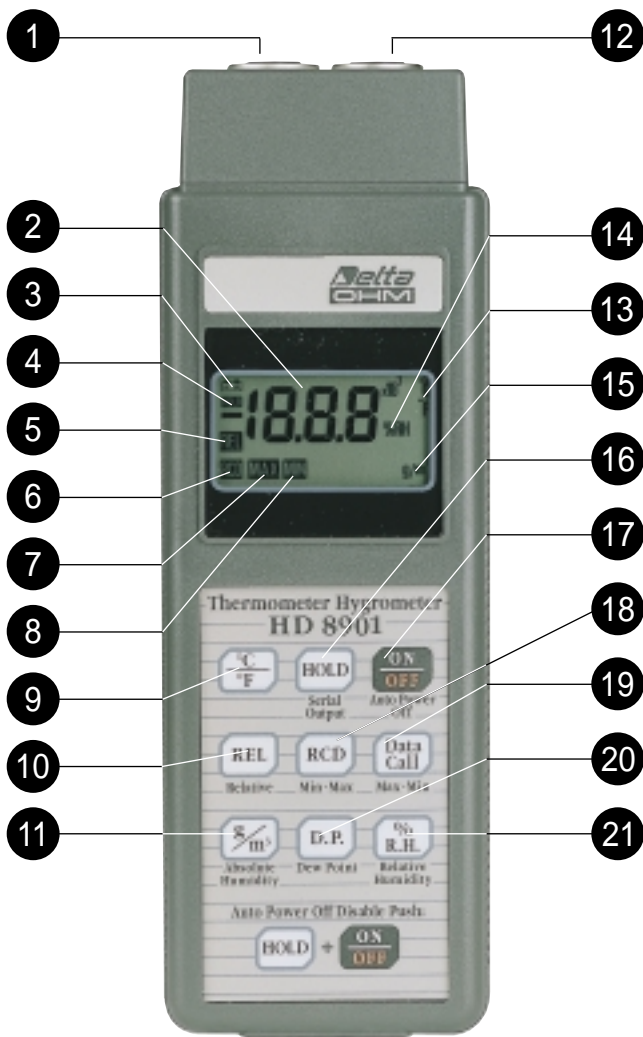


HD 8901

INSTRUCTIONS MANUAL



HD 8901



HD 8901

MULTIFUNCTION DIGITAL MICROPROCESSOR
HYGROMETER-THERMOMETER

ENGLISH

HD 8901

-
- 1 Input A, DIN 5-pole connector. This input is suitable for the air humidity and temperature probes HD 8501S, HD 8501SAT/500, HD 8501SS/500.

 - 2 Display.

 - 3 Battery symbol.

 - 4 HOLD symbol.

 - 5 REL symbol, indicates that the instrument is making a relative measurement.

 - 6 RCD symbol, indicates that the instrument is storing the data for the two inputs, RECORD.

 - 7 MAX symbol. The value indicated on the display is the MAX value stored at the input selected.

 - 8 MIN symbol. The value indicated on the display is the MIN value stored at the input selected.

 - 9 Key for selecting readings in °C or °F.

 - 10 REL mode selection key. When this key is pressed the relative measurement is taken with respect to the moment in which the REL key was pressed.

 - 11 When the g/m³ key is pressed, the instrument will take a reading of the absolute humidity. The absolute humidity is calculated from the relative humidity data at that moment and the gas temperature with reference to the volume of humid gas in normalized conditions of T = 0°C, P = 1013 mbar.

 - 12 Input B, DIN 8-pole connector. This input is suitable only for the temperature probes in the series TP 870 TP 870/C, TP 870/A, TP 870/P.

 - 13 Symbol indicating temperature readings in °C or °F.

 - 14 Symbol indicating relative humidity measurements in % R.H.

 - 15 Symbol indicating relative humidity measurements g/m³.

 - 16 HOLD key for blocking the reading; internally the instrument continues to update data.








 - 17 ON/OFF key for switching the instrument on and off.





 - 18 RCD key. When this key is pressed the instrument is set to store the MAX, MIN and present values read at the probe inputs.

 - 19 DATA CALL key. When this key is pressed the display shows in sequence the MAX, MIN and present value of the selected input.

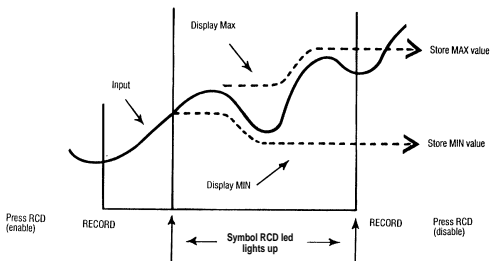
 - 20 D.P. When this key is pressed the dew point measurement is selected. The display shows the dew point temperature value expressed in °C or °F, the °C or °F symbol flashes. D.P. = DEW POINT.

 - 21 R.H. When this key is pressed the relative humidity measurement is selected.
-

KEY	SYMBOLS LIT BESIDES THE NUMBERS	FUNCTION DESCRIPTION
	All the symbols are lit for a few seconds after switching on	Switches the instrument on and off. Press once to switch on; when it is pressed again it switches the instrument off. The instrument switches itself off automatically about 8 minutes after the ON/OFF key has been pressed. If any key other than the ON/OFF key is pressed, the instrument switches itself off 8 minutes after the last key was pressed.
 	The  symbol flashes to show that AUTO POWER OFF is disabled	If the HOLD key is held down simultaneously with the ON/OFF key when switching on, the automatic cutout is disabled and power is supplied without interruption. The cutout function is also disabled during RCD. To switch off, press the ON/OFF key.
	Err	If the probe is not connected to the connector (or if there is a breakage) the ERROR signal appears. This signal also appears if the humidity/temperature probe is inserted in connector B instead of connector A.
	HOLD HOLD DIASAPPEARS	HOLD key. Press this key to "freeze" the reading. When the key is pressed again the instrument leaves HOLD mode and returns to normal functions.
	°C/°F	This key selects the measuring units. Whenever it is pressed the units °C and °F alternate. The change may occur during HOLD , RCD , REL and DATA CALL modes. If as well as the temperature and humidity probe at input A a probe of the TP 870 series is connected to the instrument, the temperature read by this probe will be indicated.
	REL	Key for selecting relative measurements. When this key is pressed the difference (relative value) between the value (D1)

KEY	SYMBOLS LIT BESIDES THE NUMBERS	FUNCTION DESCRIPTION
		measured shortly before pressing the key (reference value) and the next value (Dx) is displayed. REL = Dx - D1.
	REL DISAPPEARS	When the key is pressed again the instrument returns to normal functions.
	RCD  flashes	MAX/MIN storage key. The maximum/minimum recording starts from the moment the REC key is pressed (the RCD symbol appears). When the key is pressed again the RCD symbol disappears and the maximum and minimum values are no longer updated. The maximum and minimum are recorded for both inputs (A and B). During RCD mode the AUTO-POWER-OFF function is disabled and the battery symbol flashes.
		Press the DATA CALL key to read the values recorded. * The data recorded remain in the memory even if the RCD mode is abandoned (the values can be read later). However, when the instrument is switched off or RCD is started again, the previous MAX/MIN values are erased. * When RCD, MAX, MIN is pressed during REL, the maximum and minimum values of the Dx measurement are memorized instead of the relative values.
		Key for recalling the maximum and minimum. Whenever this key is pressed the indication on the display varies in the order shown below.
	MAX	Maximum value.
	MIN	Minimum value.

KEY	SYMBOLS LIT BESIDES THE NUMBERS	FUNCTION DESCRIPTION
Update value		Updated measured value. This applies whatever the type of measurement selected: temperature, relative humidity, dew point, absolute humidity.



* The MAX/MIN values can be read during RCD. In this case the values shown correspond to the dotted lines in the above figure.

KEY	SYMBOLS LIT BESIDES THE NUMBERS	FUNCTION DESCRIPTION
	g/m ³	<p>Key for selecting absolute humidity measurement expressed in grams of water per cubic metre of air. Absolute humidity is calculated taking as a reference the relative humidity at the time and the temperature conditions that refer to the volume of humid gas at a temperature of T=0°C and pressure P=1013 mbar. The absolute humidity is the weight in grams of the vapour contained in one cubic metre of humid air.</p> <p>Absolute humidity is influenced by pressure: the formula for correcting pressure from 1013 mbar to the real value is the following:</p> $f_o(p) = f_o \frac{p}{1013}$ <p>where: $f_o(p)$ is the absolute humidity of the humid gas at 0°C and pressure p. f_o is the absolute humidity of the humid gas at 0°C and pressure 1013 mbar. p is the pressure of the gas expressed in mbar.</p> <p>Example: if the pressure of the gas is 1.2 bar and the instrument indicates a value of 9 g/m³ the following calculation must be made:</p>
	°C °F flashes	<p>Key for selecting the dew point temperature. D.P. = DEW POINT.</p> <p>The dew point is the temperature at which the cooled air becomes saturated, giving rise to the condensation of the excess vapour. When this key is pressed the dew point appears expressed in °C or °F. The °C or °F symbol flashes.</p>
	% R.H.	<p>Key for selecting relative humidity measurement. The relative humidity is the ratio between the amount of vapour present in the air considered and the amount that air at the same temperature could contain if it were saturated.</p>

KEY	SYMBOLS LIT BESIDES THE NUMBERS	FUNCTION DESCRIPTION
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Air is defined as saturated when, in these determined conditions of temperature, air and pressure, it has absorbed the greatest possible amount of vapor. The relative humidity value is expressed in % of relative humidity.


PROBE CONNECTION

One or two probes may be connected to the HD 8901 hygrometer thermometer: at input A, the probe for measuring humidity and temperature mode. HD 8501S, HD 8501SAT/500, HD 8501SS/500, these probes have a DIN 5-pole connector, if they were to be connected by mistake to input B the instrument would indicate **Err**.

At input B the Pt100 temperature probes may be connected, series TP 870 for immersion, TP 870/C for contact, TP 870/A for air, TP 870/P with a penetration point. These probes have a DIN 8-pole connector.

N.B.: When the temperature probe is inserted in input B the instrument automatically excludes the section for measuring the temperature of the probe inserted in input A. **This operation is not carried out in reading the D.P. dew point temperature.**

HOW TO MEASURE

- 1 Press the ON/OFF key to switch on the instrument. This operation enables the automatic cutout timer. If you wish power supply without automatic interruption, press the HOLD and ON/OFF keys simultaneously. In this case the  symbol flashes. This operation should be carried out before switching the instrument on. When the instrument is switched on all the numbers and symbols light up for a few moments, allowing you to check that all the segments are connected.
- 2 Check display.
 - * After all the segments are lit, the °C or °F unit and the measured temperature value appear.
 - * If there is a break in the probe or if it is not properly connected, the broken probe signal appears (Err). In this case check the sensor part and/or the connector.
- 3 Selection of the measuring unit. When keys °C, °F, g/m³, D.P., R.H. are pressed the measurement that is to be taken is selected. Whenever a key is pressed a beep sounds to signal that the operation has been accepted.

Note: When measuring D.P. the temperature must be read by the

temperature probe coupled with the humidity probe, that is with the probe at input A while input B is free.

- 4 The instrument is switched off by pressing the ON/OFF key. Because of the AUTO POWER OFF function the instrument can switch itself off during measurements. In this case press the ON/OFF key to switch it on again.
- 5 Various operations. For operations such as HOLD display, relative measurements, storing and reading MIN/MAX, see the description of the key function.


ATTENTION

The use of the keys on this instrument is relatively simple, but care must be taken to avoid setting it by mistake in an undesired mode. Ensure that HOLD, RCD, REL, MAX, MIN are not displayed during normal operation.

METHOD OF USE

- * Do not expose the probes to gases or liquids which could corrode the sensor material. After use, clean the probe carefully.
- * Do not bend the connectors by applying upward or downward force.
- * Do not bend or deform the probes or drop the sensors for surface measurements.
- * Temperature probes for surface measurements must be held in a vertical position with respect to the surface. A drop of oil or silicone grease must be applied between the surface and the sensor so as to improve the thermal contact. Do not use water or solvents to do this.
- * Temperature measurements on non metal surfaces require a great deal of time on account of their low heat conductivity. In order to obtain a reliable measurement, avoid too fast variations in temperature.
- * This instrument is resistant to water but it is not watertight and should not therefore be immersed in water. If it should fall into the water, take it out immediately and check that no water has infiltrated. The instrument must be manoeuvred in such a way that water cannot get in at the connector side.

LOW BATTERY WARNING AND BATTERY REPLACEMENT

If the battery voltage falls below acceptable levels, a beep sounds every 30 seconds and the  symbol appears. From that moment there remains about 1 hour autonomous operation, however the battery should be replaced as soon as possible.

To change the battery turn the battery retaining screw in an anti-clockwise direction. After replacing it (with an ordinary IEC 6LF22 9V battery) close the door, inserting the tag on the door into the slot provided, and turn the screw in a clockwise direction.

Ensure that the instrument is switched off before changing the battery.

FAULTY OPERATION WHEN SWITCHING ON AFTER CHANGING THE BATTERY

Repeat the battery changing procedure, waiting for a few minutes to allow the circuit condenser capacities to be completely discharged, then insert the battery.

WARNING

- * If the instrument is not to be used for a long time the battery must be removed.
- * If the battery is flat it must be replaced immediately.
- * Take steps to avoid leakage of liquid from the battery.
- * Use good quality leakproof batteries.

Warning for sensors and probes

The TP 870 series of Pt100 temperature probes are sturdy, the element on which the platinum wire is wound is alumina. For long life avoid hard knocks, especially at temperatures, above 400°C, or thermal shocks. The outer shell is made of AISI 303 stainless steel.

Handle the air humidity and temperature sensor with care and avoid contact of the sensor surfaces with sticky or corrosive substances which may cause irremediable damage to the sensors.

Condensate or occasional contact with water do not influence the reliability of the sensors. As soon as the traces of water or condensate disappear, the sensors return to their original conditions. The humidity probes HD 8501SAT/500 and HD 8501SS/500 have a sturdy filter to protect the temperature and humidity sensor.

Any violent knocks or attempts to use the point as a lever could cause irremediable damage.

Stability of measurement

For instruments in continuous use, calibration may be performed about every 12 months for the humidity sensor alone; the long-term drift of the temperature sensor is negligible.

For calibration the following saturated solutions are necessary:

HD 11 corresponding to 11.3% R.H. at 20°C.

HD 33 corresponding to 33.0% R.H. at 20°C.

HD 75 corresponding to 75.4% R.H. at 20°C.

MAINTENANCE

Storage conditions:

* Temperature: -10 to +50°C .

* Humidity: less than 85% relative humidity.

* Do not store the instrument in places where:

1 - there is a high degree of humidity;

2 - the instrument is exposed to direct sunlight;

3 - the instrument is exposed to a source of high temperature;

4 - there are strong vibrations;

5 - there is steam, salt and/or corrosive gas.

The instrument body is made of plastic so it must not be cleaned with solvents which can spoil plastic.

GUARANTEE

This instrument is strictly inspected before being sold. However if there should be any defect due to manufacture and/or transport, apply to the dealer from whom you bought the instrument. The guarantee period is 2 (two) years from the date of purchase. During this period all defects found by us will be repaired free of charge, **excluding those due to incorrect use and careless handling. The probes are not covered by the guarantee, as they can be irreparably damaged after only a few minutes of incorrect use.**

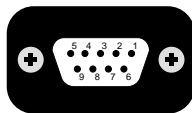
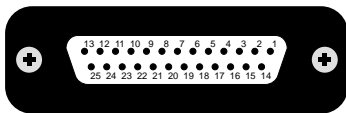
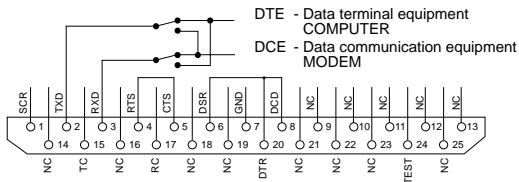
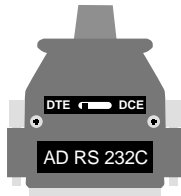
SERIAL OUTPUT FOR HD 8901

To enable the serial output on the instrument, proceed as follows:

- 1 Insert the SUB D 9-pole female connector on the adapter cable with electronics AD RS232C in the SUB D 9-pole socket on the instrument.
- 2 Connect the SUB D 25-pole female connector of the coupling to the serial input of the printer or the computer.
The position of the switch inside the connector must be:
DCE: data communication equipment - (**Modem**)
DTE: data terminal equipment - (**Computer**).
- 3 If you wish to send the information shown on the display (once only), press the **HOLD** button until the instrument gives **two beeps**.
- 4 If you wish to send the information shown on the display continuously, at a fixed rate every 10 seconds, press the **HOLD** button until the instrument gives **three beeps**.
- 5 To disable the serial output during continuous transmission, press the **HOLD** button until the instrument gives **three beeps**.
- 6 If the serial output is not being used, it is advisable not to insert the coupling AD RS232C in the instrument; this will allow battery saving.

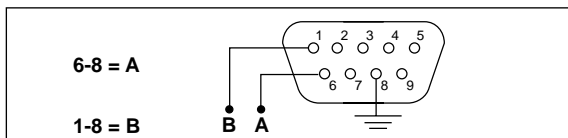
7 Serial output: RS232C

Data transmission speed
300 baud
8 data bit length
1 start bit
1 stop bit
no parity



ANALOG OUTPUT FOR HD 8901

It is possible to connect to the SUB D 9-pole male connector on the instrument so as to have an analog output. This is:

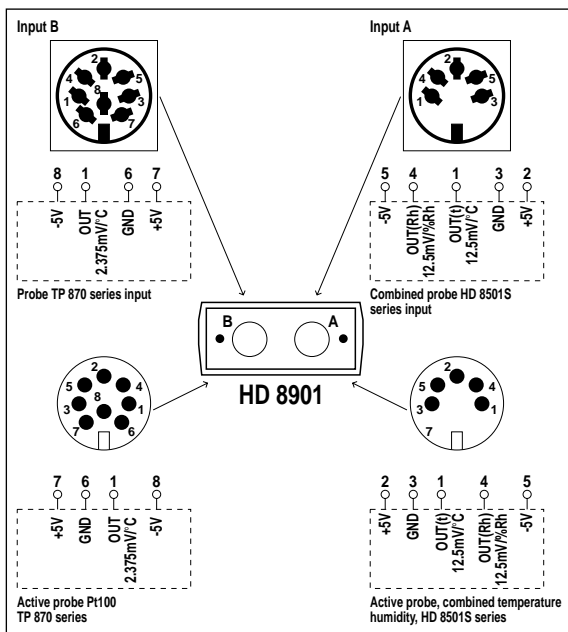
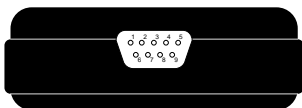


HD 8901

A = 10 mV/°C

A = 10 mV/1% R.H.

B = 1.9 mV/°C (TP 870)



TECHNICAL DATA

No. of inputs: 2

Input A for humidity/temperature probes HD 8501S, HD 8501SAT/500, HD 8501SS/500.

Input B for only temperature probes of the type TP 870, TP 870/C, TP 870/A, TP 870/P.

Measuring range

Relative humidity:

probe HD 8501S: 5 ...98% R.H. in the temperature range -20...+80°C (referred to the sensor).

* Precision, including the probe:

5 to 90% R.H. = 2% R.H.

90 to 98% R.H. = +4/-2.5% R.H.

Probe HD 8501SAT/500: 5...100% R.H. in the temperature range -30 ...+130°C (referred to the sensor).

* Precision, including the probe:

5 to 90% R.H. = 2% R.H.

90 to 100% R.H. = +4/-2.5% R.H.

* This precision refers to measurements lasting less than 15 minutes.

If the hygrometric sensor is exposed to humidity levels close to saturation for periods of over 30 minutes, an excess deviation of up to +6% R.H. is measured. This deviation is memorized in the sensor when normal humidity levels return (less than 90% R.H.). The sensor resumes its original characteristics if it is exposed to humidity levels of less than 80% R.H. for about 24 hours.

Response time without the protection filter = 6 seconds, with the protection filter = 4 minutes.

This response time refers to a measurement in air at a constant temperature. For a correct measurement the temperature of the humidity sensor must be the same as that of the air of which you wish to measure the humidity. Differences in temperature between the sensor and the air cause errors in measurement because the temperature influences the relative humidity of the air. The higher (or lower) temperature of the case radiates heat to the sensor.

Absolute humidity in g/m³:

the absolute humidity is calculated taking as a reference the relative humidity at the time and the temperature conditions that refer to the volume of humid gas at a temperature of $T = 0^{\circ}\text{C}$ and pressure $P = 1013 \text{ mbar}$. Measuring range: 0 g/m³ ...3500 g/m³.

Dew point:

the dew point measurement lies within the temperature measuring range of the relative humidity probes. The dew point of a gas is the temperature at which the humidity present in the gas begins to condense.

Temperature with the TP 870 series of probes:

-200°C (-328°F)...+800°C (+1472°C) in two scales with automatic change of scale.

Precision, including the probe:

-50°C (-58°F)...+200°C (392°F) $\pm 0.1\%$ of reading $\pm 0.2^\circ\text{C}$ ($\pm 0.4^\circ\text{F}$);
-200°C (-328°F)...-50°C (-58°F) and +200°C (+392°F)...+800°C (+1472°F): $\pm 0.3\%$ of reading $\pm 1^\circ\text{C}$ (2°F).

Instrument conversion frequency: about 1 second.

Functions:

automatic switch-off, automatic change of temperature scale, HOLD, storage of MAX, MIN and relative measurement.

Indications on the LCD display:

height of figures 12.5 mm, symbols HOLD, °C, °F, RCD, MAX, MIN, REL, g/m³, % R.H., Err for no probe, broken probe or inverted connector.

Instrument working temperature and humidity range:

-10°C...+50°C, 0...90% R.H.

Power supply:

9V IEC 6LF22 battery.

Battery life:

200 hours with an alkaline battery.

Probe connection:**Input:**

A, DIN 5-pole connector, humidity and temperature probe.

Input:

B, DIN 8-pole connector, temperature probe.

CALIBRATION OF THE COMBINED TEMPERATURE AND HUMIDITY PROBE

A. Instructions for calibration of the **RELATIVE HUMIDITY** section of combined Relative Humidity / Temperature probes in the series HD8501S... with saturated solutions of salts of **SODIUM CHLORIDE (75.4%)**, **MAGNESIUM CHLORIDE (33%)**, and **LITHIUM CHLORIDE (11.3%)** with three calibration points.

Foreword: The procedure for calibrating the probes is quite simple, but in order to achieve correct calibration it is fundamental to know and respect the physical phenomena involved in measuring relative humidity. **We strongly advise you not to have the instrument adjusted by people who are not sufficiently trained or who do not have adequate technical knowledge.**

The calibration sequence with three points is performed in the following order:

1st calibration	solution with 75.4% R.H. (HD75)
2nd calibration	solution with 33% R.H. (HD33)
3rd calibration	solution with 11.3% R.H. (HD11)

The first calibration point is always 75.4% R.H.

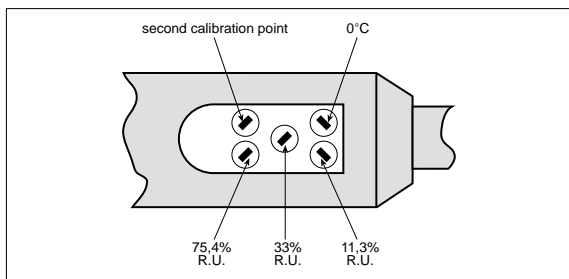
For correct calibration it is very important for the environment temperature to be stable and for both the saturated solution and the probe to be calibrated to be at the same temperature. We recommend 20°C.

Calibration sequence:

- 1) Unscrew the sensor protection.
- 2) Screw the perforated cap and its threaded ring nut into place, right down to the base.
- 3) Open the cap of the 75.4% R.H. saturated solution.
- 4) Check that there are no drops of solution inside the measuring chamber; if there are any, dry them with absorbent paper.
- 5) Insert the probe in the container, ensuring that the cap with the probe goes down to the base. The measuring chamber must be perfectly closed, otherwise it will not become saturated. It is fundamental that there be non possibility of air getting in from outside.
- 6) **Wait 30 minutes.**
- 7) Open the door of the compartment housing the calibration trimmers using a suitably sized cross-head screwdriver.
- 8) The probe is connected to the instrument. Switch on the instrument. Ensure that the measurement is stable.
- 9) Using a small screwdriver, set the calibration trimmer for the value of 75.4% R.H. The trimmer can rotate through 270°. **Do not try to force the stop, as this would break the slot for the screwdriver.** Turn the

trimmer until the value indicated by the instrument coincides with the one on the chart corresponding to the temperature of the sensor and of the saturated solution.

- 10) Ensure that the measurement is stable; wait a few minutes, then go on to calibrate the second point.
- 11) Take the probe out of the container, close the container with its cap and open the container of the saturated solution with 33% R.H. Check that there are no drops of solution inside; if there are any, dry them with absorbent paper.
- 12) Insert the probe in the container, ensuring that the probe and the cap go perfectly down to the base. The measuring chamber must be perfectly closed, otherwise it will not reach equilibrium. This is fundamental.
- 13) **Wait 30 minutes.**
- 14) Switch on the instrument and ensure that the measurement is stable.
- 15) Using a small screwdriver, set the calibration trimmer for the value of 33% R.H. until the value indicated by the instrument coincides with the one on the chart corresponding to the temperature of the sensor and of the calibration solution. **The trimmer can rotate through 270°; do not try to force the stop, as this would break the slot for the screwdriver.**
- 16) Ensure that the measurement is stable; wait a few minutes, then go on to calibrate the third point.
- 17) Take the probe out of the container, close the container with its cap and open the container of the saturated solution with 11.3% R.H. Check that there are no drops of solution inside; if there are any, dry them with absorbent paper.
- 18) Insert the probe in the container, ensuring that the probe and the cap go perfectly down to the base. The measuring chamber must be perfectly closed, otherwise it will not become balanced. This is fundamental.
- 19) **Wait 30 minutes.**
- 20) Switch on the instrument and ensure that the measurement is stable.
- 21) Using a small screwdriver, set the calibration trimmer for the value of 11.3% R.H. until the value indicated by the instrument coincides with the one on the chart corresponding to the temperature of the sensor and of the calibration solution. **The trimmer can rotate through 270°; do not try to force the stop, as this would break the slot for the screwdriver.**
- 22) Ensure that the measurement is stable; wait a few minutes. Switch off the instrument, remove the probe from the container. Close the container with its cap.
- 23) Unscrew the ring nut with the cap, screw on the sensor protection and close the door of the calibration trimmer compartment. This operation concludes calibration.



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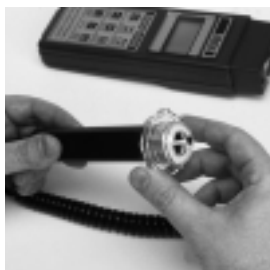
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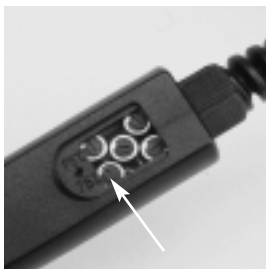
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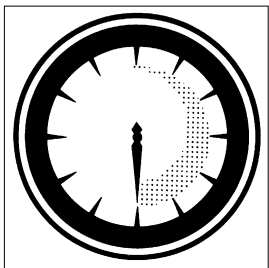
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11



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16

HUMISET HD33										
RH 33,0 % at 20 °C										
°C	10	15	20	25	30	35	40	45	50	
% RH	30,4	33,3	35,0	36,7	38,4	40,0	41,8	43,1	44,5	
MAGNESIUM CHLORIDE										
TO CLOSE AFTER USE										

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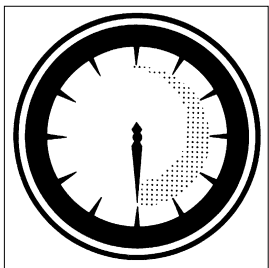
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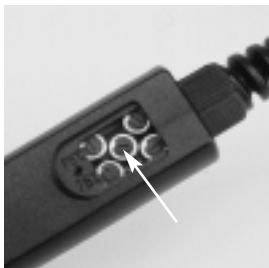
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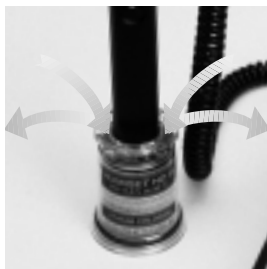
HUMISET HD 11
RH 11,3 % at 20 °C

°C	10	15	20	25	30	35	40	45	50
% RH	11,2	11,3	11,3	11,3	11,2	11,2	11,1	11,1	11,0

LITHIUM CHLORIDE

TO CLOSE AFTER USE

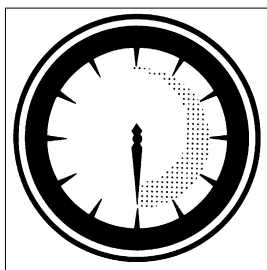
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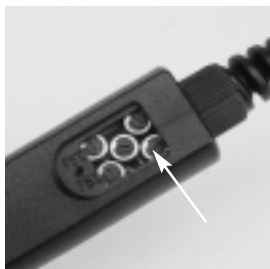
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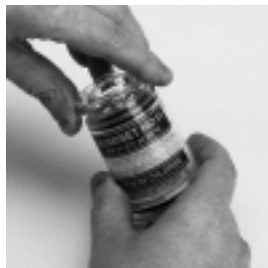
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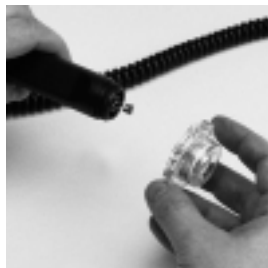
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IMPORTANT NOTES

- * Do not touch the R.H. sensor with your hands.
- * The base of the R.H. sensor is made of glass, it breaks very easily.
- * **During the entire calibration cycles, work as much as possible at a constant temperature;** plastics are generally bad heat conductors, so it takes some time for them to reach a given temperature and remain stable.
- * Temperature influences the humidity measurement.
- * If you do not succeed in staying within the calibration values, the possible causes may be the following:
 - A) The sensor is faulty, corroded or broken.
 - B) During calibration the measurement chamber was not perfectly closed, that is air was getting in.
 - C) The saturated solutions used are exhausted, that is there is no more salt, but only a dense liquid; in this state the measurement chamber cannot reach saturation.
- * Storage of the saturated solutions:

The saturated solutions must be kept, if possible, at a constant temperature of around 20°C.

Avoid leaving the container open, otherwise the lifetime of the solution will be quite short; also, a large number of drops of liquid would form inside the measurement chamber.

During transport or air freight, pressures or vacuums may tend to cause the liquid to escape from the balancing hole or from the porous septum of the measurement chamber; if this should occur, dry up the liquid with absorbent paper; even if some drops are lost the solution will still work perfectly for a long time.

Equilibrium Relative Humidity of Selected Saturated Salt Solutions from 0 to 100 °C

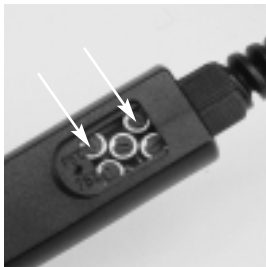
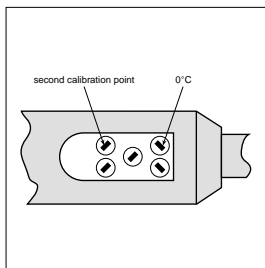
Relative Humidity, %										
T °C	Lithium Chloride	Potassium Acetate	Magnesium Chloride	Potassium Carbonate	Magnesium Nitrite	Sodium Chloride	Potassium Chloride	Potassium Nitrate	Potassium Sulfate	
0	11.23 ± 0.54		33.66 ± 0.33	43.13 ± 0.66	60.35 ± 0.55	75.51 ± 0.34	88.61 ± 0.53	96.33 ± 2.9	98.77 ± 1.1	
5	11.26 ± 0.47		33.60 ± 0.28	43.13 ± 0.50	58.86 ± 0.43	75.65 ± 0.27	87.67 ± 0.45	96.27 ± 2.1	98.48 ± 0.91	
10	11.29 ± 0.41	23.28 ± 0.53	33.47 ± 0.24	43.14 ± 0.39	57.36 ± 0.33	75.67 ± 0.22	86.77 ± 0.39	95.96 ± 1.4	98.18 ± 0.76	
15	11.30 ± 0.35	23.40 ± 0.32	33.30 ± 0.21	43.15 ± 0.33	55.87 ± 0.27	75.61 ± 0.18	85.92 ± 0.33	95.41 ± 0.96	97.89 ± 0.63	
20	11.31 ± 0.31	23.11 ± 0.25	33.07 ± 0.18	43.16 ± 0.33	54.38 ± 0.23	75.47 ± 0.14	85.11 ± 0.29	94.62 ± 0.66	97.59 ± 0.53	
25	11.30 ± 0.27	22.51 ± 0.32	32.78 ± 0.16	43.16 ± 0.39	52.89 ± 0.22	75.29 ± 0.12	84.34 ± 0.26	93.58 ± 0.55	97.30 ± 0.45	
30	11.28 ± 0.24	21.61 ± 0.53	32.44 ± 0.14	43.17 ± 0.50	51.40 ± 0.24	75.09 ± 0.11	83.62 ± 0.25	92.31 ± 0.60	97.00 ± 0.40	
35	11.25 ± 0.22		32.05 ± 0.13		49.91 ± 0.29	74.87 ± 0.12	82.95 ± 0.25	90.79 ± 0.83	96.71 ± 0.38	
40	11.21 ± 0.21		31.60 ± 0.13		48.42 ± 0.37	74.68 ± 0.13	82.32 ± 0.25	89.03 ± 1.2	96.41 ± 0.38	
45	11.16 ± 0.21		31.10 ± 0.13		46.93 ± 0.47	74.52 ± 0.16	81.74 ± 0.28	87.03 ± 1.8	96.12 ± 0.40	
50	11.10 ± 0.22		30.54 ± 0.14		45.44 ± 0.60	74.43 ± 0.19	81.20 ± 0.31	84.78 ± 2.5	95.82 ± 0.45	
55	11.03 ± 0.23		29.93 ± 0.16			74.41 ± 0.24	80.70 ± 0.35			
60	10.95 ± 0.26		29.26 ± 0.18			74.50 ± 0.30	80.25 ± 0.41			
65	10.86 ± 0.29		28.54 ± 0.21			74.71 ± 0.37	79.85 ± 0.48			
70	10.75 ± 0.33		27.77 ± 0.25			75.06 ± 0.45	79.49 ± 0.57			
75	10.64 ± 0.38		26.94 ± 0.29			75.58 ± 0.55	79.17 ± 0.66			
80	10.51 ± 0.44		26.05 ± 0.34			76.29 ± 0.65	78.90 ± 0.77			
85	10.38 ± 0.51		25.11 ± 0.39				78.68 ± 0.89			
90	10.23 ± 0.59		24.12 ± 0.46				78.50 ± 1.0			
95	10.07 ± 0.67		23.07 ± 0.52							
100	9.90 ± 0.77		21.97 ± 0.60							

B. Instructions for calibration of the TEMPERATURE HUMIDITY section of combined Relative Humidity / Temperature probes in the series HD 8501S...

Foreword: Save in cases where the thin film platinum probe Pt100 (100 Ω at 0°C) is working in a particularly hostile or corrosive environment, or if the calibration trimmers have been tampered with, the temperature probe rarely loses calibration, so **we advise you not to take any action** unless you are sure what you are doing.

The calibration sequence is performed in the following order:

1st calibration 0°C
2nd calibration 100°C



The first calibration point is always 0°C.

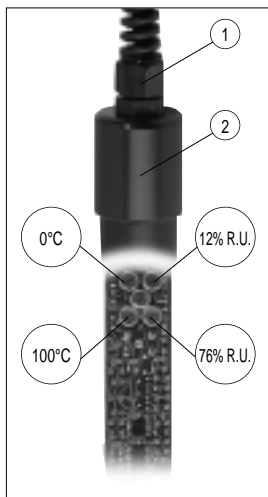
For correct calibration it is very important for the environment temperature to be stable and for both the probe and the simulator to be at the same temperature. We recommend 20°C.

Calibration sequence:

- 1) Unscrew the probe protection filter with the instrument switched off. Be very careful.
- 2) Carefully unsolder the temperature sensor.
- 3) In its place connect a precision Pt100 simulator.
- 4) At the probe input, simulate 0.0°C, corresponding to 100 Ω .
- 5) Open the door of the compartment housing the calibration trimmers using a suitably sized cross-head screwdriver.
- 6) The probe is connected to the instrument. Switch on the instrument. Ensure that the measurement is stable.
- 7) Using a small screwdriver, set the calibration trimmer for the value of 0°C. **The trimmer can rotate through 270°. Do not try to force the slot, as this would break the slot for the screwdriver.** Turn the

trimmer until the value indicated on the display of the instrument corresponds to 0.0°C.

- 8) At the probe input, simulate 100°C, corresponding to 138.5 Ω.
- 9) Using a small screwdriver, turn the calibration trimmer for the value of 100°C until the value indicated by the instrument corresponds to 100.0°C. **The trimmer can rotate through 270°. Do not try to force the stop, as this would break the slot for the screwdriver.**
- 10) Switch off the instrument, disconnect the Pt100 simulator and very carefully resolder the Pt100 sensor. **The Pt100 sensor used has a precision rating A according to IEC 751.**
- 11) Turn the temperature sensor at an angle of 90° towards the extreme edge of the probe so that the sensor body protrudes from the edge.
- 12) Switch on the instrument. Immerse the temperature sensor in a container full up to the brim with bidistilled water at about 20°C. The container is placed over a working agitator; a reference thermometer will be immersed in the container.
- 13) Wait a few minutes until the reading is stable, then read the value on the instrument. If the value does not coincide with the reference thermometer, turn the 0°C trimmer.
- 14) Switch off the instrument, dry the temperature sensor with soft absorbent paper and return it to its working position.
- 15) Screw on the protection filter and close the door of the calibration trimmer compartment. This operation concludes calibration of the temperature section.



Note: To calibrate the probe HD 8501 SAT/500 and HD 8501 SS/500 proceed as follows:

- 1) Unscrew the mobile ring nut that anchors the grommet, turning it in an anti-clockwise direction so as to release the pressure of the rubber ring that holds down the cable.
- 2) Unscrew the end of the grip, turning it in an anti-clockwise direction so as to obtain access to the slots in which you can then insert the screwdriver to calibrate the trimmer. **Attention: when unscrewing the end of the grip, hold the cable still (it must not turn).**
- 3) The other instructions are the same as for the probe HD 8501S.

CE CONFORMITY	
Safety	EN61000-4-2, EN61010-1 level 3
Electrostatic discharge	EN61000-4-2 level 3
Electric fast transients	EN61000-4-4 level 3
Voltage variations	EN61000-4-11
Electromagnetic interference susceptibility	IEC1000-4-3
Electromagnetic interference emission	EN55020 class B

NM HD8901



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