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INSTRUMENTOS DE MEDICIÓN INDUSTRIAL

Termohigrómetro + Anemómetro
LT-AM4205A

+ 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

TABLE OF CONTENTS

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 ℃, ℉ 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	*Anemometer :* 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 - ℃,℉.
	Humidity meter : %RH (Relative Humidity). Temperature - ℃,℉.
	Type K/J thermometer
Sensor Structure	*Anemometer :* Air velocity : Conventional twisted van arm and low friction ball bearing design. Temperature : Precision thermistor.
	Humidity meter : Humidity : High precision thin-film capacitance sensor. Temperature : Precision Temp. sensor.
	Thermometer : Type K/J thermocouple probe.

Type K/J Thermometer structure	*Input Socket :* Standard 2 pin thermocouple socket.
	Linear Compensation : Linear Compensation for the full range.
	Temperature Compensation : 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 ℃ (32 to 122 ℉).
Operating Humidity	Less than 80% RH.
Power Supply	DC 9V battery (heavy duty), 006P, MN1604 (PP3) or equivalent.
Power Consumption	*Type K/J thermometer :* Approx. DC 6 mA
	Anemometer : Approx. DC 11 mA
	Humidity : Approx. DC 7 mA
Weight	256 g/0.56 LB, main instrument.

Dimension	*Main instrument:* 180x72x32 mm (7.1x2.8x1.3 inch). *Anemometer probe :* Round, 72 mm Dia. *Humidity Probe:* 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 ℃)

Type K/J Thermometer

Sensor Type	*Reso-lution*	*Range*	*Accuracy*
Type K	0.1 ℃	-50.0 to 1300.0 ℃	± (0.4 % + 0.8 ℃)
		-50.1 to -199.9 ℃	± (0.4 % + 1 ℃)
	0.1 ℉	-58.0 to 2372.0 ℉	± (0.4 % + 1.5 ℉)
		-58.1 to -327.8 ℉	± (0.4 % + 1.8 ℉)
Type J	0.1 ℃	-50.0 to 1100.0 ℃	± (0.4 % + 0.8 ℃)
		-50.1 to -199.9 ℃	± (0.4 % + 1 ℃)
	0.1 ℉	-58.0 to 2012.0 ℉	± (0.4 % + 1.5 ℉)
		-58.1 to -327.8 ℉	± (0.4 % + 1.8 ℉)

* *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

Measure-ment	*Range*	*Resolution tion*	*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 (international knot); mph - miles per hour

B. Temperature

Measuring Range	0 ℃ to 50 ℃/32 ℉ to 122 ℉
Resolution	0.1 ℃/0.1 ℉
Accuracy	± 0.8 ℃/1.5 ℉

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 ℃ to 50 ℃/32 ℉ to 122 ℉
Resolution	0.1 ℃/0.1 ℉
Accuracy	± 0.8 ℃/1.5 ℉

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

3. FRONT PANEL DESCRIPTION

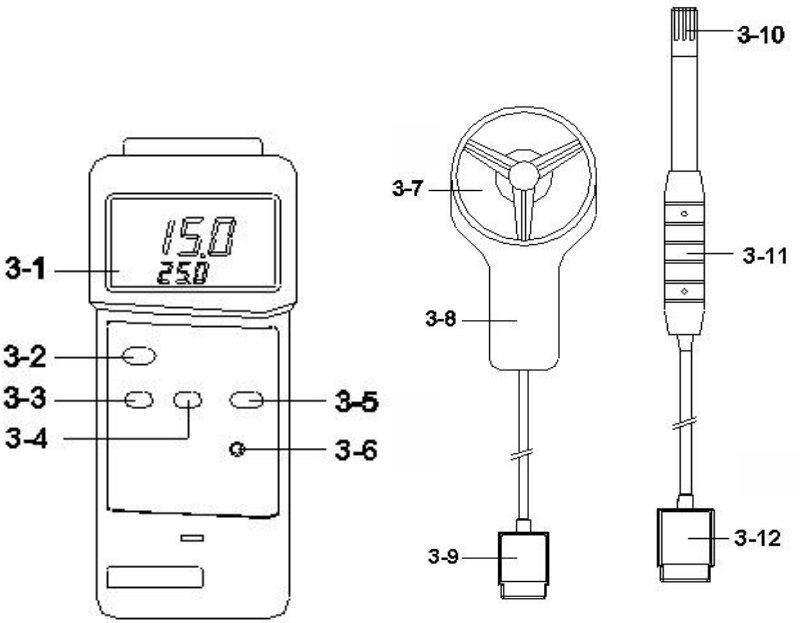


Fig. 1

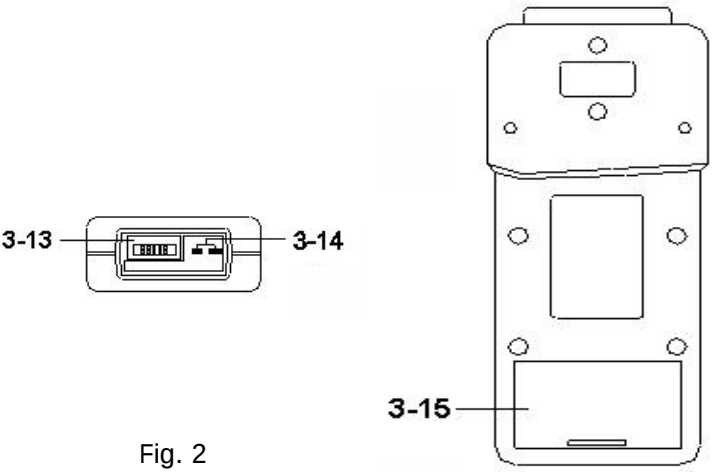


Fig. 2

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 " ℃ ". If intend change temperature unit to " ℉ ", the detail procedures please refer
5-3 Change the Temp ℃, ℉ 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 sening 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 " ℃ ".
   If intend change temperature unit to " ℉ ", the detail procedures please refer
   5-3 Change the Temp ℃, ℉ 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 " ℃ ", if intend change temperature unit to " ℉ ".
   The detail procedures please refer
   5-3 Change the Temp ℃, ℉ 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
℃**.....**Change the Temp ℃, ℉ 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.

Anemometer	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 ℃, ℉ unit

Change the " Temp ℃, ℉ unit " only available for the

Anemometer meter
Humidity meter
Type K/J Thermometer

a. Use " Function button " (3-3, Fig. 1) to select " ℃ " or " ℉ ".
b. After select the desiring value (℃ or ℉), 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")

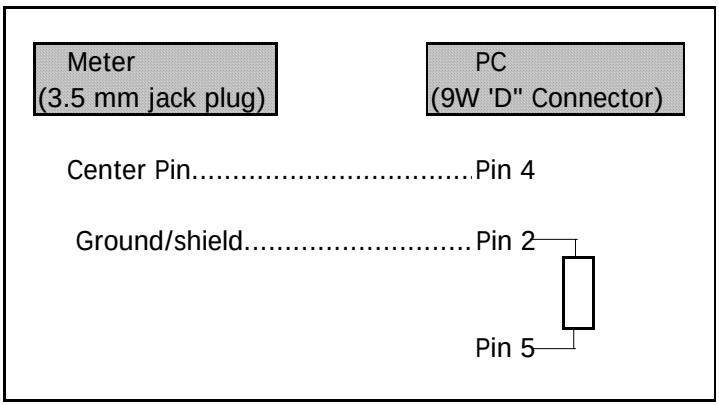
The upper display will show 100.
The code setting is used for the further calibration usage.
It do not enter any new code, just press the " Enter button " (3-4, Fig. 1) will finish the Advanced Setting Procedure.

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		
	℃ = 01	℉ = 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, ACESS.., wide intelligent applications.

(Type K) TP-01	* Max. short-tern operating Temperature: 300 ℃ (572 ℉). * It is an ultra fast response naked-bead thermocouple suitable for many general purpose application.
Thermocouple Probe (Type K), TP-02A	* Measure Range : -50 to 900 ℃, -50 to 1650 ℉. * Dimension:10cm tube,3.2mm Dia.
Thermocouple Probe (Type K), TP-03	* Measure Range : -50 to 1200 ℃, -50 to 2200 ℉. * Dimension: 10cm tube, 8mm Dia.
Surface Probe (Type K), TP-04	* Measure Range : -50 to 400 ℃, -50 to 752 ℉. * 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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