USER GUIDE

HMK15

Vaisala · Authorized Partner

Distributed by AKRIBIS

M210185EN-E

User Guide

Vaisala Humidity Calibrator

HMK15

VAISALA

PUBLISHED BY

Vaisala Oyj
Vanha Nurmijärventie 21, FI-01670 Vantaa, Finland
P.O. Box 26, FI-00421 Helsinki, Finland
+358 9 8949 1

Visit our Internet pages at www.vaisala.com.

© Vaisala 2022

No part of this document may be reproduced, published or publicly displayed in any form or by any means, electronic or mechanical (including photocopying), nor may its contents be modified, translated, adapted, sold or disclosed to a third party without prior written permission of the copyright holder. Translated documents and translated portions of multilingual documents are based on the original English versions. In ambiguous cases, the English versions are applicable, not the translations.

The contents of this document are subject to change without prior notice.

Local rules and regulations may vary and they shall take precedence over the information contained in this document. Vaisala makes no representations on this document's compliance with the local rules and regulations applicable at any given time, and hereby disclaims any and all responsibilities related thereto.

This document does not create any legally binding obligations for Vaisala towards customers or end users. All legally binding obligations and agreements are included exclusively in the applicable supply contract or the General Conditions of Sale and General Conditions of Service of Vaisala.

Table of contents

1. About this document 7
1.1 Version information 7
1.2 Related manuals 7
1.3 Documentation conventions 8

2. Product overview 9
2.1 Introduction to HMK15 9
2.2 Salt package calibration certificates 10
2.3 Safety 11

3. Preparing salt solutions 12
3.1 Before preparation 12
3.2 Salt properties 13
3.3 Preparing solutions 13

4. Calibration of humidity instruments 18
4.1 Thermometer 19
4.2 Calibration 21
4.3 Greenspan's calibration table 22
4.4 Transportation 24
4.5 On-site calibrations 25

5. Maintenance 27

6. Technical data 28
6.1 HMK15 specifications 28
6.2 Spare parts and accessories 29
6.2.1 HMK15 chamber lid options 30

Maintenance and calibration services 33

Technical support 33

Warranty 33

List of figures

Figure 1 HMK15 calibrator and selected accessories....9
Figure 2 Salt chamber....18
Figure 3 Using thermometer sleeve....19
Figure 4 Inserting thermometer....20
Figure 5 Using thermometer holders....21
Figure 6 Optional transit bag for HMK15....24
Figure 7 Stabilization time when probe is removed from process....25
Figure 8 Stabilization time when transportation and calibration site temperatures are different....26

List of tables

Table 1 Document versions (English)....7
Table 2 Related manuals....7
Table 3 Greenspan's calibration table....23
Table 4 O-rings used in HMK15....27
Table 5 HMK15 measurement performance....28
Table 6 HMK15 operating environment....28
Table 7 HMK15 mechanical specifications....28
Table 8 HMK15 spare parts and accessories....29

1. About this document

1.1 Version information

This document provides information for operating and maintaining Vaisala Humidity Calibrator HMK15.

Table 1 Document versions (English)

Document code	Date	Description
M210185EN-E	July 2022	This manual. Updated sections: • Introduction to HMK15 (page 9) • Maintenance (page 27) • Spare parts and accessories (page 29)
M210185EN-D	March 2021	Previous version. New document template. Updated sections: • Introduction to HMK15 (page 9) • Before preparation (page 12) • Thermometer (page 19) • Calibration (page 21) • HMK15 specifications (page 28) • Spare parts and accessories (page 29) Added sections: • HMK15 chamber lid options (page 30) Added information on the KCl salt option throughout the document. Removed references to the discontinued mercury thermometer and HMP233 probe.
M210185EN-C	March 2006	Added chapter *General Information*. Updated chapter *On-Site Calibration and Transportation*.

1.2 Related manuals

Table 2 Related manuals

Document code	Name
M211060EN	*Vaisala HMP60 and HMP110 Humidity and Temperature Probes User Guide*
M211289EN	*Vaisala Dew Point Transmitter DMT132 User Guide*

1.3 Documentation conventions

WARNING! Warning alerts you to a serious hazard. If you do not read and follow instructions carefully at this point, there is a risk of injury or even death.

CAUTION! Caution warns you of a potential hazard. If you do not read and follow instructions carefully at this point, the product could be damaged or important data could be lost.

Note highlights important information on using the product.

2. Product overview

2.1 Introduction to HMK15

Vaisala Humidity Calibrator HMK15 has been developed for the calibration and checking of humidity probes and transmitters. The functioning of the calibrator is based on the fact that certain salt solutions generate a specific relative humidity in the air above them.

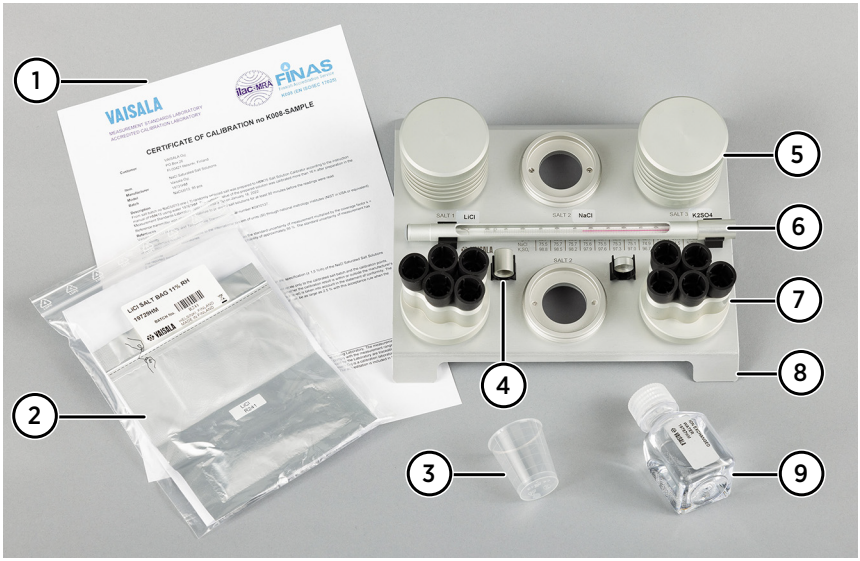


Figure 1 HMK15 calibrator and selected accessories

1 Calibration certificate for salt package
2 Ready-dosed salt package (accessory)
3 Measurement cup
4 Calibration adapter
5 Salt chamber with transit cover on
6 Thermometer
7 HMK15 basic chamber lid with rubber plugs
8 Base plate
9 Ion-exchanged water (accessory)

The four holes in the **HMK15 basic chamber lid** are designed for Vaisala probes and transmitters with 12 mm (0.47 in) diameter. The fifth hole is for the thermometer delivered with HMK15.

The **HMK15 universal lid** is suitable for probe models with 12 mm (0.47 in), 13.5 mm (0.53 in), or 18.5 mm (0.73 in) diameter.

Optional **custom lids** are available for Vaisala DMT132 dew point transmitter and Vaisala HMP60 and HMP110 humidity and temperature probes [1]. For instructions on using HMK15 with DMT132 and HMP60/HMP110, see the respective user guides, available at docs.vaisala.com.

The following salt solutions, for example, are suitable for HMK15:

- Lithium chloride LiCl (11 %RH)
- Magnesium chloride $MgCl_2$ (33 %RH)
- Sodium chloride NaCl (75 %RH)
- Potassium chloride KCl (85 %RH)
- Potassium sulphate K_2SO_4 (97 %RH)

In calibration, the sensor head is inserted into a salt chamber containing a saturated salt solution. The reading given by the probe or transmitter is then adjusted to the humidity value that the specific salt solution generates at that particular temperature.

To ensure the sensor accuracy over the entire humidity range (0 ... 100 %RH), calibration is usually performed at least at two different humidities.

HMK15 is suitable for both laboratory and field use. The chambers can be tightly closed for transportation with custom-designed transit covers. The optional transit bag (item code HM27032) allows the calibrator to be transported in vertical position or to be housed during calibration.

Accessories include additional salt chambers, ion exchanged water, transit bag, and ready-dosed salt packages: LiCl (11 %RH), $MgCl_2$ (33 %RH), NaCl (75 %RH), KCl (85 %RH), and K_2SO_4 (97 %RH).

More information

- Related manuals (page 7)
- Spare parts and accessories (page 29)
- HMK15 chamber lid options (page 30)

2.2 Salt package calibration certificates

The ready-dosed salt packages available from Vaisala are delivered with calibration certificates given on the basis of a batch check. In other words, a sample of packages is taken from a batch and salts are prepared according to the instructions given in this manual. These salt solutions are then checked at the Vaisala Measurement Standards Laboratory (a calibration laboratory accredited by FINAS, a member of the European Cooperation for Accreditation of Laboratories). The calibration certificate certifies that the equilibrium humidities generated by these salt solutions correspond to Greenspan's calibration table within the specified accuracy.

1) *Vaisala item codes of custom lids: 230914 and 253277SP.*

More information

- Greenspan's calibration table (page 22)
- HMK15 specifications (page 28)

2.3 Safety

This product has been tested for safety. Note the following precautions:

CAUTION! Do not modify the unit. Improper modification can damage the product or lead to malfunction.

CAUTION! Never add water to dry LiCl salt; the salt may heat up so rapidly that it splashes out of the chamber.

CAUTION! LiCl is harmful when swallowed; the solution is also corrosive.

3. Preparing salt solutions

3.1 Before preparation

Prepare the salts using the equipment provided with the calibrator or make sure that all accessories used are suitable for preparing salt solutions and are absolutely clean. If necessary, wash them carefully and rinse several times before preparing the salt solutions. The last rinse must be made with distilled or ion exchanged water.

The salts are quick and easy to prepare with the ready-dosed salt packages available from Vaisala. If you do not use ready-dosed salt packages, measure the salts using the measurement cup provided. Make sure that the cup is clean before measuring the salts. The salt solutions must be prepared from pro analysis grade salts, which are available in agencies selling industrial chemicals. Note that the water must be distilled or ion exchanged (conductivity < 0.25 µS/cm). You can order ion exchanged water as an accessory for the HMK15 calibrator (item code 19767HM).

Handle the salts and equipment carefully and keep them absolutely clean so that the salts are not contaminated. Make sure that the salts do not mix.

There must not be more than 10 mm (0.39 in) of undissolved salt and liquid at the bottom of the salt chamber. Otherwise, the sensor to be calibrated may get immersed into the solution. If necessary, verify the amount, for example, with the measurement spoon.

The use of saturated salt solutions is covered by several standards, including ASTM E104 - 20a and JIS Z 8806.

Some salts in the ready-dosed salt packages, especially potassium chloride, may harden slightly over time. This may happen even with the vacuum bag intact. Before using a salt bag with hardened salt inside, break up the salt with, for example, a small rubber mallet. Shelf life of unopened salt bags is 2 years.

3.2 Salt properties

- **Lithium chloride** generates a reference humidity of approximately 11 %RH. It is normally used as the dry end (offset) reference.

CAUTION! Never add water to dry LiCl salt; the salt may heat up so rapidly that it splashes out of the chamber.

CAUTION! LiCl is harmful when swallowed; the solution is also corrosive.

If the LiCl solution is used or stored in temperatures below +18 °C (+64 °F), its equilibrium humidity changes permanently.

- **Magnesium chloride** generates a reference humidity of approximately 33 %RH. It is often used as a checkpoint if calibration is performed at more than two points.
- **Sodium chloride** generates a reference humidity of approximately 75 %RH. It is used as the wet end reference (gain) for probes measuring in applications with normal humidities.
- **Potassium chloride** generates a reference humidity of approximately 85 %RH.
- **Potassium sulphate** generates a reference humidity of approximately 97 %RH. Potassium sulphate is used as the wet end reference (gain) for probes measuring in applications with very high humidities, 90 ... 100 %RH (for example, outdoor and concrete measurements).

3.3 Preparing solutions

Prepare the salt solutions according to the following instructions. The required amounts are given in grams and milliliters. Measure the salts carefully if you do not use the ready-dosed packages.

1. Take the calibrator out of the box and place it on a clean, even surface.
2. Remove the transit cover of the salt chamber.
3. Remove the chamber lid from the chamber holder and put it aside.

4. Press the transit cover on the chamber holder.

5. Pour the required amount of ion exchanged water into the salt chamber.

- **LiCl**: 12 ml
- **$MgCl_2$**: 3 ml
- **NaCl**: 10 ml
- **KCl**: 10 ml
- **K_2SO_4**: 10 ml

6. Sprinkle the contents of a salt package (or measure the required amount of salt [1]) in small quantities into the chamber, stirring constantly.

- **LiCl**: 15 g / 18 ml
- **$MgCl_2$**: 30 g / 30 ml
- **NaCl**: 20 g / 15 ml
- **KCl**: 30 g / 30 ml
- **K_2SO_4**: 30 g / 20 ml

When measuring with the measurement cup, make sure that the cup is clean and dry. Rinse and dry the cup after every use.

7. When all the salt has been sprinkled into the chamber, the saturated salt solution should have a ratio of 60 ... 90 % undissolved salt to 10 ... 40 % liquid.

1) *The liquid volumes given in ml are approximations. Vaisala recommends that you use the masses when measuring the salts.*

8. Close the salt chamber with the chamber lid.

9. Fasten the salt chamber on the holder in the base plate and close the measurement holes with rubber plugs.

   The chambers can also be used individually, without the base plate.

> The rubber plugs have three steps, each of which is suitable for a certain hole diameter: the first step for the 12 mm (0.47 in), the second step for the 13.5 mm (0.53 in), and the third step for the 18.5 mm (0.73 in) hole. Keep the holes always closed when not calibrating.

10. Write the preparation date on a sticker and use it to mark the chamber. If you use a ready-dosed salt package, use the sticker with the batch code. Mark all parts of the salt chamber (chamber, chamber lid, and transit cover) with stickers. This way, the lids/covers and different salts do not get mixed.

11. Allow approximately 24 hours for stabilization before use so that the salt solution reaches the equilibrium humidity.

If you do not use the instrument for a longer period of time, close the chambers with the transit covers.

More information

- Maintenance (page 27)
- HMK15 chamber lid options (page 30)

4. Calibration of humidity instruments

Errors during humidity calibration are commonly due to temperature differences. A temperature difference of ±1 °C at +20 °C (+68 °F) between the air in the chamber and the sensor causes an error of ±3 %RH at 50 %RH and an error of ±6 %RH at 97 %RH. The length of the stabilization time depends on how great the difference is between the transportation or process temperature and the calibration site temperature. In laboratory use, the calibrator should be stored where the room temperature is most stable. The calibrator must be kept out of direct sunlight and away from localized heat sources, such as spotlights, heaters, and soldering irons. If the probe or transmitter is checked against several humidity references, the checking must first be made at the dry end. For more information, see the respective transmitter or probe user guide at www.vaisala.com.

Handle the probe as little as possible. Do not hold the salt chamber or other parts of the calibrator in your hand during calibration as they warm up and cause errors in the readings.

Even the smallest water drop on the probe near the sensor distorts the readings. Make sure that the chamber lids and rubber plugs are carefully closed.

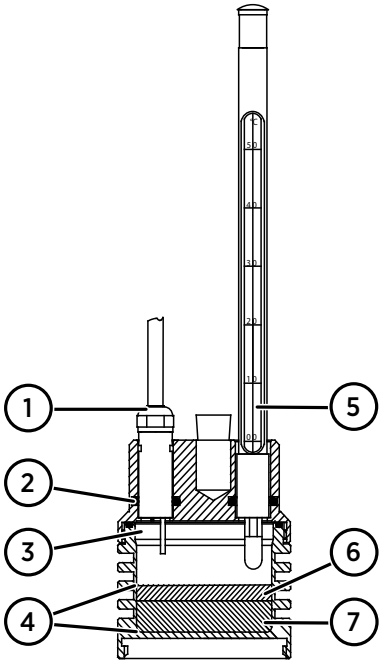


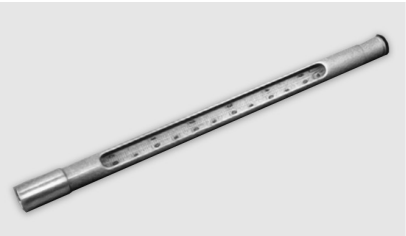
Figure 2 Salt chamber

1 Humidity probe
2 O-rings
3 Sensors
4 Max. depth 10 mm (0.39 in)
5 Thermometer
6 Saturated salt solution
7 Undissolved salt

4.1 Thermometer

The calibrator comes with a thermometer containing red capillary liquid, and a factory calibration certificate by the thermometer manufacturer. [1)]

You can use the sleeve at the end of the thermometer's protective tube in two different positions. The thermometer is delivered with the sleeve protecting the part containing the capillary liquid (left image). When you turn the sleeve the other way around (right image), it acts as an adapter when the thermometer is inserted into the 13.5 mm (0.53 in) hole in the chamber lid.



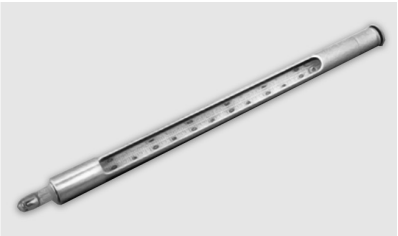


Figure 3 Using thermometer sleeve

1) *When adjusting temperature readings, Vaisala recommends using a mercury thermometer for its superior accuracy and stability compared to a thermometer with red capillary liquid.*

During calibration, the thermometer is inserted into the 13.5 mm (0.53 in) hole of the chamber lid. Press it downwards until it passes the O-rings. The thermometer is correctly in place when you can feel a resistance while pressing it downwards.

Figure 4 Inserting thermometer

When the thermometer is not in use or the calibrator is transferred from one place to another, place it in the thermometer holders.

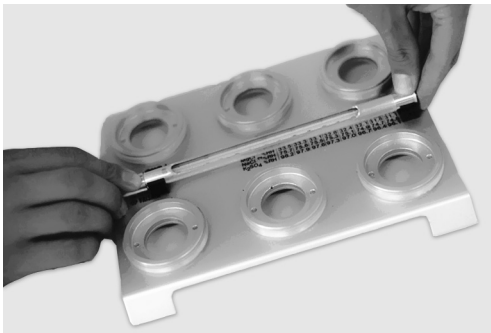


Figure 5 Using thermometer holders

4.2 Calibration

Leave the HMK15 calibrator and the probe at the calibration site for at least 30 minutes before starting the calibration in order to let the probe temperature stabilize to room temperature.

With lithium chloride, it is not necessary to use the thermometer, as the humidity reading changes only very slightly in temperature range +25 ... +30 °C (+77 ... 86 °F). However, if you use the thermometer, make sure that the sleeve is in the correct position and insert it into the 13.5 mm (0.53 in) hole of the LiCl salt chamber.

See also HMK15 chamber lid options (page 30).

Handle the thermometer as little as possible and do not touch the measuring end. Press the thermometer downwards until it passes the O-rings. The thermometer is correctly in place when you feel a resistance while pressing it downwards.

1. Remove the grid or filter protecting the sensor. Take care not to damage the sensor.

When calibrating HPP271 or HPP272 probes, or when using lid 253277SP with any 12 mm diameter probe, **leave the grid or filter on**.

2. Some 12 mm (0.47 in) probes need a calibration adapter if used in one of the 13.5 mm (0.53 in) holes of spare part chamber lid 271550 (see HMK15 chamber lid options (page 30)). The calibration adapter prevents the sensor from soaking in the salt liquid.

   In case you need a calibration adapter, remove the grid or filter and replace it with the adapter. Two adapters are provided on the base plate of the HMK15.

   > Remember to check from the user guide of your device if a calibration adapter is needed.
   > **If the sensor accidently soaks in salt liquid, remove it quickly and rinse with clean water.** Let the sensor dry before taking into use again.

3. Insert the probe into a suitable hole of the LiCl salt chamber. Press it downwards until it passes the O-rings. The shorter the time the hole stays open before inserting the probe, the shorter the stabilization time required.
4. Wait until the humidity reading stabilizes; this takes about 10 ... 30 minutes.
5. Read the salt chamber temperature from the thermometer and then read the closest humidity value from the calibration table (Greenspan's Calibration, LiCl solution).
6. Adjust the dry end (DRY, offset) to correspond to the value given in the calibration table.
7. Insert the thermometer into the 13.5 mm (0.53 in) hole of the NaCl salt chamber.

   > When calibrating probes that are being used for long term measurements (over 1 hour) in high humidities (90 ... 100 %RH), use the K_2SO_4 salt as the high end reference.

8. Insert the probe into a suitable hole of the NaCl (or K_2SO_4) salt chamber. The shorter the time the hole stays open before inserting the probe, the shorter the stabilization time required.
9. Wait until the humidity reading stabilizes; this takes about 10 ... 30 minutes. Note that in high humidities the risk for errors increases. Therefore, the stabilization time should be longer (approximately 20 ... 40 minutes).
10. Read the salt chamber temperature from the thermometer and then read the closest humidity value from Greenspan's calibration table, NaCl or K_2SO_4 solution. See Table 3 (page 23).
11. Adjust the wet end (WET, gain) to correspond to the value given in the calibration table.

4.3 Greenspan's calibration table

The number on the right in each column indicates the uncertainty of the reference humidity of the salt in that temperature.

Table 3 Greenspan's calibration table

ºC	LiCl	$MgCl_2$	NaCl	KCl	K_2SO_4
0		33.7 ± 0.3	75.5 ± 0.3	88.6 ± 0.5	98.8 ± 1.1
5		33.6 ± 0.3	75.7 ± 0.3	87.7 ± 0.5	98.5 ± 0.9
10		33.5 ± 0.2	75.7 ± 0.2	86.8 ± 0.4	98.2 ± 0.8
15		33.3 ± 0.2	75.6 ± 0.2	85.9 ± 0.3	97.9 ± 0.6
20	11.3 ± 0.3	33.1 ± 0.2	75.5 ± 0.1	85.1 ± 0.3	97.6 ± 0.5
25	11.3 ± 0.3	32.8 ± 0.2	75.3 ± 0.1	84.3 ± 0.3	97.3 ± 0.5
30	11.3 ± 0.2	32.4 ± 0.1	75.1 ± 0.1	83.6 ± 0.3	97.0 ± 0.4
35	11.3 ± 0.2	32.1 ± 0.1	74.9 ± 0.1	83.0 ± 0.3	96.7 ± 0.4
40	11.2 ± 0.2	31.6 ± 0.1	74.7 ± 0.1	82.3 ± 0.3	96.4 ± 0.4
45	11.2 ± 0.2	31.1 ± 0.1	74.5 ± 0.2	81.7 ± 0.3	96.1 ± 0.4
50	11.1 ± 0.2	30.5 ± 0.1	74.4 ± 0.2	81.2 ± 0.3	95.8 ± 0.5

Greenspan, L.: Journal of Research of the National Bureau of Standards - A Physics and Chemistry Vol. 81A, No. 1 January-February 1977, pp. 89-95

4.4 Transportation

You can easily transfer HMK15 from one place to another. Two O-rings seal the transit cover on the chamber. The optional transit bag helps to transport the calibrator so that the chambers stay in vertical position. The bag can also be used for housing the calibrator during calibration.

Figure 6 Optional transit bag for HMK15

When transferring the calibrator from one place to another:

1. Place the protective sleeve on the thermometer and place it in the thermometer holders.
2. Replace the chamber lids with transit covers. Press the chamber lids on the vacant chamber holders for transportation.
3. Place the calibrator so that the chambers stay as upright as possible. This way, very little salt solution gets on transit covers and cleaning is easier.

   The closer the transportation temperature is to the temperature of the calibration site, the shorter the time required for temperature stabilization. If the transportation temperature is below +18 °C (+64 °F), the LiCl salt chamber should be transported separately to keep the solution warm.

4. When the calibrator has been transported to the calibration site, remove the transit covers and fasten the chamber lids on the salt chambers.

   Close the holes with rubber plugs.

   > The plugs have three steps, each of which is suitable for a certain hole diameter: the first step for the 12 mm (0.47 in), the second step for the 13.5 mm (0.53 in), and the third step for the 18.5 mm (0.73 in) hole. Keep the holes always closed when not calibrating.

5. Clean the transit covers with a damp cloth and press them on vacant chamber holders.
6. Take the thermometer off the holder, turn the sleeve the other way around and perform the calibration.

More information

- Calibration (page 21)

4.5 On-site calibrations

In on-site calibrations, it is important to allow enough time for the calibrator and probe temperatures to stabilize. A two-point calibration takes about 30 minutes ... 2 hours, depending on the difference between transportation or process temperature (with probes removed from the process) and the calibration site. If there are several instruments at the same site needing frequent calibration, it is useful to know the respective stabilization times.

In the following temperature and humidity stabilization example, a humidity probe is transferred from an oven temperature of 75 °C (167 °F) to a suitable hole in the NaCl salt chamber, which is at room temperature. After 40 minutes, the humidity reading differs by 0.2 %RH from the final reading.

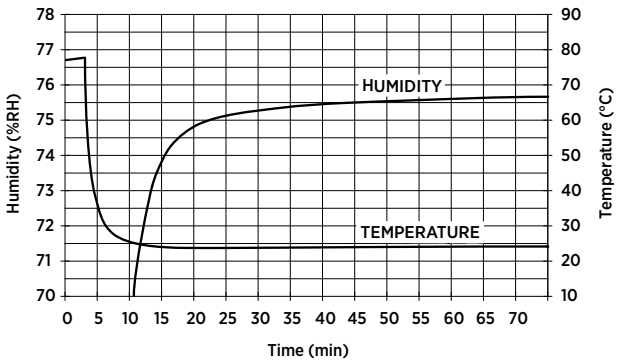


Figure 7 Stabilization time when probe is removed from process

In the following example, the calibrator (without the LiCl) is brought in from a transportation temperature of +5 °C (41 °F) to room temperature. A humidity probe stored at room temperature is then inserted into a suitable hole in the NaCl salt chamber. After 40 minutes, the reading differs by 1.4 %RH from the final reading.

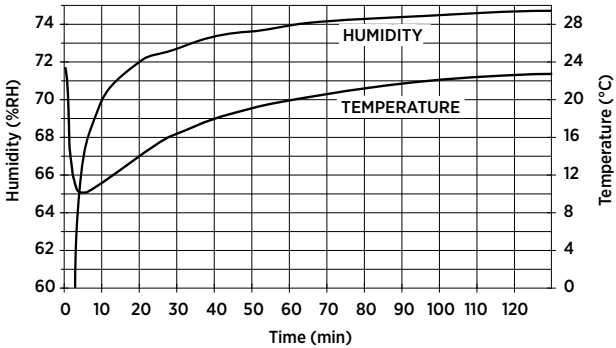


Figure 8 Stabilization time when transportation and calibration site temperatures are different

More information

- Calibration (page 21)

5. Maintenance

Depending on the frequency of use and the general operating conditions, the salt solutions maintain their characteristics for 6 ... 12 months, after which they must be replaced. Perform a visual check every 2 ... 3 months. There must be a minimum of 10 % of undissolved salt at the bottom of the chamber (max. 90 %). The salt must be clean, otherwise it must be reprepared.

LiCl solution may crystallize on the surface, but there may still be solution under the surface. In this case, stir the solution and check it again the next day.

It is advisable to log the dates when salt solutions are prepared and other maintenance procedures are performed.

For correct calibration, it is essential that the salt chambers are tightly closed. Check the O-rings at each salt replacement. If they are damaged, replace them with new ones.

Table 4 O-rings used in HMK15

O-ring location	Dimensions	Type
Ø12.0 mm (0.47 in) measurement hole	12.0 × 2.5 mm	NBR70
Ø13.5 mm (0.53 in) measurement hole	13.5 × 2.5 mm	NBR70
Ø14 mm (0.55 in) measurement hole with ISO G1/2″ thread in custom lid for DMT132	14.0 × 2.0 mm	NBR70
Ø18.5 mm (0.73 in) measurement hole	18.3 × 2.4 mm	NBR70
Transit cover	41.2 × 3.0 mm	NBR70
Chamber	50.0 × 2.0 mm	NBR70

More information

- Spare parts and accessories (page 29)

6. Technical data

6.1 HMK15 specifications

Table 5 HMK15 measurement performance

Property	Description/Value
Response time (with probe and calibrator at the same temperature)	With Vaisala sensors typically 10 min (deviation of the final value < ±1 %RH)
Accuracy of thermometer	±1 °C
Accuracy of salt solutions	
Lithium chloride LiCl	±1.0 %RH + Greenspan's uncertainty [1)]
Magnesium chloride $MgCl_2$	±1.0 %RH + Greenspan's uncertainty [1)]
Sodium chloride NaCl	±1.4 %RH + Greenspan's uncertainty [1)]
Potassium chloride KCl	±1.5 %RH + Greenspan's uncertainty [1)]
Potassium sulphate K_2SO_4	±1.5 %RH + Greenspan's uncertainty [1)]

1) *The uncertainty given in Greenspan's calibration table at the calibration temperature. For example, the accuracy of LiCl salt at +20 °C (+68 °F) is ±(1.0 + 0.3) %RH = ±1.3 %RH.*

Table 6 HMK15 operating environment

Property	Description/Value
Operating temperature range	+0 ... +50 °C (+32 ... +122 °F)

Table 7 HMK15 mechanical specifications

Property	Description/Value
Dimensions (H × W × L)	90 × 230 × 200 mm (3.54 × 9.06 × 7.87 in)
Weight	1 kg (2.20 lb) without salt solutions
Material (metal parts)	Anodized aluminum

6.2 Spare parts and accessories

Table 8 HMK15 spare parts and accessories

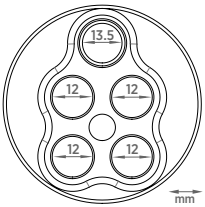
Description	Item code
Rubber plug set	19746HM
O-ring set	218096
Ion exchanged water	19767HM
Thermometer with red capillary liquid	25130HM
Transit bag	HM27032
Salt chambers and lids	
HMK15 basic lid	271549
HMK15 universal lid	271550
HMK15 custom lid for 4 × HMP110 with filter on	253277SP
HMK15 custom lid for DMT132 and HMP60/HMP110 with filter on	230914
HMK15 salt chamber with basic lid and transit cover	DRW255417SP
HMK15 salt chamber with universal lid and transit cover	19766HM
Calibration adapters	
Calibration adapter for HMP9 probe	ASM213801
Calibration adapter (Ø13.5 mm) for Ø12 mm probes with long sensor legs	211302SP
Calibration adapter (Ø13.5 mm) for Ø12 mm probes with short sensor legs	218377SP
Calibration adapter for HMP42 probe	HM37067
Certified and ready-dosed salts [1]	
Ready-dosed LiCl salt package (LiCl salt 11 %RH, total uncertainty ±1.3 %RH) [2]	19729HM
Ready-dosed $MgCl_2$ salt package ($MgCl_2$ salt 33 %RH, total uncertainty ±1.2 %RH) [2]	19730HM
Ready-dosed NaCl salt package (NaCl salt 75 %RH, total uncertainty ±1.5 %RH) [2]	19731HM
Ready-dosed KCl salt package (KCl salt 85 %RH, total uncertainty ±2.0 %RH) [2]	251377HM

Description	Item code
Ready-dosed K_2SO_4 salt package (K_2SO_4 salt 97 %RH, total uncertainty ±2.0 %RH) [2]	19732HM

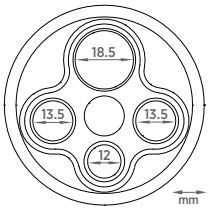
1) *Calibration certificate included with each salt package.*
2) *Uncertainties given at +20 °C (+68 °F).*

6.2.1 HMK15 chamber lid options

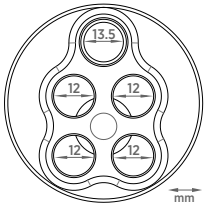
Check the diameter of your probe from the probe's user documentation, available at www.vaisala.com.



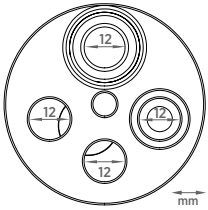
- HMK15 basic lid with four measurement holes
- Suitable for Ø12 mm probes with short (< 7 mm) sensor legs
- Ø13.5 mm hole for the thermometer delivered with HMK15
- Product examples:
  - HMD60
  - HMM100
  - HMP1, HMP3, and HMP9
  - HMP75
  - HMP110, HMP113, and HMP115
  - HMT333
- HMP70 series probes can be used as reference probes in the Ø13.5 mm hole with an adapter
- Spare part item codes:
  - Salt chamber with basic lid and transit cover: DRW255417SP
  - Basic lid only: 271549



- HMK15 universal lid for Ø12, Ø13.5, and Ø18.5 mm probe models
- Ø18.5 mm hole for HPP270 series probes
- Suitable for probes with long (> 7 mm) sensor legs, needing a calibration adapter (refer to your probe's user guidance if uncertain)
- Product examples:
  - HMP4, HMP5, and HMP7
  - HMP76, HMP77
  - HMP155
  - HMT334, HMT335, HMT337, and HMT338
- Spare part item codes:
  - Salt chamber with universal lid and transit cover: 19766HM
  - Universal lid only: 271550



- HMK15 custom lid with four measurement holes for HMP110 probes with the filter on
- Suitable for Ø12 mm probes with short filters when calibration with the filter on is required for regulatory reasons
- Ø13.5 mm hole for the thermometer delivered with HMK15
- Product examples:
    - HMD60
    - HMP40S
    - HMP110
- Spare part item code of lid: 253277SP



- HMK15 custom lid with four measurement holes for DMT132 and HMP60/HMP110 probes with the filter on, or other Ø12 mm probe models
- Topmost hole is raised higher than the others and has an ISO G1/2″ thread for mounting DMT132 tightly
- Spare part item code of lid: 230914

Maintenance and calibration services

Vaisala offers comprehensive customer care throughout the life cycle of our measurement instruments and systems. Our factory services are provided worldwide with fast deliveries. For more information, see www.vaisala.com/calibration.

- Vaisala Online Store at store.vaisala.com is available for most countries. You can browse the offering by product model and order the right accessories, spare parts, or maintenance and calibration services.
- To contact your local maintenance and calibration expert, see www.vaisala.com/contactus.

Technical support

Contact Vaisala technical support at helpdesk@vaisala.com. Provide at least the following supporting information as applicable:

- Product name, model, and serial number
- Software/Firmware version
- Name and location of the installation site
- Name and contact information of a technical person who can provide further information on the problem

For more information, see www.vaisala.com/support.

Warranty

For standard warranty terms and conditions, see www.vaisala.com/warranty.
Please observe that any such warranty may not be valid in case of damage due to normal wear and tear, exceptional operating conditions, negligent handling or installation, or unauthorized modifications. Please see the applicable supply contract or Conditions of Sale for details of the warranty for each product.

VAISALA

www.vaisala.com

AKRIBIS · www.akribis.info · contacto@akribis.info