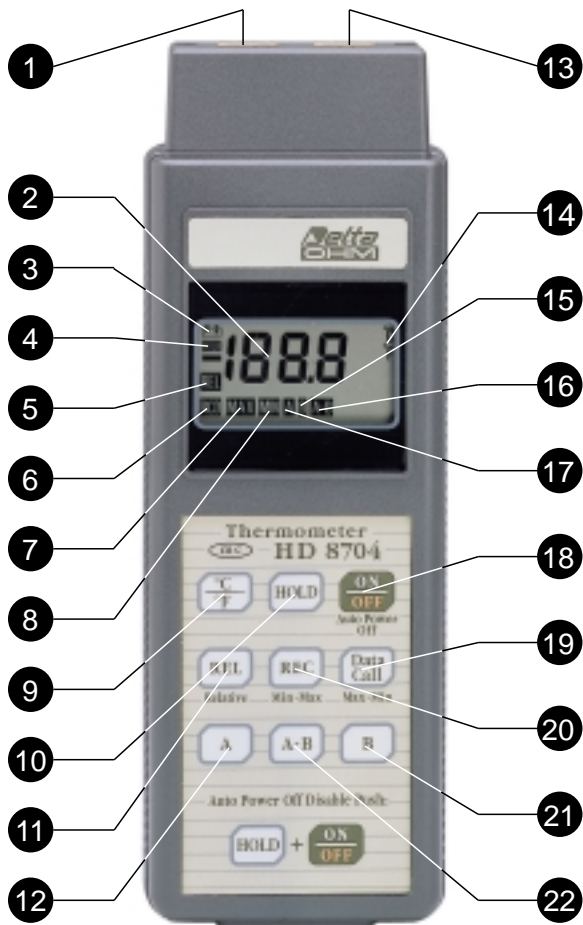


# HD 8704 - HD 9016

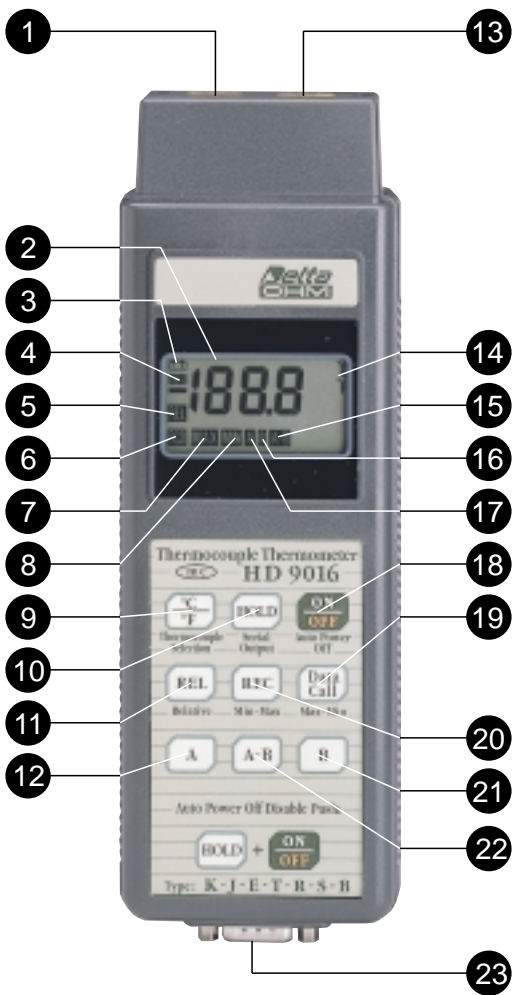
## INSTRUCTION MANUAL



# HD 8704



# HD 9016



# HD 8704 - HD 9016

MULTIFUNCTION DIGITAL  
MICROPROCESSOR THERMOMETER

ENGLISH


# HD 9016

- 
- 1 - Probe A input connection.

---

  - 2 - Display.

---

  - 3 -  symbol.

---

  - 4 - HOLD status display.

---

  - 5 - REL relative selection display.

---

  - 6 - RCD display. Indicates that the instrument is storing data at the two inputs.

---

  - 7 - MAX display. Shows the MAX stored input value.

---

  - 8 - MIN display. Shows the MIN stored input value.

---

  - 9 - °C/°F display selection key. If held down it selects the type of thermocouple with which the measurement is to be made: K(H), J(j), T(t), E(E), R(r), S(S), B(b).

---

  - 10 - Display HOLD key. Data are continuously updated inside the instrument. If the key is held down, the buzzer emits a second beep, the value shown on the display is sent to the serial output RS 232C. If the key is held down until the instrument gives the third beep, this operation enables the serial output RS 232C. Every 10 seconds the value shown on the display is sent to the serial output.

---

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

---

  - 12 - Button A. Selects input A.

---

  - 13 - Probe B input connection.

---

  - 14 - °C or °F unit display.

---

  - 15 - Difference between inputs A and B.

---

  - 16 - Input B selection symbol.

---

  - 17 - Input A selection symbol.

---

  - 18 - Power ON/OFF key.

---

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

---

  - 20 - REC. When pressed, the instrument stores the MAX and MIN value recorded by the probes connected to the two inputs.

---

  - 21 - Button B. Selects input B.


---






  - 22 - Selects the difference in value between inputs A and B.





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  - 23 - Serial output RS 232C through the cable AD RS 232C.
-

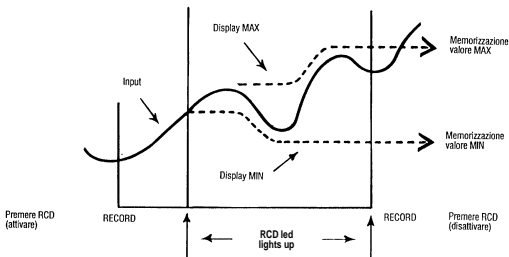
# HD 8704

- 
- 1 - A-input connection.
- 
- 2 - Display.
- 
- 3 -  symbol.
- 
- 4 - HOLD status display.
- 
- 5 - REL symbol.
- 
- 6 - RCD display. Indicates that the instrument is storing data at the two inputs.
- 
- 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 - Display HOLD key. Blocks the reading while internally the instrument continues updating data.
- 
- 11 - REL key. When this key is pressed the relative measurement is taken with respect to the moment in which the REL key was pressed.
- 
- 12 - A-input display selection key.
- 
- 13 - B-input connector.
- 
- 14 - Symbol indicating readings in °C or °F.
- 
- 15 - Input B selection symbol.
- 
- 16 - Difference between input A and B.
- 
- 17 - Input A selection symbol.
- 
- 18 - Power ON/OFF key.
- 
- 19 - DATA CALL. When this key is pressed the display shows in sequence the MAX, MIN and present value of the selected input.
- 
- 20 - REC. When pressed, the instrument stores the MAX and MIN value recorded by the probes connected to the two inputs.
- 
- 21 - Selects input B.
- 
- 22 - Selects the difference in value between inputs A and B.
-

KEY	SYMBOLS LIT BESIDES THE NUMBERS	FUNCTION DESCRIPTION
	All the symbols are lit for a few seconds after switching on	<p>Switches the instrument on and off. Press once to switch on; when it is pressed again it switches the instrument off.</p> <p>The instrument switches itself off automatically about 8 minutes after this key has been pressed.</p> <p>If any key other than the <b>ON/OFF</b> key is pressed, the instrument switches itself off 8 minutes after the last key was pressed. If the <b>HOLD</b> key is held down simultaneously with the <b>ON/OFF</b> key when switching on, the automatic cutout is disabled and power is supplied without interruption.</p> <p>The cutout function is also disabled during <b>RCD</b>.</p> <p>To switch off, press the <b>ON/OFF</b> key.</p>
	 <p>The symbol flashes to show that <b>AUTO POWER OFF</b> is disabled</p>	
	A	Channel A selection key.
	B	Channel B selection key.
	A-B	<p>Channel A - B selection key.</p> <p>This indicates the value obtained when B is subtracted from A.</p> <p>When switched on, the instrument indicated the measurement in channel A.</p>
	Err	<p>If the probe is not connected to the connector (or if there is a break in it) the <b>ERROR</b> signal appears.</p> <p>This signal appears also if a channel (A or B) to which no probe is connected is selected.</p>

KEY	SYMBOLS LIT BESIDES THE NUMBERS	FUNCTION DESCRIPTION
	HOLD  HOLD DISAPPEARS	<p><b>HOLD</b> key.</p> <p>Press this key to “freeze” the reading. When the key is pressed again the instrument leaves <b>HOLD</b> mode and returns to normal functions.</p> <p>For the <b>HD 9016</b>: if the <b>HOLD</b> key is held down until the second beep is heard, the data shown on the display are sent to the serial output.</p> <p>If the <b>HOLD</b> key is held down until the third beep is heard, the data shown on the display are sent continuously, every 10 seconds, to the serial output.</p>
	°C/°F	<p>This key selects the units for the reading. Whenever it is pressed the units °C and °F alternate.</p> <p>The change may occur during HOLD, RCD, REL and DATA CALL modes.</p> <p>For the <b>HD 9016</b>: by holding down the °C/°F key it is possible to choose the desired type of thermocouple: K, J, E, T, R, S or B. When the symbol of the desired thermocouple appears on the display, release the key.</p>
	REL  REL DISAPPEARS	<p>Key for selecting relative measurements.</p> <p>When this key is pressed the difference (relative value) between the value (D1) measured shortly before pressing the key (reference value) and the next value (Dx) is displayed. <math>REL = Dx - D1</math>.</p> <p>When the key is pressed again the instrument returns to normal functions.</p>
	RCD	MAX/MIN recording key.

KEY	SYMBOLS LIT BESIDES THE NUMBERS	FUNCTION DESCRIPTION
	 flashes <b>RCD</b> °C or °F A or B	<p>The maximum/minimum recording starts from the moment the <b>RECORD MAX/MIN</b> 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) and for A-B. During RCD mode the AUTO POWER OFF function is disabled and the  symbol flashes.</p>
	<b>MIN/MAX</b>	<p>Press the <b>DATA CALL MAX MIN</b> key to read the recorded values.</p> <p>* 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.</p> <p>* When <b>RECORD MAX/MIN</b> is pressed during REL, the maximum and minimum values of the Dx are memorized instead of the relative values.</p>
		<p>Key for recalling the maximum and minimum.</p>
	<b>MAX A (or B or A-B)</b>	Maximum value.
	<b>MIN A (or B or A-B)</b>	Minimum value.
	<b>Updated value</b>	Measured value.




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

## PROBE CONNECTION

The HD 8704 or HD 9016 thermometers can be fitted with one or two type K thermocouple probes or K, J, E, T, R, S, B only for the HD 9016. Use only the indicated thermocouples.

If only one probe is being used, the keys must be used correctly to select channel A or B after switching on. The connectors are polarized to avoid errors in connection.

## 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 present.
- 2 Check display.
  - \* After all the segments are lit, the measured value is displayed. The display should show the value of the measurement and the °C or °F unit as well as the channel A (or B or A-B).
  - \* 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.
  - \* If only one probe is being used and the wrong channel or A-B is selected, the error signal appears.
- 3 Channel A or B selection.  
Channel A or B or A-B may be selected. Whenever a key is pressed a beep sounds to signal that the operation has been accepted.

- 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, recording and reading MIN/MAX, see the description of the key function.


## ATTENTION

The use of the keys on these instruments are 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

- \* As the instrument is not provided with insulation, ensure that there is no difference in potential between the two probes.
- \* 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 connector by applying upwards or downward force.
- \* Do not bend the sensor, deform it or drop the probes for surface measurements.
- \* 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.
- \* 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..
- \* These instruments are resistant to water but they are not watertight and check that no water has infiltrated. The instruments must be used 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, the symbol  appears and a beep sounds every 20 seconds. 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 anticlockwise direction. After replacing it (with an ordinary 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.

### **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.

## CALIBRATION

The calibration data are stored in an internal memory; they may be checked, controlled or varied when required.

**Attention: this operation must be carried out by skilled personnel with suitable checking and testing equipment. We strongly recommend you not to have it carried out by persons without these qualifications. The instrument has been calibrated and checked before leaving the factory.**

## CALIBRATION CODES

The instrument can store 5 codes.

These are:

- C1** Resumes the original calibration of the instrument; this means that the instrument takes measurements and operates with the original calibration performed in the DELTA OHM workshop. It cannot be altered.
- C2** Resumes the calibration of the instrument alone; this means that the instrument takes measurements and operates with a calibration performed by the user with suitable equipment or by a SIT centre.
- C3** Resumes the calibration of the instrument plus the probe; this means that the instrument takes measurements and operates with the instrument's own calibration combined with a certain probe; in order to be correct, the measurement must always be taken with this probe.
- C6** Calibration of the instrument alone; this is the access code to enable calibration of the instrument by a SIT centre or by the user with a simulator, hence the calibration of the instrument alone.
- C8** Calibration of the instrument plus probe; this is the access code to enable calibration of the instrument plus the probe, in a furnace, by a SIT centre or by the user with suitable equipment. Calibration of the instrument with a certain probe: in order to be correct, the measurement must, of course, always be taken with this probe.

Codes **C1**, **C2**, **C3** are working codes, while **C6** and **C8** are codes used for calibration alone.

Once a code has been set, the instrument will always work with this one until it is changed.


When switching on, after all the symbols have appeared on the display for a few moments, the instrument indicates the set working code.


## PROCEDURE FOR CHOOSING THE WORKING CODES

To choose the working codes, proceed as follows:

1. Switch on the instrument with the **ON/OFF** key; hold down the °C/°F key and the CAL message appears on the display; release the °C/°F key and the **00** message appears on the display.
2. Using the **DATA CALL** and **REL** keys, set the desired code: **01** or **02** or **03**.
3. Confirm the desired code with the **REC** key; the  symbol flashes for a few moments and the CAL message appears.
4. The instrument switches off automatically. From this moment on the operator will take measurements with the selected working code.


## PROCEDURE FOR CALIBRATING THE INSTRUMENT ALONE (WORKING CODE C2)


1. Switch on the instrument with the **ON/OFF** key; hold down the °C/°F key and the CAL message appears on the display; release the °C/°F key and the **00** message appears on the display.
2. Using the **DATA CALL** and **REL** keys, set the code **06**, then press the **REC** key.
3. Using a K thermocouple simulator without compensation of cold junction at the instrument input A, simulate zero (zero degrees Centigrade), that is the first calibration point.
4. Using the **DATA CALL** and **REL** keys, set the correct value of zero on the display.
5. Simulate the value of the second calibration point with the K thermocouple simulator without compensation of cold junction.
6. Using the **DATA CALL** and **REL** keys, set on the display the correct value of the second calibration point ( $\geq 150^{\circ}\text{C}$ ).
7. Insert the K thermocouple probe in the connector of the instrument.
8. Press the **HOLD** key to enable calibration of the compensation of the environment temperature.
9. Using the **DATA CALL** and **REL** keys, set the value of the environment temperature (the environment temperature must be measured with a precision thermometer).
10. Press the **REC** key to store the calibration performed.
11. If the calibration procedure has been performed correctly, the  symbol flashes for a few moments, the CAL message appears and the instrument switches off automatically.

If the calibration procedure has not been performed correctly, the  symbol and the CAL message flash. Repeat the operation.

## PROCEDURE FOR CALIBRATING THE INSTRUMENT AND ITS PROBE (WORKING CODE C3)

1. Switch on the instrument with the **ON/OFF** key; hold down the °C/°F key and the CAL message appears on the display; release the °C/°F key and the **00** message appears on the display.

2. Using the **DATA CALL** and **REL** keys, set the code **08**, then press the **REC** key.
3. The K thermocouple chosen for the combination is connected to the instrument and will be inserted in a calibrating furnace; the temperature will be 0°C, corresponding to the first calibration point.
4. Using the **DATA CALL** and **REL** keys, set on the display the temperature value corresponding to the 0°C of the calibration furnace **minus the value of the environment temperature measured with a precision thermometer**.
5. Insert the probe in a furnace, the temperature of which corresponds to the second calibration point.
6. Using the **DATA CALL** and **REL** keys, set on the display the temperature value corresponding to the second calibration point of the furnace **minus the value of the environment temperature measured with a precision thermometer**.
7. Bring the probe inserted in the instrument to environment temperature.
8. Press the **HOLD** key.
9. Using the **DATA CALL** and **REL** keys, set on the display the correct value of the environment temperature **(the environment temperature must be measured with a precision thermometer)**.
10. Press the **REC** key to store the calibration.
11. If the calibration procedure has been performed correctly, the  symbol flashes for a few moments, the CAL message appears and the instrument switches off automatically.

If the calibration procedure has not been performed correctly, the  symbol and the CAL message flash. Repeat the operation.

## THERMOCOUPLE

Temperature measuring device composed of two homogeneous but dissimilar metal conductors, insulated along their whole length. The two conductors are welded together at one end, called the measuring junction or, sometimes, hot junction, and are connected to a circuit for measuring the electromotive force (e.m.f.). The connecting area between the thermocouple and the measuring circuit is called the reference junction or, sometimes, cold junction. When there is a difference in temperature between the measuring junction and the reference junction, the thermocouple generates an e.m.f. that depends on this temperature difference (Seebeck effect).

### Measuring junction (hot junction):

This is the end of the thermocouple where the two thermoelements are welded together and is the heat-sensitive part of the thermocouple.

### Reference junction (cold junction):

This is the isothermal connection area between the thermocouple and the measurement circuit.

**Electromotive force (e.m.f.) of the thermocouple:**

This is the difference in electric potential that is measured at the open terminals of the thermocouple when there is a difference in temperature between the measurement junction and the reference junction.

The maximum recommended temperature limits for the K thermocouple and the respective dimensions of the leads are indicated for protected thermocouples, that is for thermocouples inserted in ceramic insulators, in metal or ceramic protection sheaths closed at one end. The temperature limits indicated and the respective diameters of the thermoelements are such as to allow a satisfactory life of the thermocouple in continuous duty.

**Working temperature limits of the thermoelements of a type K thermocouple:**

Diameter in mm.:	0.3	0.5	0.8	1.6	3.2
Maximum temperature in °C:	870	970	980	1090	1250

**TOLERANCE**

The tolerance of a type of thermocouple corresponds to the maximum allowed deviation of the e.m.f. of any thermocouple of that type, with reference junction at 0°C. The tolerance is expressed in degrees Celsius, preceded by the plus or minus sign. The percentage tolerance is given by the ratio between the tolerance expressed in degrees Celsius and the temperature of the measuring junction, multiplied by one hundred.

Thermocouples that comply with the standard must respect one of the following two degrees of tolerance, the values of which are shown in the table.

**G I** (special tolerances)

**G II** (normal tolerances)

The tolerances refer to the working temperature for which the thermocouple is intended, with relation to the diameter of the thermoelements.


**TOLERANCES OF TYPE K THERMOCOUPLES**

	<b>G I*</b>	<b>G II*</b>
Range 0 to 1250°C:	±1.1°C or ±0.4%	±2.2°C or ±0.75%
Range -200 to 0°C:	—	±2.2°C or ±2%

\* The higher limit of the two options applies. For example: for a type K thermocouple with tolerance G II, at 200°C the percentage tolerance ±0.75% is equal to ±1.5°C. The applicable limit is therefore ±2.2°C. On the other hand, at 600°C the percentage tolerance is equal to ±4.5°C, so this is the limit to be used.

The thermocouples that satisfy the limits for temperatures higher than 0°C do not necessarily satisfy the limits for the range below 0°C.

## HD 8704 TECHNICAL DATA

<b>No. inputs</b>	2 type K thermocouples.
<b>Measuring range</b> (instrument only)	-200°C (-328°F)...+1372°C (1999°F).
<b>Resolution</b>	≤199.9°C (199.9°F): 0.1°C (0.1°F) ≥200°C (200°F): 1°C (1°F).
<b>Precision</b> (instrument only)	From 0 to +199.9°C (199.9°F): ±0.1% of reading ±0.4°C (0.7°F). From 200°C (200°F) to full-scale value or from -0.1°C (31.8°F) to -200°C (-328°F): ±0.2% of reading +1°C (1.8°F) (environment temperature 25°C ±5°C).
<b>Temperature coefficient</b>	±0.01% of reading +0.01°C (0.02°F)/°C.
<b>Conversion frequency</b>	Approx. 1 sec./conversion.
<b>Functions</b>	Automatic change of scale. HOLD display, MAX/MIN recording, relative measurements.
<b>Display</b>	LCD 3 1/2 digit figure height 12.5 mm, symbols HOLD, RCD, REL, MAX, MIN, °C °F, A, B, A-B,  .
<b>Working temperature and humidity range</b>	0÷50°C, 0÷90% R.H.
<b>Power supply</b>	Zinco/carbon battery 9V, IEC 6LF 22.
<b>Battery duration</b>	100 hours continuous duty with an alkaline battery.
<b>Instrument weight</b>	Approximately 280 gr.
<b>Dimensions</b>	Approximately 215x73x38 mm.
<b>Probe connections</b>	2 miniature thermocouple sockets K, compensated cold junction.
<b>Accessories</b>	9V battery, instructions manual, carrying case.
<b>Optional</b>	Different shaped and use probes.

## ORDER CODES

**HD 8704 K:** Instrument HD 8704, 9V battery, instructions manual, diplomatic carrying case. Dimensions 450x300x105 mm, weight 1600 gr.

# HD 9016

## CHOOSING THE TYPE OF THERMOCOUPLE

When the display lights up, all the symbols appear. Then the symbol of the stored thermocouple and the working code appear.

If you want to change the type of thermocouple, proceed as follows:

When the °C/°F key is held down the symbols for the following thermocouples appear in sequence on the display:

SYMBOL	TYPE OF THERMOCOUPLE
H	K (CHROMEL-ALUMEL)
J	J (IRON-CONSTANTAN)
E	E (COPPER-CONSTANTAN)
t	T (CHROMEL-CONSTANTAN)
r	R (PLATINUM-PLATINUM 13% RHODIUM)
s	S (PLATINUM-PLATINUM 10% RHODIUM)
b	B (PLATINUM 6% RHODIUM-PLATINUM 30% RHODIUM)

Press the key and release it when the symbol of the desired thermocouple appears on the display; from that moment the instrument is set to accept the type of thermocouple selected.

SYMBOL THERMOCOUPLE

SYMBOL THERMOCOUPLE



K



J



E



T

SYMBOL THERMOCOUPLE

SYMBOL THERMOCOUPLE

**R****S****B**


## THE LIMITS OF THE THERMOCOUPLES BEYOND WHICH THE LOV OR ERR INDICATION APPEARS ARE AS FOLLOWS:

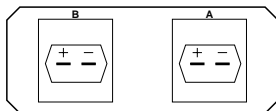
Thermocouple type	<b>K</b> : -200... +1370°C
	<b>J</b> : -100... + 750°C
	<b>T</b> : -200... + 350°C
	<b>E</b> : -200... + 750°C
	<b>R</b> : +200... +1480°C
	<b>S</b> : +200... +1480°C
	<b>B</b> : +200... +1800°C

## SERIAL OUTPUT RS 232C ENABLE

To enable the serial output, proceed as follows:

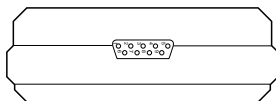
- Connect the AD RS 232C connecting cable to the instrument (the arrangement of the connections is shown in the drawing) and connect the probes to the input.
- Switch on the instrument.
- Press the **HOLD** key until the instrument gives a second beep, the data shown on the display are sent to the serial output.

If you want to send the data shown on the display continuously, every 10 seconds, you must hold down the HOLD key until you hear the third beep. At this point the  symbol flashes and the data shown on the display is sent every 10 seconds to the serial output. To quit this situation, press the HOLD key until the instrument gives 3 beeps.



THERMOCOUPLE INPUT B  
TYPE K, J, T, E, R, S, B

THERMOCOUPLE INPUT A  
TYPE K, J, T, E, R, S, B



AD RS 232C  
CONNECTION CABLE

HD 9016




PRINTER  
COMPUTER

300 bauds  
8 data bit length  
1 start bit  
1 stop bit  
Non parity



## HD 9016 TECHNICAL DATA

<b>No. inputs</b>	2.
<b>INSTRUMENT RANGE:</b>	
<b>Thermocouple K:</b>	(-200...+1370°C) (-328...+1999°F)
<b>Thermocouple J:</b>	(-100...+ 750°C) (-148...+1382°F)
<b>Thermocouple T:</b>	(-200...+ 350°C) (-328...+ 662°F)
<b>Thermocouple E:</b>	(-200...+ 750°C) (-328...+1382°F)
<b>Thermocouple R:</b>	(+200...+1480°C) (+392...+1999°F)
<b>Thermocouple S:</b>	(+200...+1480°C) (+392...+1999°F)
<b>Thermocouple B:</b>	(+200...+1800°C) (+392...+1999°F)
<b>Probe connection</b>	2 miniature thermocouple K sockets, compensated cold junction.
<b>Resolution</b>	≤199.9°C (+199.9°F) 0.1°C (0.1°F) ≥200°C (+200°F) 1°C (1°F).
<b>Instrument precision</b>	From 0 to +199.9°C (+199.9°F) ±0.1% of reading ±0.4°C (±0.7°F) ±1 digit. From 200°C (200°F) to full scale or from -0.1°C (31.8°F) to -200°C (-328°F) ±0.2% of reading ±1°C (±1.8°F) ±1 digit. This precision applies to an environment temperature 25°C ±5°C.
<b>Influence of temperature</b>	±0.01% of reading +0.01°C/°C ±0.01% of reading +0.02°F/°F.
<b>Conversion frequency</b>	1 second.
<b>Instrument working temperature</b>	0...50°C.
<b>Relative humidity</b>	0...90% R.H.
<b>Instrument functions</b>	Automatic change of scale, HOLD, automatic cut-out, MAX/MIN storage, relative measurements, difference between inputs, serial output RS 232C, selection of thermocouple type.
<b>Serial output</b>	RS 232C, unidirectional, data transmission speed 300 baud. Connection by means of a connecting cable from female 9-pole to SUB D female 25-pole. Transmission of the displayed value at a fixed rate every 10 seconds.
<b>Display</b>	LCD 3 1/2 digit figure height 12.5 mm, symbols HOLD, RCD, REL, MAX, MIN, °C °F, A, B, A-B,  .
<b>Power supply</b>	9V battery IEC 6LF22.
<b>Battery life</b>	Approximately 100 hours, alkaline battery.
<b>Instrument weight</b>	280 gr.

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**Dimensions**                    215x73x38 mm.

## **ORDER CODES**

**HD 9016 kit:** Instrument HD 9016, 9V battery, instructions manual, diplomatic carrying case. Dimensions 450x300x105 mm, weight 1800 gr.

**AD RS 232C:** Connecting cable from SUB D female 9-pole to SUB D female 25-pole, complete with electronics for serial output RS 232C.

## 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.

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



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