

THERMOHYGROGRAPH standard

User Manual

HB 3083-02

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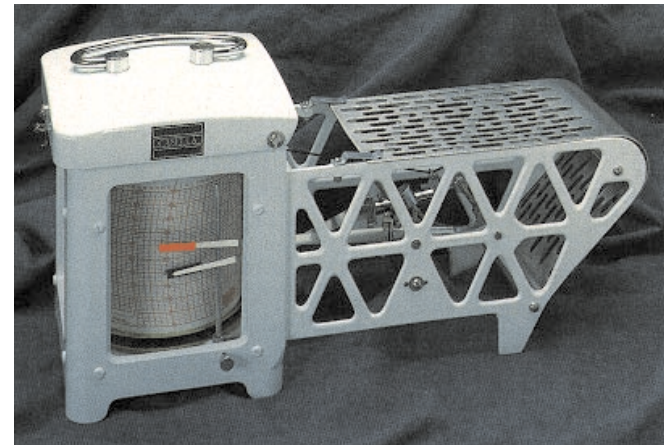
1. INTRODUCTION

This handbook introduces you to the basic operation and features of the CASELLA *standard* THERMOHYGROGRAPH.

Thermohygrographs are used to produce a continuous record of the variation of both the temperature and relative humidity of the atmosphere against time, by drawing coloured traces on a chart.

Variations in relative humidity can affect many manufacturing processes, storage of raw materials, weights of items such as wool, paper, tobacco, confectionery, and computer operation, as well as being an important factor in human comfort. Since temperature is often linked to changes in relative humidity, this instrument records both on a single chart.

The THERMOHYGROGRAPH *standard* model may be ordered with or without a calibration certificate.



2 PRINCIPLE OF OPERATION

2.1 Humidity Measurement

The element that senses relative humidity is made from several strands of specially treated human hair, which shorten as relative humidity decreases and lengthen as it increases. The relative humidity element is connected through a linkage to the pen arm so that changes are recorded as an ink line on the chart. The linkage is designed to give a near linear movement over most of the chart range.

2.2 Temperature Measurement

The temperature element is a bi-metallic strip, whose curvature depends on the current air temperature. As the temperature changes, the angular position of the free end of the strip changes. The free end is connected via a linkage to the pen arm so that changes are recorded on the chart.

2.3 General

Relative humidity and temperature are recorded on the same chart, so to distinguish between the two traces, the temperature pen is black while the relative humidity pen is red.

To allow the pens to pass each other without colliding, the black temperature arm is shorter than the red relative humidity arm. This also means that the two traces are displaced in time with respect to each other, with the red trace indicating the correct time.

Fibre tipped pens are supplied which contain sufficient ink in the body to write for approximately 9 months. Replace the pen when the trace grows too faint to read.

Relative humidity is always scaled from 0 - 100%.

The temperature span for the THERMOHYGROGRAPH *standard* is 50°C, and this can be set to cover two alternative ranges: -10°C to +40°C or 0°C to +50°C.

When the instrument is dispatched, a special chart is fitted that gives instructions for changing the temperature offset to match the range of the chart selected. The unit is factory calibrated for 0°C to +50°C.

3. PREPARATION FOR USE

Once you have removed the THERMOHYGROGRAPH *standard* from the packing you should have

- ✘ THERMOHYGROGRAPH *standard*,
- ✘ Tool kit,
- ✘ Document showing settings for the clock,
- ✘ Chart drum with lid,
- ✘ User Manual,
- ✘ Calibration certificate (supplied only with M109015).

Make sure that all foam packing is removed from inside the THERMOHYGROGRAPH case. Also make sure that the rubber band which holds the pen arms together is removed.

3.1 Removing/Replacing the Drum

Before attempting to remove or replace the drum, it is important to move the pens out of the way by pulling the pen lifter control outward.

To remove the chart drum, first open the top of the unit. Then take off the lid of the drum by simply pulling it upwards. The drum can now be pulled out by holding the inside walls of the drum and lifting. Note that the drum may be fairly tight in a new unit.

To replace the drum, carefully locate it on the clock drive shaft and firmly push it home.

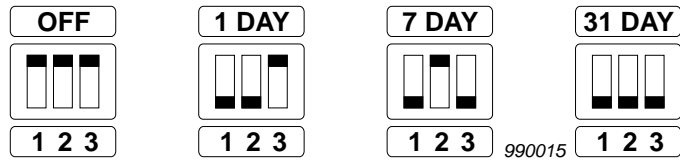
3.2 Fitting/Replacing the Battery

After removing the drum, the battery access cover can be found on the side of the clock, at the rear of the unit.

To open the battery compartment, use either a coin or flat headed screwdriver to rotate the cover a quarter turn anti-clockwise. The clock uses a single AA (MN1500 or LR6) alkaline battery, which should be inserted with the positive end facing outwards. To refit the battery cover, push it into the battery compartment, ensuring that the slot is vertical. Turn the cover a quarter turn clockwise to lock it.

3.3 Setting the Clock speed

With the chart drum removed set the three dip-switches in the clock base to suit your requirements.



Refer to the diagram supplied (or the one above) for the required switch positions.

3.4 Fitting/Replacing the Chart

1. Remove the chart drum and its lid as described earlier.
2. Slide the chart retaining clip upwards and remove any existing chart.
3. Wrap a new chart around the drum, ensuring that its ends overlap at the point where the clip fits.

Make sure the paper is as low as possible on the drum so that the base line on the chart aligns at the overlap.

Failure to observe these points will cause an error in the recording.

4. Carefully replace the clip, making sure that the chart does not move.
5. Pull the pen lifter outwards, moving the pens away from the spindle.
6. Lower the clock drum on to the spindle, this is a push fit.
7. Replace the chart drum lid, aligning the slot in the lid with the chart clip.

3.5 Fitting/Replacing the Pens

1. Take one pen out of each sachet.

The short-reach pen with black ink (M118004) fits the short arm and records temperature.

The long-reach pen with red ink (M119003) fits the long arm and records relative humidity.

Leave the other pens sealed for future use.

2. Gain access to the pens by removing the glazing from the window in the case nearest to them.

3. Steady the short temperature arm between the fingers of the right hand.
4. Hold the short-reach black ink pen in the fingers of the left hand and slide it on to the arm until it stops. Do not use excessive force or allow the mechanism to become deformed.

Note: Pens have a tapered inner section and are a push fit on the pen arms.

5. Repeat with the long-reach red ink pen on the long relative humidity arm.
6. Rotate the clock drum to give the approximate time under the long (red ink) pen.
7. Remove and discard the protective caps from the pen tips.

Do not press the pens on to the paper to see how they write, as this will damage the fine tips of the pens and prevent ink flow.

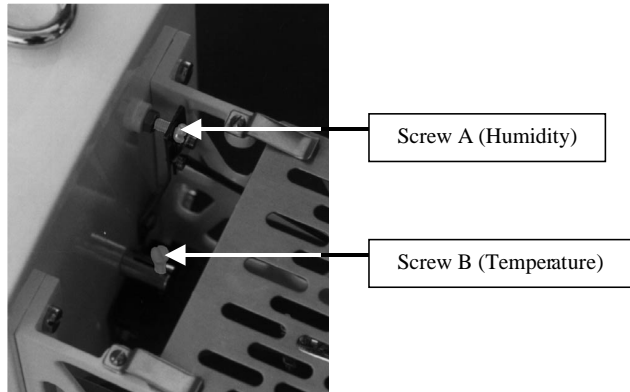
8. Push the pen lifter inwards to allow the pens to "almost" touch the chart.
9. Rotate the clock drum to show the correct time under the long (red ink) pen, making the last movement anti-clockwise to eliminate backlash.
10. Continue to push the pen lifter inwards until the pens rest against the chart.

4. OPERATING THE INSTRUMENT

1. Allow the instrument to stabilise to the temperature and humidity of it's surroundings.

If possible, choose a place free from draughts, temperature gradients or sources of variable humidity.

2. Place a thermometer as near to the bi-metallic temperature element as convenient and allow the instrument to record for 15 minutes.
3. Adjust to the correct temperature by turning screw B, set low down near the bi-metallic temperature strip.



Clockwise rotation moves the pen **upwards** across the chart.

The adjustment is enough to allow the instrument to fit charts within our standard range.

It is not possible to change the 50°C measurement span.

4. Measure relative humidity with a whirling, sling or other aspirated hygrometer.

Do not use stationary or un-aspirated types, as this may cause errors.

5. Adjust the humidity reading by turning screw A, set high up near the rear of the instrument.

Clockwise rotation moves the pen **downwards** across the chart.

6. Check the calibration of the instrument every 2 to 4 weeks.

5. MAINTENANCE & SPARES

5.1 Routine Care

No routine maintenance is required.

Do not oil spindle pivots as this attracts dust which will make the movement slow and may cause inaccuracy. If the instrument is used in a dusty environment use a fine brush to remove any dust from the hair and linkage pivots.

Do not wash the hair with water, except at long intervals or for special reasons, as wetting the hair will upset the calibration temporarily.

5.2 Quartz Clock

The quartz clock should not require any attention, apart from battery replacement. Quartz movements contain no parts that can be serviced by the user. If the clock fails, a replacement must be obtained from Casella at Bedford.

5.3 Cleaning

Cleaning may be carried out by using a soft damp cloth. Solvents or other cleaning products should not be used.

5.4 Service

The original setting of the temperature element will remain correct for a long period and will only need attention in the case of damage. The humidity element does not have such a long life and will need replacement. The interval depends on exposure and general care during use.

Indication of the need for replacement is when checks on accuracy show large errors, when re-adjustment is needed very frequently, or erratic hysteresis errors are noted.

When a temperature check and a humidity check are necessary, the temperature check must be carried out first.

Casella's in house service department offers a comprehensive range of repair and calibration services, designed to effect a fast and efficient back-up for all our products. The Service Department is operated under the scope of our BSI registration for products manufactured by us. We will however, undertake the repair of other manufacturers equipment.

For further information please contact our service department at our Bedford headquarters. We will be happy to provide quotations for individual repairs or provide annual maintenance under contract.

We recommend factory service by technicians trained and equipped to repair your instrumentation.

Should you wish factory repair assistance, send your equipment in a package equivalent to the original packaging. Insure to full value and ship pre-paid. Include a letter giving full details with your packing list.

Send to: CASELLA CEL LIMITED
 (Service Department)
 Regent House
 Wolseley Road
 Kempston
 Bedford
 MK42 7JY

If purchased outside of the United Kingdom, please return to your distributor.

5.5 Spare Parts

When ordering from this list, please quote the catalogue reference number.

M109014	THERMOHYGROGRAPH <i>standard</i> with two pens each for temperature and humidity (charts to be ordered separately).
M109015	THERMOHYGROGRAPH <i>standard</i> with two pens each for temperature and humidity and a calibration certificate (charts to be ordered separately).
M107404	Box of 200 Daily charts 0°C to 50°C
M107405	Box of 200 Daily charts -10°C to 40°C
M107408	Box of 200 Weekly charts 0°C to 50°C
M107409	Box of 200 Weekly charts -10°C to 40°C
M107415	Box of 200 Monthly charts 0°C to 50°C
M107414	Box of 200 Monthly charts -10°C to 40°C
M118004	Pack of 2 (short-reach) black temperature pens.
M119003	Pack of 2 (long-reach) red relative humidity pens.
B124	1.5 volt battery

6. SPECIFICATION

Accuracy:	Temperature	±1% of full scale.
	Humidity	±3% between 20% and 80% RH
Range:	Temperature	50°C span between -10°C and 50°C
	Humidity	0% to 100% RH
Time scale:	Daily	25hrs at 11.25 mm/hr,
	Weekly	168hrs at 1.6 mm/hr,
	Monthly	31 days at 8 mm/day,
Sensitivity:	1°C =	1.64 mm,
	1% RH =	0.82 mm,
Chart size:	300 x 90 mm.	
Dimensions:	350 x 150 x 160 mm.	
Weights:	3.2 kg.	

ALTERATION WITHOUT NOTICE

Please note that the contents of this manual may be subject to alteration without notice.

