



SKH 1093
RH Calibration Kit
for SKH 2000 probes

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.....SKH 1093 Calibration Kit.....

CONTENTS

1. CON TENTS OF THE KIT	5
2. AD DI TIONAL EQUIP MENT NEEDED	5
3. INTRODUCTION	6
4. ABOUT THIS CAL I BRA TION KIT	7
5. PRE PARING THE KIT	8
6. RECALIBRATION TECH NIQUE	9
7. GENERAL PRE CAUTIONS	11
FIG URE 1 - Quick Fit Adapter	12
FIG URE 2 - SKH 2011 PCB layout	13
FIG URE 3 - SKH 2013 PCB Lay out	14

1. CONTENTS OF THE KIT

1 off 'Quickfit adaptor' to suit SKH 2000 series probes

2 off 2000 series 'O' rings

2 off 250 ml 'Quickfit' flasks

2 off stoppers for above

Approx. 80g. Molecular Sieve

Approx. 120g. 'Analar grade' Sodium Chloride

Approx. 40 mls distilled de-ionised water

2. ADDITIONAL EQUIPMENT NEEDED

Constant temperature waterbath or similar system to maintain a constant temperature.

A good quality millivoltmeter or milliammeter

3. INTRODUCTION

To get the best performance from your SKH 2000 series of humidity probes a regular calibration check is recommended, preferably at least annually.

A rapid recalibration may be made in the field by adjustment of the slope control to correspond to the reading from a certified Assman or similar wet and dry bulb system. However, a proper 2 point trim check is recommended at 2 - 6 month intervals, depending on conditions.

When the sensor is exposed in constant medium or low humidity environments in frequent checks only will be required, but when exposed to freezing wet conditions then more frequent checks should be made. As the sensor ages, then less frequent checks will be required.

Relative Humidity is a figure relating to a sample of gas at a fixed temperature. It is the percentage saturation with water of that gas at the given temperature, i.e.

$$\text{R.H.} = \frac{\text{actual water vapour pressure at temp. T. deg. at}}{\text{T. deg. saturated vapour pressure at temp T. deg.}} \times 100 \text{ Temp.}$$

If the amount of water in a closed system is fixed and the temperature is changed, then the RH will change.

4. ABOUT THIS CALIBRATION KIT

This SKH 1093 calibration kit provides a 2 point reference system with which the zero and slope of the humidity calibration may be set.

The zero reference is a sealed flask with Alumino Silicate. This is a molecular sieve which removes all moisture from the air. This removal is exponential with time, and after 6 - 8 hours, virtually no further decrease in RH will be observed.

A second calibration point at approx. 75% RH is provided by a saturated solution of Sodium Chloride. This is very accurate, provided that the temperature of the flask is kept constant. The actual RH of the air above the solution when in equilibrium, varies little with temperature (see Table 1), but is slow to respond to correct a change of RH, with the air above the solution, imposed by a change of temperature in the sealed flask.

Calibration is performed by sealing the probe into the neck of the flask using the adaptor provided.

When used correctly this system gives very good results, better than 1%, and much better than that obtained with tiny capsules of ferred with other systems.

TABLE 1

76.0% at 10 degrees Celsius
75.5% at 20 degrees Celsius
75.0% at 25 degrees Celsius

.....SKH 1093 Calibration Kit.....

5. PREPARING THE KIT

The glass flasks and screw caps should be thoroughly washed and dried before use.

Use one flask for the molecular sieve or zero reference. The molecular sieve is supplied dry, but if desired, to overcome possible problems in shipping, loose caps etc., it may be further dried before use. This involves heating for 2 hrs or more at between 200 and 300 deg. C.. For this, a clean open glass or ceramic dish should be used, and when the heating cycle is finished the granules may be returned to the flask using a clean paper funnel, with care though, they are hot! Immediately after this the flask should be stoppered tightly until use.

The second flask should be used to make the saturated solution of salt. Add the contents of the pot of Sodium Chloride, using a clean funnel, paper or polythene to avoid contaminating the inside of the ground glass neck. This is very important to avoid salt getting onto the humidity sensor later. The distilled water may now be added. If water gets on the ground glass seal, then dry this with a clean tissue. It is most important to keep this neck clean and dry at all times.

This solution should now be allowed to settle in the constant temperature bath or where measurements are to be made for 2-3 days. Gentle agitation should be given at intervals.

There should at all times be a surplus of undissolved salt crystals, but the proportion of these to the volume of solution does not matter. When not in use the flask should be kept fully closed.

6. RECALIBRATION TECHNIQUE

Refer to Figure 1 to fit the adapter stopper and seal it to the neck of the probe. Slip one 'O' ring seal over the sensor head and push down on to the sensor stem.

Taking care if a gauze filter screen is fitted over the sensitive element, slip the red stopper over the head of the probe and slide down the stem of the probe, the large hexagonal section nearest the sensor electronics box. Twist the adapter lightly to position it over the "O" ring.

Resistance should be felt as the 'O' ring is forced into the taper inside the stopper, sealing the stopper to the outside of the probe.

The assembly may now be used as an air tight stopper for 'Quick fit' flasks, either the zero or 75% reference, though care must be taken to avoid liquids, etc., from contacting the head of the probe.

To remove, reverse above procedures.

If a constant temperature bath is used for keeping the flasks in, ensure that the flasks are covered with water to the base of the ground glass neck, and well fastened in this position. Water should not be allowed to reach the top of the flask or wet the screw top. It is recommended that a temperature of about 20 deg. C. is used.

If a bath such as this is not available, then a simple tank or container of water may be used, in which the flasks are anchored, by weights or clips etc. In this case, although the water will help prevent rapid

.....SKH 1093 Calibration Kit.....

changes in temperature, the room in which it is kept must also have a fairly constant temperature.

In both cases, strong lights, sunlight especially, should not shine on the flasks, since this will rapidly warm the air in the flasks, despite the water bath.

Remove the base of the sensor's electronics box using the 4 corner screws, to reveal the PCB inside.

It is important the zero calibration reference point is done before the slope (75%RH) point.

The probe should first be put in the zero reference (molecular sieve) and left for 6-8 hrs. or over night, and then the zero control pot adjusted to give a reading of 1% RH. See Figures 2 and 3.

Next the probe should be transferred to the 75% reference and left for 6-8 hrs, or again over night. The slope control pot should now be adjusted. This process may be repeated if time allows, but where good temperature control exists more than one repeat will make little difference.

If it is difficult or not practical to achieve good temperature control, (this will be shown by inconsistent results, when repeating the recalibration cycle) and a certified aspirated Hygrometer or dew point apparatus is available, the following procedure may be tried.

The zero reference may be used as described, (the zero reference is only slightly affected by temperature) and the slope control can be adjusted to readings from the aspirated hygrometer or calculated from

.....SKH 1093 Calibration Kit.....

the dew point de vice (ta ble and charts are usu ally pro vided with the equipment).

This tech nique is not as de sir able as the sealed flask 75% ref er ence, since it is easy for the op er a tor, his breath, etc., to greatly up set the read ings. Pre cau tions must be taken to avoid this.

7. GENERAL PRE CAUTIONS

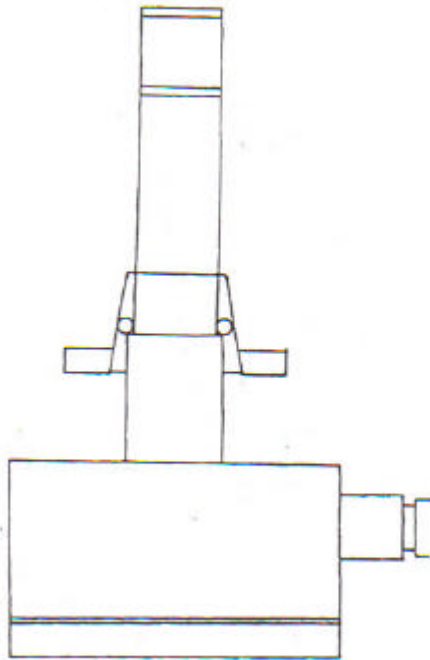
The chem i cals used here are not sub ject to any reg u la tion or par tic u lar haz ard, how ever, they should be treated with re spect and on no ac count eaten, or used for a pur pose other than de scribed.

The mo lec u lar sieve will re quire pe ri odic dry ing, but with min i mal use this will be nec es sary yearly, if kept tightly closed. The tech nique is de scribed in 'Pre paring the Kit'.

If the sensor has been installed in very high humidity or sat u rated con di tions for more than an hour or so, it is ad vis able to leave in a nor mal room at mo sphere (approx. 20deg. C. and 50% RH) to set tle, for 6 hrs or so be fore cal i brat ing.

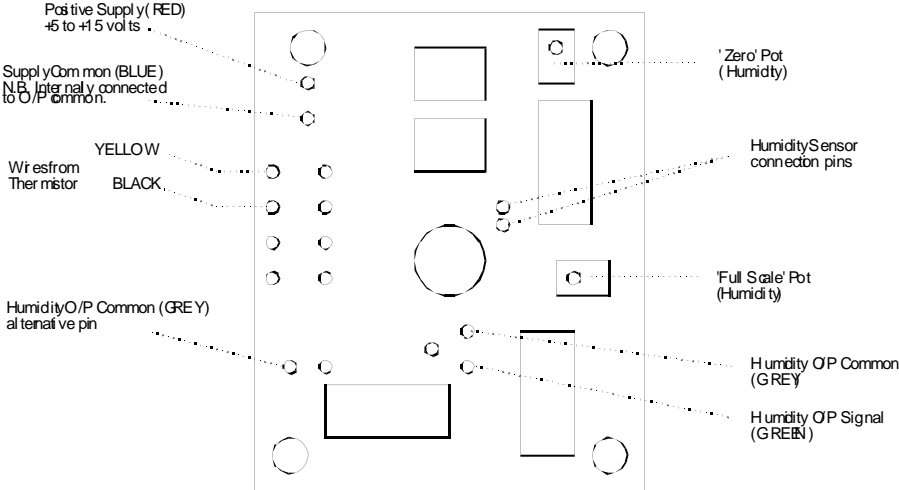
.....SKH 1093 Calibration Kit.....

FIGURE 1 - Quick Fit Adapter



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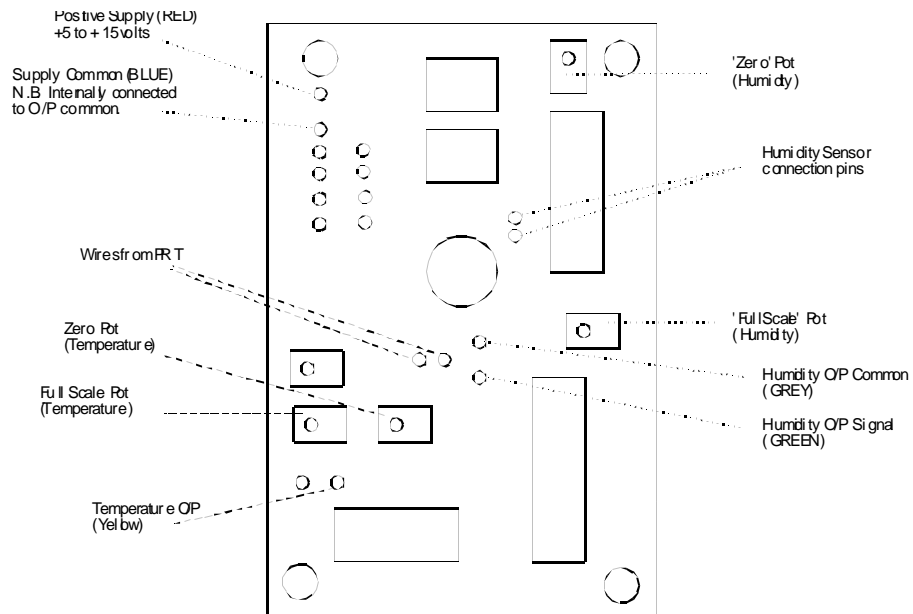
FIGURE 2 - SKH 2011 PCB layout



NB No potentiometers should be adjusted unless the sensor is being recalibrated. Adjustment of any preset will upset calibration and should only be done in strict accordance with calibration instructions.

.....SKH 1093 Calibration Kit.....

FIGURE 3 - SKH 2013 PCB Lay out



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