

# Humidity Sensor **ES2-HB-N**

# Temperature/Humidity Sensor **ES2-THB-N**

**Detect Humidity within an Accuracy of  $\pm 3\%$  in a Compact Body. Controller Set Provides Superior Humidity Control and Temperature/Humidity Control.**

- Employs high-polymer-resistive Sensor with superior durability.
- Compact and lightweight.



Refer to the Safety Precautions page 4.



## Ordering Information

Name	Model
Humidity Sensor	ES2-HB-N
Temperature/Humidity Sensor	ES2-THB-N
Humidity Sensor Module (See note.)	ES2-M-N

**Note:** This is a replacement item. One Module is provided with the ES2-HB-N/-THB-N. Always attach the Humidity Sensor Module when using the ES2-HB-N/-THB-N. Approximately 5.5 VDC will be output for the humidity output if the Module is not attached or is incompletely attached.

## Specifications

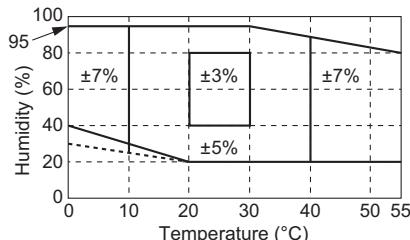
Humidity Sensor section	High-polymer resistive
Humidity detection range	20 to 95%
Humidity detection accuracy	$\pm 3\%$ (25°C, 40 to 80%)
Power supply voltage	24 VDC (See note 1.)
Operating voltage range	85% to 110% of power supply voltage
Current consumption	4 mA max.
Humidity output	1 to 5 VDC (for humidity of 0% to 100%) Permissible load impedance: 100 kΩ min. (Use a 1:1 connection when connecting to an E5□C/E5□D/E5□D-H.)
Temperature Sensor Section (See note 2.)	Platinum resistance thermometer
Temperature detection range	0 to 55°C
Temperature output	Pt100: 3 wire (See note 4.)
Class	JIS class B
Communications cable length	5 m
Operating temperature and humidity range (See note 3.)	0 to 55°C, humidity of 95% max.
Storage temperature and humidity range (See note 3.)	-20 to 60°C, humidity of 95% max.
Degree of protection	IP 20
Weight	ES2-HB-N: Approx. 37 g (excluding cables) ES2-THB-N: Approx. 39 g (excluding cables)

**Note:** 1. The maximum ripple voltage of 2% p-p max.

The recommended power supply is the OMRON S8FS-G or S8VS.

2. ES2-THB-N only.
3. Do not use or store the Sensor for an extended period at a humidity of 90% or more. With no icing or condensation.
4. Pt100 (JIS C 1604-1997) is used for the measuring elements. Set Pt100 for input sensor type of the Temperature Controller.

### ● Observed Humidity and Measuring Accuracy



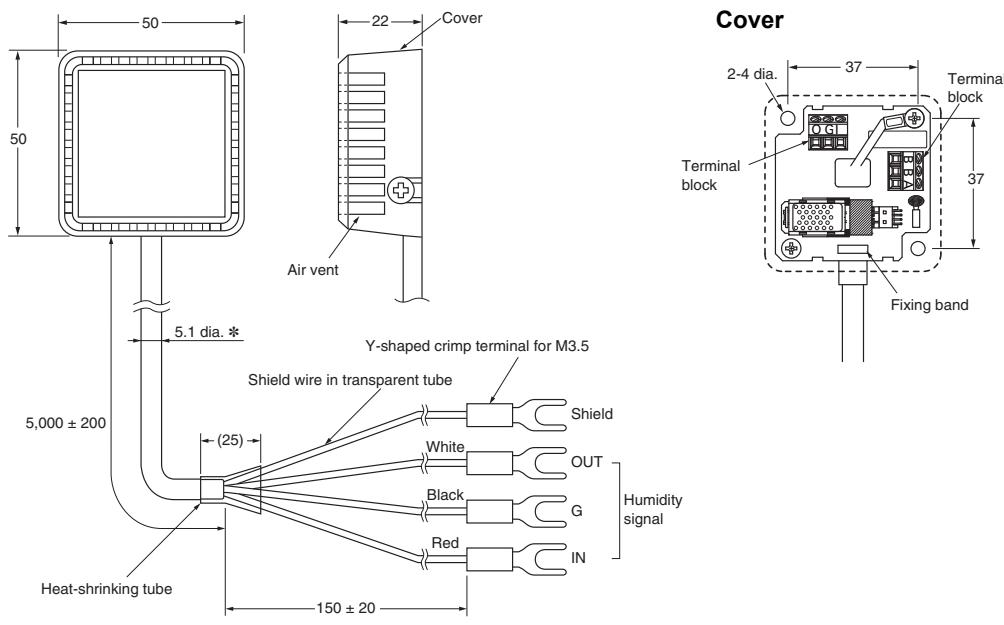
Note: The broken line in the low temperature and low humidity area shows actual value.

Humidity output: DC 1–5 V corresponding to a relative humidity range of 0–100%.

## Dimensions

Note: All units are in millimeters unless otherwise indicated.

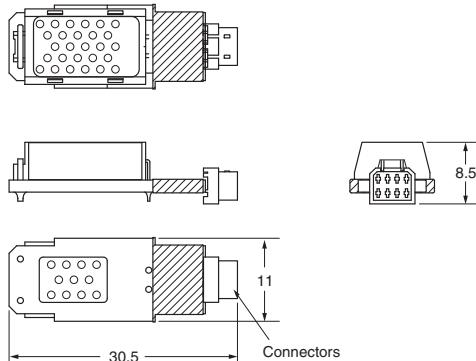
### ES2-HB-N Humidity Sensor ES2-THB-N Temperature/Humidity Sensor



The above figure is for the ES2-HB-N. The ES2-THB-N has temperature output wires (yellow/green/brown).

\* ES2-HB-N: 5.1 dia. ES2-THB-N: 5.8 dia.

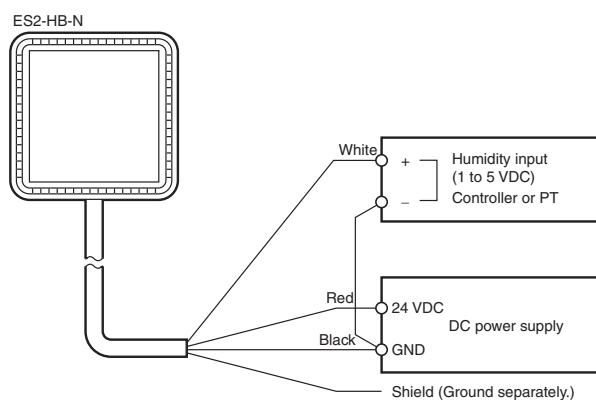
### ES2-M-N Humidity Sensor Module



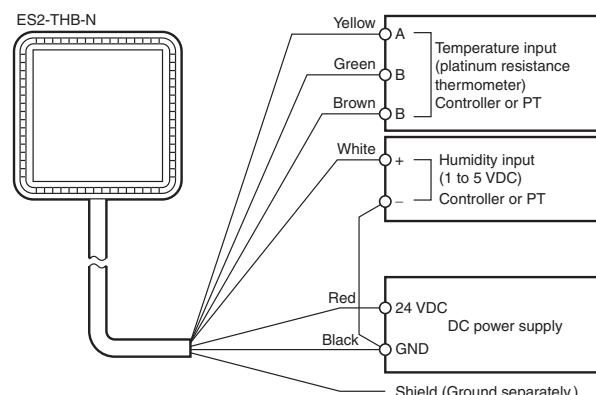
Note: Firmly insert the connector all the way in when mounting the ES2-M-N to the Sensor.

## Connection Examples

### ES2-HB-N Humidity Sensor



### ES2-THB-N Temperature/Humidity Sensor

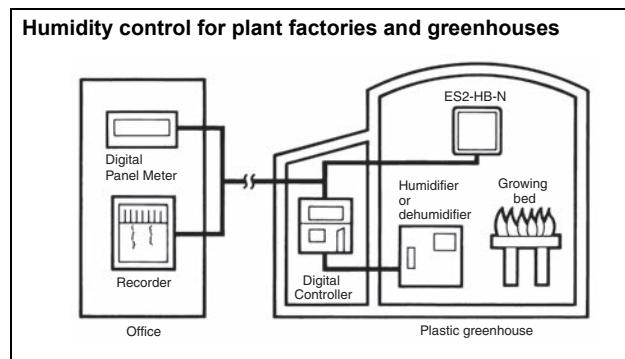
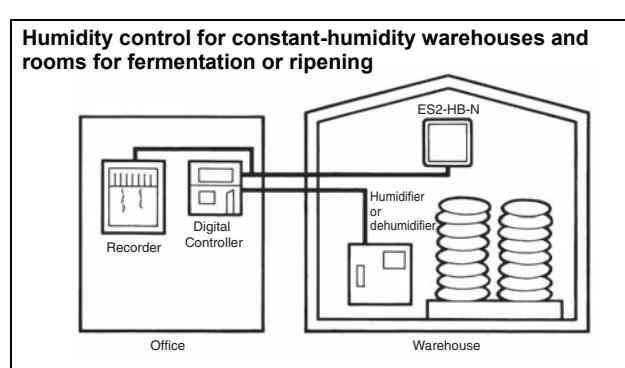
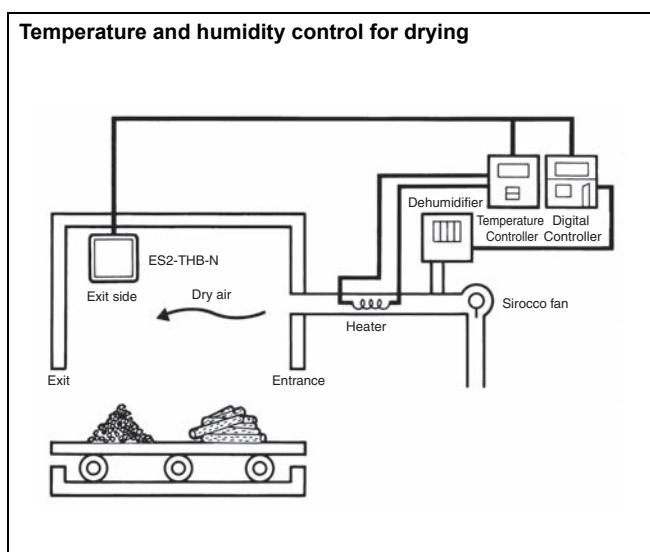
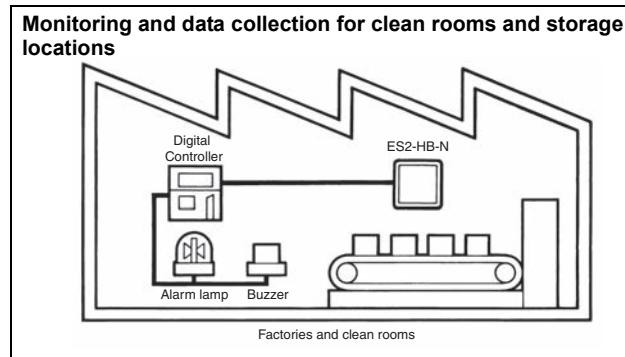
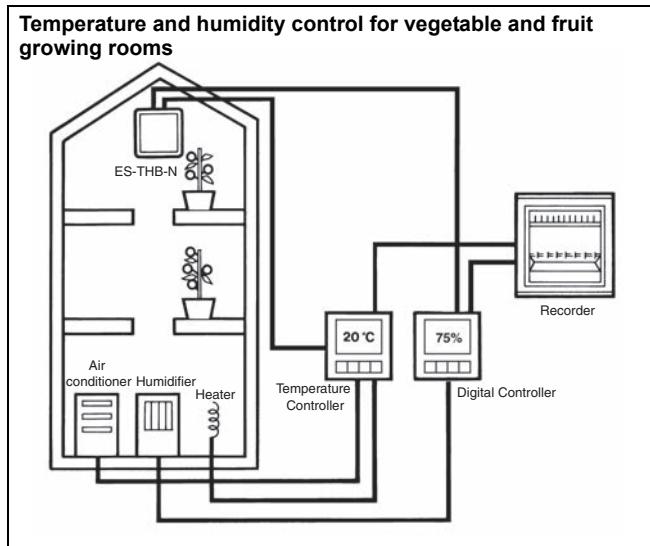


# Cable Conditions

Item	Model	ES2-HB-N	ES2-THB-N
Diameter		AWG22	AWG24
Number of conductors		3	6
Shield		Braided	Braided
Maximum conductive resistance (20°C)		60 Ω/km max.	92 Ω/km max.
Finished outer cable diameter		5.1 mm	5.8 mm

**Note:** Provide a separate cable according to the details listed at the left if the length of the supplied cable is insufficient. The cable can be extended to a maximum of 50 m. For details on the method of handling the shield, refer to *Processing Cable Ends* in the operation manual packaged with the humidity sensor or temperature/humidity sensor.

# Application Examples



# Safety Precautions

Be sure to read the precautions for all models in the website at: <http://www.ia.omron.com/>.

## Key to Warning Symbols

	<b>CAUTION</b>	Indicates a potentially hazardous situation which, if not avoided, is likely to result in minor or moderate injury or property damage.
	<b>Precautions for Safe Use</b>	Supplementary comments on what to do or avoid doing, to use the product safely.

## Meaning of Product Safety Symbols

	Used to warn of the risk of electric shock under specific conditions.
	Indicates the instructions of unspecified prohibited action.
	Used to indicate prohibition when there is a risk of minor injury from electrical shock or other source if the product is disassembled.
	Used for general mandatory action precautions for which there is no specified symbol.

### Caution

Minor injuries may occasionally occur due to electric shock.



Do not touch terminals while power is being supplied.  
Do not open covers when power is being supplied.

Electric shock, fire, or device damage may occasionally occur.



Make sure dirt such as metals, lead wires, chips during the installation work, etc. or moisture does not enter inside the product.

Electric shock, fire, or device damage may occasionally occur.



Do not perform disassembly, modification, or repair work.



Loosening of screws may cause fire.

Make sure the crimp terminal conforms to the screw size of the connection-destination terminal block, and tighten the screws properly to the appropriate torque.

Tighten the terminal screws of the internal terminal block properly to the appropriate torque.

## Precautions for Safe Use

Follow the points described below to prevent defective operation or malfunctioning of the product, and also to avoid an ill effect on the characteristics and functions.

1. This product is for internal use only. Do not use or store it in the following environments:
  - Locations that are out of the rated temperature and humidity range
  - Locations where the humidity is constantly 90% or more
  - Locations exposed to water or oil
  - Locations subject to direct sunlight
  - Locations with severe temperature variations
  - Near devices that generate heat
  - Locations subject to hot air or cold air
  - Near hot water or cold water
  - Locations where there could be freezing or condensation
  - Locations with a large impact of vibrations and shock
  - Locations with presence of dust
  - Locations with presence of salt content
  - In inorganic gas environments, such as sulfur dioxide, chlorine, and ammonia
  - In organic gas environments such as alcohols, carbons, glycols, ketones, aldehydes, etc.
2. Follow the points described below when performing work by removing the cover of the main unit, such as during installation of the main unit, installation or replacement of the humidity sensor module, change of cable outlet, or cable extension.
  - Do not touch electronic parts with hands, or apply shock or unnecessary force.
  - Use M3 to M3.5 screws when installing the main unit, and tighten both locations with an appropriate torque.
  - When installing the humidity sensor module, insert it right till the end of the connector.
  - Take care not to scratch or cut off the cables when cutting off the fixing band.
  - When fixing the board on the metallic frame, be sure to pass the side where the shield terminal is present through the shield terminal, and tighten the screws on both locations with the stipulated torque (0.49 to 0.59 N·m).

For details on the method of handling the shield, refer to *About Drawing Out the Cable from the Rear Panel* in the operation manual packaged with the humidity sensor or temperature/humidity sensor.

  - Do not touch the notch for fastening the cover as it may cause an injury.
  - Do not touch the flaps of the metallic frame after removing the board from the metallic frame as it may cause injury.
3. Use the product within the rated voltage and current.
4. Be sure to install the main unit in the specified direction.  
For details on the method of handling the shield, refer to *Mounting Method* in the operation manual packaged with the humidity sensor or temperature/humidity sensor.
5. When turning on the power supply, set the warm-up time as three seconds or more.
6. Ensure sufficient space around the main unit case so that the air vent is not covered.
7. Wire the terminals correctly after confirming the signal name and polarity.
8. Maintain the load impedance of output at the rated value.
9. If there is any problem in the operation, cut off the power supply and stop the use of the product.
10. To prevent induction noise, separate the unit from high-voltage and large-current power lines. Also avoid connecting the unit in a parallel wiring connection or same wiring connection as the power line.
11. Install a surge absorber or noise filter in peripheral devices that generate noise (particularly, devices having inductance components such as motors, transformers, solenoids, magnetic coils, etc.).
12. Install the product as far as possible from strong frequencies and surge-generating devices.
13. Do not connect anything to a crimp terminal that is not in use.

# Terms and Conditions Agreement

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**Note: Do not use this document to operate the Unit.**

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