



Ion analysis

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832 KF Thermoprep

Instructions for Use

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1 Introduction

Thanks to its reliability and simple handling, the Metrohm 832 KF Thermoprep is a very versatile instrument. It has been designed for use in production and laboratories and covers a wide range of applications.

The 832 KF Thermoprep can be used wherever it is necessary to heat up a solid or liquid sample and/or to drive off water by the application of heat.

When combined with a coulometric or volumetric KF titrator, the 832 KF Thermoprep forms the ideal analytical system for determining the water content of samples which contain interfering components or which only release their moisture slowly.

Among the decisive advantages of the KF Thermoprep is the reduction of sample preparation to a minimum. By using hermetically sealed sample vessels (headspace vials) the samples can be filled directly on site. The PTFE-coated septa guarantee a constant and true water content, even when the sample have been allowed to stand for a long time.

1.1 Description of the instrument




The 832 KF Thermoprep has been designed primarily for the determination of moisture by the oven method. The samples are heated in the oven block and release their moisture in the form of water vapor; this is transferred to a measuring cell by a carrier gas. The carrier gas stream is produced by a built-in air pump. An inlet valve is also provided for the use of nitrogen or other inert gases. The determination of moisture in the measuring cell can be carried out either coulometrically or volumetrically according to the Karl Fischer method.

The 832 KF Thermoprep is characterized by its compact construction; the oven heating block, air pump, temperature controller, flowmeter and flow controller as well as the drying bottles are already built in.

1.2 Information about these Instructions for Use

Please read through these Instructions for Use before you start to use the 832 KF Thermoprep.

The following notations and pictograms are used in these instructions:

35	Operating element The operating elements are explained on pages 3ff.
	Danger This symbol indicates a possible risk of death or injury to the user and possible damage to the instrument or its components by electricity.
	Danger/Warning This symbol indicates a possible risk of death or injury to the user and possible damage to the instrument or its components.
	Attention This symbol indicates important information. Read the information provided before you continue.

1.3 Parts and controls

1.3.1 Individual parts and standard accessories

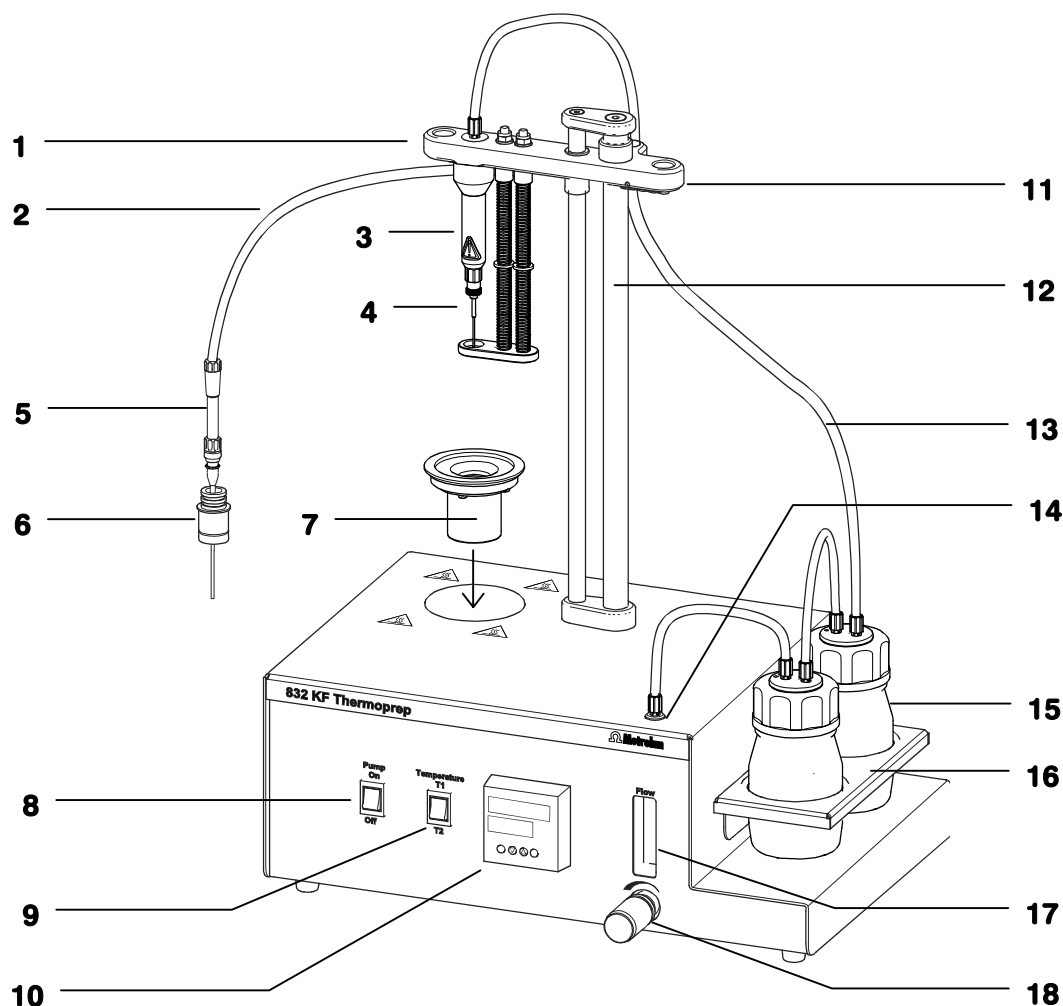


Fig. 1 Front view

1	Guide head	10	Temperature controller
2	Transfer tubing 6.1805.460	11	Clamping lever
3	Spacer 4.832.4190	12	Guide rod
4	Penetration and outlet needle 6.2816.070 and 6.2816.080	13	Inlet tubing 6.1805.020
5	Dosing tip 6.1543.060	14	Air/Nitrogen outlet
6	Septum stopper 6.2730.050	15	Drying bottles 6.1608.050 With 6.1602.140 inset, filled with 6.2811.000 molecular sieve
7	Sample holder	16	Bottle holder
8	Pump switch	17	Flow indicator
9	Temperature selection switch	18	Flow controller

1.3.2 Rear view

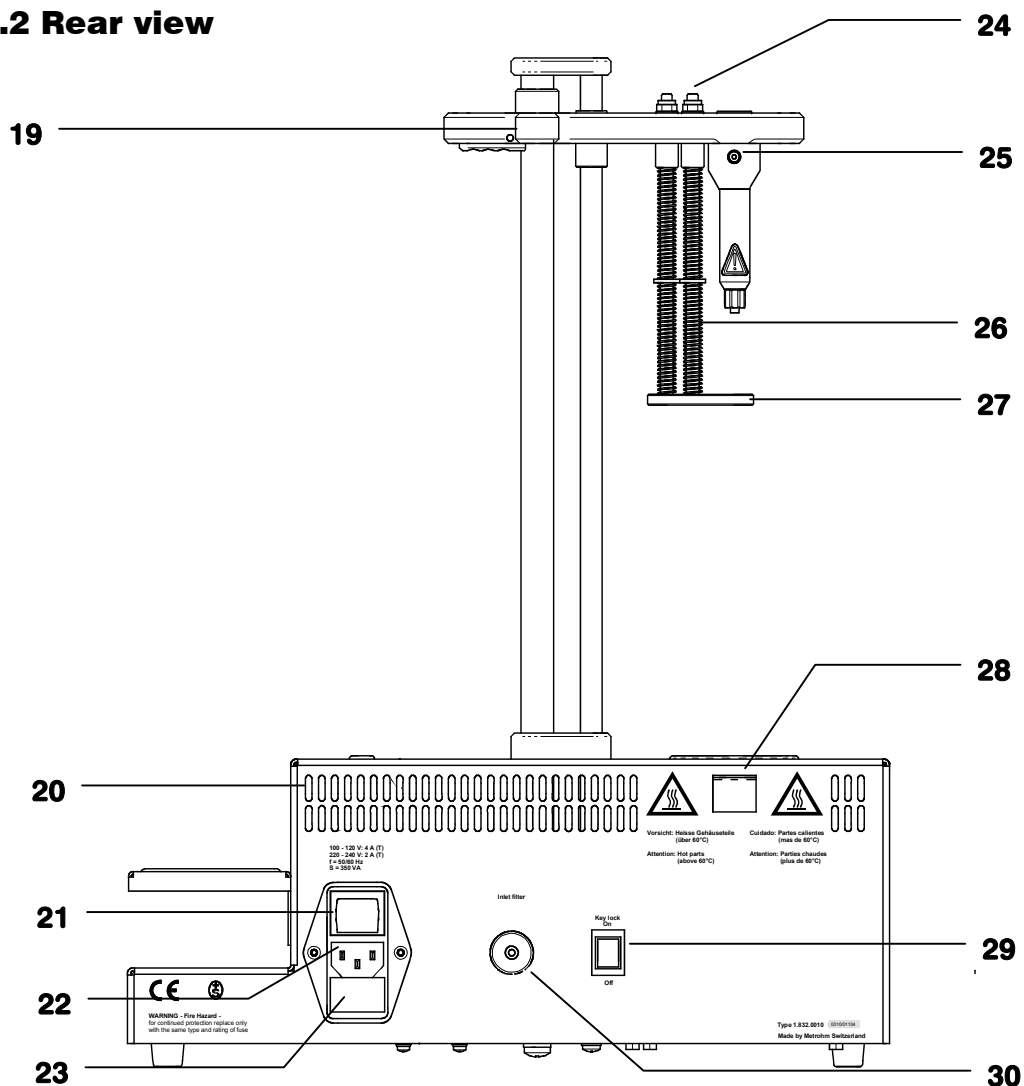
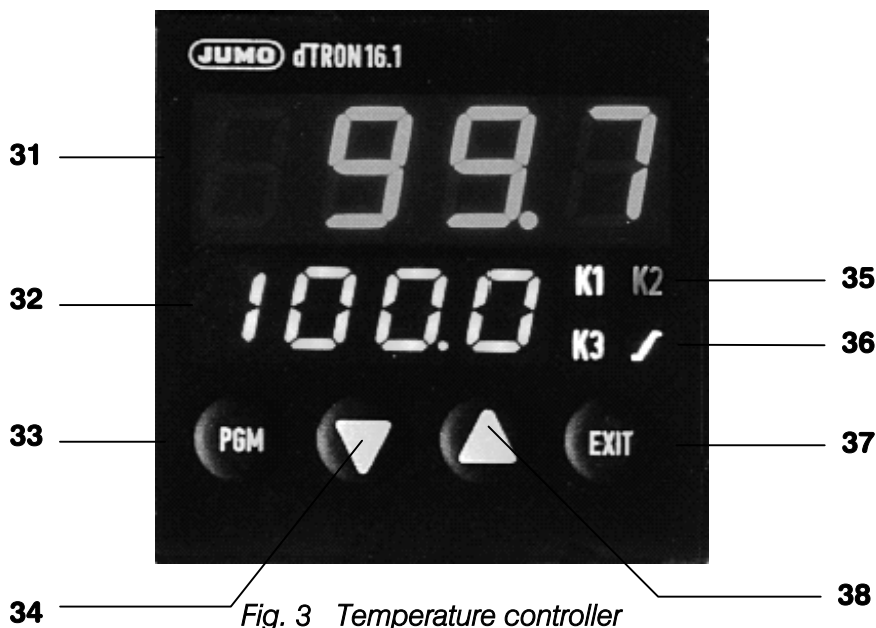


Fig. 2 Rear view

19	Tubing guide	25	Transfer tubing connection
20	Ventilation slots	26	Guide spring
21	Mains switch	27	Needle base
22	Mains connection	28	Hot air outlet
23	Fuse holder	29	Key lock switch
24	Adjustment nuts	30	Air/nitrogen outlet Connection for dust filter (6.2724.010)

1.3.3 Temperature controller



31 Actual value display red, 4-place	35 Output status display yellow, for outputs 1 to 3 (K1 and K3: oven heating, K2: fan)
32 Set value display green, 4-place	36 LED for ramp/program function green, lights if configured
33 Program key for selecting the parameters	37 EXIT key to exit the dialog levels
34 Decrement key for changing values	38 Increment key for changing values

1.3.4 Sample holder for standard vials

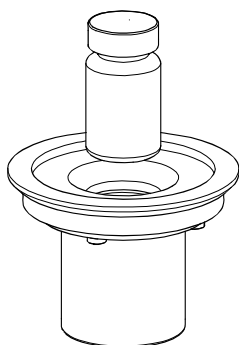


Fig. 4 Sample holder

The dimensions of the 6.2063.000 sample holder are optimized for the Metrohm 6.2419.007 standard sample vials (6 mL). This ensures the highest possible heat flow from the oven to the sample.

If other sample containers with different dimensions shall be used custom made sample holders can be delivered. For this the precise dimensions (incl. dimensional tolerances) must be known.

The measures of non-standard sample containers must vary within the following dimensional limits:

- Diameter 10.0 ... 32.0 mm
- Depth of immersion 20.0 ... 45.0 mm

2 Safety information

**Warning!**

This instrument should only be used in accordance with the information given in these Instructions for Use.

2.1 General

This instrument left our works in perfect condition from the point of view of its operational safety (see Technical data, safety specification). To keep it in this condition and to continue to operate safely the following information must be carefully observed.

2.2 Electrical safety

Please observe the following guidelines:

- Only qualified Metrohm personnel should carry out service work on electronic components.
- Do not open the instrument housing as this could damage the instrument. The housing contains no components which could be serviced or exchanged by the user.

Electrical safety when handling the instrument is guaranteed within the scope of Standard IEC 61010. However, please observe the following point:

Protection against electrostatic charges**Warning!**

*Electronic components are sensitive to electrostatic charges and can be destroyed by a discharge. Always remove the mains connection cable from socket **12** before making or breaking electrical connections on the rear panel of the instrument.*

Connection to the electricity supply:

This instrument must only be operated at the specified mains voltage.

Repair and maintenance:

If faults or malfunctions occur while using the 832 KF Thermoprep we recommended that you first check that the connection to the control instrument has been made correctly.



The instrument must not be opened. This is reserved exclusively for authorized service personnel.

3 Installation

This section describes the things you should pay attention to when unpacking and starting up the 832 KF Thermoprep. It also tells you how a complete automation system is built up.

The following illustration provides an overview of the peripheral devices which can be used with an 832 KF Thermoprep:

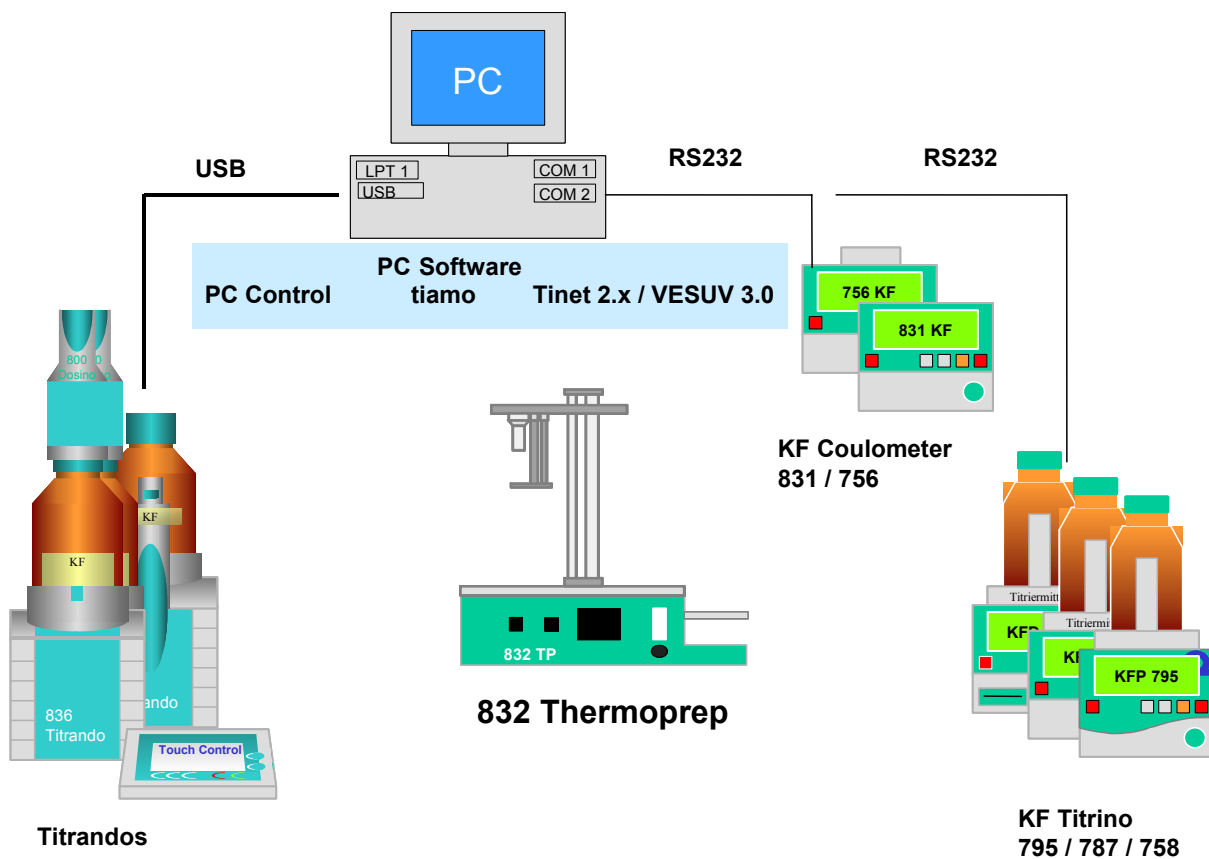


Fig. 5: 832 KF Thermoprep – peripheral devices

3.1 Instrument setup

3.1.1 Packaging

The 832 KF Thermoprep and its specially packed accessories are supplied in very protective special packaging. Please store this packaging in a safe place; it is the only way in which the safe transport of the instrument can be guaranteed.

3.1.2 Checks

Please check that the delivery is complete and undamaged immediately on receipt (compare with delivery note and list of accessories given in Section 8.28.2). If transport damage is evident please refer to the information given in Section 8.4.1 "Warranty".

3.1.3 Location

The 832 KF Thermoprep has been developed for use indoors and must not be used in explosion-endangered surroundings.

Place the instrument on a suitable vibration-free laboratory bench, protected as much as possible from corrosive atmospheres and contamination by chemicals.

Select a location in which the ambient temperature is normally between +5 °C and +45 °C. The instrument should be protected against excessive variations in temperature and direct sunshine.



If an instrument which has been stored under cold conditions is brought into a warm room then the atmospheric humidity may condense inside the instrument and form water. In order to avoid damaging the instrument please wait for at least one hour before switching it on.

3.2 Mains connection



Please observe the following rules when connecting the instrument to the electricity supply. If the instrument is operated with an incorrectly set mains voltage and/or an incorrect mains fuse then it represents a fire hazard!

Setting the mains voltage

Before you switch on the 832 KF Thermoprep for the first time please check that the mains voltage set on the instrument (see illustration on the following page) corresponds to your local mains voltage. If this is **not** the case then you must alter the mains voltage as follows:

- **Pull out mains cable**
Remove the mains cable from the mains supply connection of the 832 KF Thermoprep.
- **Remove the fuse holder**
Use a screwdriver to loosen the fuse holder beside the mains supply connection and remove it completely.
- **Check the fuse and replace it**
Carefully remove the built-in fuse for the intended voltage from the fuse holder and check its specifications (the position of the fuse in the fuse holder is indicated by the white arrow beside the voltage range):

100...120 V 4 A (slow blow)	Metrohm-No. U.600.0022
220...240 V 2 A (slow blow)	Metrohm No. U.600.0019
- **Insert fuse**
Exchange the fuse if necessary and replace it in the fuse holder.
- **Insert fuse holder**
Depending on the required mains voltage, insert the fuse holder so that the white arrow of the corresponding voltage range points to the white bar; this is to the right of the fuse holder (see below).

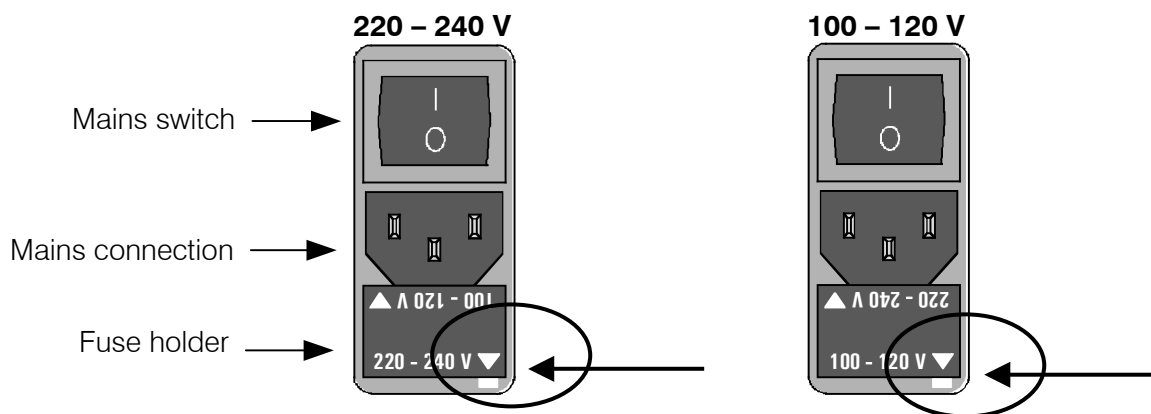
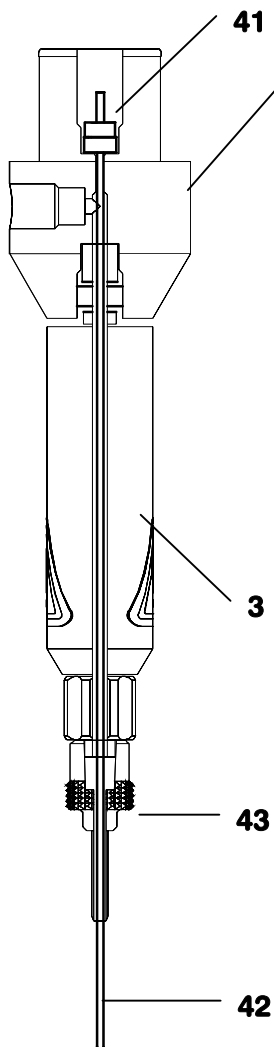


Fig. 6 Fuse holder

3.3 Assembling the 832 KF Thermoprep

3.3.1 Assembling the needles



- Screw spacer **3** (4.832.4190, L=58 mm) into distributor **39**. For special requirements, e.g. different sample vials, custom-made spacers can be supplied, see p. 27.
- Place PTFE distance ring **41** (supplied with the needle) on penetration needle **42** (6.2816.070) and insert this into distributor **39** from above (see left). Pull penetration needle **42** down as far as it will go.
- Slide hollow outlet needle **43** over penetration needle **42** from below and fasten it to Luer-lock connector of the spacer **3**.
- Connect inlet tubing **13** (6.1805.020, 52 cm) to distributor **39** from above and fasten it. This fixes penetration needle **42** in the proper position.

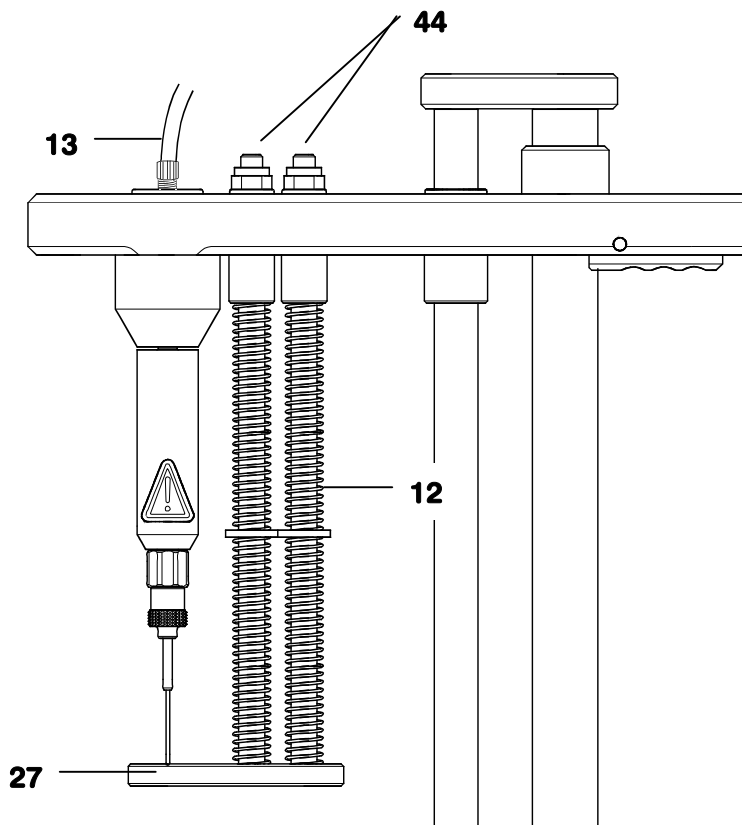
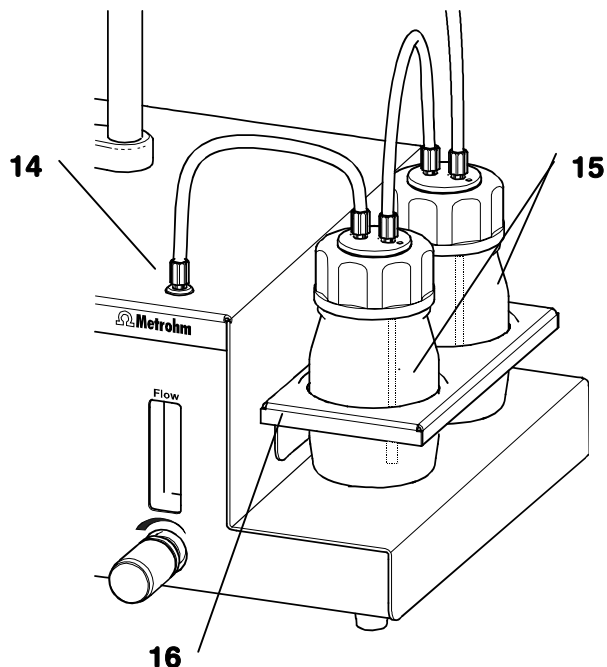


Fig. 8 Guide head with needles

To prevent possible injury the height of needle base **27**, which protects the tip of penetration needle **42**, can be adjusted. Screw adjustment nuts **44** of guide rod **12** until the needle tip is flush with the lower side of needle base **27**.

3.3.2 Attaching the drying bottles

1. Fill 6.1608.050 drying bottles **15** with 6.2811.000 molecular sieve and place 6.1821.040 outlet tube (with 6.2821.090 filter) in 6.1602.140 screw cap. Screw the screw caps onto the drying bottles.



2. Place drying bottles **15** in holder **16** of the oven. Screw the 6.1805.180 Tubing (16 cm) to the inlet tubing connection of the front drying bottle. The carrier gas must enter the drying bottle at the top of the bottle. Connect the other end of the tubing to the air/nitrogen outlet **14** (see drawing).
3. The rear drying bottle is connected to the front bottle using 6.1805.010 Tubing (13 cm). Screw the tubing onto the outlet tube of the front bottle and connect the other end to the inlet connection of the rear drying bottle. The carrier gas must enter the rear drying bottle at the top of the bottle.
4. Screw 6.1805.020 Tubing (52 cm) onto the outlet tube of the rear drying bottle and lead it through the tubing guide on the guide head of the 832 KF Thermoprep. The free end of the tubing is screwed onto the connection provided for it on the guide head.

When attaching the tubing please observe the following:

To filter the carrier gas before leaving the drying bottle, it must be led through the outlet tube to the outlet connection.

5. 6.1805.460 Transfer tubing (27 cm) is screwed onto the back of the distributor piece. Attach 6.1543.060 Dosing tip to the other end of the tubing and insert it into the titration vessel.

3.3.3 Attaching the dust filter

Attach 6.2724.010 Dust filter to the '**Inlet filter**' connection on the rear panel of the instrument.

If nitrogen is to be used as the carrier gas then the nitrogen inlet tubing can be attached directly to the dust filter tubing nozzle.

3.4 Assembling the coulometric cell

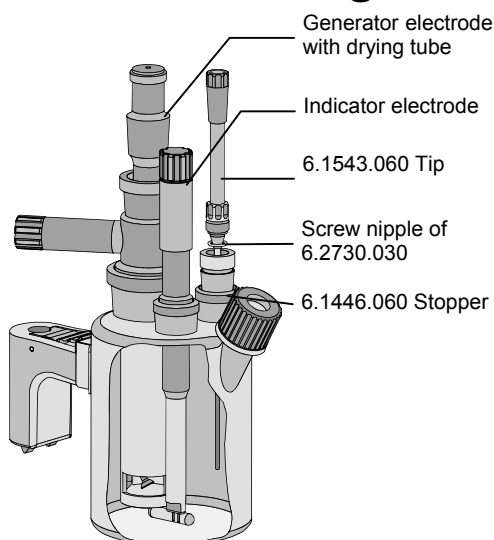


Fig. 9 Coulometer cell

The coulometer cell is setup for the gas inlet as follows:

6.1543.060 Tip is screwed into the 6.1446.060 Stopper by using the screw nipple (screw nipple of 6.2730.030 with O-ring) and the stopper is inserted into the SGJ 14/15 opening.

If simultaneous aspiration is necessary while gas is being led in then the gas inlet tubing must be inserted into the side inlet. This requires the use of the following parts:

Tip 6.1543.060
Screw cap 6.2701.040

Sealing ring A.254.0104

A titration vessel with 2 side-mounted inlets is also available: order number 6.1465.320.

3.5 Assembling the titration vessel for volumetric KF titrators

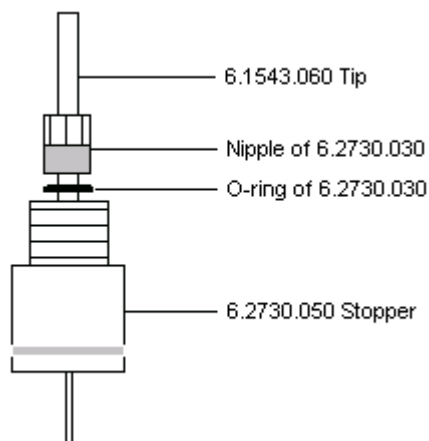


Fig. 10 Volumetric KF cell

The titration vessel is adapted for the gas inlet in the following way:

Instead of the 6.2730.020 Septum stopper, the 6.2730.050 Stopper is used with 6.1543.060 Tip. (Nipple and O-ring of 6.2730.030 from the Titrino accessories.)

4 Operation

This section describes the basic principles of handling the 832 KF Thermoprep.

4.1 Inserting and removing sample vials

As the oven of the 832 KF Thermoprep can reach a temperature of 250 °C, vials must only be inserted in or removed from the oven by using crimping pliers or other tools. Hot vials should only be placed on temperature-resistant surfaces.

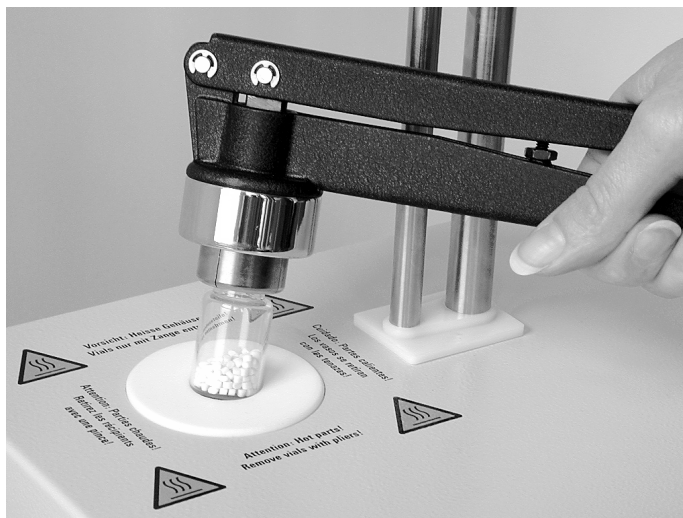


Fig. 11 Crimping pliers

4.2 Needle penetration

Always lower guide head **1** by using both hands. In this way you can avoid injuring yourself on the needle.

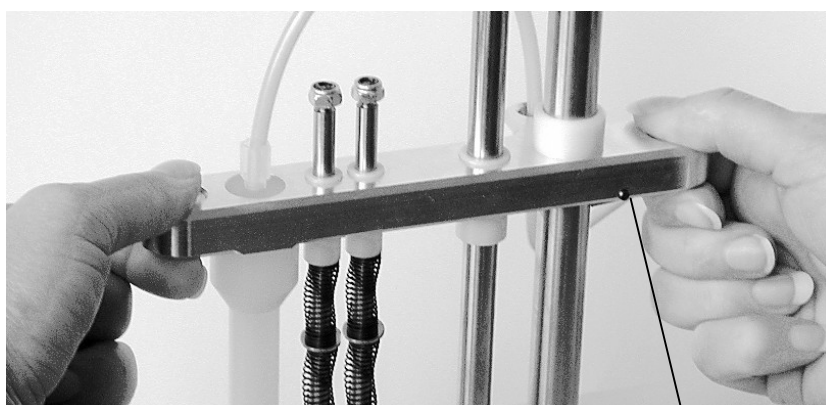


Fig. 12 Loosening the guide head

Clamping lever
11

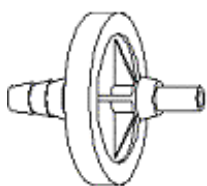
Loosen the red clamping lever by pressing it strongly and lower the guide head and needle by using both hands. Penetrate the vial septum with the needle and lower the guide head until it reaches the bottom stop.



Fig. 13 Needle in lowered position

4.3 The pump

The 832 KF Thermoprep is equipped with a powerful air pump, with which the released humidity of the sample can be transferred to a titration cell in a constant carrier gas stream.



Attach a 6.2724.010 dust filter to the air inlet **30** on the instrument's rear side. Avoid the intrusion of dust particles.

The dust filter must be replaced in a regular equipment service.

If thermal unstable samples, which may decompose at higher temperatures are treated, the use of nitrogen as carrier gas is highly recommended. Connect the nitrogen supply pipe to the hose olive of the dust filter. The maximum pressure of the nitrogen supply must not exceed 1 bar.

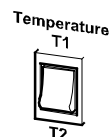
4.4 The temperature controller

The best proven **dTron 16.1 (JUMO)** temperature controller of the 832 KF Thermoprep is very easy to use for routine operation of the instrument. Fine adjustment of the control parameters is possible but not normally necessary. Unappropriate parameters of configuration settings may cause faults of the instrument. The default settings can be used without any problems. The temperature controller **10** also has a comfortable and simple self-optimization function which can be used if necessary.

4.4.1 Two set temperatures



The temperature controller of the 832 KF Thermoprep can store two set temperatures (T1 and T2). You can switch between these two set temperatures by using the temperature selection switch.





Temperature display

The display indicates the real value and the set value (T1 or T2).

The oven starts to heat up as soon as the instrument is switched on and is controlled at the set temperature (T1 or T2). If a switch is made from one set temperature to the other one then this will be adopted immediately by the temperature controller, i.e. the oven will immediately heat up or cool down until the set temperature has been reached.

4.4.2 Setting a temperature

The desired temperature (T1 or T2) is easily set by using the two arrow keys  (increment key **38**) and  (decrement key **34**) of the temperature controller. The set temperature can be altered at any time, regardless of whether the set temperature has been reached or not.

Please observe the green set value display **32**. This always refers to the set temperature T1 or T2 which has been selected. Longer pressure on an arrow key changes the set value more quickly. Altered set values are immediately accepted by the temperature controller.

If the key lock function (tumbler switch **29** on the rear panel of the housing) is switched on then no settings can be made.

4.4.3 Self-optimization of the control parameters

Self-optimization should only be used when the set temperature cannot be achieved by the temperature controller or when the actual temperature varies about the set temperature by more than 2...5 °C (overshooting).

Preparation

Set the same conditions as would be used in a real determination.

- Set the temperature (T1 or T2) to a value corresponding to a real determination (e.g. 120 °C).
- Wait until the oven has reached the set temperature.
- Insert a sealed sample vial containing a sample in the oven.
- Lower the work head and completely penetrate the sample vial septum with the needle.
- Switch on the pump (or open the nitrogen valve) and set the gas flow to a realistic value which would be used during a proper determination.

Self-optimization

- Start the self-optimization process with **EXIT** (keep key **37** pressed down for at least 2s!).

During the self-optimization process "tunE" blinks in the display **31**. When the blinking stops the process is finished. Self-optimization normally takes 1 to 5 minutes. The duration depends on the selected temperature, i.e. the higher the temperature the shorter it takes.

- Save the control parameters which have been determined by pressing the **EXIT** key **37** for 2 seconds.

The self-optimization process can be canceled by pressing the **EXIT** key **37** briefly.

4.4.4 Key lock function

The temperature controller settings can be protected against accidental alteration. On the rear panel of the 832 KF Thermoprep the 'Key Lock' tumbler switch **29** can be switched to 'On'.

If the key lock function is switched on the 'Temperature' tumbler switch **9** can still be used to select the two set temperatures T1 and T2. It is also possible to switch the pump on and off (key **8**).

However, no alteration can be made to the temperature controller **10** with the key lock function switched on.

4.5 Working procedure

**Warning!**

As both the sample vials and the oven become very hot the sample vials must be removed from the oven by using the crimping pliers. The sample vials should only be placed on a heat-resistant surface.

In principle two different methods can be used.

For samples with a low water content one (or more) blank values must be determined and subtracted from the water content determined for the sample. Sample vials contain a considerable amount of atmospheric humidity, e.g. Metrohm standard vials with a volume of 6 mL can contain 60...150 μg water. While the determination is being carried out atmospheric moisture can also enter the coulometer cell as a result of leaks, etc.

For samples with a high water content blank value determinations are not necessary as the atmospheric humidity contained in the vial is negligible when compared with the moisture contained in the sample. If no blank determinations are carried out then the whole procedure is simplified and takes less time.

Determinations with the 832 KF Thermoprep basically take part in three phases:

1. Preparing / Conditioning the system
2. Possibly determining the blank value
3. Determination of the sample

The procedure for determinations with the 756/831 Coulometer is described below. A similar procedure can be used with a volumetric KF titrator (e.g. 795 KFT Titrino).

**Note**

When using either a coulometer or a volumetric KF titrator it is absolutely essential that an extraction time of at least 300 s is observed per determination. More details are given in the Instructions for Use of the particular instrument.

4.5.1 Preparing the 832 KF Thermoprep/756/831 Coulometer system

1. Switch on the 832 KF Thermoprep. The oven heats up automatically to set temperature T1 or T2.
2. If necessary use the set value switch to alter set temperature T1 or T2.
3. Place an empty sealed vial in the oven.
4. Lower the needle until the stop is reached. Both hands should be used for safety reasons.
5. Switch on air pump (if N₂ is used open the nitrogen valve).
6. Check the gas flow at the flowmeter **17** and alter it if necessary (optimal range: 40...60 mL/min).
7. Start the 756/831 Coulometer and allow it to be conditioned.
8. Let the oven heat up until the set temperature is reached and the coulometer cell is conditioned.

4.5.2 Determination with blank value subtraction

Determination of blank value(s)

1. Load a method for a blank value determination (e.g. Blank) into the coulometer. The mean value of the blank value determinations should be stored as a common variable. Set the extraction time to 300 s.
2. Start conditioning the coulometer (with the **<START>** key).
3. Wait until the set temperature has been reached and the coulometer cell is conditioned.
4. Start the blank determination at the coulometer with **<START>**.
5. Raise the needle fully and remove the conditioning vial from the oven with the crimping pliers.
6. Insert an empty sealed vial (blank sample) in the oven using the crimping pliers.
7. Lower the needle until it reaches the stop and pierce the septum cap.
8. After the determination wait for post-conditioning to be completed and, if necessary, carry out further blank value determinations, i.e. repeat the procedure from item 3 onward.

Sample determination

1. Load a method for a sample determination into the coulometer. The mean blank value, stored as a common variable, is to be subtracted from the sample result. Set the extraction time to 300 s.
2. Start conditioning the coulometer (with the **<START>** key).
3. Wait until the set temperature has been reached and the coulometer cell is conditioned.
4. Start the determination at the coulometer with **<START>**.

5. Raise the needle fully and remove the blank sample vial from the oven with the crimping pliers.
6. Insert the sealed sample vial in the oven using the crimping pliers.
7. Lower the needle until it reaches the stop. Enter the sample size at the coulometer and confirm it with **<ENTER>**.
8. After the determination wait for post-conditioning to be completed and, if necessary, carry out further determinations.

4.5.3 Determination without blank value subtraction

Sample determination

1. Load a method for a sample determination into the coulometer. The result calculation must not contain any blank value subtraction. Set the extraction time to 300 s. 'Value' must be entered under '>Preselection' | 'Request sample size'.
2. Start conditioning the coulometer (with the **<START>** key).
3. Wait until the set temperature has been reached and the coulometer cell is conditioned.
4. Start the determination at the coulometer with the **<START>** key.
5. Raise the needle fully and remove the conditioning vial from the oven with the crimping pliers.
6. Insert the sealed sample vial) in the oven using the crimping pliers.
7. Lower the needle until it reaches the stop. Enter the sample size at the coulometer and confirm it with **<ENTER>**.
8. After the determination wait for post-conditioning to be completed and, if necessary, carry out further determinations.

4.6 Practical information

Selecting the carrier gas

Nitrogen (N₂) should be used as the carrier gas if the hot sample is sensitive to air or oxygen (decomposition) or releases substances which interfere with the KF reaction.

Temperature setting

Select as high a temperature as the sample allows (high temperature = short analysis time). However, the sample must not decompose. It should not release any other oxidizable substances than water. The temperature shown on the temperature controller refers to the temperature in the aluminum heating block and not to the sample temperature. Depending on the size of vial used and the temperature setting, the sample temperature could vary by up to 10%.

Gas flow

The gas flow is set on the flow controller on the front panel of the 832 KF Thermoprep and passes through the drying bottles. The gas flow should be kept as low as possible. With very moist samples in particular care must be taken that large amounts of water do not enter the titration vessel too quickly. The solution in cell must be able to absorb the driven-off moisture. A flow rate of 40...60 mL/min is normally optimal. If the needle is inserted in the sample bottle until the stop is reached then the flow of gas through the sample will be transferred to the titration vessel via the outlet needle. The moisture is then titrated in the titration vessel.

Extraction time

An extraction time of at least 5 min should be set on the connected titrator, in order to prevent the titration from being stopped before all the sample has released all its moisture.

Conditioning the system

Before a measurement the system must be conditioned with an empty sealed sample vial (conditioning vessel).

Literature

- Hydranal[®] Manual, Water reagents for Karl-Fischer-Titration, Riedel-de Haën, 1987
- The following Metrohm Application Bulletins can be obtained free of charge:
 - No. 109 Karl Fischer water determination with the KF drying oven
 - No. 145 Determination of low water contents in plastics using the KF oven method
 - No. 217 Karl Fischer water determination in pharmaceuticals using the oven method

5 Maintenance information

The 832 KF Thermoprep does not need a lot of care. Ensure that it does not become excessively dirty and is not exposed to corrosive atmospheres.

- Renew used-up molecular sieve in good time. The molecular sieve should be exchanged as soon as increased drift values occur in the Karl Fischer cell.
- Rinse the tubing and the distributor occasionally and carefully dry the tubing.
- Clean the oven compartment at regular intervals.
- Replace the dust filter on the rear panel when necessary.

6 GLP validation

Each instrument produced by Metrohm undergoes a rigorous quality control check before delivery.

GLP (Good Laboratory Practice) requires, among other things, that the precision and correctness of analytical instruments are checked at regular intervals by using **SOPs (Standard Operating Procedure)**.

Recommended literature

- Metrohm leaflets "Quality Management with Metrohm", detailed information about the principles and procedures of Good Laboratory Practice
- Metrohm Application Bulletin 252/1 "Validation of Metrohm titrators according to GLP/ISO 9001"

7 Troubleshooting

7.1 Problems

Problem	Possible cause	Remedy
Titration results widely scattered.	Molecular sieve in the drying bottles is used up.	➡ <i>Replace molecular sieve. (If the molecular sieve in the front bottle is still OK then this bottle can be used as the rear bottle. The "freshest" molecular sieve belongs in the front bottle.)</i>
	Condensate in the outlet tubing.	➡ <i>Dry the tubing. Reduce gas flow. Possibly lower the temperature.</i>
	Gas flow too high.	➡ <i>Reduce gas flow</i>
	Inhomogeneous sample.	➡ <i>Reduce sample particle size before weighing.</i>
	Not all the moisture has been driven out.	➡ <i>Set "harder" switch-off conditions at the titrator: Lower stop drift, increased switch-off delay.</i>
	Leaky tubing connections.	➡ <i>Check tubing and replace if necessary.</i>
Drift too high.	Molecular sieve in the drying bottles is used up.	➡ <i>Replace molecular sieve. (If the molecular sieve in the front bottle is still OK then this bottle can be used as the rear bottle. The "freshest" molecular sieve belongs in the front bottle.)</i>
	Leaky titration vessel O-rings.	➡ <i>Replace O-rings.</i>
	Leaky septum cap.	➡ <i>Replace septum cap.</i>
Titration time too long.	Inhomogeneous sample.	➡ <i>Reduce sample particle size before weighing.</i>

8 Annex

In this section you will find the most important technical data of the 832 KF Thermoprep, a list of standard and optional accessories and the warranty and conformity declarations.

8.1 Technical data

8.1.1 Oven

<i>Temperature range</i>	50...250 °C
<i>Correction range</i>	-10...+10 °C
<i>Heating power</i>	200 VA
<i>Heating rate</i>	15 °C/min

8.1.2 Air pump

<i>Delivery rate</i>	0...300 mL/min (0...18 L/h)
<i>Adjustment range</i>	0...80 mL/min (0...4.8 L/h)

8.1.3 Temperature controller

<i>Make</i>	JUMO dTRON 16.1
<i>Temperature control</i>	Self-optimizing microprocessor controller, can be used as 2-point, 3-point or continuous controller
<i>Display</i>	2x 7-segment digital display of set and actual values

8.1.4 Power supply

<i>Voltage</i>	100...120 V, 220...240 V
<i>Frequency</i>	50...60 Hz
<i>Power consumption</i>	220 VA

8.1.5 Safety specifications

<i>Construction and testing</i>	According to IEC 61010, EN 61010, EN50093, protection class 3
<i>Safety information</i>	The Instructions for Use contains safety information that must be observed by the user in order to ensure the safe operation of the instrument.

8.1.6 Electromagnetic compatibility (EMC)

Emission	Standards fulfilled: - EN/IEC 61326-1 - EN 55022 class B - CISPR 22 class B - EN/IEC 61000-3-2 class A - EN/IEC 61000-3-3 - Namur
Immunity	Standards fulfilled: - EN/IEC 61326-1 - EN/IEC 61000-4-2 - EN/IEC 61000-4-3 - EN/IEC 61000-4-4 - EN/IEC 61000-4-5 - EN/IEC 61000-4-6 - EN/IEC 61000-4-8 - EN/IEC 61000-4-11 - Namur

8.1.7 Ambient temperature

Nominal working range	+5...+45 °C (at max. 85% relative humidity)
Storage	-20 °C...+60 °C
Transport	-40 °C...+60 °C

8.1.8 Dimensions and materials

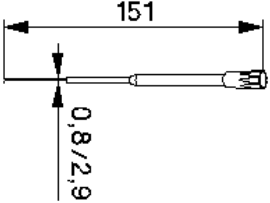
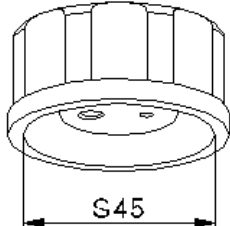
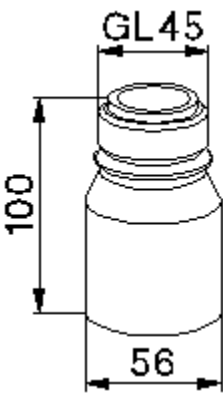
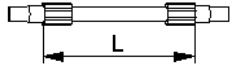
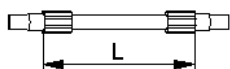
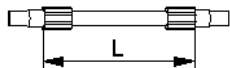
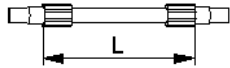
Height	49.5 cm
Width	35.5 cm
Depth	22.0 cm
Weight	approx. 8.9 kg (without accessories)
Housing material	Metal housing, surface-refined

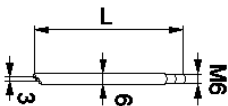

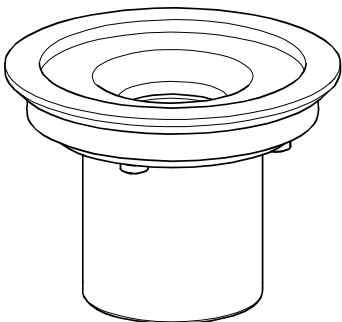
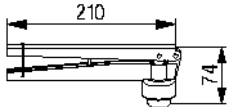
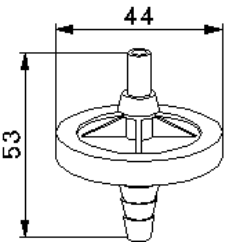
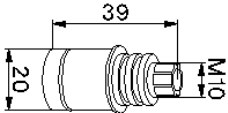
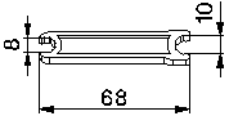
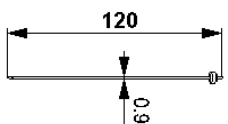
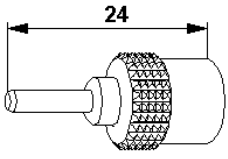
8.2 Standard equipment

Immediately upon receipt of the instrument please check that the delivery is complete.

8.2.1 832 KF Thermoprep

Order no. 2.832.0020

No.	Order no.	Description
1	1.832.0020	832 KF Thermoprep KF oven for processing single samples in sealed vials. The following accessories are supplied as standard:
1	6.1543.060	ETFE/FEP dosing tip 
2	6.1602.145	Drying bottle insert 
2	6.1608.050	Clear glass bottle GL 45, 100 mL 
1	6.1805.010	FEP tubing, M6, L=13 cm 
1	6.1805.020	FEP tubing, M6, L=52 cm 
1	6.1805.180	FEP tubing, M6, L=16 cm 
1	6.1805.460	FEP tubing, M6, L=27 cm 

2	6.1821.040	Inlet tube for drying bottle, with filter, L=92 mm	
1	6.2049.030	Spacer with Luer-Lock needle connector, L=58mm	
1	6.2063.000	Sample holder for 6.2419.007 sample vials (6 mL)	
1	6.2621.110	Crimping pliers	
1	6.2724.010	Dust filter, 32 mm diameter	
1	6.2730.050	Stopper for dosing tip, M10, with O-ring	
1	6.2739.000	Tubing nipple wrench	
1	6.2811.000	Molecular sieve, 250 g	
1	6.2816.070	Penetration needle	
1	6.2816.080	Outlet needle	
100	6.2419.007	Sample vials, 6 mL	
100	6.1448.057	Septum seals for sample vial 6.2419.007	
1	8.800.1023	Instructions for Use for 832 KF Thermoprep	

8.3 Optional accessories

8.3.1 Sample vials

<i>Order no.</i>	<i>Description</i>
6.2419.000	Sample vials , 6 mL, 1000 ea.
6.1448.050	Septum seals for sample vial, 1000 ea.

In order to use other sample vials with different dimensions the sample holder of the 832 KF Thermoprep must be replaced. Please contact your Metrohm distributor.

For further accessories please see Metrohm Accessories Catalog.

8.4 Warranty and conformity

8.4.1 Warranty

The warranty on our products is limited to defects that are traceable to material, construction or manufacturing error which occur within 12 months from the day of delivery. In this case, the defects will be rectified in our workshops free of charge. Transport costs are to be paid by the customer.

For day and night operation, the warranty is limited to 6 months.

Glass breakage in the case of electrodes or other parts is not covered by the warranty. Checks which are not a result of material or manufacturing faults are also charged during the warranty period. For parts of outside manufacture insofar as these constitute an appreciable part of our instrument, the warranty stipulations of the manufacturer in question apply.

With the regard to the guarantee of accuracy, the technical specifications in the instruction manual are authoritative.



Concerning defects in material, construction or design as well as the absence of guaranteed features, the orderer has no rights or claims except those mentioned above.

If damage of the packaging is evident on receipt of a consignment or if the goods show signs of transport damage after unpacking, the carrier must be informed immediately and a written damage report demanded. lack of an official damage report releases Metrohm from any liability to pay compensation.



If any instruments and parts have to be returned, the original packaging should be used if at all possible. This applies above all to instruments, electrodes, burette cylinders and PTFE pistons. Before embedment in wood shavings or similar material, the parts must be packed in a dust-proof package (for instruments, use of a plastic bag is imperative). If open assemblies are enclosed in the scope of delivery that are sensitive to electromagnetic voltages (e.g. data interfaces etc.) these must be returned in the associated original protective packaging (e.g. conductive protective bag). (Exception: assemblies with built-in voltage source belong in a non-conductive protective packaging).

No warranty responsibility whatsoever will be accepted by Metrohm for damage which arises as a result of non-compliance with these instructions.

8.4.2 EU Declaration of Conformity for 832 KF Thermoprep

 <p>EU Declaration of Conformity</p>					
<p>The Metrohm Ltd. company, Herisau, Switzerland hereby certifies, that the instrument:</p> <p style="text-align: center;">832 KF Thermoprep</p> <p>meets the requirements of EU Directives 89/336/EEC and 73/23/EEC.</p>					
<p>Source of specifications:</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 20%; padding: 5px;">EN 61326-1</td> <td style="padding: 5px;">Electromagnetic compatibility, basic specification Emitted Interference, Interference Immunity</td> </tr> <tr> <td style="padding: 5px;">EN 61010-1</td> <td style="padding: 5px;">Safety requirements for electrical laboratory measurement and control equipment</td> </tr> </table>		EN 61326-1	Electromagnetic compatibility, basic specification Emitted Interference, Interference Immunity	EN 61010-1	Safety requirements for electrical laboratory measurement and control equipment
EN 61326-1	Electromagnetic compatibility, basic specification Emitted Interference, Interference Immunity				
EN 61010-1	Safety requirements for electrical laboratory measurement and control equipment				
<p>Description of the instrument:</p> <p style="text-align: center;">Instrument with sample heating block, temperature controller and air pump for processing samples according to the Karl Fischer oven method.</p>					
<p>Herisau, May 30, 2002</p> <div style="display: flex; justify-content: space-around; align-items: center; margin-top: 20px;"> <div style="text-align: center;">  <p>Dr. J. Frank Development Manager</p> </div> <div style="text-align: center;">  <p>Ch. Buchmann Production and Quality Assurance Manager</p> </div> </div>					

8.4.3 Declaration of Conformity

Certificate of Conformity and System Validation	
<p>This is to certify the conformity to the standard specifications for electrical appliances and accessories, as well as to the standard specifications for security and to system validation issued by the manufacturing company.</p>	
<p>Name of commodity: Manufacturer: Technical specifications:</p>	<p>832 KF Thermoprep Metrohm Ltd., Herisau, Switzerland Distribution voltage: 100...120, 220...240 V Frequency: 50...60 Hz</p>
<p>The instrument was manufactured and tested according to the following standards:</p>	
<p>Electromagnetic compatibility:</p>	
<p><i>Emission</i> IEC 61326-1, EN 55022 class B, CISPR 22 class B EN/IEC 61000-3-2 class A, EN/IEC 61000-3-3</p>	
<p><i>Immunity</i> EN/IEC 61326-1, EN/IEC 61000-4-2, EN/IEC 61000-4-3, EN/IEC 61000-4-4, EN/IEC 61000-4-5, EN/IEC 61000-4-6, EN/IEC 61000-4-8, EN/IEC 61000-4-11, EN/IEC 61000-4-14</p>	
<p>Security specifications</p>	
<p>EN/IEC 61010-1, UL 3101-1</p>	
<p>It has also been certified by the Swiss Electrotechnical Association (SEV), which is member of the International Certification Body (CB/IEC).</p>	
<p>The technical specifications are documented in the instruction manual.</p>	
<p>Metrohm Ltd. is holder of the SQS-certificate of the quality system ISO 9001 for quality assurance in design/development, production, installation and servicing.</p>	
<p>Herisau, May 30, 2002</p>	
 <p>Dr. J. Frank Development Manager</p>	 <p>Ch. Buchmann Production and Quality Assurance Manager</p>

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