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30 AÑOS AL SERVICIO DE LA INDUSTRIA

OPSIS®
LIQUIDLINE®

KjelROC Distillation Unit
Operation Manual
Version I

1. Contents

2. Introduction

The KjelROC Distillation Unit is designed for highly automated distillation. Dependent on locally available reagents it can be set to fit almost any requirement. The different screens showing the alternatives possible at a given point will guide the operator. However, to fully benefit from all features it is recommended to carefully read this Manual. It is wise to keep it available for future questions.

The built in data handling system gives an option to save log files and add traceability. How to set up the PC network connection is described in a separate Network Connection manual.

As most analyses carried out on this Distillation Unit involve the use of hazardous chemicals it is important that the operator reads or is informed about what is written in chapter 3 “User Safety”.

To get a brief understanding of how he KjelROC Distillation Unit is working please refer to chapter 4 “Function”.

In chapter 5 “Operation” the different available functions will be described. Dependent on how the installation of your instrument is done these functions can be different, as the set-up will tailor make the Distillation Unit to best fit your workload. Also the language can be set to your local if translation is available at the time for the installation.

Chapter 6 “How to run a Distillation” describes how some analyses are performed using the KjelROC Distillation Unit. One or several of these might be excluded at the installation upon your request. However they can always be restored by using the default initialisation file. If so the local language selected also has to be re-installed.

To get the best from your instrument it is important to maintain and service it correctly. This is described in chapter 7 “Maintenance and Service”.

2.1. Difference between Manual Distillation Unit (KD-200) and Auto Distillation Unit (KD-210)

The two models of Distillation Units are similar in design and the KD-200 can also be upgraded, at a later stage to an Auto Distillation Unit, KD-210. This manual primarily describes the operation of KD-210.

The following is not available in the Manual Distillation Unit KD-200:

- No receiver pump
- There is no receiver addition option in the program menu
- There is no enhanced water valve
- There is no dedicated receiver vessel (only conical flask for receiving distillate)

3. Safety

The KjelROC Distillation Unit is protecting the operator from any hazardous actions, e.g. no steam ore alkali can be dispensed without having a tube in place and the protecting door completely closed. However, as the methods described often involve the use of hot corrosive chemicals every user should read the Safety Instructions or be instructed by the laboratory manager. Below you can find the instruction in all EU languages.

3.1. User Safety

The instrument may only be used by laboratory personnel and other persons who have knowledge and/or experience of doing chemical analysis and dealing with reagents.

Applications not mentioned in this document are improper. In particular, it is forbidden to use the instrument in the following instances:

- Use of the instrument that require ex-protected instruments
- Use of Samples or Reagents which can explode or inflame

It shall be noted that:

- Modifications and upgrades to the instrument shall only be carried out by authorized service personnel
- Service Menus in the Instrument is only to be used by authorized Service Personnel

3.2. Safety Symbols


General Hazard


Corrosive acid


Crushing hazard


Electrical shock hazard


Hot Surface

Explanations used in this manual


Important, Please Note


Please Note, Protection Glasses is recommended


Please Note, Gloves should be used

3.3. Product Safety Systems

The instrument is designed and built in accordance with state-of-the-art technology. Nevertheless, risks to users, property, and environment can arise when the instrument is used carelessly or improperly. If the equipment is not used in a manner specified by this document, the protection provided by the equipment may be impaired.

3.3.1. Maintenance and Service

The Operator is responsible for ensuring that recommended daily and monthly user maintenance is performed on the Instrument. Failure to do so might impair the functionality and/or shorten the lifespan of the instrument.

The operator is responsible to schedule regular Maintenance with authorized service personnel only. Only OPSIS LiquidLINE Spare parts should be used in the instrument.

3.3.2. Safety Sensors

The instrument is equipped with several safety systems

- A Sensor will identify if a tube is placed in the holder. No automatic operation is allowed without tube in place
- The Safety door (protecting the tube) is monitored and no distillation or manual operation is allowed with the door open. Analysis will stop if opened during distillation
- The small door protecting the Splash head is monitored and no distillation or manual operation is allowed with the door open.


Please note that the large door is not monitored in order to allow access to receiver vessel during distillation. However, caution should be taken if running distillation with open door.

4. Function

This section describes the general function of your KjelROC Distillation Unit.

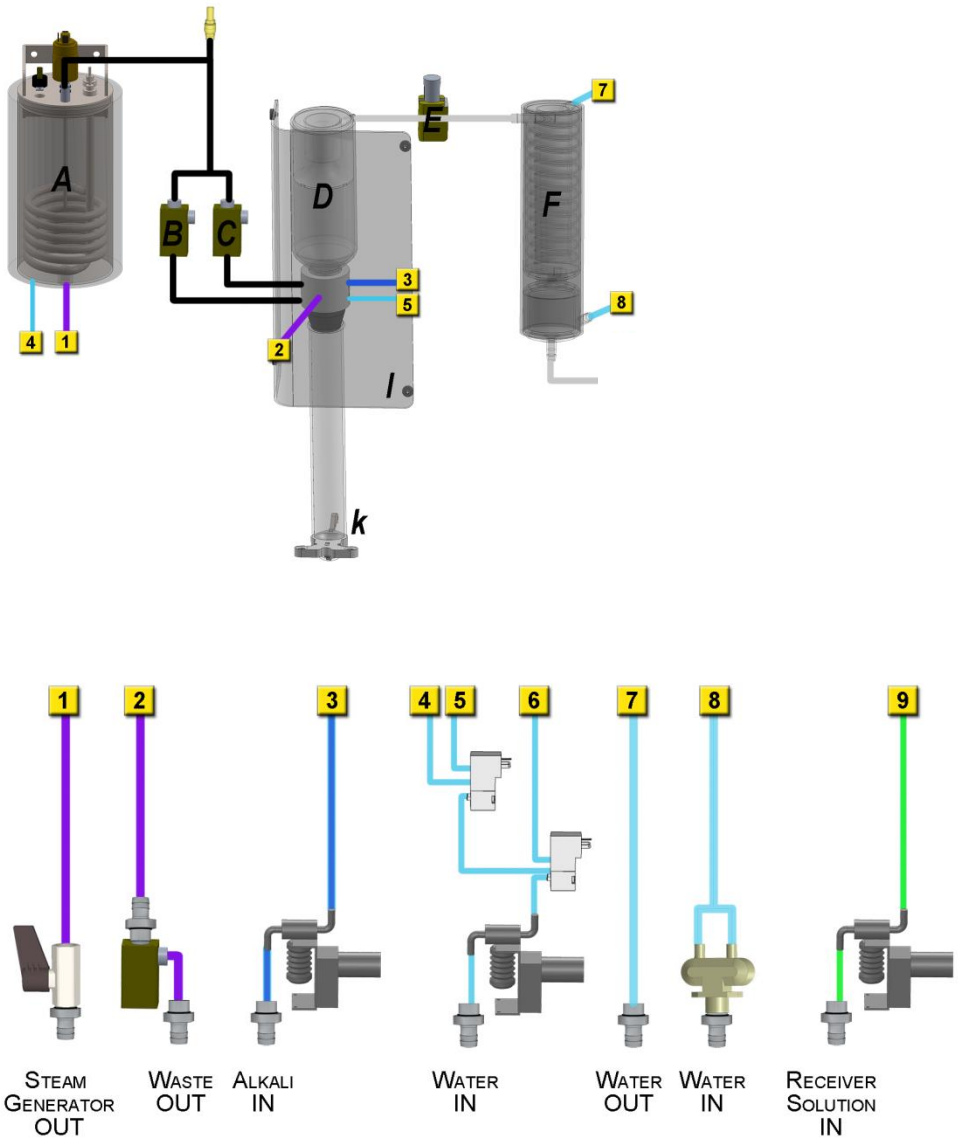


Fig.1: Functional overview of the KjelROC Distillation Unit

A: Steam generator
B: Valve for steam used during distillation
C: Valve for steam used during tube drainage
D: Splash Head to prevent alkali drops to go with the steam
F: Condenser to cool down the distillate. It is supplied with a sensor to prevent operation without flowing cooling water. This sensor also reduces the water flow if sufficient temperature is obtained.

Volumes and times for the analytical cycle are all pre-set to optimise the use of chemicals and energy. As Kjeldahl analysis is the mostly used method for this instrument the text below will refer to this. However, if other methods are used the reagents and functions might be different. Please refer to the corresponding Application Note.

Please use Figure 1 to identify the parts/functions described below.

At power on the instrument automatically prepares for operation. The steam generator starts to heat, the function is controlled by a Pressure switch. If LOGIN is pre-set the operator will key in the pin code and thereby reaching the allowed level of operation.

A Test Tube is put in place and locked with a Tube holder (k). The analytical cycle is started by closing the Safety Door (l) and touching the optional Start Button.

Pump (A) dispenses Receiver Solution (only KD-210). The Water Pump (5) dilutes the digest and after a pre-set delay time Alkali is added with pump (3) The Steam valve (B) opens and the liberated ammonia is transferred by steam through the Splash Head (D), cooled down in the Condenser (F) and finally collected in the Receiver Vessel (supplied Conical Flask).

The distillation ends as soon as the end time has been reached.

If Tube Drain has been selected then the drain cycle begins with that the Steam Valve (B) closes and instead (C) opens. Waste Valve (2) opens and Valve (E) between Splash Head (D) and Condenser (F) closes. The residues from the Test Tube are pressed into either the connected Waste Tank (2) or directly to drain. After some seconds Steam Valve (C) closes again and also Valve (E) opens.

Now next analytical cycle can start.

5. Operation

The instrument functions can at any time be used in almost any order. However, the most common way to run an analysis is to

- Start up the instrument
- Select Standard program in the main menu
- Run distillation by pressing Start

This is the structure we will follow in this chapter. For easy understanding each section in the user interface is described under a separate chapter in this guide.

5.1. General Guidelines

If a function is not available because another one is in use, the button is faded out.

In all sub sections you can reach the main menu by pressing “Home”  .

There will always be a visible “Stop” button,  , when running an analysis, which is used if there is a need to stop the process. When running an analysis most menu options will be disabled for safety reasons.

A warning button,  , might appear in the lower right corner in case there is a warning from your KjelROC Distillation Unit. Warnings are to indicate if there is low level of Alkali, water or Borid acid in your tanks, high level in your waste tank or if it is time for maintenance. Optional level indicators are required in order to use the warning feature in the system.

It is recommended to use the supplied OPSIS LiquidLINE pen on the Touch screen

5.2. START UP

Switch on power to start your KjelROC Distillation Unit. The instrument prepares for operation by pre-heating the steam generator.

Optionally a login feature can be enabled in the settings menu. Login is required in order to access features such as the Managers menu.

Note that the Steam generator will only start heating at start-up. It might therefore take a couple of minutes from start-up until the steam is at full effect.

5.3. MAIN MENU / HOME

The main menu will be visible immediately after power on.

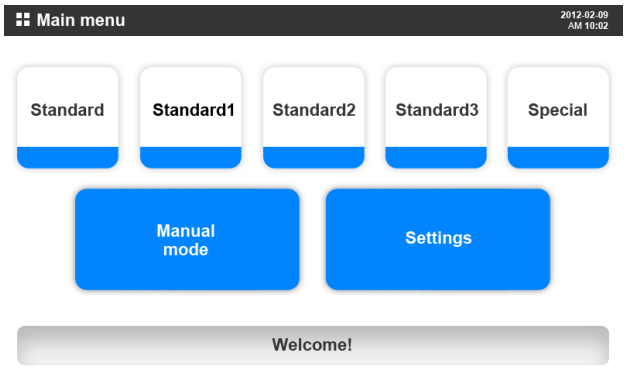


Fig. 1. Main menu screen

The main menu is the central point in the menu structure and you can always reach this menu by selecting the “Home” .

The options available in the main menu are listed in two rows;

The first row will contain one to five different program buttons to start a distillation. The standard distillation method will have a screen with step-by-step display of the progress. Optionally a second method can be enabled to show a list of performed analyses, similar to the view used in OPSIS LiquidLINE KjelROC Analyzer.

In the second row there will be two buttons; manual mode and settings. By pressing the desired button you will reach the corresponding section.

If you have login enabled you can always logout by selecting the “logout” button, .

5.4. RUNNING A DISTILLATION

5.4.1. Standard Program Method

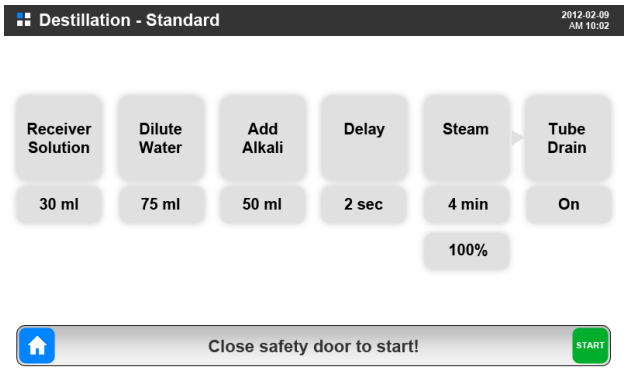


Fig. 4. The Distillation View - Start

The standard program view in the Distillation Unit makes it easy to follow the progress of the instrument. The dosing amounts are indicated for each step and can easily be changed in the settings. This is the recommended view to use for the Auto DistIlation Unit.

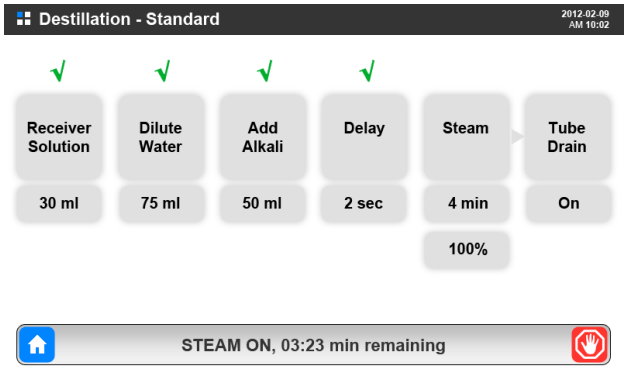


Fig. 4. The Distillation View – Running

Each step in the process will be indicated in the view;

- Receiver solution added into the receiver vessel (only KD-210)
- Water added into the tube
- Alkali added into the tube
- Delay before adding steam
- Steam on, distillation start
- Tube drain

5.4.2. Special Program Method

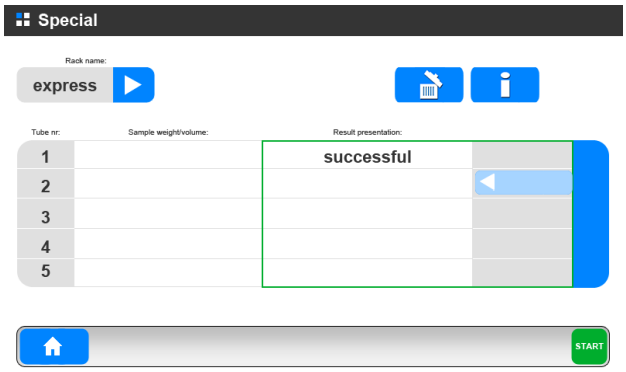


Fig. 2. The Analysis View (optional)

The Special program view will only be visible if this method has been selected in the program settings. The purpose of this method is to provide a similar interface as the OPSIS LiquidLINE Analyzer with improved visibility of performed distillations and possibility to trace all activities in the instrument. This method should be used in case network transfer of distillation data (for traceability purposes) is used.

5.5. MANUAL MODE

Manual mode is a possibility to rune several functions of your KjelROC Distillation Unit manually. Manual mode cannot be selected during an analysis and as long as one operation is on-going in this view all other buttons are faded out and has no function.

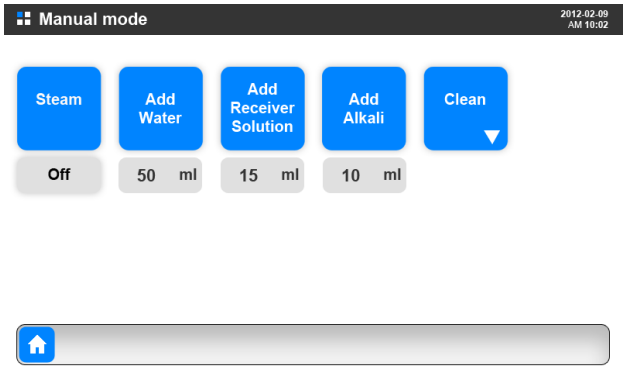


Fig. 3. Manual View

This menu is used to fill up reagent tubing and clean systems when changing reagents or after a longer time not in use. It is also used to check the dispensed volumes of water and alkali. For safety reasons all functions except Receiver solution requires a tube in place as well as the Safety Door in closed position.

- “Steam”, one touch starts the steam production and the flow of cooling water. Condensed water into the Titration Vessel goes to drain as the valve is open. A second touch stops the operation.
- “Add Water”, dispenses the pre-set volume into the test tube.
- “Add Receiver Solution dispenses the pre-set volume into the Receiver Vessel. (Only KD-210)

- “Add Alkali”, dispenses the pre-set volume into the test tube.
- “Clean”, gives two options. Auto Clean and Tube Drain.
  - “Auto”, starts an automatic cleaning cycle. This function requires an empty Test tube and closed Safety Door as well as that Tube Drain is not set to off. Water is dispensed into the Test tube. Steam distillation is on for some minutes and thereafter the tube is drained. The time of the Auto Clean can be adjusted by changing the settings.
  - “T.Drain”, any time an analytical cycle has been interrupted by mistake, e.g. if the Safety Door is opened during operation and hot liquid is in the Test tube a touch on “T.Drain” will automatically empty the tube.

Please make sure that there is a receiver vessel inserted when running steam, add receiver solution and Auto Clean

5.6. USING NETWORK CONNECTION

The KjelROC Distillation Unit is equipped with an Ethernet Interface and can optionally be connected to a KjelROC wireless router. This give the possibility to transfer traceability information to a computer network. By enabling login on the instrument and transferring the result files to a computer it is possible to follow start- and end-time of distillation as well as following the identity of the operator.

Please note that the storage of results is only available when running the special program. The standard program does not store any values.

5.6.1. Network Setup

The KjelROC Distillation Unit can communicate to a PC network via the Ethernet Interface (RJ-45). Simply connect a network cable between the Distillation Unit and your Ethernet network. The KjelROC Distillation Unit will connect and acquire an IP address automatically.

It is also possible to connect a KjelROC Wireless router to the Ethernet Interface. Simply connect the supplied network cable between a KjelROC Wireless router (optional) and the KjelROC Distillation Unit. The instrument will connect and acquire an IP address automatically. It thereafter possible to access the KjelROC Distillation Unit via the KjelROC Wireless network (WiFi).

Please read the separate KjelROC Network Connection Guide for further explanations, proposed set-up for your laboratory and OPSIS LiquidLINE supplied programs.

5.7. SETTINGS

The KjelROC Distillation Unit comes pre-set for all needed functions but sometimes there might be a need to change some of the default settings. The KjelROC Distillation Unit has three different settings;

- A Settings view with basic adjustments for administrators and operators. This view will be explained in this section.
- A Managers menu with more detailed analytical adjustments. This menu is explained in KjelROC Distillation Unit Managers Manual.
- Settings files, accessed via PC, for complete control and adjustments. These files are described in the KjelROC Network Connection Guide.

By using the above options you will get a Distillation Unit tailor made for your operation. However, in most cases the set-up adjustments described in this section will be sufficient for complete control. To prevent mistakes all settings can be password protected.

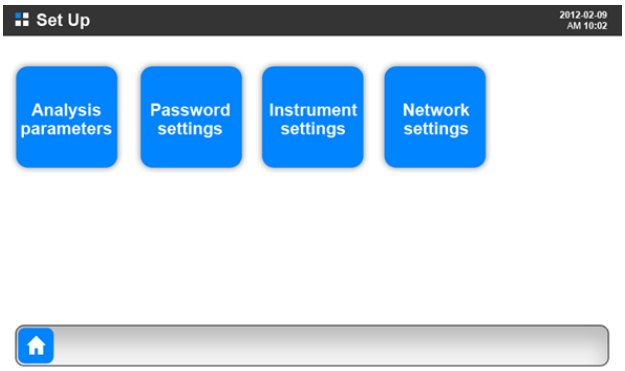


Fig. 4. Settings menu

You can adjust the Analysis parameters, Password, Instrument and Network settings from this menu.

5.7.1. Set-Up Distillation parameters

The Distillation Parameters view shows the values for distillation program. You can select between Standard method view, Special method view and Off for all five program buttons.

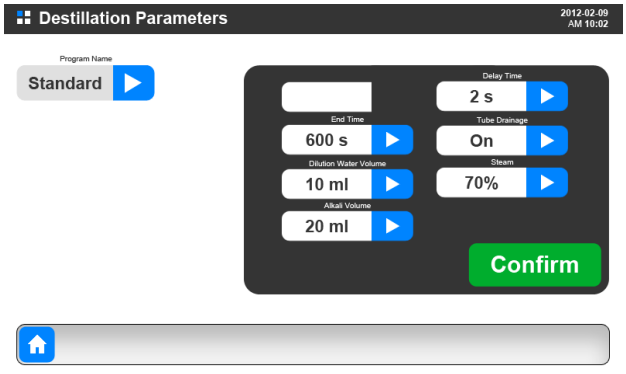


Fig. 5. Distillation Parameters Settings

The following parameters can be adjusted for each program;

- Dilution Water Volume;
  Enough water, to avoid a violent reaction when alkali later is dispensed, should be added. If dilution is done manually the volume can be set to zero.
- Alkali Volume;
  Dependent on the concentration enough volume to neutralise the acid has to be dispensed. Note that the Auto clean sequence always should have Alkali volume set to zero.
- Delay Time;
  To allow the alkali and water to mix before steam distillation starts. A longer time, several minutes, is often used in combination with Dewardas Alloy when analysing fertilizers. Please see separate Application Note.
- Tube Drainage;
  If set to “on” the test tube will be automatically emptied after analysis. If the sample contains solid particles, e.g. soil or boiling beads it is recommended to switch of the tube drainage as otherwise the valve might be blocked by the particles.
- Steam, (10-100%);
  In Kjeldahl 100% is recommended.

If any parameter is changed then press “Confirm” to save your new setting.

5.7.2. Set-Up Password

Fig. 6. Password Setup

- Select if login should be active or not (default off)
- Selection of name where you want to adjust access level or password. The actual name that is displayed is changed with the userdata settings file.
- Selection of access level (administrator or operator) can be done in this menu. The administrator has access to all functions in the instrument while the operator only can run analysis.

If any parameter is changed then press “Confirm” to save your new setting.

5.7.3. Set-Up Instrument settings

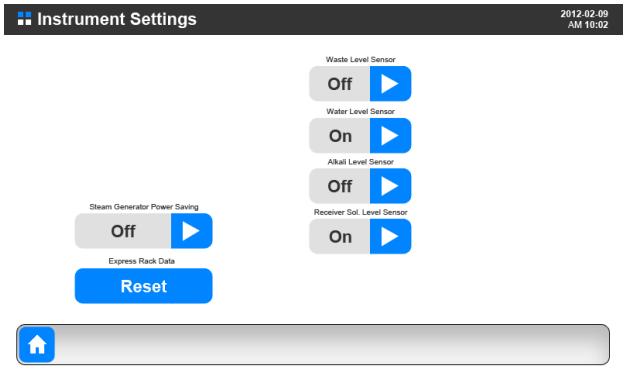


Fig. 7. Instrument Settings

The use of level sensors can be enabled or disabled in this menu. It is also possible to define the behaviour of the steam generator when the instrument is not in use. The reset button resets the distillation list used in the special program.

5.7.4. Set-Up Network settings

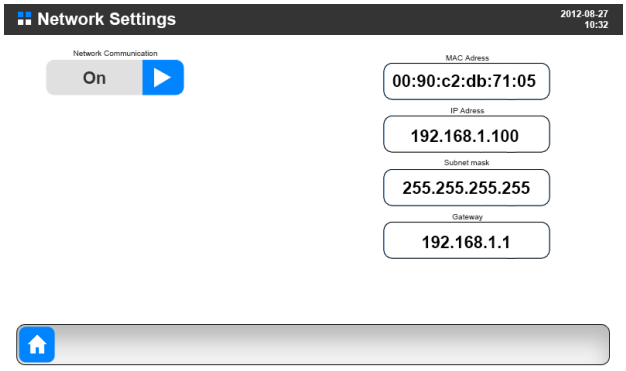


Fig. 8. Network Settings

The Network settings view display the current IP address acquired in the KjelROC Distillation Unit.

If the IP address is 0.0.0.0 then please try to re-establish a new connection by selecting the on/off button. If that is not successful, then switch off and thereafter switch on your KjelROC Distillation Unit. If this does not work then please follow the instructions in the KjelROC Network Connection Guide to troubleshoot your connection.

6. How to run a Distillation

From the main menu, select the “Standard” program button for distillation.

Put the tube in place

Fig. 9. Inserting a tube in the KjelROC Distillation Unit

Start distillation by first closing the Safety Door and then pressing START (Dependent on settings the cycle can be started by just closing the door)

Fig. 10. Closing the Protection door and starting a distillation

Reagents are added and distillation will run until the pre-set end time. The test tube empties (if tube drain is enabled) and the distillation is finished.
Open the Safety Door and continue with next test tube.

6.1. Closing down and Cleaning

Switch off the instrument and close the water tap after Cleaning. Though the KjelROC Distillation Unit is designed to resist the chemicals normally used a clean instrument will always last longer. Therefore it is recommended to follow below hints.

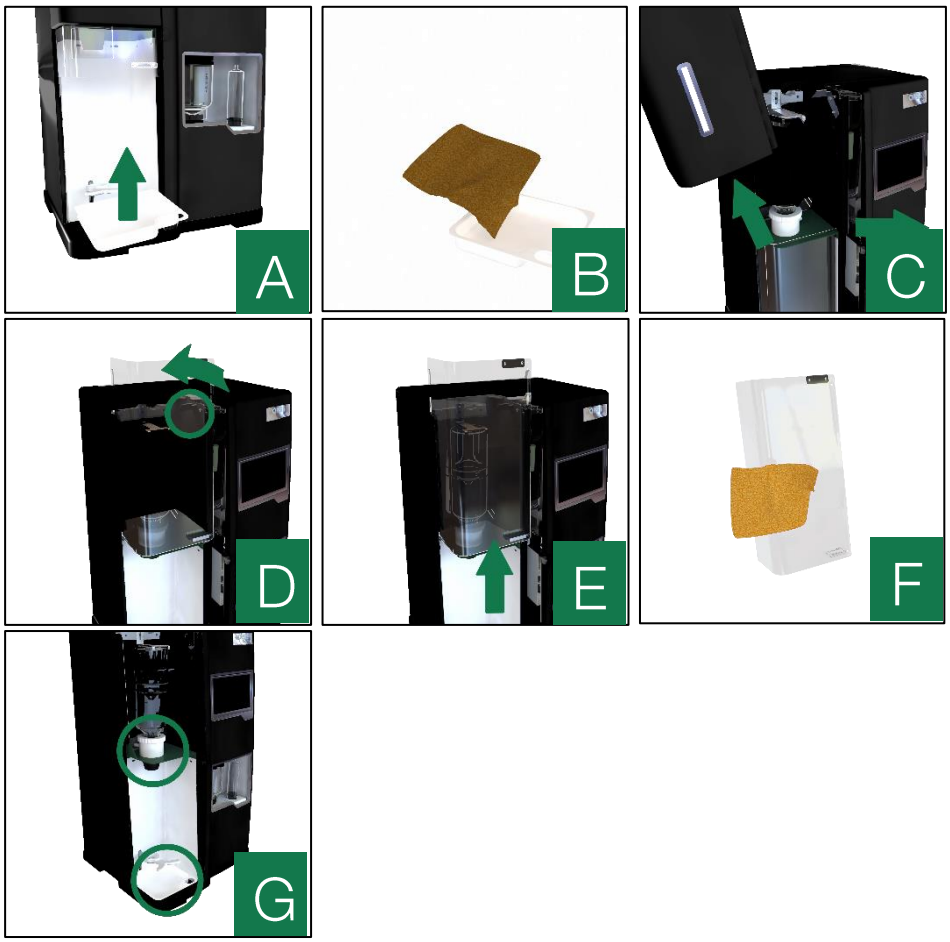
1. Use a wet cloth to wipe of any spillages from the instrument
2. Remove and clean the Drip Tray
3. Remove the Service Door protecting the Splash head. Move the Protection Door upwards to remove it from your KjelROC. Clean the Protection Door with a wet cloth
4. Check the area around the Tube and Splash head Holder and use a wet cloth to wipe any spillages.

7. Maintenance and Service

7.1. Daily maintenance and cleaning

It is recommended to follow below hints for daily care of your instrument, to avoid break-downs of your instrument or faulty results.

7.1.1. Clean spillages



- Remove the Drip tray (A) and clean tray with warm water and a soft cloth (B).
- Remove the Service door protecting the Splash head (C).
- Release the Safety door stop/hatch by turning the holding screw counter clockwise (D)
- Move the Safety door upwards to remove it from your KjelROC Distillation Unit (E).

- Clean the Safety door with a wet cloth (F).

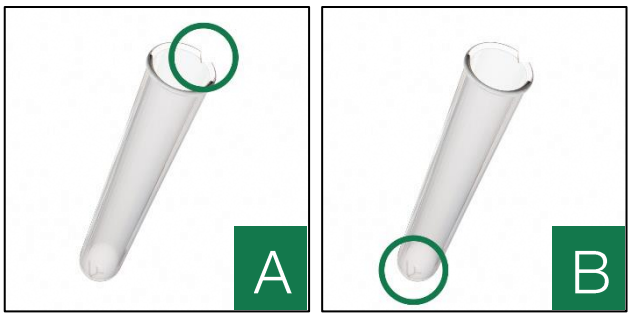
If there are cracks in the Safety door then these might be a result of leakage between the sample tube and the adapter. Please check your tubes and adapter as well as take care when inserting your sample tubes.

- Check the area around the Adapter and Splash head holder and use a wet cloth to wipe any spillages (G). Check also below the drip tray.

- Use a wet cloth to wipe of any general spillages from the instrument. Alkali and Hydrochloric acid are particular important to clean due to their corroding effects.

- Put back Safety and Service door into the KjelROC Distillation Unit. Take care to move back the Safety door stop (D).

7.1.2. Check Digestion Tubes



- Check the rims of the digestion tubes for uneven surfaces (A). In particular, look for cracks and chips. A damage in this area can cause leakage and loss of nitrogen during analysis.

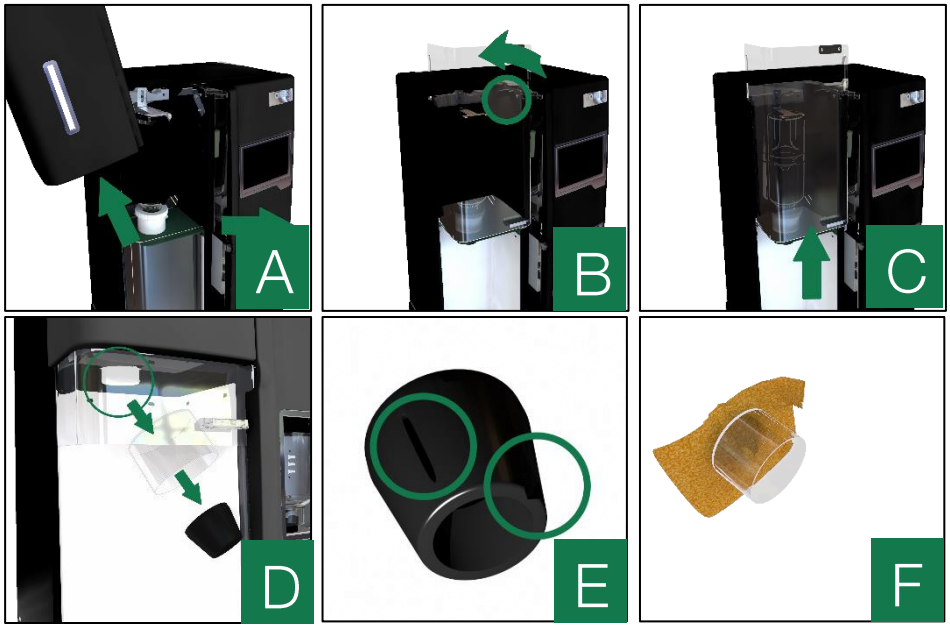
- Check the bottom of the digestion tubes for cracks (B). Most tubes becomes discoloured or “white” in the bottom, which normally is no problem. However, if cracks are discovered then these samples tubes should be discarded.

It is recommended to use OPSIS LiquidLINE tubes. If other tubes are used, take care that they follow the same dimensions (inside diameter, length of tubes) and tolerances as original tubes to avoid leakages or cracks.

7.2. Monthly Maintenance and Cleaning

Once a month an extended user maintenance should be performed. Please follow these instructions to ensure an instrument that will work and perform as expected over time.

7.2.1. Check Rubber Adapter and Clean Protection Cover



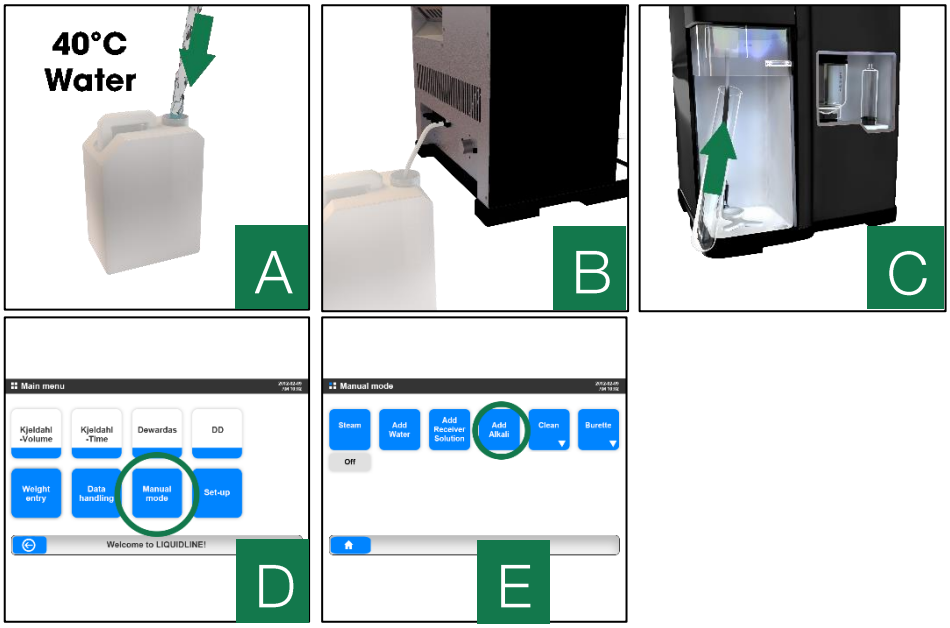
A leaking or damage Tube Cone Adapter will affect your results and also increases the risk for damages to your instrument. It is therefore important to remove the adapter at regular intervals for inspection.

- Remove the Service and Safety Door following the same procedure as in the daily maintenance (A)(B)(C).
- Remove the adapter by pulling it down, also remove the transparent cover (D).
- Inspect the Adapter rubber and notice if there are any scratches or cracks (E). Check also that the adapter has not lost its softness. If something is noted then exchange the adapter against a new Tube Cone Adapter.
- Clean the transparent cover with a wet cloth or wash it with warm water (F).
- Take care when returning the adapter and cover to the instrument. Some force might be necessary in order to put the Tube Cone Adapter in the correct position.

Hint, put the Tube Cone Adapter in hot water during two minutes. It will make the Adapter softer and easier to mount.

- Put back Safety and Service door into the KjelROC Distillation Unit. Take care to move back the Safety door stop and lock it by turning the screw clockwise (A)(B)(C).

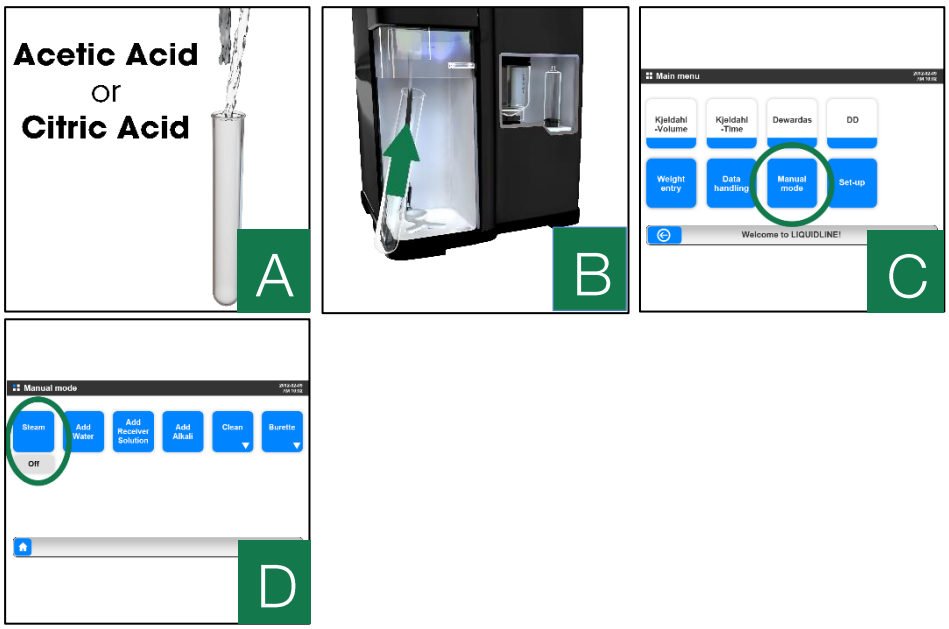
7.2.2. Clean Alkali Pump



It is necessary to clean the Alkali pump at regular intervals to ensure that your pump will last over time.

- Fill distilled warm water, approximately 40°C, in a tank (A).
- Connect the KjelROC Distillation Unit to the tank by placing the tube from the Alkali inlet inside the tank (B).
- Insert an empty 250 ml sample tube in the KjelROC Distillation Unit (C).
- Select MANUAL MODE (D) and then ADD ALKALI (E) to pump water into the sample tube. Several key presses might be necessary in order to fill a tube.
- Repeat until at least one, preferably two or three, tube(s) have been filled with water. Exchange sample tube whenever it is full.
- Remove the warm water tank. Select ADD ALKALI two to three times to ensure that all water is removed from the system.
- Reconnect your Alkali tank and select ADD ALKALI until you see Alkali added into the sample tube.

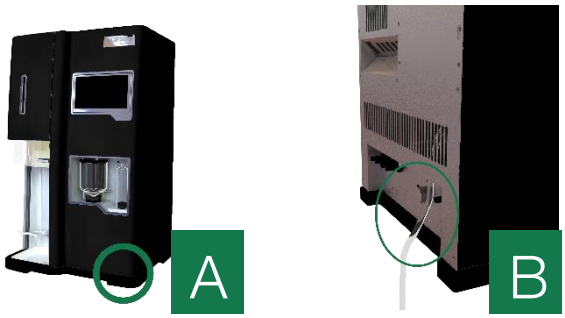
7.2.3. Clean Splash head



The Splash head might become dirty during analysis, which normally is not a problem for the instrument or your analysis results. However, regular check your instrument performance and if carry-over effects are noticed then cleaning of the Splash head is recommended.

- Mix 25 ml of distilled water with 25 ml of concentrated acetic acid (CH_3COOH) in an empty 250 ml sample tube (A). You can also mix a solution of 25 ml distilled water and 1g of citric acid.
- Insert the sample tube inside the KjelROC Distillation Unit and close the Safety door (B).
- Select MANUAL MODE (C) and then STEAM (D). Leave steam on for approximately 10 minutes.
- Replace the tube with a new sample tube containing a new mixture of water and acetic acid. Repeat this at least three times.
- Replace the tube with a new sample tube containing only water and run steam to clean.

7.2.4. Rinse Steam Generator



It is necessary to rinse the steam Generator at regular intervals to remove any residues or deposits inside.

- Switch off the KjelROC Distillation Unit (A)
- Open Steam Generator Drain valve to empty the Steam Generator (B).
- Switch on the KjelROC Distillation Unit and let the pump refill the generator.

7.2.5. Further Adjustments

The KjelROC Distillation Unit is prepared with a specific Managers menu for calibration of pumps, changing time/date and factory restore. Please see the Manager Manual for a description of the features in this menu.

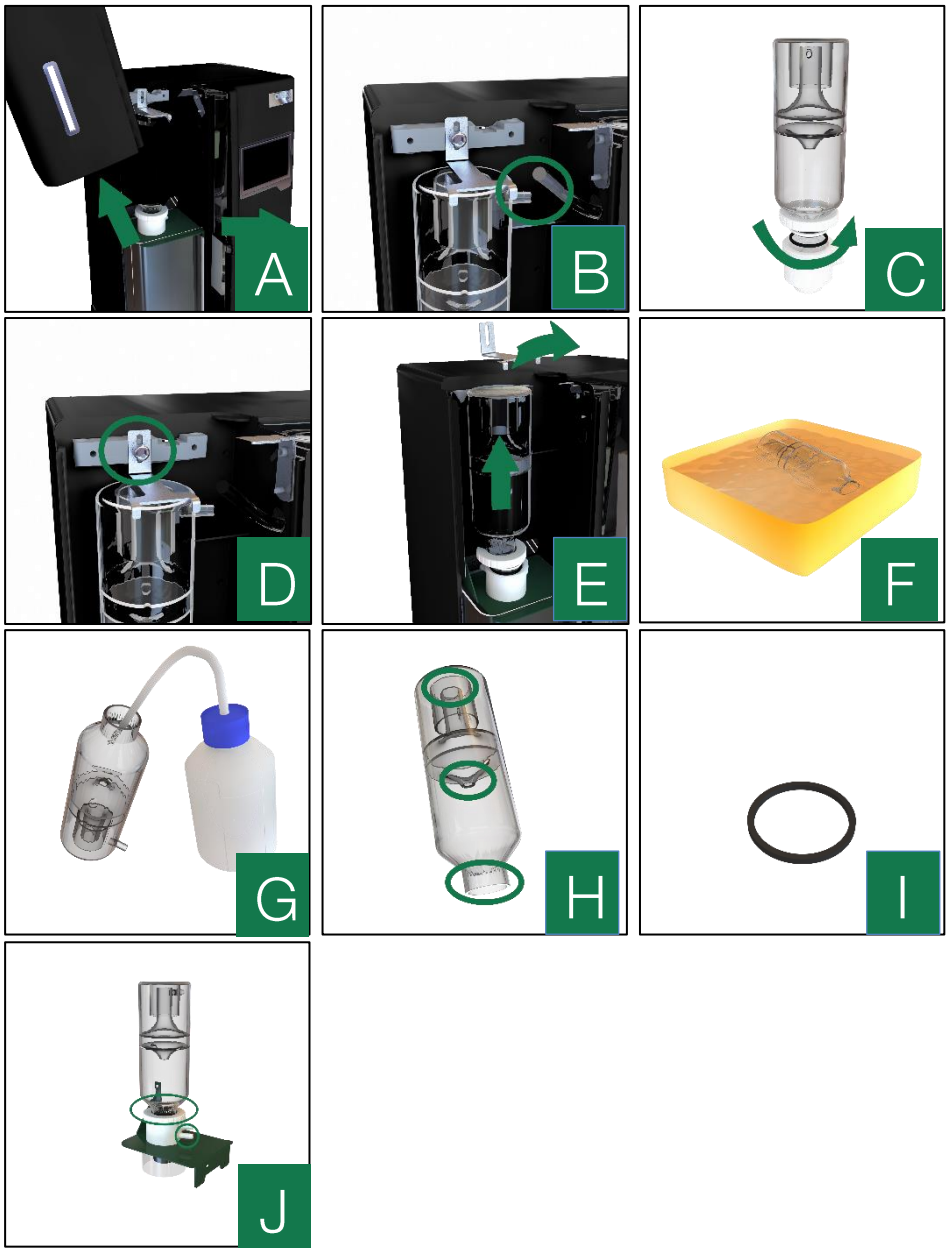
It is also possible to adjust all parameters of the instrument via settings file. In addition of the options in the set-up menu this includes setting date format, adjusting behaviour of Start and other buttons etc. Please see the KjelROC Network Connection Guide or contact your distributor for further instructions how to adjust these settings.

7.3. Additional Maintenance

Every two or three months a more complete user maintenance should be performed. Please consult your OPSIS LiquidLINE representative and follow these instructions to ensure an instrument that will work and perform as expected.

Never open any rear plates without prior approval by an authorized service engineer. Always disconnect the KjelROC Distillation Unit from mains power before any maintenance. Please always also ensure that you have necessary components available before starting to remove or detach any parts from the KjelROC Distillation Unit.

7.3.1. Control and Washing of Splash head



The Splash head is the area above the sample tube that ensures that only nitrogen is released to the receiver vessel. In addition to the monthly cleaning it might also be necessary with a more complete cleaning as well as exchange of this part.

It is recommended that the OPSIS LiquidLINE maintenance program is followed for this part. When inspecting and replacing, please follow these instructions:

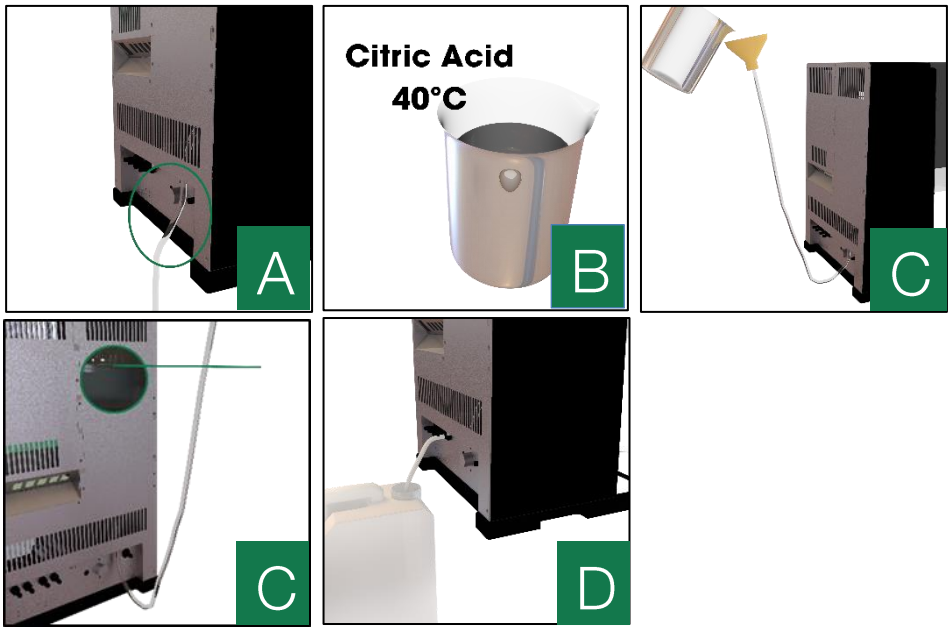
- Disconnect the Power Supply.
- Remove the Service door protecting the Splash head (A).
- Cut the tube between the Splash head and condenser. Remove the tube from the KjelROC Distillation Unit (B).
- Remove the Splash head carefully from the holder by turning the Top cover counter clockwise (C). Remove the stop above the Splash head by turning the screw counter clockwise (D). Move the Splash head upwards (E).
- Prepare a container with a solution of 50% distilled water and 50% concentrated acetic acid (CH_3COOH). A solution with distilled water and citric acid can also be used. Place the Splash head inside the container and leave it there for 5-10 minutes (F). If necessary spray distilled water inside for additional cleaning (G).
- Inspect the Splash head (H)
    - Check for signs of glass that glass has disappeared inside the Splash head. If this is the case then there is no need for immediate replacement. However, this is a sign that Splash head should be replaced soon.
    - Check for signs of leakage at the top area. If there are any holes then Splash head should be replaced.
    - Check for signs of a rim in the bottom area (the part that is covered by the holder). This might indicate an increased risk for leakage in the future. No immediate replacement but if leakage is detected then Splash head should be replaced.
- Put the Splash head back inside the instrument.
    - Put a new tube from the condenser, through the pinch valve.
    - Put the Splash head in place and secure it with the Top cover and the stop above the Splash head (C)(D).

      A new sealing ring should be used when reattaching to avoid leakages (I).

    - Secure the tube from the condenser to the Splash head.
    - Put back the Service door (A)
- Confirm that there is no leakage (J) after reattaching the Splash head by running a couple of blank analyses. You will need to remove the Service door to observe any leakage.

7.3.2. Clean Steam Generator



The frequency how often you will need to clean the Steam generator depends on the environment around the laboratory. In particular the quality of water which should always be distilled, with few particles and at a neutral pH level. Higher hardness of the water will require more frequent cleaning, since more salt deposits will build-up inside the generator.

Always use distilled water for the Steam Generator. However, please note that a certain conductivity is necessary in order for the level pins to work correctly.

- Disconnect the Power Supply.
- Empty the Steam generator by opening the drain valve on the back (A).
- Prepare a solution of 100g Citric Acid in 800ml hot distilled water (B).
- Fill-up the generator by pouring the prepared solution into a funnel (C). Take care so that the inlet is in a higher position than the steam generator (C).
  or
  Fill-up the generator by pumping the prepared solution using the water pump (connect the power supply and switch-on the unit).
- Close the drain valve, whilst the funnel inlet is still above the Steam generator. Leave the solution in the KjelROC Distillation Unit overnight.
- Open the drain valve and empty the steam generator.

- Connect the Power supply and switch on the KjelROC Distillation Unit. The KjelROC will now refill the steam generator with water automatically. Switch off the instrument and empty the steam generator. Repeat two to three times.

7.4. Maintenance Programs By OPSIS LiquidLINE

The KjelROC Distillation Unit has a built-in service system to inform when it is time for service. Intervals will depend on amount of analyses and elapsed time since last service.
To keep your instrument in good shape it is wise to call for service technician when the warning is displayed.
Some parts are recommended to be replaced on a regular basis to assure proper operation. Please consult your authorized service technician. Original parts from OPSIS LiquidLINE should always be used.

8. Installation

Normally we recommend that the installation and first training of the laboratory personal should be done by and authorized OPSIS LiquidLINE technician. However, by carefully following the instructions below it also can be done by others.

8.1. Installation Requirements

- Laboratory bench 0.6 m free space
- Electrical supply 230V +/- 10%
- Power Consumption 2200W
- Water Supply: Cold water tap and drain within 1.5 m from the instrument, 1.75 l/min tap water at 20°C
- Standard Plastic tanks for reagents (10 or 20 litres recommended)

8.2. Unpacking and assembly

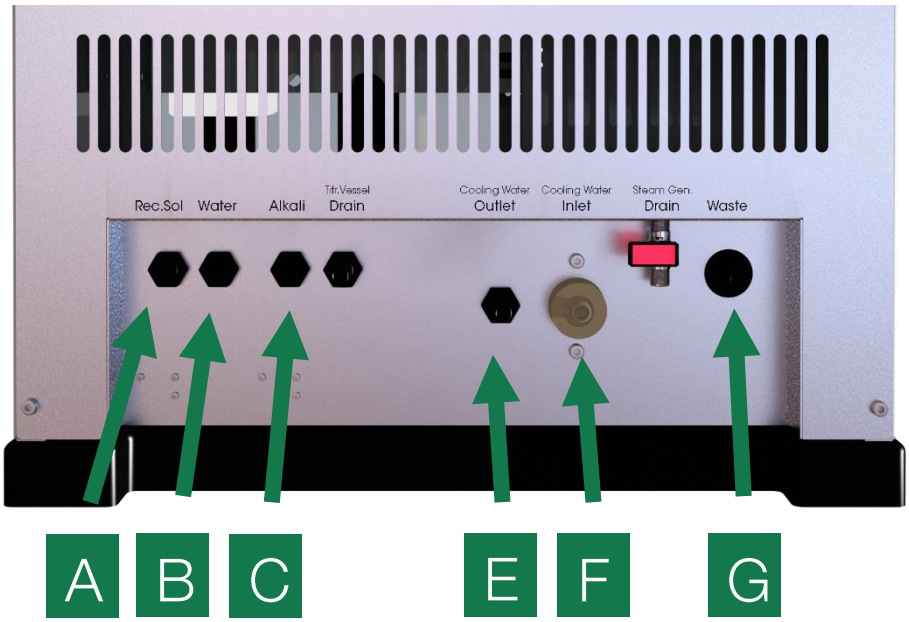
Carefully remove the packing material and make sure there are no transport damages. If so you should directly contact your OPSIS LiquidLINE representative.

To avoid breakage during transport there will be packaging material inside the KjelROC Distillation Unit. Also remove this.

Dependent on choice either the delivered reagent tanks or locally supplied should be connected. Make sure the tube with the level sensor is adjusted to fit the height of the tank. If too long, shorten it.

If local regulations permit waste (alkaline residues) in the drain there is no need for a waste tank. If so the waste level sensor should be deactivated.

8.3. CONNECTING THE KJELROC DISTILLATION UNIT



- Connect All tubes to the KjelROC Distillation Unit
  - In case of a KjelROC Distillation Unit Auto (KD-210). Fill Receiver Solution to Receiver Solution Tank. Connect the PVC tube to rear plate of Analyzer (A).
  - Fill distilled Water to a tank with Water. Mount the supplied water filter to the tube inlet. Connect PVC tube to rear plate of the Distillation Unit (B).

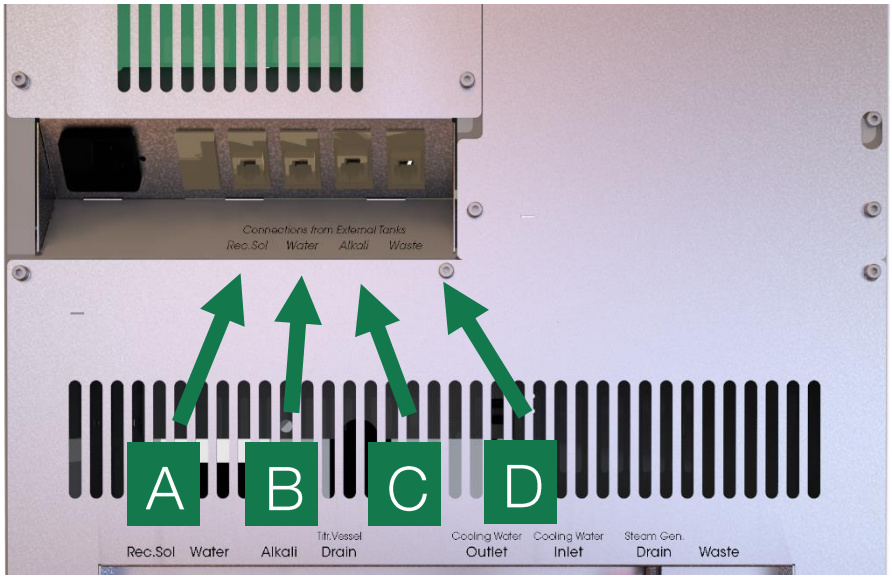
    Please note, Water tank should be installed with the supplied Water filter. The filter looks like a small sponge and should be added at the inlet of the tube that is inserted into the water tank.

  - Fill Alkali into the Alkali Tank. Connect PVC tube to rear plate of the Distillation Unit (C).
  - Connect the PVC tube to the cooling water OUT. Ensure that the outlet is going to the drain (E).
  - Connect the Water tube to the cooling water IN. This tube should be connected to a cold water tap (F).
  - Connect the enforced PVC tube to the Waste outlet, at the rear plate of the Distillation Unit (G).

    Ensure that waste is going to the drain or a waste tank. Make sure that outlet from the Waste is in air and not in any liquid (if so then you will get problem with the automatic Tube Drain).

- Connect the Power to the KjelROC Distillation Unit

- If included in the package, connect the signal from the External Level Pins to the RJ-connectors. If not used then switch off these sensors in the software (MENU->SETTINGS->INSTRUMENT SETTINGS)



  - Connect the Receiver Solution signal to the KjelROC Distillation Unit (A).
  - Connect the Water signal to the KjelROC Distillation Unit (B).
  - Connect the Alkali signal to the KjelROC Distillation Unit (C).
  - Connect the signal from the Waste to the KjelROC Distillation Unit (D).

- Ensure that there is an empty tube inserted into the Distillation Unit

8.4. Starting the KjelROC Distillation Unit

1. Switch on the KjelROC Distillation Unit
2. Check Receiver Pump (MENU->MANUAL->RECEIVER PUMP). You should get receiver solution into the Receiver Vessel. Repeat until success. (Only KD-210)
3. Check Water pump (MENU->MANUAL->WATER PUMP). You should get water into the Tube. Repeat until success.
4. Check the Alkali pump (MENU->MANUAL->ALKALI). You should get Alkali into the Tube. Repeat until success.
5. If you plan to use the automatic Tube Drain then please confirm this function (MENU->MANUAL->TUBE DRAIN). Make sure that the tube is empty before proceeding to the next step.

It is important that the outlet of the waste tube is in the air and not in any liquid, since that might prevent the Auto Drain to function correctly.

6. Check that programs and user access is set-up according to your requirements (i.e., alkali dosing, program names, login codes etc). Switch-off instrument and re-start to confirm that changes are registered into the system.

8.4.1. Optional configuration of Network Connection

Please study the KjelROC Network Connection Guide before setting-up the network connection.

8.4.2. Connect using Ethernet

- Connect an Ethernet cable between your PC network and the KjelROC Distillation Unit. Please note that the KjelROC Distillation Unit expects connection to a DHCP router. Direct connection between a computer and the Distillation Unit will not work.
- Switch on the KjelROC Distillation Unit
- Check that the Distillation Unit connects to the KjelROC network (MENU->SETTINGS->NETWORK SETTINGS). If everything is fine then there will be an IP address for the Distillation Unit.
- You are now ready to transfer files between the Distillation Unit and a computer, using Ethernet.

8.4.3. Connect using Wireless (requires optional KjelROC Wireless Router)

- Place the KjelROC Router near the Distillation Unit and connect an Ethernet cable between the Distillation Unit and the router (not supplied with unit). Connect a KjelROC Wireless router to a power outlet.
- Switch on the KjelROC Distillation Unit
- Check that the Distillation Unit connects to the KjelROC network (MENU->SETTINGS->NETWORK SETTINGS). If everything is fine then there will be an IP address for the Distillation Unit.
- You are now ready to transfer files between the Distillation Unit and a computer, using Wireless.

It is recommended that you make a copy on your computer of settings.ini, service.ini, userdata.ini and wifi.ini (for later support issues). You can use the backup feature of the OPSIS LiquidLINE Transfer Utility program.

It is recommended to make a backup copy of the system before leaving the installation. This can simplify future support.

Depending on your preferences; it is possible to copy the settings.ini file from the settings folder to the backup folder on the Distillation Unit. This means that when you select “Factory Restore” in the Managers menu the instrument will NOT be restored to factory defaults but rather installation defaults.

9. Technical Data

Operating Temperature	5˚C - 40˚C
Relative humidity	max 80 %
Power Supply	190-240 VAC, 50-60 Hz, 10A
Power consumption	2200 W
Dimensions (WxHxD)	430 x 700 x 330 mm
Weight	30 kg

10. Declarations and Requirements

10.1. Declaration of conformity

OPSIS

CE

Declaration of Conformity

Identification of apparatus:	KjelROC Distillation Unit KD-200 KjelROC Distillation Unit KD-210 KjelROC Analyzer KD-310
Model/type:	Kjeldahl Analyzer
Manufacturer:	OPSIS AB Box 244, SE–244 02 Furulund, Sweden Phone: +46 46 72 25 00

The undersigned hereby declares that the above-referenced product, to which this declaration relates, is in conformity with the provisions of:

- Council Directive 2014/30/EU (February 26, 2014) on Electromagnetic compatibility (EMC),
- Council Directive 2014/35/EU (February 26, 2014) on Electrical Safety: low-voltage electrical equipment,
- Council Directive 2006/42/EC (June 9, 2006) on Safety of Machinery,
- Council Directive 2011/65/EU (June 8, 2011) on Restriction of the use of hazardous substances (RoHS 2).

The below harmonised standard specifications have been applied:

Safety:

ANSI/ISA-61010-1 (November 5, 2012) Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use - Part 1: General Requirements

Electromagnetic Compatibility:

Emission: EN 61000-6-3 (2007)

Immunity: EN 61000-6-2 (2005)

October 8, 2018

Svante Wallin
President OPSIS AB

OPSIS AB Box 244, SE-244 02 Furulund, Sweden Phone +46 46 72 25 00 E-mail info@opsis.se www.opsis.se

10.2. FCC REQUIREMENTS (FOR USA AND CANADA)

English:

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to both Part 15 of the FCC Rules and the radio interference regulations of the Canadian Department of Communications. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.

Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

> Caution – Exposure to Radio-Frequency Radiation.
>
> To comply with FCC RF exposure compliance requirements, for mobile configurations, a separation distance of at least 20 cm must be maintained between the antenna of this device and all persons.
>
> This device must not be co-located or operating in conjunction with any other antenna or transmitter.

Français:

Cet appareil a été testé et s'est avéré conforme aux limites prévues pour les appareils numériques de classe A et à la partie 15 des réglementations FCC ainsi qu'à la réglementation des interférences radio du Canadian Département of Communications. Ces limites sont destinées à fournir une protection adéquate contre les interférences néfastes lorsque l'appareil est utilisé dans un environnement commercial.
Cet appareil génère, utilise et peut irradier une énergie à fréquence radioélectrique, il est en outre susceptible d'engendrer des interférences avec les communications radio, s'il n'est pas installé et utilisé conformément aux instructions du mode d'emploi. L'utilisation de cet appareil dans les zones résidentielles peut causer des interférences néfastes, auquel cas l'exploitant sera amené à prendre les dispositions

KjelROC
Distillation Unit
Managers Manual

Version B

1. Contents

2. Introduction

The KjelROC Auto Distillation Unit is designed to facilitate Kjeldahl analysis and Protein determination in a lab. Care has been taken to allow full traceability in the system and therefore there are many levels of access into the instrument. The KjelROC Auto Distillation Unit differentiates between the following scenarios;

2.1.1. Login disabled

There is no login into the instrument. This makes it easy to use the instrument but unfortunately it also means that there is no traceability of operator activity. When login is disabled there is still a code required to enter the settings menu.

2.1.2. Login enabled - Operator access

Login is enabled but the user has only operator level privileges. This allows the user to enter weights (unless this has been disabled via the settings file) and run an analysis. The operator can also retrieve his/her own results but is unable to see other operator results. The operator cannot access the settings menu.

2.1.3. Login enabled - Administrator access

Login is enabled and the user has administration level privileges. In addition to the operator privileges this level also allows access to the settings menu and it is possible to retrieve all results on the instrument.

2.1.4. Managers Menu

There is a Managers menu which will be described in this manual. This menu is for calibration or adjustment of the instrument. The Managers menu is independent of access level and uses its own login code.

Please note that to access the Manager menu the login needs to be enabled (the login code for managers menu is via the login screen).

3. Safety

The KjelROC Auto Distillation Unit is protecting the operator from any hazardous actions. e.g. no steam ore alkali can be dispensed without having a tube in place and the protecting door completely closed. However, as the methods described often involve the use of hot corrosive chemicals every user should read the Safety Instructions or be instructed by the laboratory manager. Below you can find the instruction in all EU languages.

3.1. User Safety

The instrument may only be used by laboratory personnel and other persons who have knowledge and/or experience of doing chemical analysis and dealing with reagents.

Applications not mentioned in this document are improper. In particular, it is forbidden to use the instrument in the following instances:

- Use of the instrument that require ex-protected instruments
- Use of Samples or Reagents which can explode or inflame

It shall be noted that:

- Modifications and upgrades to the instrument shall only be carried out by authorized service personnel
- Service Menus in the Instrument is only to be used by authorized Service Personnel

3.2. Safety Symbols


General Hazard


Corrosive acid


Crushing hazard


Electrical shock hazard


Hot Surface

Explanations used in this manual

 Important, Please Note

 Please Note, Protection Glasses is recommended

 Please Note, Gloves should be used

3.3. Product Safety Systems

The instrument is designed and built in accordance with state-of-the-art technology. Nevertheless, risks to users, property, and environment can arise when the instrument is used carelessly or improperly. If the equipment is not used in a manner specified by this document, the protection provided by the equipment may be impaired.

3.3.1. Maintenance and Service

The Operator is responsible for ensuring that recommended daily and monthly user maintenance is performed on the Instrument. Failure to do so might impair the functionality and/or shorten the lifespan of the instrument.

The operator is responsible to schedule regular Maintenance with authorized service personnel only. Only OPSIS LiquidLINE Spare parts should be used in the instrument.

3.3.2. Safety Sensors

The instrument is equipped with several safety systems

- A Sensor will identify if a tube is placed in the holder. No automatic operation is allowed without tube in place
- The Safety door (protecting the tube) is monitored and no analysis or manual operation is allowed with the door open. Analysis will stop if opened during analysis
- The small door protecting the Splash head is monitored and no analysis or manual operation is allowed with the door open.

Please note that the large door is not monitored in order to allow access to Titration Area during analysis. However, caution should be taken if running analysis with open door.

4. Managers Menu

4.1. Accessing the Managers menu

The Managers menu is accessed via the main login screen, see Fig. 1. Managers Menu. Please note that the login screen is only visible if the login function is enabled in the system.

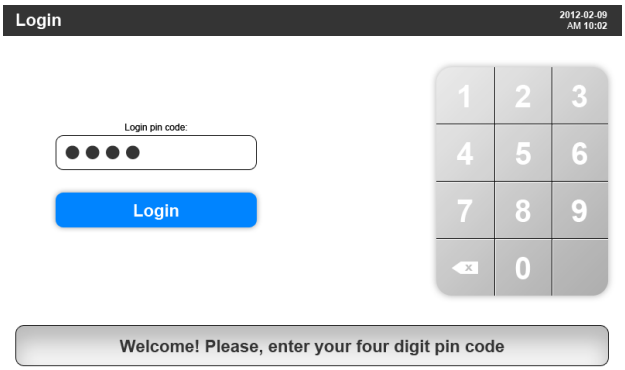


Fig. 1. Managers Menu

The code used to enter the Managers menu is 1 2 3 1 .

4.2. The Managers menu

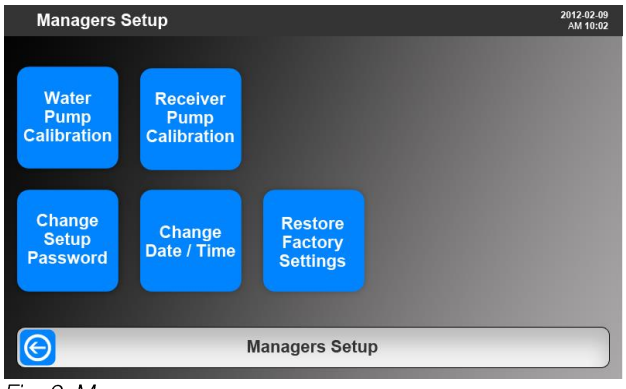


Fig. 2. Managers menu

The Managers menu consists of;

Water Pump Calibration (dosing of water) – in case you want to calibrate the dosing given by the Water pump.

Receiver Pump Calibration (dosing of receiver solution) – in case you would like to calibrate the dosing given by the Receiver Solution pump.

Change Setup Password – change the default password for entering the settings menu

Change Date/Time – change the date and/or time in the instrument

Restore Factory Settings – reload the default settings file into the instrument. Your results will not be affected.

4.3. Water Pump Calibration

The Water pump calibration menu will guide you through the calibration of the water pump.

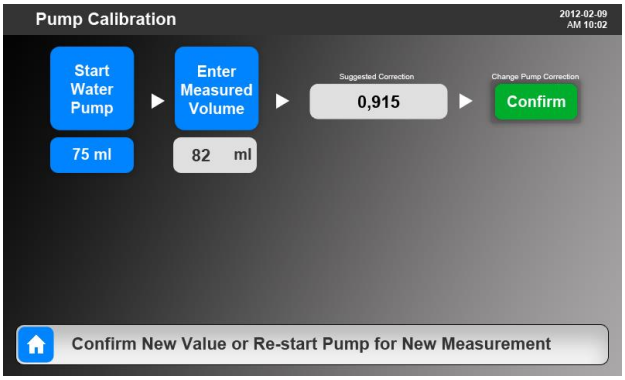


Fig. 3. Water Pump Calibration Menu

Follow these steps to calibrate your pump;

1. Insert an empty tube into the KjelROC Auto Distillation Unit
2. If you want a different amount of dosing water (default is 70 ml) then please press the “ml” button to change. Otherwise press the “Start Water Pump” button and dosing will come into the tube.
3. Measure the dose amount and enter value by pressing on the second “ml” button.
4. Press the “Enter Measured Volume” button and the KjelROC Auto Distillation Unit will suggest a calibration of your pump. If you agree with the suggestion then press Confirm. If you do not want any change then press the Home button instead.

4.4. Receiver Pump Calibration

The Receiver pump calibration menu will guide you through the calibration of the receiver pump.

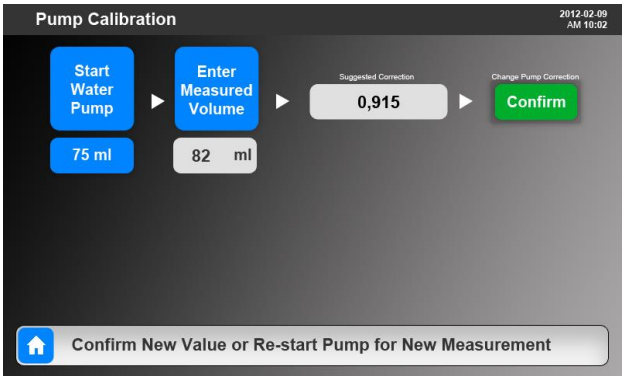


Fig. 4. Receiver Pump Calibration Menu

Follow these steps to calibrate your pump;

5. Insert a receiver vessel into the KjelROC Auto Distillation Unit
6. If you want a different amount of dosing water (default is 30 ml) then please press the “ml” button to change. Otherwise press the “Start Pump” button and dosing will come into the receiver vessel.
7. Measure the dose amount and enter value by pressing on the second “ml” button.
8. Press the “Enter Measured Volume” button and the KjelROC Auto Distillation Unit will suggest a calibration of your pump. If you agree with the suggestion then press Confirm. If you do not want any change then press the Home button instead.

4.5. Change Setup Password

By pressing this button you can change the default Setup password to something else. Default password for the settings menu is 1234.

4.6. Change Date/Time

The Date/Time menu allows you to change the date and time in the instrument.

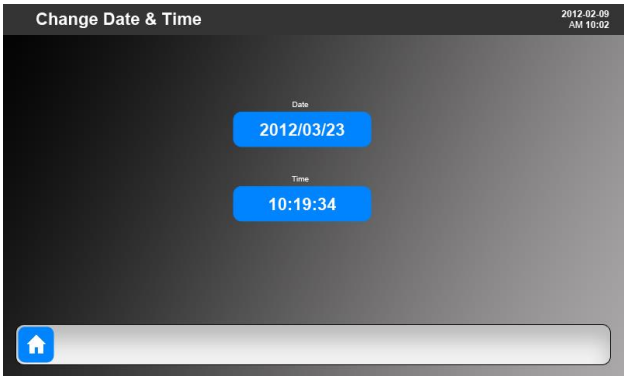


Fig. 5. Date/Time menu

4.7. Restore Factory Settings

The Restore Factory settings button allows you to restore the KjelROC Auto Distillation Unit to the default settings. Unless your service engineer has updated the default settings file to your default installation then this will be factory settings. The restore factory settings will not erase any analytical data, user data or wireless settings.

Please note that after pressing this button you should log out to ensure that the factory settings file is restored. The instrument will thereafter reboot itself with the new settings file.

The Restore Factory Settings will only restore the settings file in the instrument. Results, user information, service information and wireless will remain intact. Please consult your technician in case a full restore is required.

5. References

5.1. Login to Managers Menu

To enter Managers menu: Please press  in the login screen. If login is disabled then you need to enable this first.

5.2. Login to Settings Menu

To enter the settings menu: Default code is 1234.

5.3. Login via Network

To enter the KjelROC Auto Distillation Unit via the Ethernet interface: Use “admin” as user and “admin” as password. Use “operator” and “operator” for network login as an operator.

DASTEC S.R.L.

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