R220 Series  Temperature/Humidity Transducers
R320 Series  Temperature/Humidity Transducers
HN-GR Series  Temperature/Humidity Converters

R220 SERIES TEMPERATURE / HUMIDITY TRANSDUCERS

These transducers are dry and wet bulbs type temperature/humidity sensors with ventilating function, which can measure temperature/humidity at calm condition.

Resistance thermometer
- Pt100 or JPt100, 3-wire type

Measuring range
- Relative humidity..... 20 to 60%RH
- Temperature..... 0 to 60°C

Accuracy
- Relative humidity..... ±2%RH
- Temperature..... ±0.3°C at 0°C

Measuring condition
- Wind speed less than 3m/sec.
- Ambient temperature 0 to 60°C

R320 SERIES TEMPERATURE / HUMIDITY TRANSDUCERS

These transducers are dry and wet bulbs type temperature/humidity sensors. Since the units are designed to measure temperature and humidity at places where the wind velocity exceeds 3m/sec. continuously, the ventilating function is not provided.

Resistance thermometer
- Pt100 or JPt100, 3-wire type

Measuring range
- Relative humidity..... 20 to 100%RH
- Temperature..... 0 to 100°C

Accuracy
- Relative humidity..... ±2%RH
- Temperature..... ±0.3°C at 0°C

Measuring condition
- Places where the wind velocity exceeds 3m/sec.
- Ambient temperature: 0 to 60°C

HN-GR SERIES TEMPERATURE / HUMIDITY CONVERTERS

These converters indicate simultaneously both temperature and humidity by combining with the temperature/humidity transducers, R220 series or R320 series, and output analog signals of 4 to 20mA.

Input signal
- Dry bulb temperature and wet bulb temperature
  - Pt100 or JPt100, 3-wire type

Input range
- Relative humidity..... 0 to 100%RH
- Temperature..... 0 to 100°C

Output signal
- Humidity..... 4 to 10mADC
- Temperature..... 4 to 20mADC

Conversion Accuracy
- Relative humidity..... ±2%RH (Above 5°C, 10%RH)
- Temperature..... ±0.3°C at 0°C
R220 SERIES TEMPERATURE/HUMIDITY TRANSDUCERS

MODELS R220 (Standard type)  
Model R221 (Automatic water-feeding type)

These compact and lightweight transducers are dry and wet bulbs type temperature/humidity sensors with ventilating function.

The units employ two platinum resistance thermometers as temperature detecting elements for dry and wet bulbs, and consist of a ventilating unit, detecting elements, and a water tank for wet bulb, and others. Since the water tank is detachable and a terminal board is exposed when tilting the units forward under the wallmount condition, the wiring, check and maintenance are very easy.

These transducers are the most suitable as measuring sensors of temperature and humidity in warehouses, rooms, offices and other places, and 4 types are available for various applications.

For places where the wind velocity continuously exceeds 3m/sec, please use R320 series transducers.

R221 series prepares strainer (with adapter) to remove the foreign substance from the feed water as an option.

**TYPES**

- **R220-0** (Standard Type)  
  This is the basic type of the R220 series, and widely used in general.
  The water tank capacity is about 300ml, and it should be refilled about every 5 days.

- **R220-0W** (Dualcouple Type)  
  Two pairs of the resistance thermometers for wet and dry bulbs are built-in for control and record of temperature and humidity at the same time in temperature/humidity chambers, etc. Each dry bulb protective tube and wet bulb protective tube contains two pairs of resistance thermometers.

- **R221-0** (Automatic Water-feeding Type)  
  This is suitable to use in high temperature or low humidity places where water is heavily consumed. Water can be supplied continuously by connecting a pipe to a water supply or a tank. Level detecting float switch turns on and off an solenoid valve to keep the water level constant.

- **R221-0W**  
  (Automatic Water-feeding and Dualcouple Type)  
  This automatic water-feeding type is provided with two pairs of the resistance thermometers for dry and wet bulbs for control and record of temperature and humidity.

**CONFIGURATION**

- **Terminal board**
- **Outlet**
- **Fan motor**
- **Solenoid valve** (Automatic water-feeding type only)
- **Dry bulb protective tube**
- **Wet bulb cotton cloth**
- **Water inlet** (Automatic water-feeding type only)
- **Float switch** (Automatic water-feeding type only)
- **Ventilator**
- **Water tank**

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<table>
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<tr>
<th>MODEL</th>
<th>TYPE</th>
<th>ELEMENTS</th>
<th>No. OF PAIRS OF ELEMENTS</th>
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<td>R22-0</td>
<td>0</td>
<td>JPt100</td>
<td>Blank : Single element type</td>
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<td>Pt100</td>
<td>W : Dualcouple type</td>
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**Template:**

- **MODEL R220-10**
- **MODEL R221-10**
GENERAL SPECIFICATIONS

Case: 
- Motor cover: Diecast aluminum
- Ventilating part: Heat-resisting ABS resin
- Water tank: Acrylic resin

Color: 
- Case: White
- Water tank: Semi-transparent gray

Mounting: Vertical wallmount type

Weight: 
- R220: About 1kg
- R221: About 1.5kg

Measuring range:
- Relative humidity: 20 to 80%RH
- Temperature: 0 to 60°C

Accuracy rating:
- Relative humidity: ±2%RH
- Temperature: ±0.3°C at 0°C

Measuring condition:
- Wind speed less than 3m/sec.
- Ambient temperature: 0 to 60°C

Resistance thermometer:
- Pt100 or JPt100, 3-wire type

Water tank capacity:
- About 300ml

Ambient temperature:
- 0 to 60°C

Power supply:
- 100V AC or 200VAC, 50/60Hz

Power consumption:
- R220: About 11VA
- R221: About 21VA

Accessories:
- 8-conductor cord (Model WP81): 5m or 10m
- Cotton cloth for wet bulb: 5 sheets

Options: Strainer and adapter

EXTERNAL DIMENSIONS

TERMINAL BOARD

Model R220-10, R220-10W

Model R221-10, R221-10W

Model R220-□0, R220-□0W

Model R221-□0, R221-□0W

Unit: mm
TEMPERATURE/HUMIDITY TRANSDUCERS & CONVERTERS

R320 SERIES TEMPERATURE/HUMIDITY TRANSDUCERS

MODELS R320 (Standard type)
  R321 (Automatic water-feeding type)
  R322 (Inside-wall mounting type)
  R323 (Internal pressure regulating type)

These compact and lightweight transducers are dry and wet bulbs type temperature/humidity sensors. Since the units are designed to measure temperature and humidity at places where the wind velocity continuously exceeds 3m/sec, the ventilating function is not provided. The units employ two platinum resistance thermometers as temperature detecting elements for dry and wet bulbs. These transducers are the most suitable as measuring sensors of temperature and humidity in chambers or ducts where the wind velocity exceeds 3m/sec, continuously, and 4 types are available for various applications. For places where is calm or the wind velocity is either below 3m/sec, or not stable, please use R220 series transducers with ventilating function. R321 series prepares strainer (with adapter) to remove the foreign substance from the feed water as an option.

■ TYPES

◆ Standard Type (R320)
This is provided with a water pot and detecting elements inside the flange, and with a terminal box and a water tank in the outside.

◆ Automatic Water-feeding Type (R321)
This is suitable to use in high temperature or low humidity places where water is heavily consumed. Water can be continuously supplied connecting a pipe to a water supply or a tank. The water pot is provided with a level detecting float switch which turns on and off a solenoid valve to keep the water level constant continuously.

◆ Inside-wall Mounting Type (R322)
Unlike the standard and other types, the unit is mounted inside wall. A large water pot is attached instead of a water tank.

◆ Internal Pressure Regulating Type (R323)
This is used in places where there is a pressure difference between the inside and the outside. The unit is the standard type attaching a pressure balancing tube to keep the water level at the specified position in the water pot.

 classifications

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<tr>
<th>MODEL</th>
<th>R32</th>
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<td>Type</td>
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<td>Inside-wall mounting type</td>
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<td></td>
<td>3</td>
<td>Internal pressure regulating type</td>
</tr>
</tbody>
</table>

| Elements | 1   | JPt100 |
|          | 3   | Pt100  |

| No. of pairs of elements | Blank : Single element type |
|                         | W : Double element type    |
**GENERAL SPECIFICATIONS**

Main body: No.3 nickel-planted brass  
Mounting: Vertical wallmount with bolts  
Weight: About 2.2kg

Measuring range:
- Relative humidity: 20 to 100%RH  
- Temperature: 0 to 100°C

Accuracy rating:
- Relative humidity: ±2%RH  
- Temperature: ±0.3°C

Measuring condition:
- Wind speed exceeding 3m/sec.  
- Ambient temperature 0 to 60°C

Resistance Thermometer:  
Pt100 or JPt100, 3-wire type  
Water pot: R320, R321, R323…. 60ml  
R322…. 400ml  
Ambient temperature:  
0 to 60°C (R320, R321, R323…..Outside flange)

Power supply: 100VAC, 50/60Hz  
Accessories: R320, R322, R323  
- 6-conductor cord (Model WV61)…. 5m  
- R321  
- 8-conductor cord (Model WP81)…. 5m  
- Cotton cloth for wet bulb….. 5 sheets  
- Strainer and adapter (Common to R221)

**EXTERNAL DIMENSIONS**

- **Model R320**

- **Model R322**

- **Model R321**

- **Model R323**

**TERMINAL BOARD**

- **R320-□0**  
  R322-□0  
  R323-□0

**MOUNTING HOLES**
HN-GR SERIES TEMPERATURE/HUMIDITY CONVERTERS

These converters indicate simultaneously both temperature and humidity by connecting with the temperature/humidity transducers, R220 series or R320 series, and output analog signals of 4 to 20mA.

6 kinds of humidity unit such as absolute humidity and relative humidity are selectable to display and output. The humidity and temperature outputs are isolated and arbitrary scalable on both outputs. Also, communication interface is available as an option.

### GENERAL SPECIFICATIONS

- **Input signal:** Dry bulb temperature and bulb temperature
  - Pt100 or JPt100, 3-wire type
- **Input range:**
  - Relative humidity..... 0 to 100%RH
  - Temperature..... 0 to 100°C
- **Conversion Accuracy:**
  - Relative humidity..... ±2%RH
    (Temperature : Above 5°C, Humidity : Above 10%RH)
  - Temperature..... 0.3°C
- **Display:**
  - Humidity (or wet bulb temperature)..... 4-digit LED
  - Temperature..... 4-digit LED
- **Output signal:** Humidity (or wet bulb temperature)
  - ...... 4 to 20mA
- **Load resistance:** 600Ω or less, with isolator

**Humidity calculation:**
- Absolute humidity (g/m²)
- Relative humidity (%RH)
- Mixing ratio (g/kg)
- Steam pressure (kPa)
- Dew point (°C)
- Wet bulb temperature (°C)

**Alarm output:** Contact output 2 points, by one common terminal
- 2 points of humidity (or wet bulb temperature) and temperature or higher/lower limits in either humidity or temperature.
- **Contact capacity**
  - Resistive load..... 100VAC 0.5A
  - ...... 200VAC 0.2A

**Hold:**
- Hold both display and output by external contact signal (standard equipped to communication interface)

**Communication interface:**
- RS232C, RS422A or RS485 (to be specified as an option)

**Working temperature range:**
- 0 to 50°C

**Power supply:** 100 to 240VAC 50/60Hz

**Allowable voltage fluctuation:**
- 85 to 264VAC

**Power consumption:** Maximum about 15VA

**Weight:** About 0.6kg

### MODEL

HN-GR3F1

- Communication interface
  - N : Not provided
  - R : RS232C
  - A : RS422A
  - S : RS485
**TERMINAL BOARD**

- **External Dimensions**
  - **Panel cutout**
    - Unit: mm

- **Configuration**
  - Recording and control of temperature and humidity

- **Terminal Functions**
  - **Alarm 1**
    - **Alarm 2**
    - **Humidity output**
    - **Power supply** 100-240VAC 50/60Hz
    - **Communication interface**
    - **Power supply** 100-240VAC 50/60Hz
    - **Conducting ground**
    - **Temperature output** 4-20mA DC
    - **Humidity output** 4-20mA DC
    - **Dry bulb resistance thermomter input**
    - **Wet bulb resistance thermomter input**

- **Recorder**
  - **Controller 1**
    - **Controller 2**
    - **Humidity control**
    - **Temperature control**

**HN-GR SERIES**

4 to 20mADC

(Option) Hold

**Wet output**

**Dry output**

**Power supply** 100-240VAC 50/60Hz

**Conducting ground**

**Temperature output** 4-20mA DC

**Humidity output** 4-20mA DC

**Dry bulb resistance thermomter input**

**Wet bulb resistance thermomter input**

**Communication interface**
## WET BULB TEMPERATURE CONVERSION TABLE

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