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INSTRUMENTOS DE MEDICIÓN INDUSTRIAL

Termohigrómetro + Anemómetro LT-AM4205A

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+ Type K/J TEMP.

HUMIDITY / ANEMOMETER

Model : AM-4205A



Your purchase of this HUMIDITY/ANEMOMETER marks a step forward for you into the field of precision measurement. Although this METER is a complex and delicate instrument, its durable structure developed. Please read the following instructions carefully and always keep this manual within easy reach.

OPERATION MANUAL

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1. FEATURES

- * Anemometer, Humidity meter and type K/J Thermometer are combined into one meter, intelligent design.
- * Microprocessor circuit assures maximum possible accuracy, provides special functions and features.
- * Large LCD with two display, easy readout.
- * Low-friction ball vane wheels is accurate in both high & low velocities for anemometer.
- * Thin-film capacitance sensor for humidity measurement, high precision.
- * Records Maximum & Minimum readings with recall.
- * Data hold.
- * Auto shut off saves battery life.
- * RS 232 PC serial interface.
- * The portable anemometer provides fast, accurate readings and the convenience of a remote sensor separately.
- * Humidity meter with the separate probe.
- * Multi-functions for air flow measurement: m/s, km/h, ft/min, knots, mile/h.
- * Build in temperature °C, °F measurement.
- * Used the durable, long-lasting components.
- * Heavy duty and deluxe hard carrying case, easy carryout & storage.
- * Wide applications : To check air conditioning & heating systems, measure air velocities, wind speeds, humidity temperature...etc.
- * Available for the HVAC applications.

2. SPECIFICATIONS

2-1 General Specifications

Circuit	Custom one-chip of microprocessor LSI circuit.
Display	* LCD size : 60 mm x 33 mm * Dual function meter's display.
Measurement	<i>Anemometer :</i> m/s (meters per second) km/h (kilometers per hour) ft/min (feet/per minute) knots (nautical miles per hour) mile/h (miles per hour) Temperature - °C, °F.
	<i>Humidity meter :</i> %RH (Relative Humidity). Temperature - °C, °F.
	<i>Type K/J thermometer</i>
Sensor Structure	<i>Anemometer :</i> Air velocity : Conventional twisted van arm and low friction ball bearing design. Temperature : Precision thermistor.
	<i>Humidity meter :</i> Humidity : High precision thin-film capacitance sensor. Temperature : Precision Temp. sensor.
	<i>Thermometer :</i> Type K/J thermocouple probe.

Type K/J Thermometer structure	<i>Input Socket :</i> Standard 2 pin thermocouple socket. <i>Linear Compensation :</i> Linear Compensation for the full range. <i>Temperature Compensation :</i> Automatic cold junction compensation both type K/J thermometer
Data hold	To freeze the display reading on the LCD display.
Memory Recall	Records Maximum & Minimum readings with recall.
Sampling Time	Approx. 1 sec.
Power Management	Auto shut off to save battery life or manual off by push button.
Over Indication	Show " - - - - - ".
Data Output	RS 232 PC serial interface.
Operating Temperature	0 to 50 °C (32 to 122 °F).
Operating Humidity	Less than 80% RH.
Power Supply	DC 9V battery (heavy duty), 006P, MN1604 (PP3) or equivalent.
Power Consumption	<i>Type K/J thermometer :</i> Approx. DC 6 mA <i>Anemometer :</i> Approx. DC 11 mA <i>Humidity :</i> Approx. DC 7 mA
Weight	256 g/0.56 LB, main instrument.

Dimension	<i>Main instrument:</i> 180x72x32 mm (7.1x2.8x1.3 inch). <i>Anemometer probe :</i> Round, 72 mm Dia. <i>Humidity Probe:</i> 197 mm (7.8 inch) in length.
Accessories Included	Instruction manual..... 1 PC. Anemometer probe.....1 PC. Humidity Probe..... 1 PC. Carrying case..... 1 PC.
Optional Accessories	* Type K thermocouple probe, TP-01, TP-02A. TP-03, TP-04. * RS232 cable, UPCB-02. * USB cable, USB-01. * Data Acquisition software, SW-U801-WIN. * AC to DC 9V adapter, AP-9VB.

2-2 Electrical Specifications (23± 5 °C)

Type K/J Thermometer

Sensor Type	Resolution	Range	Accuracy
Type K	0.1 °C	-50.0 to 1300.0 °C	± (0.4 % + 0.8 °C)
		-50.1 to -199.9 °C	± (0.4 % + 1 °C)
	0.1 °F	-58.0 to 2372.0 °F	± (0.4 % + 1.5 °F)
		-58.1 to -327.8 °F	± (0.4 % + 1.8 °F)
Type J	0.1 °C	-50.0 to 1100.0 °C	± (0.4 % + 0.8 °C)
		-50.1 to -199.9 °C	± (0.4 % + 1 °C)
	0.1 °F	-58.0 to 2012.0 °F	± (0.4 % + 1.5 °F)
		-58.1 to -327.8 °F	± (0.4 % + 1.8 °F)

* Accuracy value is specified for the meter only.

* Temp. probe (Type K, TP-01 TP-02A, TP-03. TP-04) is the optional accessories, refer page 22.

Anemometer

A. Air velocity

Measurement	Range	Resolution	Accuracy
m/S	0.4 - 25.0 m/s	0.1 m/s	± (2% + 0.2 m/s)
km/h	1.4 - 90.0 km/h	0.1 km/h	± (2% + 0.8 km/h)
mph	0.9 - 55.9 mile/h	0.1 mile/h	± (2% + 0.4 mile/h)
knot	0.8 - 48.6 knots	0.1 knots	± (2% + 0.4 knots)
FPM	80 - 4930 ft/min	1 ft/min	± (2%+40 ft/min.)

Note: m/S - meters per second km/h - kilometers per hour
 FPM - feet/per minute knot - nautical miles per hour
 mph - miles per hour (international knot)

B. Temperature

Measuring Range	0 °C to 50 °C/32 °F to 122 °F
Resolution	0.1 °C/0.1 °F
Accuracy	± 0.8 °C/1.5 °F

Humidity/Temp. meter

A. Humidity

Measuring Range	10 % to 95 % R.H.	
Resolution	0.1 % R.H.	
Accuracy	≥ 70% RH	± (3% reading + 1% RH).
	< 70% RH	± 3% RH.

B. Temperature

Measuring Range	0 °C to 50 °C/32 °F to 122 °F
Resolution	0.1 °C/0.1 °F
Accuracy	± 0.8 °C/1.5 °F

* *Above specification tests under the environment RF Field Strength less than 3 V/M & frequency less than 30 MHz only.*

3. FRONT PANEL DESCRIPTION

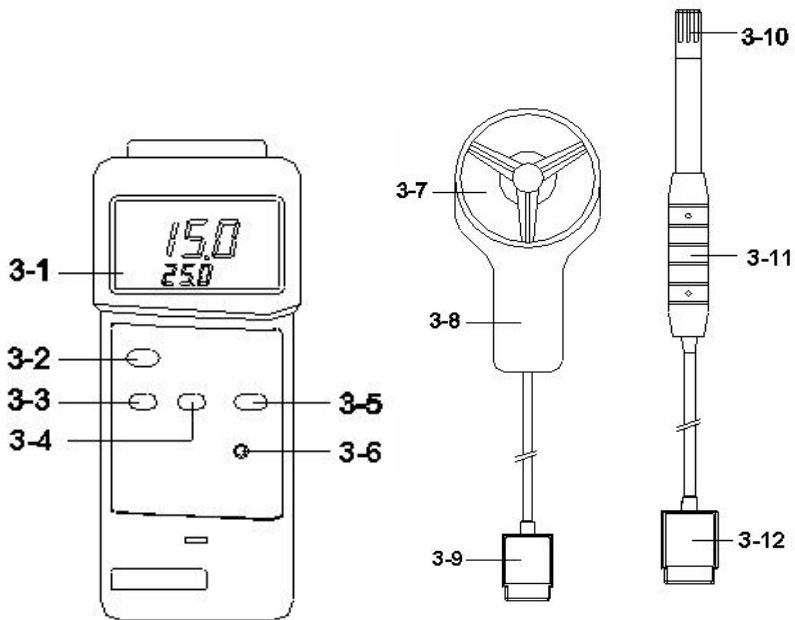


Fig. 1

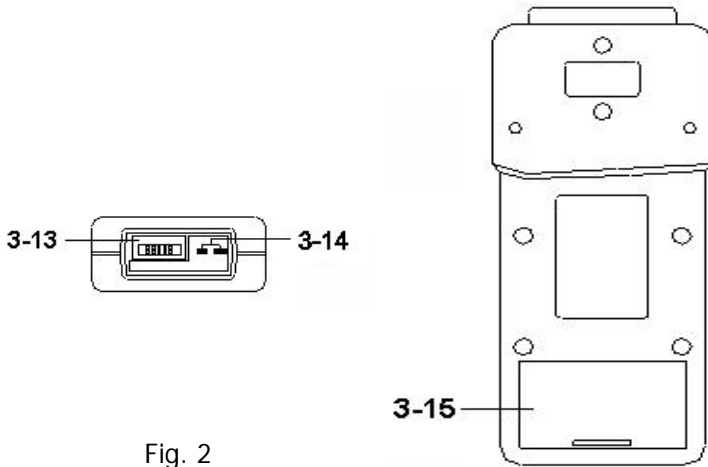


Fig. 2

- 3-1 Display
- 3-2 Power Button (ESC Button)
- 3-3 Hold Button (Function Button)
- 3-4 REC Button (Enter Button)
- 3-5 Setting Button
- 3-6 RS-232 Output Terminal
- 3-7 Vane Probe Head
- 3-8 Vane Probe Handle
- 3-9 Vane Probe Plug
- 3-10 Humidity Probe Head
- 3-11 Humidity Probe Handle
- 3-12 Humidity Probe Plug
- 3-13 Humidity/Anemometer Socket
- 3-14 Thermometer Socket
- 3-15 Battery Compartment/Cover

4. MEASURING PROCEDURE

4-1 ANEMOMETER

- 1) Install the " Vane Probe Plug " (3-9, Fig. 1) into the " Anemometer Socket " (3-13, Fig. 2).
- 2) Power on the meter by pressing the " Power Button " (3-2 , Fig. 1) once.
- 3) Hold the " Vane Probe Handle " (3-9, fig. 1) by hand and let the " Vane Probe Head " (3-8, Fig. 1) face against the measuring air flow source, then the " Display " (3-1, Fig. 1) will show air velocity and the air temperature value together.

Measuring Consideration :
The yellow dot mark on the " Sensor head " indicates the direction that need to face against the air flow.

The anemometer air velocity unit is default to " m/s ". If intend change to the other air velocity unit such as km/h, mph, FPM or knot with default, the detail procedures please refer

5-1 Change the measuring unit, page 14.

The anemometer air temperature unit is default to " °C ". If intend change temperature unit to " °F ", the detail procedures please refer

5-3 Change the Temp °C, °F unit, page 14.

4-2 HUMIDITY METER

- 1) Install the " Humidity Probe Plug " (3-12, Fig. 1) into the " Humidity Socket " (3-13, Fig. 2).
- 2) Power on the meter by pressing the " Power Button " (3-2 , Fig. 1) once.
- 3) The display will show the humidity (%RH) and temperature value that sensing from " Humidity Probe Head " (3-10, Fig. 1) directly.

When the humidity values of tested environment be changed, it need to take a few minutes to get the stable " %RH " reading.

The humidity temperature unit is default to " °C ".

If intend change temperature unit to " °F ", the detail procedures please refer

5-3 Change the Temp °C, °F unit, page 14.

4-3 Thermometer

- 1) Connect the plug of the Temp. probe (optional, such as type K probe, TP-01, TP-02A, TP-03, TP-04) into the " Thermometer socket " (3-14, Fig. 2).
- 2) Power on the meter by pressing the " Power Button " (3-2 , Fig. 1) once.
- 3) The display will show the Temp. value that measuring from the Temp. probe's head.

The thermometer mode is default to " type K ".

If intend change the Temp. mode to " type J " with default, the detail procedures please refer

5-2 Change thermocouple type to K or J , page 14.

The temperature unit is default to " °C ", if intend change temperature unit to " °F ".

The detail procedures please refer

5-3 Change the Temp °C, °F unit, page 14.

4-4 Both Anemometer/Thermometer

- 1) Install the " Vane Probe Plug " (3-9, Fig. 1) into the " Anemometer Socket " (3-13, Fig. 2).
Connect the plug of the Temp. probe (optional, such as type K probe, TP-01, TP-02A, TP-03, TP-04) into the " Thermometer socket " (3-14, Fig. 2).
- 2) Power on the meter by pressing the " Power Button " (3-2 , Fig. 1) once.
- 3) The main measuring procedures are same as above chapter and chapter 4-3.
- 4) Press the " Function Button " (3-3, Fig. 1) continuously at least 2 seconds, the function will change from " Air velocity " to " Thermometer " in cycling.

4-5 Both Humidity meter/Thermometer

- 1) Install the " Humidity Probe Plug " (3-12, Fig. 1) into the " Humidity Socket " (3-13, Fig. 2).
Connect the plug of the Temp. probe (optional, such as type K probe, TP-01, TP-02A, TP-03, TP-04) into the " Thermometer socket " (3-14, Fig. 2).
- 2) Power on the meter by pressing the " Power Button " (3-2 , Fig. 1) once.
- 3) The main measuring procedures are same as above chapter 4-2 and chapter 4-3.
- 4) Press the " Function Button " (3-3, Fig. 1) continuously at least 2 seconds, the function will change from " Humidity " to " Thermometer " in cycling.

4-6 Data Hold

During the measurement, pushing the " Data Hold Button " (3-3, Fig. 1) will hold the measured value & the LCD will indicate " HOLD " symbol.

- * Push the "Data Hold Button" again to release the data hold function.

4-7. Data Record (Max., Min.)

- * The data record function records the maximum and minimum readings. Press the " REC. Button " (3-4, Fig. 1) once to start the Data Record function and there will be a " REC " symbol on the display.

- * With the " REC " symbol on the display :

- a) Press the " REC. Button " (3-4, Fig. 1) once, the " REC MAX " symbol along with the maximum value will appear on the display.

Press the " REC button " (3-4, Fig. 1) again, the " REC MIN " symbol along with the minimum value will appear on the display.

If intend to delete the maximum (minimum) value, press the " Hold button " (3-3, Fig. 1) once, the display will show the " REC " symbol only and execute the memory function continuously.

- b) To exit the memory record function, just press the " REC " button for 2 seconds at least. The display will revert to the current reading.

5. ADVANCED SETTING PROCEDURES

Before executing Advanced Setting Procedures, exit the " Hold function " and the Record " function first.

- * **Press " Setting Button " continuously at least 5 seconds to enter the setting function.**
- * After already set the desiring value (function), press the " Enter button " to save with default.
- * Press the " Esc button " to escape the setting procedures.

- a. Hold the " Setting Button " (3-5, Fig. 1) at least five seconds will enter the Advanced Setting Procedures.
- b. One by one to press the " Setting Button " (3-5, Fig. 1) once a while to select the main setting function in sequence and show the text the lower display as :

Unit..... Change the measurement unit

K.....Change thermocouple type to type K or type J

°C.....Change the Temp °C, °F unit

OFF..... Auto power ON/OFF management

Code.....Code entering for the further calibration usage

5-1 Change the measuring unit

Change the measurement unit are available for

Anemometer

- a. Use " Function button " (3-3, Fig. 1) to select the desiring measuring unit.

<i>Anemometer</i>	m/S, km/h, mph, knot, FPM
-------------------	---------------------------

- b. After select the desiring unit, press the " Enter button " (3-4, Fig. 1) to save the data with default.

5-2 Change thermocouple type to K or J

Change " thermocouple type to K or J " only available for

Type K/J Thermometer

- a. Use " Function button " (3-3, Fig. 1) to select " K " or " J " .
- b. After select the desiring value (K or J), press the " Enter button " (3-4, Fig. 1) to save the data with default.

5-3 Change the Temp °C, °F unit

Change the " Temp °C, °F unit " only available for the

Anemometer meter

Humidity meter

Type K/J Thermometer

- a. Use " Function button " (3-3, Fig. 1) to select " °C " or " °F " .
- b. After select the desiring value (°C or °F), press the " Enter button " (3-4, Fig. 1) to save the data with default.

5-4 Auto power On/Off

(Lower display show " OFF ")

- a. Use " Function button " (3-3, Fig. 1) to select " YES " or " no ".
 - * *YES : Auto power off.*
 - * *no : Auto power disable.*
- b. After select the desiring function (YES or no), press the " Enter button " (3-4, Fig. 1) to save the function with default.

5-5 Code entering for the further calibration usage

(Lower display show " CodE")

The upper display will show 100.

The code setting is used for the further calibration usage.

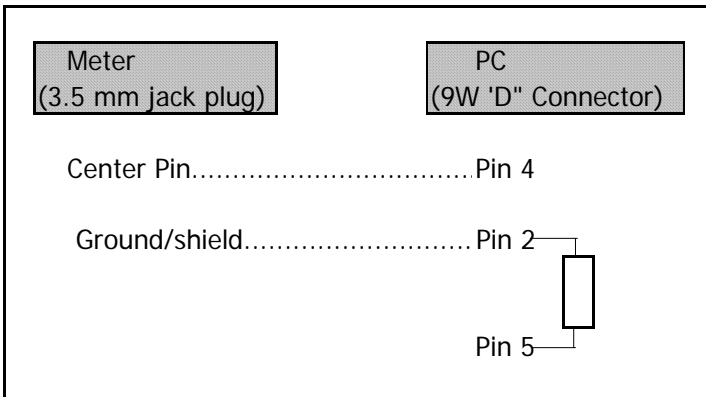
It do not enter any new code, just press the " Enter button " (3-4, Fig. 1) will finish the Advanced Setting Procedure.

6. RS232 PC SERIAL INTERFACE

The instrument has RS232 PC serial interface via a 3.5 mm terminal (3-6, Fig. 1).

The data output is a 16 digit stream which can be utilized for user's specific application.

A RS232 lead with the following connection will be required to link the instrument with the PC serial port.



The 16 digits data stream will be displayed in the following format :

D15 D14 D13 D12 D11 D10 D9 D8 D7 D6 D5 D4 D3 D2 D1 D0


Each digit indicates the following status :

D15	Start Word
D14	4
D13	When send the upper display data = 1 When send the lower display data = 2
D12 & D11	Annunciator for Display
	°C = 01 °F = 02 m/S = 08
	km/h = 10 mph = 12 knot = 09
	FPM = 11 %RH = 04
D10	Polarity 0 = Positive 1 = Negative
D9	Decimal Point(DP), position from right to the left 0 = No DP, 1 = 1 DP, 2 = 2 DP, 3 = 3 DP
D8 to D1	Display reading, D8 = MSD, D1 = LSD. For example : If the display reading is 1234, then D8 to D1 is : 00001234
D0	End Word

RS232 setting

Baud rate	9600
Parity	No parity
Data bit no.	8 Data bits
Stop bit	1 Stop bit

7. BATTERY REPLACEMENT

- 1) When the left corner of LCD display show " , it is necessary to replace the battery. However, in-spec. measurement may still be made for several hours after low battery indicator appears before the instrument become inaccurate.
- 2) Open the " Battery Cover " (3-15, Fig. 2) away from the instrument and remove the battery.
- 3) Replace with 9V battery (Alkaline or Heavy duty type) and reinstate the cover.
- 4) Make sure the battery cover is secured after changing the battery.

8. OPTIONAL ACCESSORIES

RS232 cable UPCB-02	Interface cable (isolated cable) that used to connect the meter to the computer (COM port).
USB cable USB-01	Interface cable that used to connect the meter to the computer (USB port).
Data Acquisition software SW-U801-WIN	* The SW-U801-WIN is a multi displays (1/2/4/6/8 displays) powerful application software, provides the functions of data logging system, text display, angular display, chart display, data recorder high/low limit, data query, text report, chart report.. .xxx.mdb data file can be retrieved for EXCEL, ACCESS..., wide intelligent applications.

(Type K) TP-01	<ul style="list-style-type: none"> * Max. short-tern operating Temperature: 300 °C (572 °F). * It is an ultra fast response naked-bead thermocouple suitable for many general purpose application.
Thermocouple Probe (Type K), TP-02A	<ul style="list-style-type: none"> * Measure Range : -50 to 900 °C, -50 to 1650 °F. * Dimension:10cm tube,3.2mm Dia.
Thermocouple Probe (Type K), TP-03	<ul style="list-style-type: none"> * Measure Range : -50 to 1200 °C, -50 to 2200 °F. * Dimension: 10cm tube, 8mm Dia.
Surface Probe (Type K), TP-04	<ul style="list-style-type: none"> * Measure Range : -50 to 400 °C, -50 to 752 °F. * Size : Temp. sensing head - 15 mm Dia. Probe length - 120 mm.
ACV to DC 9V adapter, AP-9VB	ACV to DC 9V adapter. Output plug is used the DC 9V battery snap.

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