

**BT-RS1**  
**Humidity Temperature Indicator**  
**Instruction Manual**

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## General

The BT-RS1 is a portable indicator that designed for use with any of the ROTRONIC relative humidity and temperature probes. The BT-RS1 has two large, easy to read, LC displays, one for humidity, the other for temperature. Each display features a trend indicator to detect stable conditions. The displays can operate in the following modes: instantaneous, minimum or maximum value. A data HOLD function is also provided.

The BT-RS1 indicator can operate as a stand alone instrument or it can be used together with a PC (IBM compatible) for the purpose of recording and/or graphing the data or for computing (on line) humidity parameters such as dew point, wet bulb temperature, humidity ratio, etc. The BT-RS1 is equipped with an RS232 connector (for connection to a serial port of the PC) and is supplied with the BT-WIN communication software. Use of this software requires that Microsoft WINDOWS (3.1 or higher) be installed on the PC. BT-WIN is used to display, graph and record the measured data. The computation of humidity parameters requires in addition that a copy of Microsoft EXCEL be also installed on the PC.

The BT-RS1 indicator is powered by means of an AC adapter. An internal rechargeable accumulator permits up to 5 hours of operation.

## Default Settings

The BT-RS1 can display temperature either in °C or °F. Humidity can be displayed as Relative Humidity (%RH) or as Water Activity (1.0 Aw = 100 %RH). The configuration of the display is determined by the position of two internal jumpers, both located on the electronic board. To access these jumpers, remove the two screws located on the back feet of the indicator and pull gently the back panel out from the instrument housing.

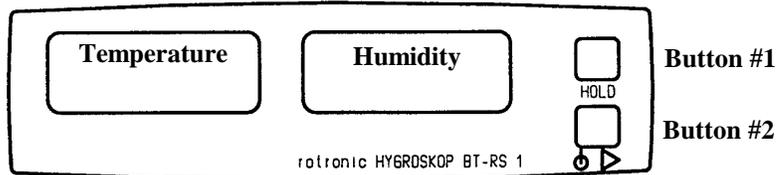


## Description

The BT-RS1 package includes the following:

- BT-RS1 Indicator (default settings as per customer order)
- AC adapter 110 VAC, 9V, 200 mA
- PC connecting cable with 25-pin connector and 9-pin connector.
- Adapter 9-pin to 25-pin connector.
- BT-WIN software

**Front Panel**

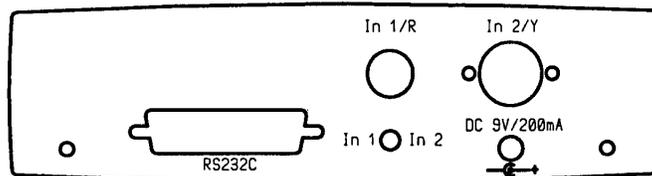


Display Symbols:

<b>%RH</b>	Humidity in %RH	<b>HOLD</b>	Hold function is on (freezes the display)
<b>aW</b>	Water Activity	<b>MIN</b>	Minimum Value
<b>°C</b>	Temperature in °C	<b>MAX</b>	Maximum Value
<b>°F</b>	Temperature in °F	<b>SET</b>	Instrument is in PC Mode
<b>▲</b>	Positive Trend (increasing value) *)	<b>BAT</b>	Accumulator charge is low
<b>▼</b>	Negative Trend (decreasing value) *)	<b>PWR</b>	Instrument operates from AC Adapter

\*) The trend symbols are lit when the measured value changes at a rate of more than  $\pm 0.4^{\circ}\text{C}/\text{minute}$  or  $\pm 0.4\% \text{RH}/\text{minute}$ . Both trend symbols are lit when conditions are stable. Any change of more than  $\pm 0.1^{\circ}\text{C}$  or  $\pm 0.1\% \text{RH}$  between two consecutive display refresh cycles removes the stability indication.

**Back Panel**



In 1/R	Connector for HYGROMER Probe
In 2/Y	Connector for HYGROLYTE Probe
In1 In2	Selector Switch In 1/R In 2/Y
RS232C	Connector for RS232
DC9V/200mA	Connector for AC Adapter

**Electrical Connections**

- **25-pin Connector for RS232:** AT-Modem Cable type B 3m (Part # 11.01.4530)
- **Connector for AC Adapter:** AC adapter 110 VAC 9VDC 200 mA tip + (Part # R93/T410-ND)
- **In 1/R 5-pin Probe Connector:** Use this connector to power and read any ROTRONIC humidity temperature probe (such as HP101A, AWC, etc.) with standard output signals:  $0..1\text{V} = 0..100\% \text{RH}$  and  $-0.5..2\text{V} = -50..200^{\circ}\text{C}$ . Set the selector switch to the corresponding position.
- **In 2/Y 7-pin Probe Connector:** Use this connector to power and read any ROTRONIC humidity temperature probe with a DMS-100(H) humidity sensor (such as WA-40, WA-40TH, etc.). Set the selector switch to the corresponding position.

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## **Operation**

### ***Stand Alone Operation***

- Connect the AC adapter to the back of the instrument.
- Connect the probe cable to the matching connector and set the selector switch to the corresponding position (only one probe should be connected at a time).

Press briefly on button #2 to turn the power on. Upon powering up, all display segments are briefly lit.

**First Time Use:** Initially, the internal accumulator should be charged for a period of 24 hours. The accumulator charges even when the instrument power is off. Maximum capacity is obtained after several charge - discharge cycles.

### ***PC Operation***

- Proceed as for stand alone operation.
- Connect the BT-RS1 to a serial port of the PC (normally COM2) with the PC connection cable.
- Press on button #2 to turn the instrument power on. Upon powering up, all display segments are briefly lit.

Start the BT-WIN software (see separate instructions). After a few seconds, the SET indicator appears on the indicator display. This shows that the indicator and the PC are communicating. At that time, control of the indicator is taken over by the PC (for example, the settings of the indicator can be modified from the PC) and the buttons on the front panel of the indicator are inoperative.

**Note:** during PC operation, the indicator cannot be powered off. When there is no communication during about 30 seconds, the SET indicator disappears and the indicator is returned to stand alone operation. At that time, power may be turned off by pressing and holding button #2.

The BT-RS1 returns to the settings corresponding to the position of the internal jumpers the next time it is being powered.

## **Functions**

### ***Selector Switch***

The selector switch should be set either in the position In 1 or in the position In 2, depending on which probe connector is being used. This switch should not be moved during operation of the indicator. Moving the switch when operating the instrument will interfere with the MIN and MAX functions.

### ***Button #1***

**HOLD:** Press briefly on this button to toggle between normal display and frozen display.

The HOLD function causes the indicator to stop accepting new data. This also affects the MIN and MAX functions.

### ***Button #2***

**ON / OFF:** Press briefly on this button to turn the instrument power on.  
Press and hold this button to turn the instrument power off.

Button # 2 is also used to change the display mode: instantaneous value, minimum value or maximum value. Switching from one mode to another is done by pressing briefly on this button.

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- MIN**            The MIN indicator is lit and the display shows the lowest value that has been measured since the instrument was powered up.
- MAX**            The MAX indicator is lit and the display shows the highest value that has been measured since the instrument was powered up.

### **RS232 Communication**

The RS232 connector permits 2-way communications with a PC (IBM compatible).

After connecting the BT-RS1 to a serial port of the PC (COM1 or COM2), data can be read and captured to a file by using any communication software such as Terminal (Windows 3.1) or Hyperterminal (Windows 95). Full communication is best accomplished using the BT-WIN software provided with the instrument.

#### ***Communication Parameters***

Baud rate:            2400  
Data Bits:            7  
Parity:                Even  
Stop Bits:            One  
Flow Control:        XON / XOFF  
Parity Check:        none

#### ***RS232 Formatting***

##### **PC to BT-RS1 Indicator**

Format:                {d\$@z\ +Chr(13)

- Synch Char            {  
- Constant                d  
- Command                \$@ (see list below)  
- Constant                z  
- End Char                \  
- End                      Chr(13) - carriage return

##### **BT-RS1 Indicator to PC**

Format:                {d\$@zTxxxx.xxFyyyy.yy} + Chr(13)

- Synch Char            {  
- Constant                \$  
- Constant                d  
- Confirm Command        \$@  
- Constant                z  
- Constant                T  
- Temperature            xxxx.xx  
- Constant                F  
- Humidity                yyyy.yy  
- End Char                }  
- End                      Chr(13) - carriage return

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### Commands (PC to BT-RS1 Indicator)

Commands should always include of 2 characters: § (display units) and @ (display mode):

Description	§	@
Display °C and %RH	1	
Display °F and %RH	2	
Display °C and Aw	3	
Display °F and Aw	4	
Display Mode MIN		0
Display Mode MAX		1
Display Mode Normal		2

Example: PC→BT: Display °F and %RH, normal display mode: {d22z\ +Chr(13)  
BT→PC (answer): {\$d22zT0072.54F0038.88} + Chr(13)

### **BT-WIN Software**

BT-WIN is a Microsoft WINDOWS based application, used to display the measured data on a computer screen. The data can be saved to a file and/or displayed on a graph. When a copy of Microsoft EXCEL is available, BT-WIN can also be used to compute on line humidity parameters such as dew point, wet bulb temperature, humidity ratio, etc. BT-WIN is provided on 3 1/2" diskettes and is described in a separate instruction manual.

Minimum Requirements: PC : IBM compatible 486 or higher  
Monitor : VGA  
RAM : 8 MB  
Hard Disk : about 12 MB free space  
Operating System : Windows 3.1 or higher

### **Specifications**

Display: 2 x LC Display  
Display Resolution: 0.1 °C or °F  
0.1 %RH or 0.001 Aw

Probe: Any ROTRONIC humidity-temperature probe

AC Adapter 110 VAC, 9V, 200 mA (+ tip)  
Accumulator Operation: up to 5 hours at full charge

Digital Output RS232  
A/D Conversion 12-bit

Operating Limits\*) 0..50°C (32..122°F)  
0..90%RH

Housing Material: ABS, gray  
Overall Dimensions: 179 x 168 x 64 mm  
Weight: 900 g (2.0 lb)

\*) Limits are for indicator only. For limits at probe, see individual probe specifications.