: 98h59min59s - mmm:ss -- Mode max: 998min59s - hhh:mm -- Mode max: 998h59min
* 5 Contrast (++) P 6 Time is hh:mm I 7 Set mA >->->->->" V 8 Ext. norm. Rng	Button 7 Input direction function Only available from software version 3.1x 7/2024
* 5 Contrast (++) P 6 Time is hh:mm I 7 Set mA >->->->->" V 8 Ext. norm. Rng	Button 8 External control Range The external range adjustment helps to output small currents precisely. With analog control: See chapter:5 "8 Ext. norm. Rng" - 0-10V Analog Input = 0mA - max. current "8 Ext. 1/2 Range" - 0-10V Analog Input = 0mA - 0.5*max. current Output current

Front panel



Connection sockets

black sockets:

Connection (current regulated).

red sockets:

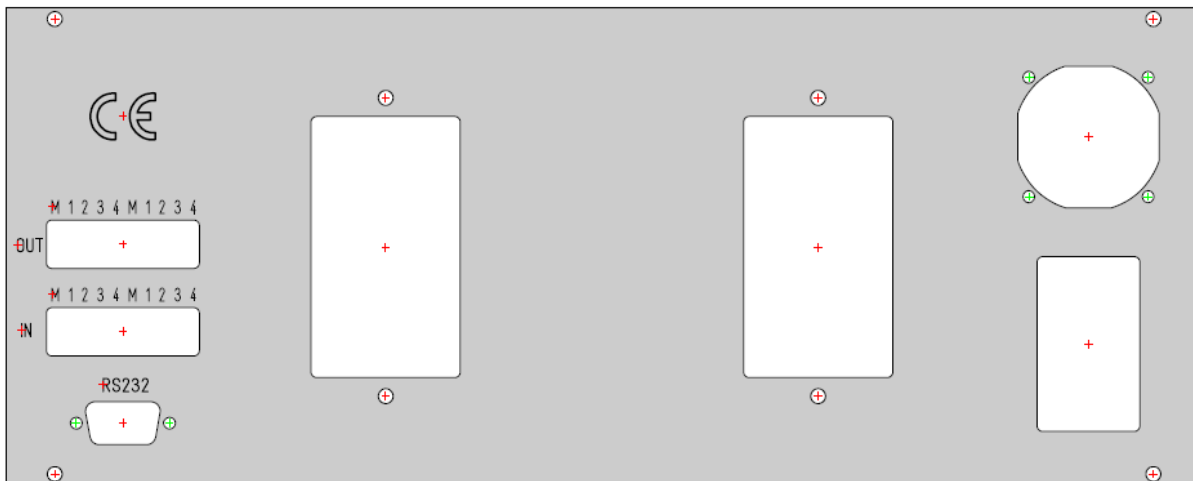
Common connection contacted internally.

Observe the current carrying capacity of individual cables!

Display:

4*20character backlit LCD display

4. Safety part / back plate



Safeguards:

The fuse (2 A) in the mains switch on the rear panel protects the control section and the power section of your KSQ power source

The appliance itself is permanently short-circuit proof. Short circuits on the cables to the baths are signaled by flashing of the voltage range and cannot trigger the device fuses.

Caution: In the event of a short circuit in the power channels, the heat sink on the rear of the device may heat up to approx. 70 °C. This does not constitute a malfunction. This does not constitute a malfunction. However, to ensure trouble-free operation, it must be ensured that the heat sink of the constant current source is not covered. The constant current sources are designed as desktop devices and must not be installed in a housing or cabinet.

5. Analog inputs and outputs up to revision 11

All KSQ power sources can be controlled by an external analog input or output signal. All interfaces are galvanically isolated from the power section.

To do this, the external control mode must first be selected using the "Channel" + "9" button.

All input signals are read in a value range of 0-10V at the respective terminals.

Connector strip IN: In the first block, the maximum permissible output voltage of the KSQ is specified by 1 and M. An analog signal of less than 2.5 V is interpreted as an error and the KSQ automatically operates in its full voltage range of 2.5 V to a maximum of 7.5 V, whereby the analog input signal is converted linearly internally within the permissible input range of 2 V to 7.5 V to the respective operating range of the KSQ source.

Inputs 2, 3 and 4 are unassigned.

The required coating current is set on the second block on the **IN** connector strip. The input signal of 0-10 V is transferred linearly to the respective current range of your KSQ.

There are two possible modes, see chapter 3 for the settings

Normal range current output	1/2 Range current output
KSQ 1204: 0-10V = 0-400mA	KSQ 1204: 0-10V = 0-200mA
KSQ 1210: 0-10V = 0-2500mA	KSQ 1210: 0-10V = 0-1250mA
KSQ 1216: 0-10V = 0-4000mA	KSQ 1216: 0-10V = 0-2000mA
KSQ 1224: 0-10V = 0-6000mA	KSQ 1224: 0-10V = 0-3000mA
KSQ1225. 0-10V = 0-25000mA	KSQ1225. 0-10V = 0-12500mA
KSQ1250. 0-10V = 0-50000mA	KSQ1250. 0-10V = 0-25000mA

Please note that the special function Protection potential is not active in external operating mode.

IN	M	1	2	3	4	M	1	2	3	4
Function	Mass	Set max. voltage	Without function	Without function	Without function	Mass	Setpoint current channel 1	Setpoint current channel 2	Setpoint current channel 3	Setpoint current channel 4

Power strip OUT:

The current operating status of your KSQ is displayed on the OUT connector strip.

1. 1st block (1-4) indicates the applied terminal voltage of each individual channel in the range 0V to maximum voltage. If a line break is detected or the power source cannot supply the full current, a 10V signal is present at the terminal.
2. 2nd block (1-4) indicates the current 0 mA to maximum current. The output is a 0-10 V signal which is linearly converted to the respective operating range of your KSQ source. The OUT connector block is always active even if the KSQ is operated in internal mode. - **Attention** "External range adjustment": In menu 9, the range of the current source can be halved to output small currents precisely. See chapter 3.

OUT	M	1	2	3	4	M	1	2	3	4
Function	Mass	Terminal voltage channel 1	Terminal voltage channel 2	Terminal voltage channel 3	Terminal voltage channel 4	Mass	Current channel 1	Current channel 2	Current channel 3	Current channel 4

6. From revision 12 and higher:

All analog input signals are omitted. Extensive data exchange information is transmitted via the digital RS232 interface

Power strip OUT:

0	1	2	3	4	5	6	7	8	9
Digital OUT 1	Digital OUT 2	SPI CLOCK	SPI SDO	SPI SDI	XX	Relay 1	Relay Mass	XX	XX

A line break is signaled at relay 1 / ground

7. KSQ12xx operation via RS232 interface

All KSQ12xx devices have an electrically isolated RS232 interface. Communication takes place with:

- Baud rate: 19200 baud
- Data bits: 8
- Stop bits: 1
- Parity: None

These settings are fixed and cannot be changed.

7.1 Send data to KSQ12xx devices with RS232

Structure of RS232 command: Attention Upper and lower case must be observed!

Unit have to set on **Control intern** see Capter 3.

!+1I0000000000x	Each RS232 command is exactly 15 characters long. Additional characters are ignored.
! +1I 0000000000x	Command Start character !+ and command End character x
! 1 I0000000000x	Character to select channel 4-channel devices (1..4) 1-channel devices (1)
! +1T 000010 1140 x ! +1I 000000 1234 x ! +1V 00000000 35 x	T = Command from time setting - here 10h11min40s I = Command for power supply - here 1234mA V = command for voltage limit - here 3.5V

Confirmation of the received command by the devices

S !+1I0000001234E	Each command sent is confirmed by the devices by sending the command back and a
--------------------------	---

Here are some examples of the control commands:

Set Time	
! +1T 0000 1230 x	Set channel 1 to 12min30s
! +3I 00000 10220 x	Set channel 3 to 1h02min20s
! +2T 0000 999999 x	Set channel 2 to continuous current - timer is switched off.
	If a value is transmitted that is higher than the permissible maximum current per channel, the value is automatically reduced to the maximum current of the respective device.

	KSQ1204 = 400mA KSQ1210 = 2500mA KSQ1216 = 4000mA KSQ1224 = 6000mA KSQ1225 = 25000mA (1-channel device) KSQ1250 = 50000A (1-channel device)
Set current	
!! +Attention Time hast o bee set > 00h:00m:00s. Otherwise the channel turns off. !! !+ 1I 000000 2500 x !+ 3I 0000000 320 x !+ 1I 00000 25000 x	Set channel 1 to 2500mA Set channel 3 to 320mA Set channel 1 to 25000mA (KSQ1225) If a value is transmitted that is higher than the permissible maximum current per channel, the value is automatically reduced to the maximum current of the respective device. KSQ1204 = 400mA KSQ1210 = 2500mA KSQ1216 = 4000mA KSQ1224 = 6000mA KSQ1225 = 25000mA (1-channel device) KSQ1250 = 50000A (1-channel device)
Set maximum voltage	
!+ xV 00000000 63 x	Set device to maximum 6.3 V terminal voltage Set the maximum voltage of the entire device. This can only be set for all channels together. The default value is 7.5V with a minimum of 2.5V. The value can be set in 0.1 V increments. If a value is transmitted that is higher than the permissible maximum current per channel, the value is automatically reduced to the maximum current of the respective device. KSQ1204 = 2.5V - 10.0V KSQ1210 = 2.5V - 7.5V

	KSQ1216 = 2.5V - 7.5V KSQ1224 = 2.5V - 7.5V KSQ1225 = 2.5V - 10V KSQ1250 = 2.5V - 10V
--	--

7.2 Read data from KSQ12xx devices with RS232

Two commands are available for reading out the operating parameters of the KSQ12xx_devices.

!+x?0000000000x	Reading the main operating parameters of a KSQ12xx device.
??????????????	Reading the complete operating parameters of a KSQ12xx device.

In normal operation, use the command "!+x?0000000000x" to read the operating parameters. The command "??????????????" is reserved for service cases.

The operating parameters are sent as a string array. The start character is # and the end character is \$.

The string array is separated by & as a separator.

A data string is structured here as an example.

Element no. in array	Value example	Description
1	#	(0) Start character
2	&1210	(1) Type number device
3-6	&200&400&600&800	(2,3,4,5) ACTUAL current on channels 1-4
7-10	&99:99:99 &10:48:22 &00:10:23 &01:07:17	(7,8,9) Remaining time on channels 1-4 in Hour:Min:Seconds
11		(11) unoccupied
12-15	&0.7 &1.8 &0.0 &0.0 &	(12 - 15) Voltage measured channels 1-4 99.9 = Line break
16	&7500	(16) Voltage limit set to 5.0V
17-20	&3.969&2.942&2.424&3.217	(17-20) AH hours counter channel 1-4
21	&0	(21) Status beeper (0/1 = off/on)
22	&0	(22) Protection potential status (0/1 = off/on)
23	&2	(23) Operation status (0-internal /2 software)
24	&33.7	

25	&2763	(24) Temperature rectifier inside (25) Internal switching power supply voltage
26	&1 &255 &1 &440	(26) Status_Start (0/1) (27) Powerboost (28) Galvanic rectifier language (29) Serial number device

30-33	&0&0&0&0	(30-33) Status channels (0/1/2/3) 0 = Normal operation 1 = Cable break 2 = Current set to 0000mA 3 = Timer expired
34	&KSQ_V_2_20.BAS	(54) Firmware software version
35	#	Stop sign

8. KSQproduction software

All KSQ devices can be controlled and monitored via a PC using the optional KSQproduction software. This requires a firmware version from 1_24.bin or higher on the KSQ devices. If your devices do not correspond to this software version, an update of the devices is necessary, see chapter 9. Update of the KSQ.

The KSQproduction software is available at:

<http://kirchner-galvanik.de/produkte.html>- KSQproduction Software for galvanic rectifiers

The software works without a valid license key for 5 minutes, then the connection to the KSQ-Unit is interrupted. To purchase a license, please contact us at:

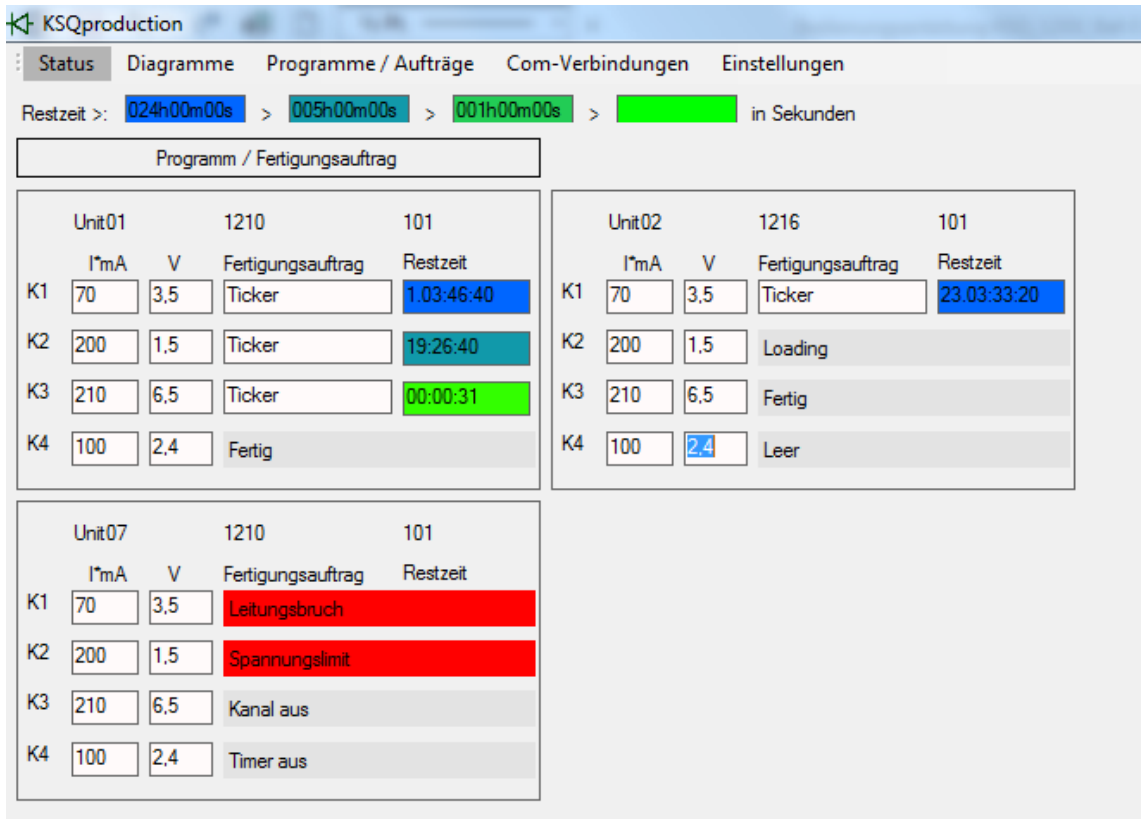
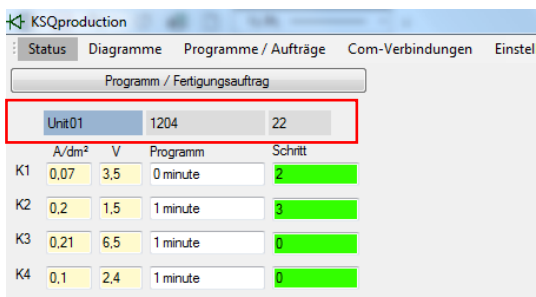
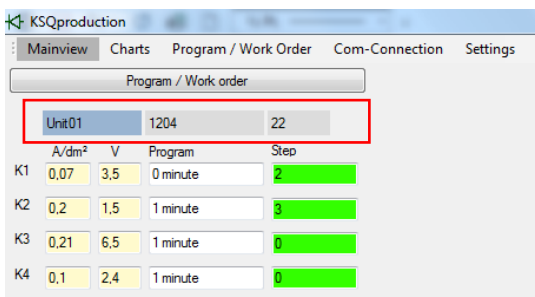
info@kirchner-galvanik.de

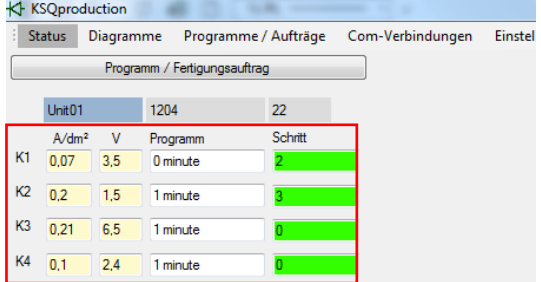
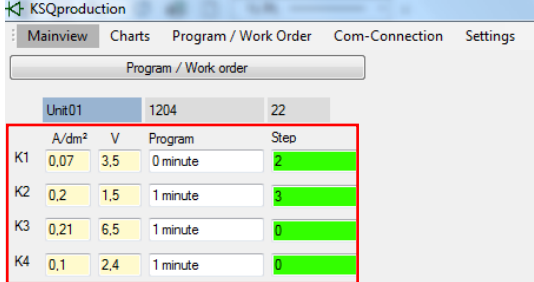
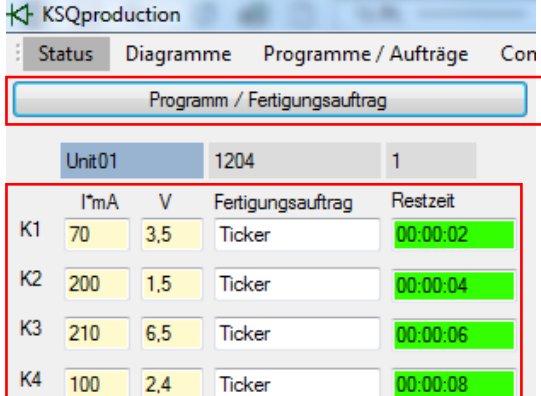
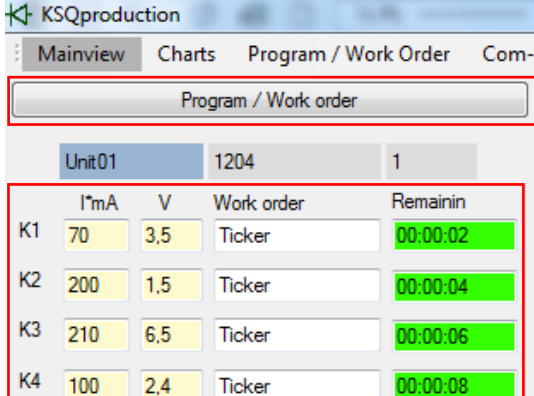
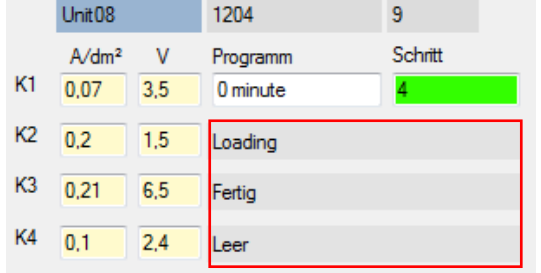
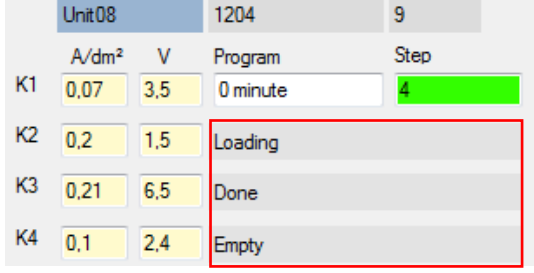
The KSQproduction software enables the following functions with the KSQ galvanic rectifier:

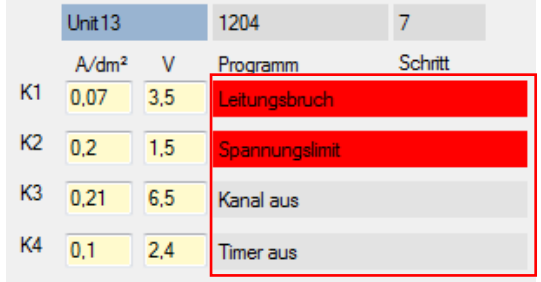
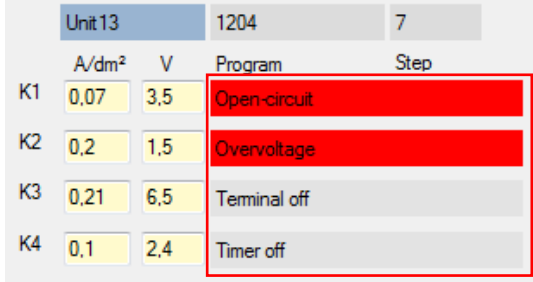
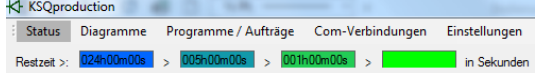
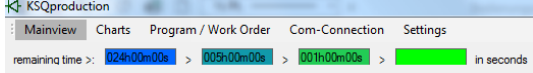
- Control of up to 24 KSQ galvanic rectifiers via a PC
- Handover and processing of production orders
- Circuit diagrams up to 12 individual steps + ramps
- Coating time up to 1000h per single step
- Data recording (current/voltage/production order/current program)
- Creating and saving circuit diagram programs
- Presentation of production data in diagrams
- Tracking and documentation of production parameters down to production order level.

Please refer to the separate operating instructions for additional KSQproduction software functions. [KSQproduction software](#).

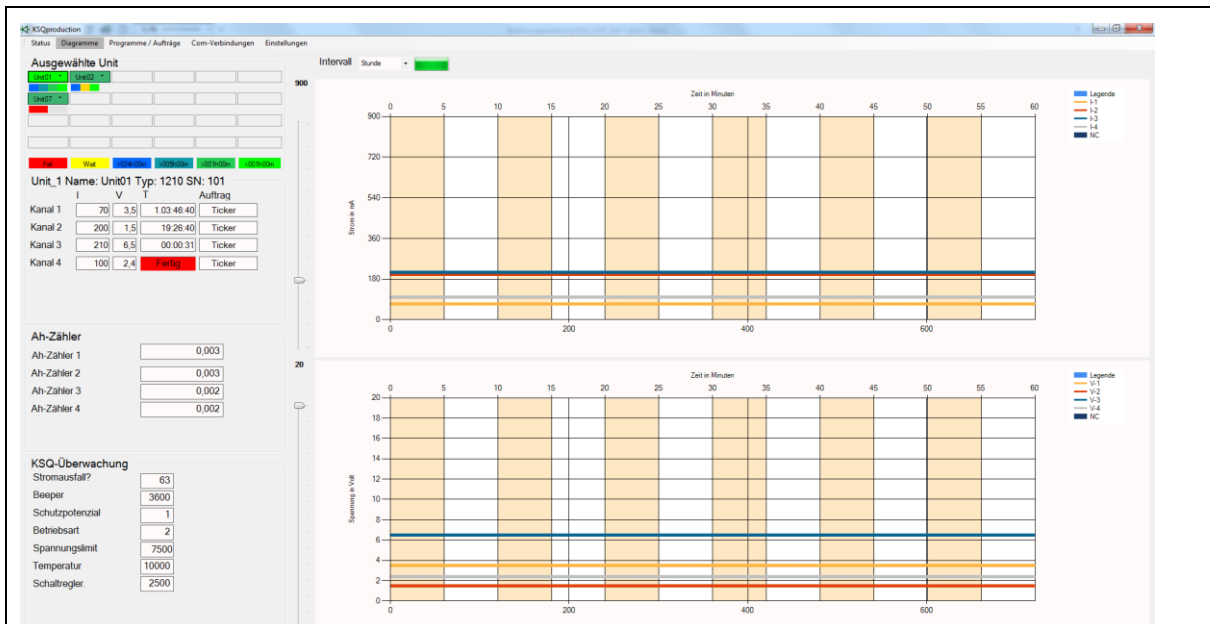
8.1 Status overview / Mainview

 <p>The screenshot shows the 'Status' tab of the KSQproduction software. It displays a table of three units: Unit01, Unit02, and Unit07. Each unit has four channels (K1-K4) with parameters like current (I'mA), voltage (V), and a status (Fertigungsauftrag). Unit01 and Unit02 show rest times (Restzeit). Unit07 shows error messages like 'Leitungsbruch' and 'Spannungslimit'.</p>	<p>Status overview</p> <p>The status overview shows the most important operating states of all connected KSQ galvanic rectifiers.</p> <p>Up to 24 galvanic rectifiers can be monitored and controlled with a single PC via USB-RS232 connection cable.</p> <p>The operating status of the KSQ rectifiers is shown in a table view.</p>
<p>Mainview</p> <p>In the mainview window it is possible to monitor all main functions of any connected KSQ-plating rectifier.</p> <p>Up to 24 KSQ rectifiers can be monitored from one PC with KSQproduction Software.</p> <p>All Connected KSQ-rectifiers are shown in a table layout.</p>	<p>Mainview</p> <p>In the mainview window it is possible to monitor all main functions of any connected KSQ-plating rectifier.</p> <p>Up to 24 KSQ rectifiers can be monitored from one PC with KSQproduction Software.</p> <p>All Connected KSQ-rectifiers are shown in a table layout.</p>
 <p>The screenshot shows the 'Mainview' tab of the KSQproduction software. It displays a table of three units: Unit01, Unit02, and Unit07. Each unit has four channels (K1-K4) with parameters like current density (A/dm²), voltage (V), program (Programm), and step (Schritt). The header of the table is highlighted with a red box.</p>	 <p>The screenshot shows the 'Mainview' tab of the KSQproduction software. It displays a table of three units: Unit01, Unit02, and Unit07. Each unit has four channels (K1-K4) with parameters like current density (A/dm²), voltage (V), program (Programm), and step (Step). The header of the table is highlighted with a red box.</p>
<p>The main details of the connected KSQ units are displayed in the header:</p> <ul style="list-style-type: none"> • Individual designation of the unit • Series • Serial number 	<p>Here are the main information about the connected KSQ-rectifier are shown.</p> <ul style="list-style-type: none"> • Individual rectifier name • type series • serial number

	
<p>The current values for each individual channel are displayed for each connected KSQ unit:</p> <ul style="list-style-type: none"> • Current density • Current voltage • Electricity program • Production step 	<p>For every connected KSQ-rectifier the actual data for each channel is shown:</p> <ul style="list-style-type: none"> • Current density • Voltage • Plating program name • Production step
	
<p>The display is changed using the <i>Program / Production order</i> button. The following is then displayed:</p> <ul style="list-style-type: none"> • Current in mA • Current tension • Designation of current production order • Total remaining time 	<p>To toggle main-view data press button <i>program / work order</i>: The second screen shows</p> <ul style="list-style-type: none"> • Current in mA • Voltage • Work order name • Remaining time •
	
<p>Channel statuses are also displayed:</p> <ul style="list-style-type: none"> • Order is handed over to KSQ unit • Production order is completed • No production order loaded 	<p>Additional information are shown if needed</p> <ul style="list-style-type: none"> • Work order loading to rectifier • Work order done • No work order loaded

	
<p>The following statuses are also displayed:</p> <ul style="list-style-type: none"> • Cable break • Voltage limit reached • Channel off or 0 mA • Timer has expired • 	<p>If there is a critical problem it is also shown:</p> <ul style="list-style-type: none"> • Open-circuit • Overvoltage (voltage is too high) • Terminal is turned off • Time is over
 <p>The remaining running time of the programs can be indicated by colors in three levels. The time levels are always set on the basis of: Hours, minutes, seconds.</p> <p>Please note that the format of the warning time must be XXXhXXmXXs.</p> <p>The times can be set freely between 999h59m59s and 000h00m01s.</p> <p>This specification causes the color to change from dark blue to light green depending on the remaining time.</p>	 <p>In the time color setting it is possible to change the color shown in depend to the remaining plating time. You have to enter the time in the format: XXXhXXmXXs. It is possible to set the time for the colors between from 000h00m01s to 999h59m59s.</p> <p>This is only a visual marking for simple monitoring a lot of units. There is no effect on the plating program itself.</p>

8.2 Diagrams / Charts

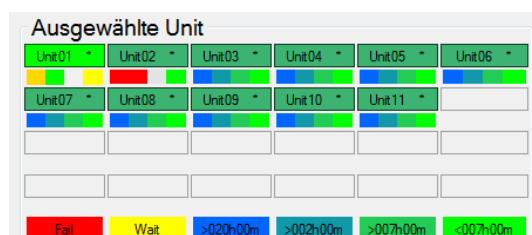


The diagram view shows all the main functional parameters of a single connected KSQ12XX unit. These are

- Current, voltage, time current
- Diagram of current and voltage up to one year in the past
- AH totaled on the device displayed in each case
- Current operating status of the displayed KSQ unit.

The "Charts" overview shows all main function parameters for each KSQ12XX-unit. The main functions are:

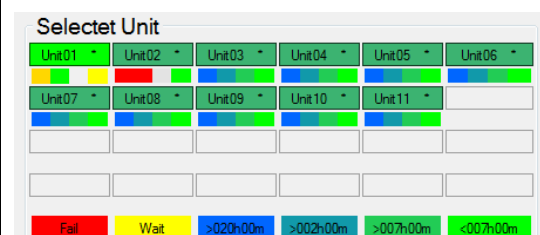
- Current, Voltage, Time remaining
- Charts Current and voltage back in time for one year
- Ampere hours done for each unit
- Actual operating conditions of selected KSQ unit.



The current status of all channels of the connected KSQ units is shown in color in the overview display.

In general: The colors **GREEN**, **turquoise** and **BLUE** stand for regular operation and show that all units are working with normal operating parameters. The colors indicate how long it will take to complete the current program.

The color **RED** indicates a problem. This requires intervention by the operator.



The overview display shows the current status for all channels of connected KSQ units by colors.

In general, the color **GREEN**, **Turquoise** and **BLUE** are for regular operation and show that all units work with normal operating parameters. The colors show how long it takes to complete the current plating program.

The color **YELLOW** indicates a channel on which a production program is currently being loaded or that a program has not yet been started.

The color **RED** indicates a problem, here any manual intervention is required by the user.

The color **YELLOW** indicates a channel to which a production program is currently being loaded, or a program has not started yet.

Unit_1 Name: Unit01 Typ: 1210 SN: 2

	I	V	T	Auftrag
Kanal 1	200	0,5	1.06:53:45	Ticker
Kanal 2	200	0,5	00:18:35	Ticker
Kanal 3	200	0,5	03:10:55	Ticker
Kanal 4	200	0,4	00:19:05	Ticker

Unit_1 Name: Unit01 Typ: 1210 SN: 2

	I	V	T	Work-Or
Terminal 1	200	0,5	1.06:53:45	Ticker
Terminal 2	200	0,5	00:18:35	Ticker
Terminal 3	200	0,5	03:10:55	Ticker
Terminal 4	200	0,4	00:19:05	Ticker

The parameter overview field shows the current current, the voltage, the remaining runtime of the job and the job name.

The panel "parameter overview" shows the actual current, the actual voltage, remaining time of the work order, and the work order name.

Ah-Zähler

Ah-Zähler 1	1,003	AH-Sum	8,21
Ah-Zähler 2	6,203		
Ah-Zähler 3	0,002		
Ah-Zähler 4	1,002		

Ah-Counter

Ah-Counter 1	1,003	AH-Sum	8,61
Ah-Counter 2	6,203		
Ah-Counter 3	0,002		
Ah-Counter 4	1,402		

The AH display shows the AH given on the unit from for each individual channel and as a total.

This is used for quality assurance in order to be able to dose AH-controlled media such as wetting agents or leveling agents. The AH counters can be reset separately for each individual channel.

In the AH counter overview, the AH done are shown for the unit is currently selected. The sum is displayed for each individual channel and as a sum.

The AH-counter can be used for quality assurance in order to be able to dose AH-controlled media such as wetting agents or levelers. The AH counters can be reset separately for each channel.

KSQ-Überwachung

Stromausfall?	2
Beeper	0
Schutzpotenzial	0
Betriebsart	2
Spannungslimit	7500
Temperatur	862
Schaltregler.	2500

KSQ-Überwachung

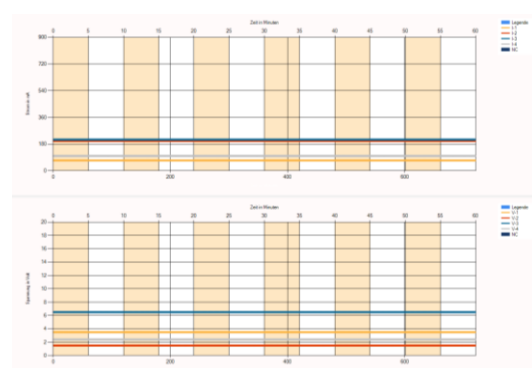
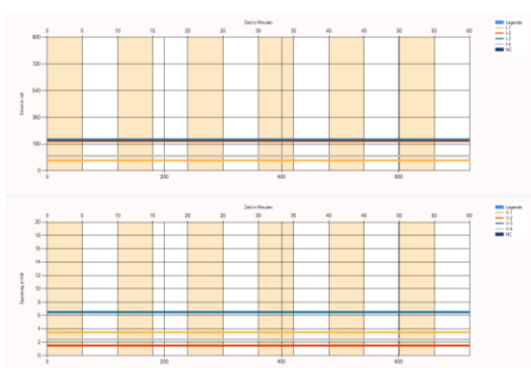
Stromausfall?	2
Beeper	0
Schutzpotenzial	0
Betriebsart	2
Spannungslimit	7500
Temperatur	862
Schaltregler.	2500

The operating parameters of the individual KSQ units are displayed in the KSQ source operating status

The operating states panel displays the operating states of the selected KSQ source.

display. This is used to check the rectifiers if remote maintenance of the rectifiers is required.

This is used to control the rectifiers of remote maintenance of the rectifiers is required.



The current / voltage diagrams show the coating current and the resulting voltage of all channels. The display period can be shown in intervals of 1 hour to 1 year for each individual device connected to .

The current / voltage diagrams show the coating current and the resulting voltage for all channels. The display period can be selected in intervals of 1 hour to 1 year for each individual connected device.

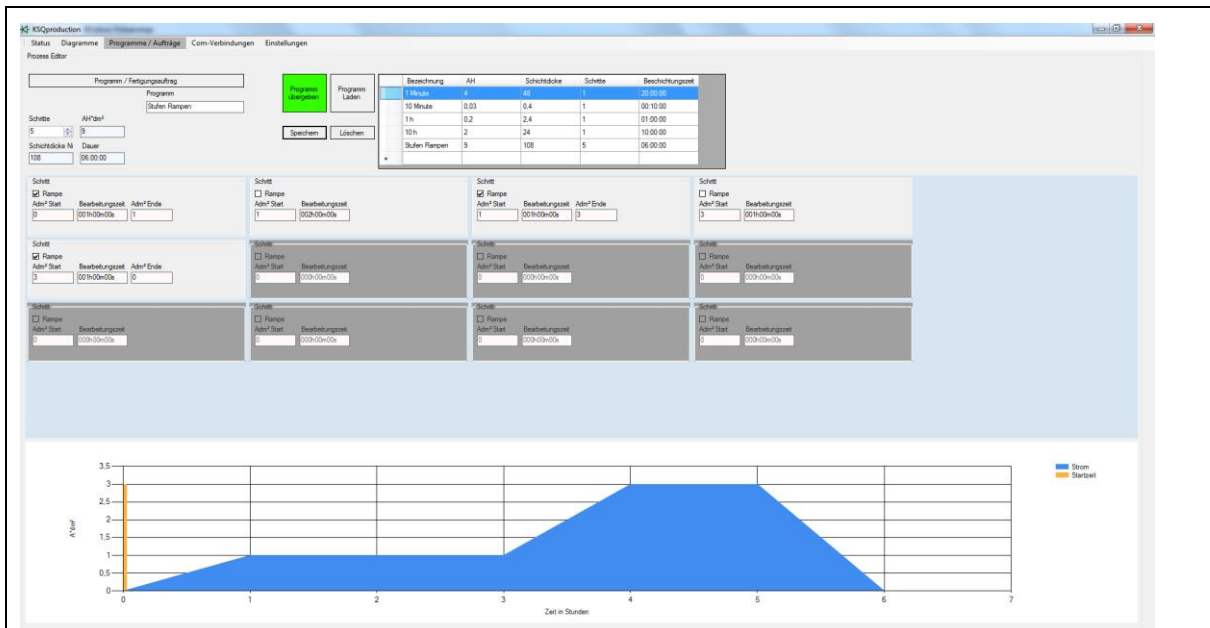
All relevant operating parameters of the electroplating rectifier are logged in a database, including the current plan, the production order and any faults that occur in the process.

All relevant operating parameters of the electroplating processors are recorded in a database, including the circuit diagram, the production order and any disturbances in the process.

This makes it possible to trace every single production order in the database.

This allows to trace each individual work order in the database.

8.3 Programs and Workorders / Programs and Workorder



The "Programs / Orders" program tab is used to create current programs and then transfer them to the electroplating rectifiers.

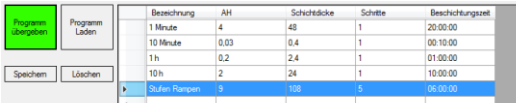
Generally possible:

- Current programs with up to 12 individual steps incl. ramps
- Coating time from 1s to 999h for each individual step
- Creation and management of an unlimited number of current programs

Use the menu "Program / work order" to create your own current programs and transfer them to the KSQ-rectifiers unit.

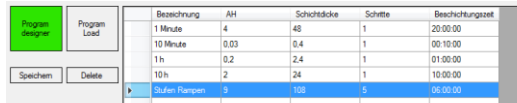
In general it is possible:

- Power programs with up to 12 individual steps including ramps
- Coating time from 1s to 999h for each step
- Create and manage an unlimited number of current programs



This screenshot shows the 'Programme / Aufträge' tab with the 'Speichern' and 'Löschen' buttons highlighted. The table below it shows the current program steps.

Bezeichnung	AH	Schichtdicke	Schritte	Beschichtungszeit
1 Minute	4	45	1	20:00:00
10 Minute	0.03	0.4	1	00:10:00
1h	0.2	2.4	1	01:00:00
10h	2	24	1	10:00:00
Stufen Rampen	5	108	5	96:00:00



This screenshot shows the 'Programme / Aufträge' tab with the 'Speichern' and 'Löschen' buttons highlighted. The table below it shows the current program steps.

Bezeichnung	AH	Schichtdicke	Schritte	Beschichtungszeit
1 Minute	4	45	1	20:00:00
10 Minute	0.03	0.4	1	00:10:00
1h	0.2	2.4	1	01:00:00
10h	2	24	1	10:00:00
Stufen Rampen	5	108	5	96:00:00

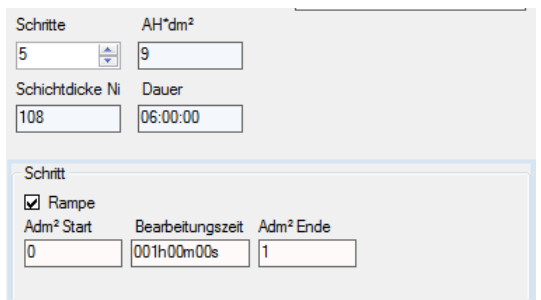
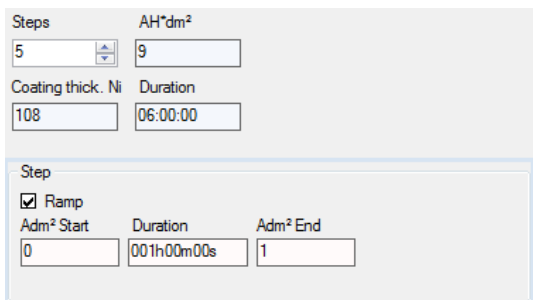
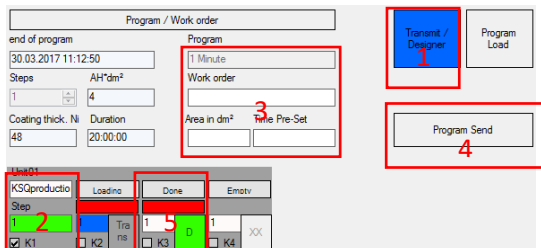
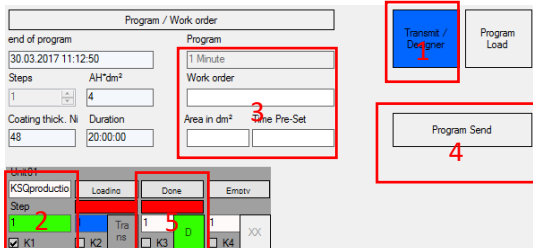
Individual power programs can be selected, edited or deleted in the program management table.

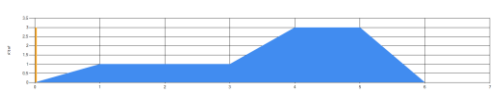
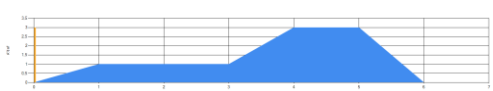
The table can be sorted according to the designation, the AH, the coating thickness, the program steps and the total coating time.

It is possible select, edit or delete individual current programs in the management section.

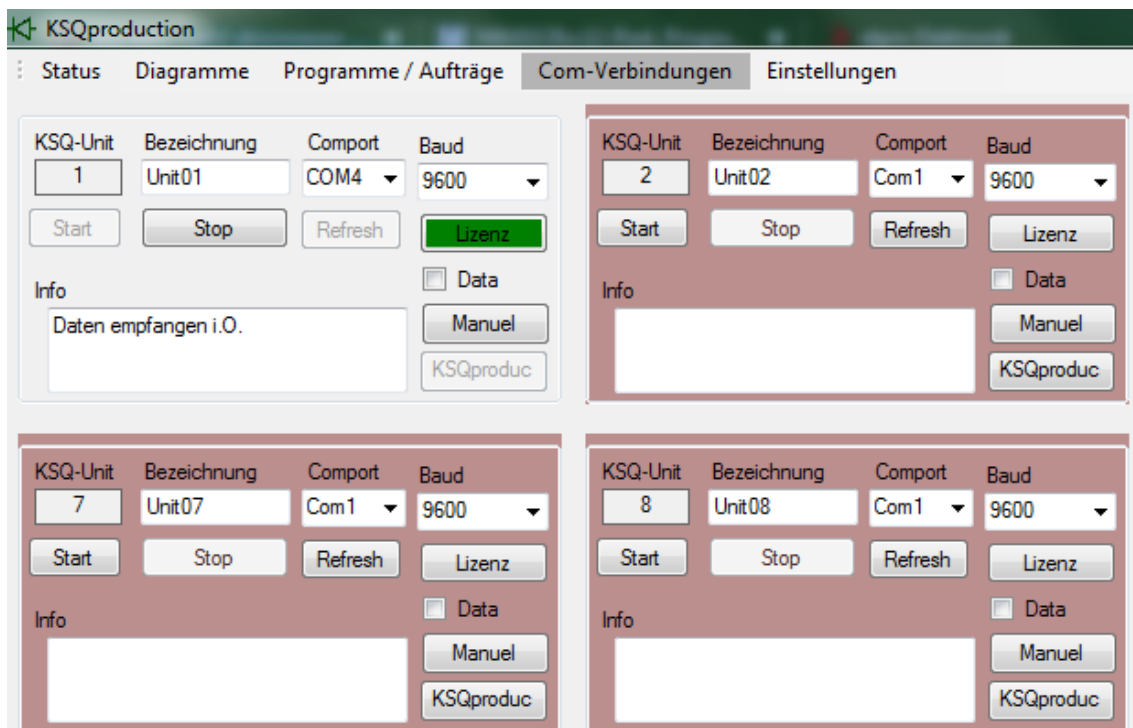
The current program table can be sorted according to the name, the AH, the layer thickness, the number of program steps and the total plating time.

<div> <div>Programm / Fertigungsauftrag</div> <div> <div>Programmende Start jetzt</div> <div>03.03.2017 17:33:11</div> </div> <div> <div>Programme</div> <div>Stufen Rampen</div> </div> <div> <div>Schritte</div> <div>5</div> </div> <div> <div>AH*dm²</div> <div>9</div> </div> <div> <div>Fertigungsauftrag</div> <div></div> </div> <div> <div>Schichtdicke Ni</div> <div>108</div> </div> <div> <div>Dauer</div> <div>06:00:00</div> </div> <div> <div>Fläche in dm²</div> <div></div> </div> <div> <div>Startzeitvorwahl</div> <div></div> </div> </div>	<div> <div>Program / Work order</div> <div> <div>end of program</div> <div>03.03.2017 17:33:11</div> </div> <div> <div>Program</div> <div>Stufen Rampen</div> </div> <div> <div>Steps</div> <div>5</div> </div> <div> <div>AH*dm²</div> <div>9</div> </div> <div> <div>Work order</div> <div></div> </div> <div> <div>Coating thick. Ni</div> <div>108</div> </div> <div> <div>Duration</div> <div>06:00:00</div> </div> <div> <div>Area in dm²</div> <div></div> </div> <div> <div>Time Pre-Set</div> <div></div> </div> </div>
<p>The left-hand column of the overview shows after selecting and loading a power program:</p> <ul style="list-style-type: none"> • When does a power program end with an immediate start. • How many individual steps does the power program consist of? • How many AH are deposited on an area of 1dm² • How thick is the expected nickel layer at 96% current yield in um and the duration of the current program <p>The column on the right in the overview shows:</p> <ul style="list-style-type: none"> • Current program Designation • Designation of the production order • Surface area of the components • Start time preselection (optional) 	<p>The left column of the overview shows after selecting and loading a current program:</p> <ul style="list-style-type: none"> • End time of current program if it is started immediately. • Number of steps for the loaded current program • How many AHs are deposited on 1dm² surface • Expected thickness of the nickel layer (96% current efficiency) • running time of the current program <p>The column to the right of the overview shows:</p> <ul style="list-style-type: none"> • Power program name • Description of the production order • Size / Area of the plated part • Start time pre-selection (optional)
<div> <div>Übergabe / Designer</div> <div>Übergabe / Designer</div> </div>	<div> <div>Transmit / Designer</div> <div>Transmit / Designer</div> </div>
<p>Use the "Transfer / Designer" button to switch between the circuit diagram management view and the transfer view.</p> <p>Clicking this button switches the view from program designer to transfer mode. The color indicates the current mode.</p>	<p>The buttons "Transmit / Designer" are used to switch between the current program designer view and the unit transfer view.</p> <p>Clicking on this button changes the view from the program designer to the transfer mode. The color indicates the current mode.</p>

	
<p>There is an option when defining the electricity program:</p> <ul style="list-style-type: none"> • Specification of how many individual steps the current program consists of (1-12) • If the single step is a ramp or a constant current • The start and end current (for ramps) in $A \cdot dm^2$ • As well as the duration of the individual step in the range 1 second to 999 hours. 	<p>While defining the plating current program it is possible to</p> <ul style="list-style-type: none"> • Setting how many individual steps the current program consists of (1-12) • Setting for each single step whether the step is a ramp or a constant current step • The start and end (for ramps) current in $A \cdot dm^2$ • The duration of the single step in the range 1 second to 999 hours.
	
<p>The following steps are necessary to transfer a current program to a galvanic rectifier:</p> <ol style="list-style-type: none"> 1. Switching to transfer mode 2. First select the channel (multiple selection possible) to which the selected current program is to be sent. 3. A designation for the production order is then entered and the area of the component to be coated is specified in dm^2 - the software calculates the required currents automatically. 4. Click on the "Transfer program" button to transfer the program to the rectifier. 5. The program is then started directly by pressing a button on the rectifier or by kicking the green "Start" button. 	<p>To transfer a current program to a galvanic rectifier, the following steps are necessary:</p> <ol style="list-style-type: none"> 1. Switch to the transfer mode 2. Select the channel (multiple selection possible) to which the selected current program is to be sent. 3. Then a name for the work order and the area of the plated part (expressed in dm^2) have to be given. The software calculates the required currents independently. 4. By clicking the "Program send" button, the program is transferred to the rectifier. 5. The program can then be started directly by a button on the rectifier

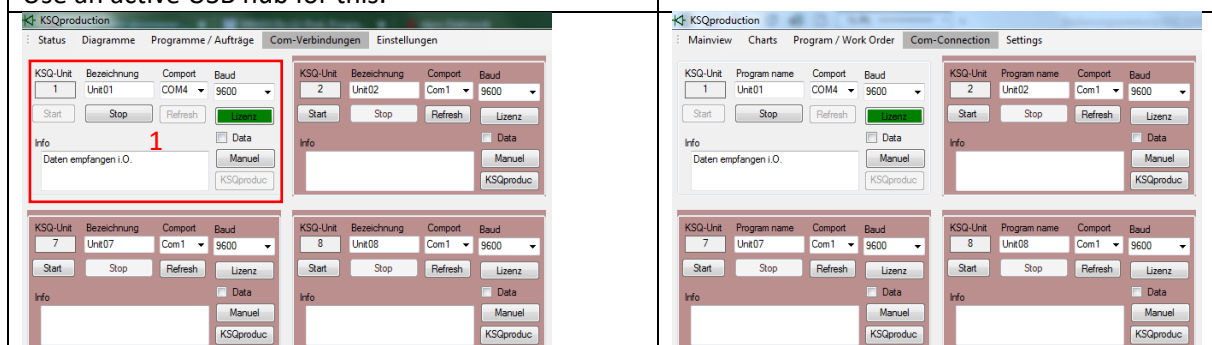
	or by a kick on the green "Start" button.
	
The diagram in the lower area shows the currently loaded or newly created power plan. The diagram can be used to check the profile of the power plan.	The diagram in the lower area shows the currently loaded or newly created current plan. The profile of the current program can be checked using the diagram.

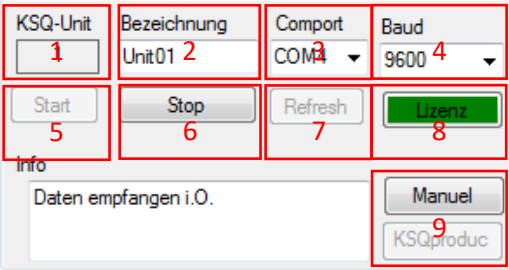
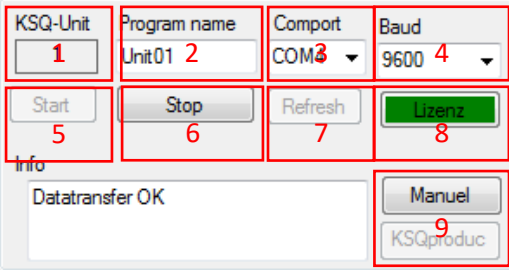
8.4 Com connections / Com-Connection



An RS232 interface is required to connect a KSQ unit to a PC.
 This can either be a permanently installed RS232 interface or a USB-RS232 interface adapter.
 Up to 24 KSQ units can be connected to a single PC.
 Use an active USB hub for this.

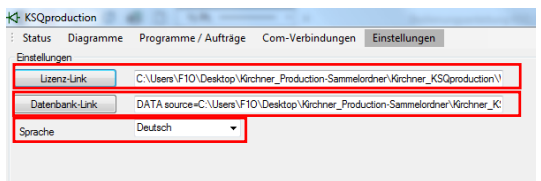
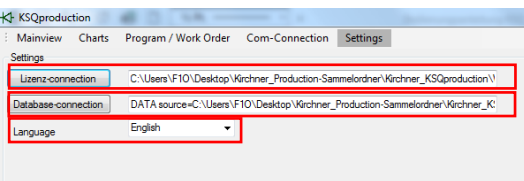
To connect a KSQ-rectifier to any PC a RS232 port or a USB-RS232 cable is necessary.
 It is possible to connect up to 24 KSQ-rectifiers via USB-RS232 cable.
 To do so you need an active USB-HUB.



<p>The connection to each individual KSQ rectifier can be set, opened or closed in the COM connections menu.</p>	<p>The menu Com-Connection is used to open, close and configure any com-connection to the KSQ-rectifier.</p>
	
<p>Description of the different functions of the COM settings:</p> <ol style="list-style-type: none"> 1. Serial number in KSQproduction (cannot be changed) 2. Individual KSQ designation determined by the user 3. COM port selection for connection 4. Data rate (9600 standard) 5. Opening and starting the data transfer 6. Closing and ending the data transfer 7. Search for available com ports 8. Licensing status (red = no valid license / green = valid license) 9. How the KSQ unit works <p>To be able to control your KSQ unit with the KSQproduction software, you must press the KSQproduction button. In manual mode, only the relevant data is displayed. It is not possible to transfer orders.</p> <p>The information field shows the current connection status to the KSQ unit</p>	<p>Instruction about functions for Com-Port settings:</p> <ol style="list-style-type: none"> 1. Place number in KSQproduction (no change possible) 2. Individual KSQ rectifier name - possible to change by user 3. COM-Port selection for connection 4. Communication speed (9600 standard) 5. Open connection and start communication 6. Close connection and stop communication 7. Search for possible com-ports 8. License status (red = no license / green = valid license) 9. KSQ rectifier mode. <p>To work with the KSQproduction Software you have to press the KSQproduction Button once. This enables the possibility to load work orders to any KSQ rectifier.</p> <p>The "Info" text box shows the actual connection mode to KSQ-rectifier.</p>

8.5 Settings / Einstellungen

<p>The settings required to operate the KSQproduction software can be made in the "Settings" menu.</p>	<p>To set the main function please open the "Setting menu".</p>
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<p>The following basic settings are defined in the "Settings" menu:</p> <ul style="list-style-type: none"> Storage location for the license file. A valid license file is required to permanently connect your KSQ electroplating rectifier to the KSQproduction software. Use the License link button to open the license file provided. During software installation, the license file is <i>saved</i> in the directory <i>"C:\Users\<localuser>\AppData\Local\Kirchner_Data\lizenz.liz"</i>. 	<p>Settings is to change the place where to save:</p> <ul style="list-style-type: none"> The license file - you need a valid license to use KSQproduction The main database (all data are stored in this file, you have to backup this file if you update KSQproduction software) Language setting

9. Update of the KSQ

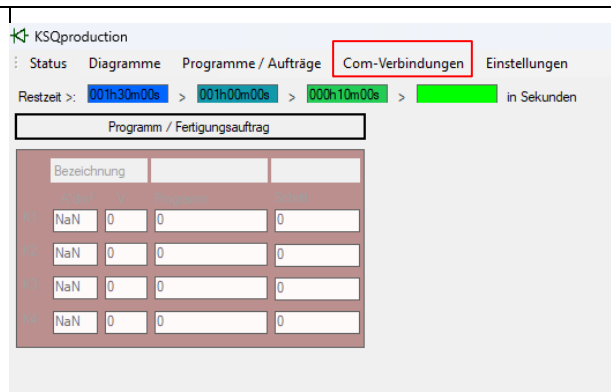
Instructions Update Kirchner KSQ rectifier with new firmware.

Download the necessary KSQproduction software with the latest firmware at

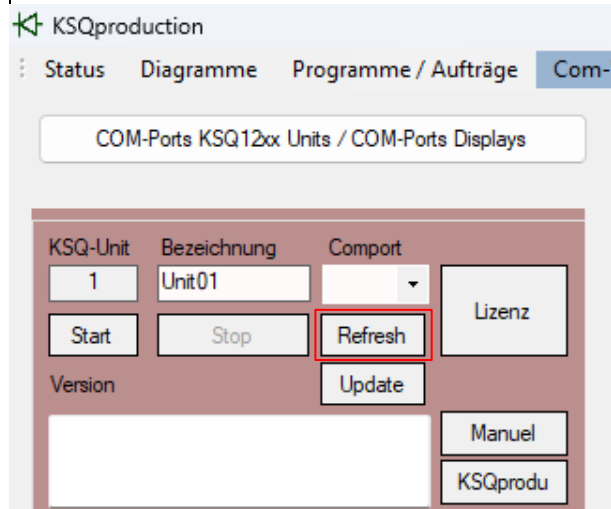
<https://www.kirchner-galvanik.de/Downloads/Paket.zip>. Install our KSQproduction software.

Name	Änderungsdatum	Typ
Firmware	18.09.2022 12:19	Dateiordner
KSQproduction_Software	16.10.2022 17:48	Dateiordner
Manuals	14.08.2022 15:33	Dateiordner
Sample Data Import File	05.01.2024 15:37	Dateiordner
Treiber-USB-RS232	29.01.2017 10:06	Dateiordner

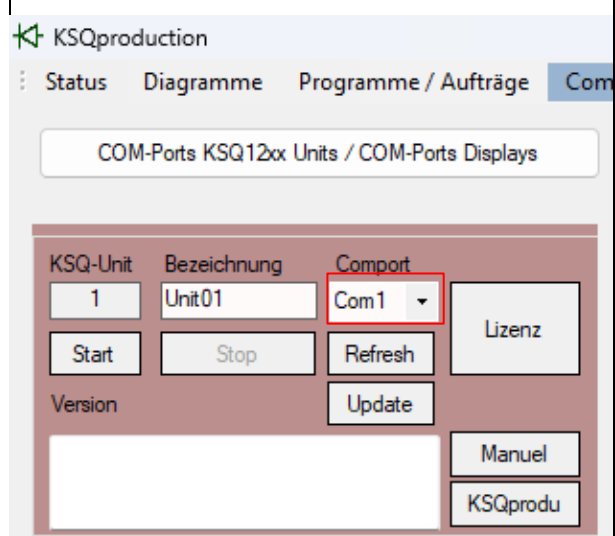
1. After installation, start the KSQproduction software
2. Switch to the tab: Com connections.



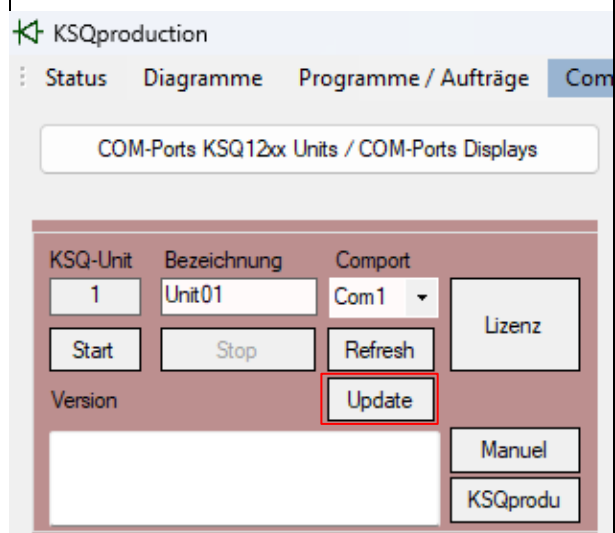
1. You need a USB-RS232 connection cable to your galvanic rectifier.
2. Press the **Refresh** button to determine all available COM connections.



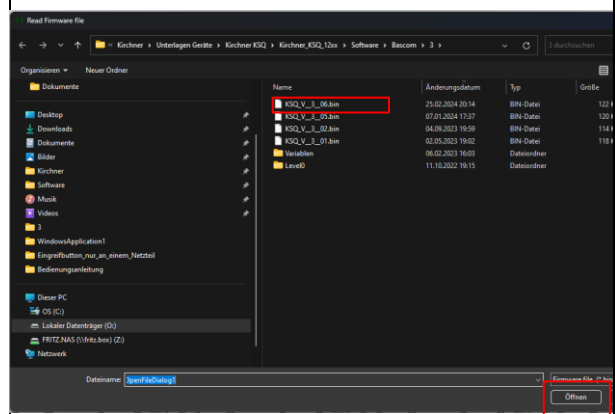
3. Then select the COM connection to which your galvanic rectifier is connected. In this example, the COM1 connection.



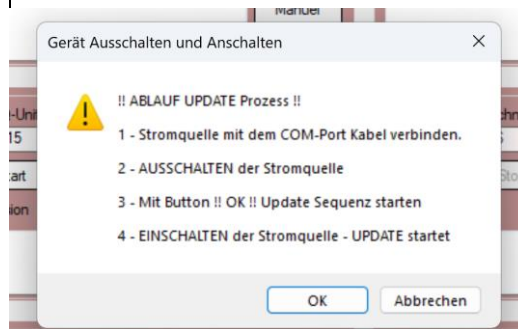
- Call up the update with the UPDATE button.



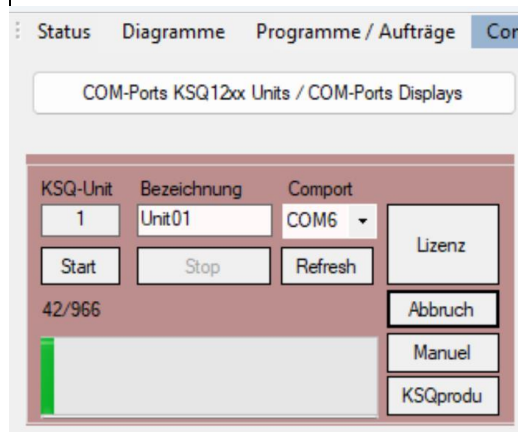
4. An Explorer window opens in which the latest software can be selected. If desired, an older software version can also be called up.
5. Make sure that the device is connected to the correct COM port.
6. Select the desired firmware version. Here is version 3__XX.bin
7. The galvanic rectifier must now be switched off!



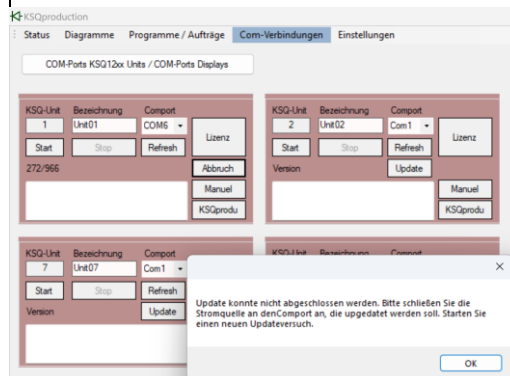
1. Now start the update with the "OK" button



2. The UPDATE - Start window appears.
3. Now switch the galvanic rectifier back on.
4. The update starts automatically.



As soon as the update is complete, the galvanic rectifier can be used as usual.



10. Characteristics of the device

Dimensions:	298 x 150 x 345 mm (W x H x D)
Weight:	approx. 4.8 kg
Mains voltage:	110 V - 240 V, 50 Hz - 60 Hz
Power consumption	KSQ 1204 / KSQ1210 = max 150W KSQ 1216 / 1224 / 1225 = max 300W KSQ 1250 / max 500W
KSQ 1204:	<ul style="list-style-type: none"> • 4 x 400mA or • 2 x 0.800mA or • 1600mA 14bit resolution +/- 1 mA
KSQ 1210:	<ul style="list-style-type: none"> • 4 x 2500mA or • 2 x 5000mA or • 10.000mA 14bit resolution +/- 1 mA
KSQ 1216:	<ul style="list-style-type: none"> • 4 x 4000mA or • 2 x 8000mA or • 16.000mA 14bit resolution +/- 1 mA
KSQ 1216:	<ul style="list-style-type: none"> • 4 x 6000mA or • 2 x 12000mA or • 24.000mA 14bit resolution +/- 1 mA
KSQ 1225:	<ul style="list-style-type: none"> • 1 x 25000mA 14bit resolution +/- 2 mA
KSQ 1250:	<ul style="list-style-type: none"> • 1 x 50000mA • 14bit resolution +/- 4 mA
Current setting ranges:	1mA. ... Current max. per channel in steps of 1 mA.
Setting ranges Time:	<ul style="list-style-type: none"> • 1 min. ... 99 hrs, 59 min, 59 s • Input 99h99min99s = continuous current
Potential holding current:	1/32 of the set current, minimum approx. 1 mA
Voltage range:	KSQ1204 - 0..12.0 V KSQ1210 - 0..7.5 V KSQ1216 - 0..7.5 V KSQ1224 - 0..7.5 V KSQ1225 - 0..10.0 V KSQ1250 - 0..10.0 V measured at the terminals. If voltage > maximum voltage or cable breakage, the display flashes

Current control:	Switch-mode power supply with downstream longitudinal regulator
Ripple:	approx. 20 mV at full load
Accuracy:	0.5% -/+ 1 digit
Input:	All entries via keypad
Control:	by CMOS microprocessor, Output of current values by D/A converter 12 bit resolution.
Voltage measurement:	Measured with A/D converter 12 bit, display in steps of 0.1 V
Data preservation:	RAM - buffering by gold capacitor Data retention without supply voltage by means of EEprom.
Control functions:	Watchdog and undervoltage control
Displays:	4 rows * 20 characters LCD displays
Structure:	Anodized aluminium desktop housing with feet, grey perforated cover. Front panel with light gray foil and short-stroke buttons with click point behind it.
Temperature range:	Room temperature 0..40°C, humidity up to 80 %

11. Commissioning and installation

Kirchner constant current sources are high-precision power supplies for electrochemical processes. As the fine adjustment of the required constant current is carried out by a continuously re-measuring analog circuit, a certain amount of power loss occurs. This is dissipated at the rear heat sink.

For this reason, Kirchner constant current sources must be installed freely. The heat sink must not be covered by a housing or similar.

When operating in electroplating shops, care must be taken to ensure that the device is not exposed to spray mist from electrochemical baths. This causes corrosion and can damage sensitive electronic components.

In the case of constant current sources with forced ventilation, a sufficient supply of fresh air must be ensured. The side fan grille and the heat sink must not be covered.

Several Kirchner constant current sources can be stacked on top of each other.

12. Maintenance and inspection

Kirchner constant current sources are highly accurate production and laboratory devices. We guarantee a precision of significantly less than 0.5 % deviation of the specified current over the entire control range when the devices are delivered.

As linear regulators work with semiconductor crystals and these are subject to a certain ageing process, the current stabilizer must be calibrated to maintain control accuracy.

As DKD-certified measuring devices are required for this, this calibration is carried out ex works.

The actual function of the current stabilizer is not affected by this, but after more than two years of operation without recalibration, we only guarantee a deviation of approx. +/- 1 %.

13. EC Declaration of Conformity

In accordance with the EC Machinery Directive (MRL) 2006/42/EC of May 17, 2006, Annex II A for machines.

The design of the machine (trade name): Kirchner constant current source
Make/function/model/type: KSQ 1204, 1210, 1216, 1242, 1225, 1250, 3025
Serial no./year of manufacture: ___KSQ12xx___

was developed, designed and manufactured under the sole responsibility of

Manufacturer/authorized representative:

Kirchner Galvanik GmbH

Tannenstrasse 51

79761 Waldshut

and complies with all relevant provisions of the MRL 2006/42/EC and the following EC directives (references as published in the Official Journal of the EU):

EMC Directive 2004/108/EC, EC Low Voltage Directive DIN EN 60204-1:2006

The following harmonized standards (Official Journal of the EU), draft European standards or national standards and technical specifications (references) were applied:

EMC Directive 2004/108/EC; DIN EN 60204-1:2006

The technical documentation has been prepared in accordance with Annex VII A of the MRL 2006/42/EC and can be submitted to the competent market surveillance authority on request.

Person responsible for documentation (based in the Community): Dr. Jens Bohnet

The operating instructions belonging to the machine (original and, if applicable, translation) - and, if applicable, installation and assembly instructions - are available.

Sincerely yours



Dr. Ing Jens Bohnet