AM3
Humidity . Temperature . Dew Point Indicator

INSTRUCTION MANUAL

CONTENTS

1. Battery Operation

The AM3 indicator is factory preset for battery operation. If you have previously set the indicator for operation with a rechargeable battery, you must return the internal jumper to its original position before inserting a regular battery (see Operation with a Rechargeable Battery).

Insert a 9V Alkaline battery or a 9V rechargeable battery in the battery compartment located at the rear of the indicator.

You may also use an AC adapter providing 9V DC (200 mA). The plug of the adapter must have the DC (+) at the tip. Connect the plug of the AC adapter to the jack located on the left hand side of the indicator.

We recommend using an AC adapter when making use of the RS232 output of the AM3. Use of the RS232 output increases the power consumption of the indicator.

2. Operation with a Rechargeable Battery

Remove any non rechargeable battery from the battery compartment. Remove the screw located in the battery compartment to open the instrument housing. Set the jumper located on the right hand side of the PCB to the ACCU position (two top pins). Reassemble the instrument housing and secure it with the screw. You can now insert a 9V rechargeable battery. If an AC adapter is connected to the indicator, this will charge the battery with a constant current.

***IMPORTANT**: using a rechargeable battery with the jumper set to the wrong position can damage the indicator.*

3. Humidity and Temperature Probe (Probe Input 1)

The AM3 indicator can operate with any humidity and temperature probe of the ROTRONIC HYGROMER series. Connect the probe to the 5-Pin BINDER connector located on the right hand side of the indicator (first connector from the top).

The pin configuration of this connector is as follows (place indicator so that the small notch of the connector is at the top - pin numbering is clockwise):

Pin 1; Temperature (+) - first pin to the right of the notch.
Pin 2: DC (+) to power the probe
Pin 3: Ground (common)
Pin 4: not used
Pin 5: Humidity (+)

The indicator may also be used to display the output signal of a humidity and temperature transmitter. This permits measurement over a wider range of temperatures. The humidity output signal from the transmitter must be 0-1V = 0-100 %RH. The temperature output signal must be such as 0V = 0°C. The minimum temperature signal accepted by the AM3 indicator is -0.5 V = -50.0°C. The maximum is +1.5V=+150.0°C when the display is in °C and +0.933V=+93.3°C (199.9°F) when the display is in °F.

***NOTE**: When ordering, the AM3 indicator can be specified to display both temperature and dew point in °F. The temperature input signal from the probe or transmitter used together with the AM3 should still be in °C, as indicated above.*

4. Temperature Probe (Probe Input 2)

The AM3 indicator can operate with any temperature probe that provides a direct 3-Wire PT100 RTD output with DIN curve 43760. Connect the probe to the 4-Pin BINDER connector located on the right hand side of the indicator (second connector from the top). A spare 4-Pin BINDER connector is provided with the indicator for this purpose.

The pin configuration of this connector is as follows (place indicator so that the small notch of the connector is at the top - pin numbering is clockwise):

Pin 1; Not Used (first pin to the right of the notch)
Pin 2: RTD (+)
Pin 3: RTD (-)
Pin 4: Third Wire to RTD

***NOTE**: The temperature from probe input 2 is displayed in the engineering unit (°C or °F) that was specified for the AM3 indicator when ordering.*

5. Push Buttons

a) Blue Push Button

The blue push button is used to switch the indicator on and off. To switch the AM3 on, press down the blue push button once. After switching on the indicator, the display and functions are tested for approx. five seconds. If the battery voltage is too low (bar indication no longer displayed), the indicator immediately switches itself off.

To switch the AM3 indicator off press down the blue push button and hold it down for at least one second.

The blue push button is also used to change the display mode of the AM3 indicator. This is possible only when the HOLD function is not active. To change the display mode,

press down the blue push button for less than a second. Display modes are available in the following sequence:

- **Display Mode 1:** Humidity and Temperature from Probe Input 1

The upper value shows the value of relative humidity measured by the probe connected to input 1 and the lower value shows the value of temperature measured by the same probe. This display mode is the default mode and is active when the indicator is switched on.

- **Display Mode 2:** Humidity from Probe Input 1 and Temperature from Probe Input 2

The upper value shows the value of relative humidity measured by the probe connected to input 1 and the lower value shows the value of temperature measured by the probe connected to input 2.

- **Display Mode 3:** Dew Point and Temperature from Probe Input 1

The upper value shows the value of dew point measured by the probe connected to input 1 and the lower value shows the value of temperature measured by the same probe.

- **Display Mode 4:** Dew Point from Probe Input 1 and Temperature from Probe Input 2

The upper value shows the value of dew point measured by the probe connected to input 1 and the lower value shows the value of temperature measured by the probe connected to input 2.

NOTE: *The value of dew point is calculated from the humidity and temperature measured by probe 1. Negative values of dew point are computed using the values of steam tables above ice.(Frost Point). If the dew point calculations are outside of the indicator range, the symbol* **LL.L** *appears on the upper portion of the display.*

b) Red Push Button

Pressing down shortly the red push button results in the following:

- Press down the red push button once to freeze the display (**HOLD** symbol)
- Press down the red push button again to read the minimum values (**MIN** symbol)
- Press down the red push button again to read the maximum values (**MAX** symbol)
- Press down the red push button again to return to the regular display.

Note: *The minimum and maximum functions are not available for the dew point. In display modes 3 and 4, the symbol* **LL.L** *is displayed when the minimum or maximum functions are active.*

6. Trend Indicators

A trend indicator is provided to the left of each of the two lines of display. An upward pointing arrow ▲ indicates that the values are increasing. A downward pointing arrow ▼ indicates that the values are decreasing. When both arrows show, the values are stable.

Stability conditions are defined as follows:

- Humidity: <±0.4 %RH/minute
- Dew Point: <±0.2 °C/minute
- Temperature: <±0.4 °C/minute

Any change of more than ±0.1 %RH or ±0.1 °C between two consecutive display refresh cycles removes the stability indication.

7. Auto Power Off

In normal operation, the symbol **APO** is displayed and the indicator switches off automatically if no push button is pressed for 4 minutes.

Automatic power off can be disabled by pressing down both the blue and the red push buttons at the same time. To restore automatic power off, repeat the same procedure. Automatic power off is also restored when you press down the red push button alone.

8. Low Battery Indication

A bar indication is displayed next to the symbol **BAT** to show the status of the battery. If no bar is visible, battery voltage is too low for proper operation and the indicator will switch off automatically.

9. RS232 Output

The 6-pin DIN connector located at the top left hand side of the indicator provides an RS232 output that can be connected to the sequential port (COM1 or COM2) of a personal computer by means of cable #AC1580 (provided with the AM3 indicator).

The RS232 output is defined as follows:

Baud Rate:	2400
Bits per Char.:	7
Parity:	Even
Stop bits:	One

Transfer of the measured values takes place every 1 to 2 seconds. The transmission string consists of 21 ASCII characters: [Tnnn.nTTnnn.nFnnn.n>, where:

- Temperature Input 1: numerical value after T
- Temperature Input 2: numerical value after TT
- Humidity input 1: numerical value after F

10. AM3 Software

The software provided with the AM3 indicator requires a computer with a 286 processor or higher and should be run under MS DOS 3.3 or higher. In addition the computer should have a sequential port (COM1 or COM2).

The AM3 software permits the following:

- Display to screen %RH, as well as the temperatures from both inputs
- Display to screen humidity computations such as dew point, wet bulb temperature, humidity ratio, etc.
- Log the measured data to a disk file (%RH as well as the temperatures from both inputs). Logging can be done with or without a timer. Log files are compatible with Microsoft's EXCEL for WINDOWS and can also be edited with Microsoft's WORD for WINDOWS.

The AM3 software is menu driven and easy to use. Communication between the AM3 and a computer requires the use of cable #AC1580, provided with the AM3 indicator. The cable is terminated at one end with a 9 pin connector that can be plugged into the sequential port of the computer.

To install the AM3 software on your computer hard disk, use the following procedure:

a) Select drive C, The screen should display the prompt **C:\>**
b) Make a directory for the AM3 software by entering the command **MD AM3**
c) Enter the command **CD AM3** to go into the AM3 directory
d) Place the AM3 diskette in drive A or B of your computer and enter the command **COPY A:*.*** or **COPY B:*.***.
e) To start the AM3 software, enter the command **AM3C** (for an instrument with a display in °C) or **AM3F** (for an instrument with a display in °F)**.** Follow the instructions provided on the screen.

Note*: The default port for reading the AM3 data is COM1. If you do not receive any data, select COM2. To do this press the F2 key when in the main menu. If there is still no data transfer, there may be a conflict between the selected port and a modem or network card already installed in your computer. Please check with your dealer.*

11. Calibration

The AM3 is factory calibrated and should not require any adjustment when received.

a) Calibration of Input 1

Please follow the instructions specific of the probe or transmitter that is connected to input 1.

b) Calibration of Input 2

The two potentiometers located on the left hand side of the indicator permit calibration of the temperature signal coming from input 2. The potentiometer that is the closest to the battery compartment is T max. This potentiometer is used to adjust the signal gain. The other potentiometer is To and is used to adjust the signal offset.

The AM3 is factory calibrated according to DIN standard 43760 for PT100 RTD's. In order to be able to re calibrate the AM3 you should have a certified reference thermometer as well as a temperature controlled water bath or temperature controlled wind tunnel. If the calibration of the temperature probe is done in air, both the reference thermometer and the temperature probe should be ventilated with an air velocity of no less than 1 m/sec or
200 ft/min.

During calibration, the signal offset should be adjusted first and the signal gain next.

12. Specifications

Battery / AC Adapter	9 V Alkaline Battery 9 V AC Adapter (200 mA) DC(+) Tip 9 V Rechargeable Battery 110 mAh
Max. Current Consumption	30 mA
Temperature Operating Range	-10...60°C (14...140°F)
Humidity Measuring Range	0...100 %RH
Dew Point Measuring Range *	-50.0...100.0 °C or -58.0...199.9°F
Temperature Measuring Range (Inputs 1 & 2) *	-50.0...150.0 °C or -58.0...199.9°F
Humidity Input Signal (Input 1)	0...1V=0...100 %RH
Temperature Input Signal (Input 1)	
for display in °C:	-0.5V....1.5V=-50.0°C...+150.0°C
for display in°F:**	-0.5V...0.933V=-50.0°C..+93.3°C
Probe Input 2	RTD direct 3-Wire DIN 43760 Linearity: ±0.1°C (±0.18°F) from -50 to 150°C (-58 to 302°F)
Display	Dual LC Display
Resolution	0.1 %RH, 0.1°C or 0.1°F
Output	RS 232
Battery Test	Automatic Indication
Automatic Power Off	After 4 Minutes (can be disabled)
HOLD, MIN and MAX Functions	Push Button Operated
Housing Material	ABS
Housing Dimensions	230 x 80 x 30 mm
Weight	Appr. 310 g (0.7 lb.)

* Specify when ordering

** Input signal should be in °C, even if the AM3 indicator was configured to display °F.