

RH95 Humidity Controller

1.1.1

USER GUIDE

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Introduction

Thank you for purchasing your Linkam equipment, please take a moment to read this manual before setting up the equipment.

If you have purchased control software, please install the software first.

See your software manual for further installation instructions.

Important Notices

Please register your products by going to www.linkam.co.uk and clicking on the activate warranty link. You will need to register your equipment with us to:

Activate your warranty and technical support.
Access the online setup videos.

Warranty

This equipment has a warranty against defects in material and workmanship for a period of 12 months from the date of shipping. Linkam will either repair or replace products that prove to be defective. For warranty service or repair, this product must be returned to Linkam or a designated service facility.

The warranty shall not apply to defects resulting from interfacing, unauthorized modification or misuse, operation outside of the environmental specifications for the product, or improper site preparation or maintenance.

Technical Support

Any technical questions or queries should be addressed to the Technical Support Department at the address shown below and on the back of this manual.

Tel: +44(0)1737 363 476

Email: support@linkam.co.uk

Feedback

Your feedback will be greatly appreciated, please email us directly info@linkam.co.uk

Safety Information

Important notice

Please check that your Linkam equipment has not been damaged during transport.
If there is any evidence of external damage to any of the electrical items:-

do not connect power to the power supply or the RH95 unit.

Contact Linkam Scientific Instruments Ltd or their appointed distributor immediately. Your warranty may be impaired if Linkam is not informed of any transport damage within 7 working days of delivery.

Requirements for safe use

1. Read all of this guide before using the equipment. Save these instructions for later use.
2. Follow all warnings and instructions marked on any of your Linkam equipment, or contained within the manuals.
3. To prevent electric shock, do not remove the cover of the equipment.
4. Never use the equipment if any of the cables, including the power cord, have been damaged. Do not allow any heavy objects to rest on the power cord. Never lay the power cord on the floor.
5. Do not obstruct any ventilation holes. Do not attempt to insert anything into these openings. Provide adequate ventilation of at least 75mm all around the equipment.
6. The mains cord set is the overall disconnect and must remain accessible.
7. If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.
8. Do not expose the equipment to water. If for any reason it gets wet, then remove the power cord from the power supply and contact Linkam Scientific Technical Support.
9. The equipment is not intended to be used outdoors.
10. Each product is equipped with a 3-wire grounded (earth) power plug or a free-end 3 wire power cord. The plug only fits into a grounded-type outlet. The free-end power cord should be connected to a correctly grounded 3-wire power outlet. Do not defeat the purpose of the grounded (earth) type plug.

Free - end power cords are colour coded as follows:-

Colour	Function
Brown	Live
Blue	Neutral
Green/Yellow	Earth (Ground)

11. The power cord must be an appropriately rated and approved cord-set for the country it is being used in.
12. Only use an appropriately rated power supply, that is approved for the country it is being used in.
13. If any problems occur then remove the power cord from the power supply and contact Linkam Scientific Technical Support.
14. NO attempt should be made to repair or modify the equipment in any way. Any servicing should be carried out by qualified service personnel. Do not remove the cover from the equipment unless the power cord has been removed from the mains outlet.
15. After servicing the safe state of the equipment must be checked.

Caution Labels and Indicators



This safety symbol is seen on the RH95 instrument rating label and warns the user :

- Do not make or remove any connections while the unit is powered on.
- Do not remove the cover.
- Servicing should only be done by qualified service personnel.

Equipment Maintenance

The equipment does not require any regular maintenance. Contact Linkam should you require any maintenance.

Before cleaning the case or front panel of the equipment, remove power from the unit. Use a small quantity of isopropyl alcohol (IPA) on a soft cloth and gently wipe the surface.

Informations de sécurité

Note importante

Veillez vérifier que votre appareil Linkam n'a pas été endommagé pendant le transport. S'il présente une trace quelconque d'endommagement aux éléments électriques:

ne pas brancher l'alimentation à l'alimentation ou à l'unité RH95

Contactez Linkam Scientific Instruments Ltd ou son distributeur désigné immédiatement. Votre garantie pourrait être réduite si Linkam n'est pas informée de tout dommage causé par le transport dans les 7 jours suivant la livraison.

Exigences en matière de sécurité d'utilisation

1. Lisez ce guide intégralement avant d'utiliser l'appareil. Conservez ces instructions pour un usage ultérieur.
2. Suivez toutes les mises en garde et instructions marquées sur toute pièce de votre appareil, ou figurant dans les manuels.
3. Pour prévenir l'électrocution, n'enlevez pas le couvercle de l'appareil.
4. N'utilisez jamais l'appareil si le cordon d'alimentation a été endommagé. Ne laissez pas d'objets lourds appuyés sur le cordon d'alimentation. Ne posez jamais le cordon d'alimentation sur le sol.
5. Le secteur cordon est la déconnexion globale et doit rester accessible.
6. Si l'équipement est utilisé d'une manière non spécifiée par le fabricant, la protection fournie par l'équipement peut être altérée.
7. N'obstruez aucun des orifices de ventilation. N'essayez pas d'insérer quoi que ce soit dans ces ouvertures. Prévoyez un espace de ventilation adéquat d'au moins 75 mm autour de l'appareil.
8. N'exposez pas l'appareil à l'eau. Si pour une quelconque raison l'appareil est mouillé, retirez le cordon d'alimentation de la prise de courant et contactez le support technique de Linkam.
9. L'appareil n'est pas destiné à un usage à l'extérieur.
10. Chaque produit est équipé d'une fiche d'alimentation mise à la terre ou d'un cordon d'alimentation avec 3 fils à extrémité libre. La fiche ne s'insère que dans une prise de courant mise à la terre. Le cordon d'alimentation à extrémités libres doit être raccordé à une prise de courant à 3 fils correctement mise à la terre. N'empêchez pas le fonctionnement de la fiche mise à la terre.

Les cordons d'alimentation à extrémité libre suivent les codes couleur suivants:

Couleur	Fonction
Marron	conducteur de phase
Bleu	conducteur neutre
Vert/jaune	mise à la terre

11. Le cordon d'alimentation doit être constitué d'un ensemble de câbles répondant aux caractéristiques nominales et approuvé dans le pays d'utilisation.
12. Utilisez uniquement une alimentation nominale appropriée, qui est approuvée pour le pays, il est utilisé po.
13. Si un problème survient, débranchez le cordon d'alimentation de la prise de courant et contactez le support technique de Linkam.
14. Aucune tentative ne devrait être faite pour réparer ou de modifier l'équipement en aucune façon. Toute réparation doit être effectuée par un personnel qualifié. Ne pas retirer le couvercle de l'appareil, sauf le cordon d'alimentation a été retiré de la prise secteur.
15. Après l'entretien de l'état de sécurité de l'équipement doit être vérifiée.

Étiquettes d'avertissement et indicateurs



Ce symbole de sécurité est visible sur l'instrument étiquette signalétique RH95 et avertit l'utilisateur:

- N'effectuez ou n'enlevez aucun raccordement quand l'appareil est sous tension.
- N'enlevez pas le couvercle.
- L'entretien doit être effectué exclusivement par du personnel qualifié.

Entretien de l'appareil

L'appareil ne nécessite pas d'entretien régulier. Contactez Linkam si vous souhaitez procéder à un entretien.

Avant de nettoyer le boîtier ou le panneau avant de l'appareil, débranchez le cordon secteur de la prise de courant. Utilisez une petite quantité d'alcool isopropylique (IPA) sur un chiffon doux et frottez délicatement la surface.

System Overview

The RH95 system contains the following components:



1. RH95 Controller
2. RH95 power adaptor
3. Mains lead
4. Humidity sensor and cable for humidity chamber
5. Humidity chamber
6. Humidity chamber tool
7. RH water bottle
8. Humidity data RS232 cable (only included when a T95 controller is supplied)
9. Screwdriver
10. USB Type A to micro B cable for firmware upgrades

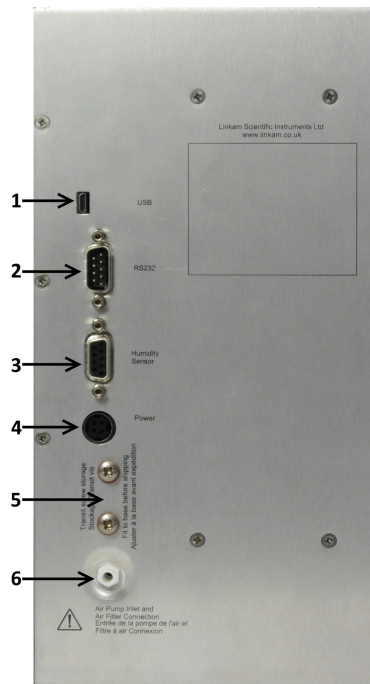
IMPORTANT NOTE: The humidity sensor (4) is susceptible to damage from electrostatic discharge. Please observe proper ESD handling precautions when handling the humidity sensor or sensor cable assembly

Connecting your RH95 Controller

This section describes the connections on the back panel of the RH95 humidity controller and their purpose.

Back Panel Connections

Warning: To avoid any damage to the RH95, switch the unit off before connecting or disconnecting any connection.



- 1: Micro USB connector (currently used for firmware upgrade only).
- 2: RS232 Connector
- 3: Humidity Sensor Connector
- 4: Power socket
- 5: Transit screw holder
- 6: Air Inlet connector

USB Connector

At present this is only used for updating the firmware in the RH95.

RS232 Connector

The RS232 connector is intended to allow the RH95 controller to be connected to a Linkam controller using the humidity data RS232 cable.

Humidity sensor connector

The humidity sensor connector is used to connect the RH95 to the humidity sensor cable.

Power socket

For connection to the power supply provided with the RH95 unit.

Note: DO NOT connect the power transformer to the RH95 while the transformer is powered on. First connect the transformer to the RH95, and then connect the mains power to the transformer.

Transit Screw Holder

The transit screw holder should be used to hold the transit screws, which hold the internal pump secure during shipping. These are found on the underside of the controller and should be removed before use. Remember to re-secure the pump with these transit screws before shipping.

Air Inlet Connector

This is the port that supplies air to the RH95 controller for humidification / drying. Blocking access to this port will prevent the RH95 from functioning.

Important Note: Only suitable for use with gas at atmospheric pressure. DO NOT flow pressurized gas into this port.

Connecting the RH95 to the humidity chamber

Your RH95 system includes a small humidity chamber that can be used to test your samples at ambient temperature. To connect the RH95 controller to the supplied humidity chamber follow the below procedure:

Note: This chamber is also used when [validating the humidity reading](#).

IMPORTANT NOTICE: The humidity sensor is extremely sensitive to contaminants - DO NOT touch the exposed chip or allow anything to come into contact with it. These sensors cannot be repaired if broken or contaminated, and are not covered by warranty.

1. Carefully remove the cap protecting the humidity sensor. Do not touch the exposed chip on the humidity sensor.



2. Remove the lid of the humidity chamber using the provided tool, as shown:



3. Screw the sensor into the chamber, being very careful not to damage the fragile sensor.



4. Connect the 9 pin connector for the sensor to the port on the back of the RH95 marked 'Humidity Sensor'



5. Connect the humidity tube from the front of the RH95 to the port on the humidity chamber opposite the sensor, as shown:



Note: Do not connect the humidity tube to the same side of the chamber as the sensor, as this will affect the readings.

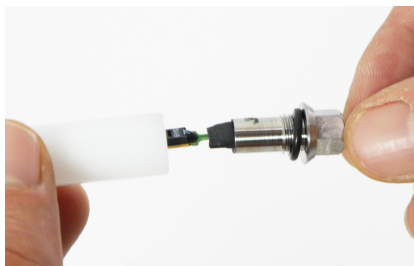
6. Replace the lid of the humidity chamber. You are now ready to control the humidity in the chamber.

Connecting the RH95 to a Linkam Heating Stage

If you have purchased a Linkam heating stage with humidity capability to go with your RH95 controller, follow these instructions to connect it:

IMPORTANT NOTICE: The humidity sensor is extremely sensitive to contaminants - DO NOT touch the exposed chip or allow anything to come into contact with it. These sensors cannot be repaired if broken or contaminated, and are not covered by warranty.

1. Carefully remove the cap protecting the humidity sensor.



2. Screw the humidity sensor into the provided threaded hole in the Linkam heating stage, being very careful not to touch the sensor.



3. Connect the 9 pin connector for the sensor to the port on the back of the RH95 marked 'Humidity Sensor'



4. Connect the humidity tube from the front of the RH95 to the port on the Linkam stage, as shown:



5. Insert the gas valve insert into the gas valve on the opposing side of the stage to the humidity feed.



6. You are now ready to control the humidity of your Linkam stage.

Using the RH95 Controller

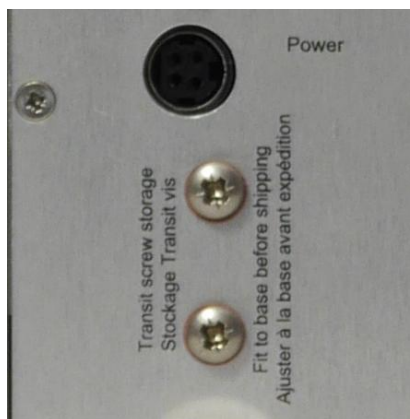
This section describes the operation of the RH95 control unit.

Filling the water bottle

Before the RH95 can control the humidity of your sample chamber, the water bottle must be filled. It is important that only distilled water is used in the Humidity Generator.

Step 1:

Make sure the controller is powered down and that the transit screws have been removed from the base of the unit. Store these screws in the provided holes on the back panel of the unit.



Step 2:

Unscrew the bottle lid assembly and remove from the bottle, being careful not to damage the heating element.



Step 3:

Half fill the bottle to the level indicated and carefully re-attach the lid assembly. Do not fill the bottle past the maximum level indicator.



Step 4:

Remove the magnetic front panel of the RH95



Step 5:

Slide the bottle into the RH95 and tighten the locking screw until it is just tight. Do not over tighten the screw.



Step 6:

Replace the magnetic front panel of the RH95

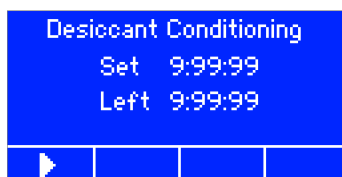


Important Note: Before shipping the RH95, the water bottle should be removed from the unit, drained and placed into the space provided in the packaging. The RH95 should not be shipped with the water bottle fitted.

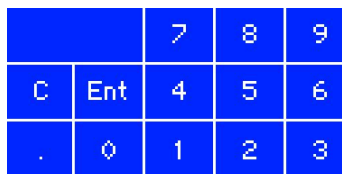
Desiccant conditioning

When the RH95 has not been used in some time, the desiccant in the controller will need drying out before use. It is advised to perform this procedure when the goods are initially received.

Tap the  button and the following screen will appear:



tap the 'set' time display and a keypad screen will appear:

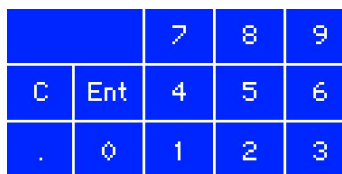


Enter the time required in hours, minutes and seconds and press enter, then push the start button to begin the conditioning.

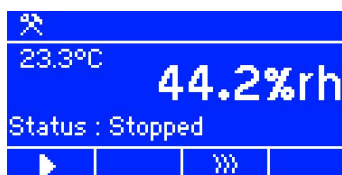
NOTE: The suggested drying time is 1:00:00 hour.

Setting the humidity level

Tap on the humidity value on the LCD display of the RH95 controller. This will bring up a number pad. Enter a humidity value of between 10-90% and press Ent. Press C to clear the last digit.



Press the  (start) button to begin controlling the humidity in your chamber.



RH95 settings and configuration

To check the serial numbers and firmware information for the humidity controller and attached sensor, tap the  button at the top of the screen, and the following screen will appear:



RH95 status

Tap the  button in the settings screen to see a graphical display of the current status of the RH95, as below:



Tap the 'X' button to return to the previous screen.

Humidity sensor details

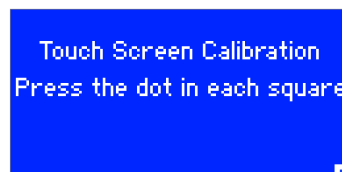
The  button accesses the humidity sensor information. This includes the chamber type it is designed for and the serial number of the sensor.



Touchscreen Calibration

If the touchscreen interface on the RH95 is not responding correctly to touch input, it may need to be re-calibrated. In order to do this, please follow this procedure:

1. Power down the RH95 Controller.
2. Place a finger on the touchscreen and hold it there
3. While continuing to hold a finger on the screen, power the RH95 back on, you should see the below screen:
(you can now remove the finger from the screen)



4. Touch the blue dot in the centre of each small white square. Once all 4 corners have been touched the RH95 will start normally.

NOTE: Use a biro or stylus to complete this operation, touches with a finger may not be sufficiently accurate.

Validating the humidity reading

If you have purchased an optional Rotronic calibration standard with your RH95 unit, you can use these to validate the humidity reading of your RH95.

You should have received the following package:



This will contain some textile pads and five ampoules of calibration salts. The RH% will depend upon which kit was ordered. They are available in RH values of 10%, 35%, 65% and 80%.

These standards consist of salts which will alter the humidity of a small enclosed space to a specific RH value, by either absorbing or releasing moisture into the air. The humidity readings can be affected by several factors, so the environment must be controlled when using these validation standards:

- Room temperature must be 23°C +/-2°C.
- The humidity standard must be at the same temperature as the humidity sensor. A 1 degree difference in temperature can cause an error of up to 6% RH
- There must be no draughts in the calibration room
- Do not expose the calibration chamber to direct sunlight while in use
- Do not expose the calibration salts to direct sunlight at any time.

Usage directions

Note: It is recommended that you wear safety goggles while performing this validation procedure.

1. Remove the lid of the supplied humidity chamber and place one of the textile pads in the recess.



Note: do not touch the textile pad with bare hands, as this can cause contamination and inaccurate readings. Wear sterile gloves, or use a clean pair of pliers or tweezers to load the pad.

2. Hold the ampoule of the selected humidity standard at the neck and bring the entire contents into the further, lower part of the ampoule by swinging or lightly tapping against the glass.



3. Break the ampoule at the marked place and empty it completely on the center of the textile pad while tapping it lightly to make sure all of the liquid is soaked into the pad.



Note: wrap the top of the ampoule with tissue paper to contain any glass fragments.

4. Screw the humidity sensor into the chamber.



Note: Be careful during this step to make sure the RH sensor does not come into contact with the soaked pad. The salts will damage the sensor if it comes into contact with them.

5. Replace the lid of the humidity chamber and place the caps on the white plastic air ports.



6. Allow the chamber to reach humidity equilibrium (see table below) and switch the RH95 unit on. You can now compare the humidity reading of the RH95 with the expected humidity value of the calibration standard used to validate the accuracy of the RH95.

Time to reach equilibrium	RH% of humidity standard
45 minutes	10%, 35%, 65%
60 minutes	80%

Note: After every calibration the textile pad must be renewed and the chamber washed out with water and well dried. Thoroughly wash your hands to remove any traces of the calibration salts.

Declaration of Conformity

Manufacturers Name: Linkam Scientific Instruments Ltd

Manufacturers Address:
8 Epsom Downs Metro Centre
Waterfield
Tadworth
Surrey
KT20 5LR
UK

Declares that the products as originally delivered:

Product Name: RH95 Controller

has been found to comply with the following applicable European Directives, and carries the CE marking accordingly:

EMC Directive 2014/30/EU using product standard EN 61326-1:2013
Low Voltage Directive 2014/35/EU using product standard EN 61010-1:2010
RoHS 2 Directive 2011/65/EU

and also carries the additional certification:

EMC: FCC CFR 47 Part 15B:2014

Safety: IEC 61010-1:2010/EN 61010-1:2010/UL 60950-1:2012/CAN/CSA no. 61010-1-12

Date: 14th April 2016

R&D Manager: Peter Grocutt



Technical Specifications

RH95 Controller

Dimensions:	250 x 270 x 140 (mm)
Weight:	4.5Kg (excluding cables and power supply)
Operating Environment:	5~40°C, 80% relative humidity at 31°C decreasing linearly to 50% at 40°C (without condensation)

Supply voltage:	24Vdc
Max current:	3A

Display Resolution:	128 X 64 pixels
Display Size:	2.3 inch
User Interface:	Touch screen

RH Sensor:	Digital capacitive sensor
RH Range:	10 to 90%
RH Resolution:	0.1% resolution
RH Accuracy:	1.8%
RH Stability:	0.5%
Set Point Resolution:	0.1%

USB Interface	
Micro USB Type B connector:	Currently only used for firmware updates.

Power Supply	
Supply Voltage:	24Vdc
Minimum Supply Current:	3A
Connector:	4 pin Mini DIN

Note—only use an earth referenced power supply with this equipment

Linkam Scientific Instruments Ltd

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