

# REFERENCE

## PRODUCT SPECIFICATIONS

RHU-223 series

SP-03-D-99\*\*\*

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|           |   |   |        |            |
|-----------|---|---|--------|------------|
| PRODUCT   | Temperature & Humidity Transmitter module | SHINYEI KAISHA<br>ELECTRONICS DIVISION<br>ENGINEERING DEPT. | Issued | 1999.12.03 |
|           |   |   | Rev.1  |            |
|           |   |   | Rev.2  |            |
| MODEL NO. | RHU-223 series                            | APPROVED BY:  | Rev.3  |            |
|           |   | CHECKED BY:   | Rev.4  |            |
|           |   | DRAWN BY:   | Rev.5  |            |

### 1. Application range

This application is applied to the Temperature & Humidity Transmitter Module Type RHU-223 series.

### 2. Configuration

|   | Model No. | Connector Type         | Drawing            |
|---|-----------|------------------------|--------------------|
| 1 | RHU-223A  | Connector(S4B-2R-SM3A) | Page 3/5, Fig. 1.1 |
| 2 | RHU-223B  | Header(FFC-4LAMP)      | Page 4/5, Fig. 1.2 |

### 3. Electrical characteristics

- 3-1. Sensing Element (Humidity): Humidity sensor "SHINYEI HUMENT HPR-MQ"
- 3-2. Supply Voltage (Vin): 5VDC  $\pm 5\%$
- 3-3. Current Consumption: 5mA max. (2mA avg.)
- 3-4. Operating Range:
  - Temperature: 0 to 60deg.C
  - Humidity: 95%rh or less
- 3-5. Storage:
  - Temperature: -20 to 70deg.C
  - Humidity: 95%rh or less
- 3-6. Humidity transmitting Range: 10 to 95%rh
- 3-7. Accuracy (Humidity):  $\pm 5\%$ rh (at 25deg.C, 60%rh, Vin=5.00VDC)  
Voltage Range: 2.20 to 2.53VDC
- 3-8. Humidity Output Signal (Reference):  
at 25 deg.C, Vin=5.00VDC

| Humidity(%rh)     | 10   | 20   | 30   | 40   | 50   | 60   | 70   | 80   | 90   |
|-------------------|------|------|------|------|------|------|------|------|------|
| Output Voltage(V) | 0.74 | 0.95 | 1.31 | 1.68 | 2.02 | 2.37 | 2.69 | 2.99 | 3.19 |

Output Impedance approx: 5 k  $\Omega$

Standard characteristics: Page 6/6 Fig. 2

- 3-9. Temperature Dependence (Reference):  $\pm 5\%$ rh (Vin=5.00VDC, 30 to 80%rh,  
Temp. Range 10 to 40deg.C (based on 25deg.C))
- 3-10. Voltage Dependence (Reference):  $\pm 5\%$ rh (Vin=5.00VDC, 30 to 80%rh,  
Voltage Range 4.75 to 5.25VDC (based on 5VDC))
- 3-11. Sensing Element (Temperature): Thermistor "Shibaura C16T-45"
- 3-12. Temperature Output Signal(Reference): R(25°C)=50k  $\Omega \pm 5\%$ , B-value(25/50)=3970K  $\pm 2\%$   
Accuracy  $\pm 1.2^\circ\text{C}$ , (at 25°C deg.C)

| Temperature(°C)         | 0     | 5     | 10    | 15    | 20    | 25    | 30    | 35    | 40    | 45    | 50    | 55    | 60    |
|-------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Resistance(k $\Omega$ ) | 166.9 | 125.6 | 100.4 | 79.01 | 62.63 | 50.00 | 40.19 | 32.51 | 26.46 | 21.67 | 17.75 | 14.78 | 12.31 |

## SUNSTAR 深圳市商斯达电子有限公司

SHENZHEN SUNSTAR ELECTRONICS CO.,LTD.  
 地址(Add):深圳福田区福华路福庆街鸿图大厦1602室  
 RM 1602,Hongtu Bldg,Fuhua Rd, Futian Region, Shenzhen China  
 电话(Tel):0755-3600718 3758073 邮编(PC):518033  
 传真(Fax):0755-3376182 E-mail:szsunstr@public.szptt.net.cn  
 网址: <http://www.sunstare.com/> 手机:(0)13902971329  
 西安办事处电话:(0)13609291696 191-8454356  
 北京办事处电话:(0)13501189838 191-8886650  
 上海办事处电话:(0)13701955389 191-3789221



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## 4. Standard instrument for condition

Test condition: Ambient temp. 25deg.C, Voltage 5.00VDC

To leave Modules under 0%rh circumstances for 30min., and another 15min. under 60%rh.

The voltage of Modules to be measured.

&lt;Measurement instruments&gt;

\*Divided flow type accurate Humidity Generator Model SRH-1 (SHONYED).

\*Voltage meter.

## 5. Reliability test.

| No. | ITEM                   | METHOD  | REQUIREMENT   |
|-----|------------------------|---|---|
| 1   | Impact test            | To drop Module 3times at random on to a hard wooden plate from 1meter above high.   | No breakage, nor cracks. Should be electrically normal. |
| 2   | Vibration test         | Vibration test in X-Y-Z axis for 30min. under 10-55Hz frequency, 1.5mm(10-55-10Hz) amplitude.   | - ditto -   |
| 3   | Heat resistance        | To leave module in an ambient of 55deg.C and 30%rh max. for 1000hours.  | Within $\pm 5\%$ rh                                     |
| 4   | Cool resistance        | To leave module in an ambient of -10deg.C and 30%rh max. for 1000hours.   | Within $\pm 5\%$ rh                                     |
| 5   | Humidity resistance    | To leave module in an ambient of 40deg.C and 95%rh for 1000hours.   | Within $\pm 5\%$ rh                                     |
| 6   | Temperature cycle test | 300 cycles. 1cycle stands for leaving module under -10deg.C for 1hour, and rise ambient temp. up to 55deg.C for next 1hour. Then, leave it another 1hour, and lower temp. to -10deg.C for next 1hour. | Within $\pm 5\%$ rh                                     |

Remarks: 1) All standard figures are based on humidity variation under 60%rh (25deg.C)

2) Upon completion of all tests, module will be left over under nominal environment and humidity for 24hours.

## 6. Packaging

(1) 40pcs of Module to be packed in a tray.

(2) \*\*\*sheets(\*\*\*pcs of Module, TYPE:RHU-223A) or \*\*\*sheets(\*\*\*pcs of Module, TYPE:RHU-223B) to be packed in a shipping carton box(size:\*\*\*x\*\*\*x\*\*\*mm).

\*\*\*sheets(\*\*\*pcs of Module, TYPE:RHU-223A) or \*\*\*sheets(\*\*\*pcs of Module, TYPE:RHU-223B) to be packed in a shipping carton box(size:\*\*\*x\*\*\*x\*\*\*mm).

(3) In case of fractional packaging, the above bag and carton box may not be used.

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地址(Add):深圳福田区福华路福庆街鸿图大厦1602室  
RM 1602,Hongtu Bldge,Fuhua Rd, Futian Region,Shenzhen China  
电话(Tel):0755-3600718 3758073 邮编(PC):518033  
传真(Fax):0755-3376182 E-mail:szsunstr@public.szptt.net.cn  
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### 7. Caution remarks on operation

- (1) To avoid direct application of DC voltage on humidity sensor.
- (2) To protect sensor from dewfall and drenching.
- (3) To avoid any operation of humidity sensors in the following environmental ambient.
  - (a) Salt
  - (b) Inorganic gas      Sulfide dioxide , Chlorine , Ammonium , etc.
  - (c) Organic gas        Alcoholic , Glycols , Aldehydes , etc.
- (4) Recommendable storage condition
  - Temperature range    10 ~ 40deg.C
  - Humidity range        60%rh max.
- (5) Do not store humidity sensors long period of time in an ambient over 60deg.C ambient due to some occasion of degradation on sensor housing case.

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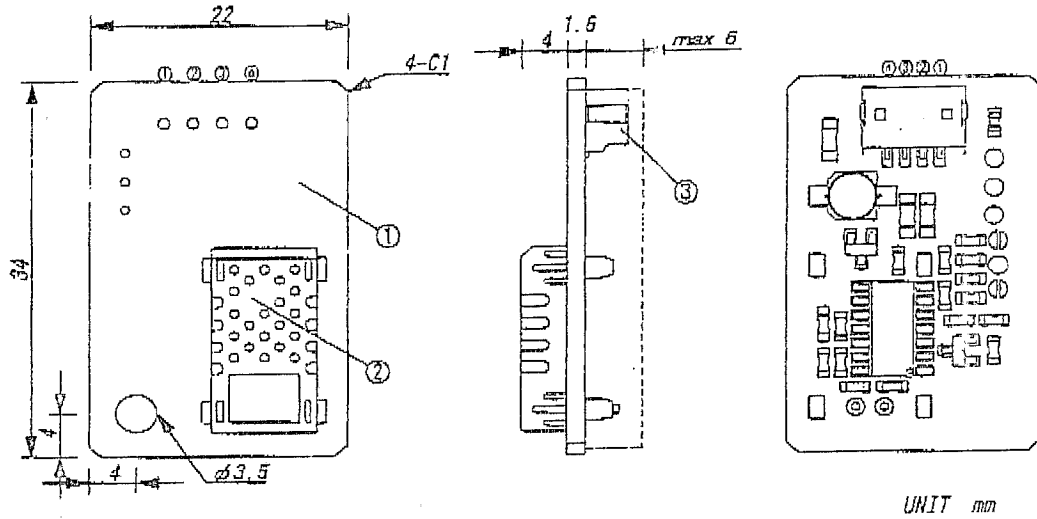
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Figure. 1.1 Configuration & Parts (Model : RHU-223A)



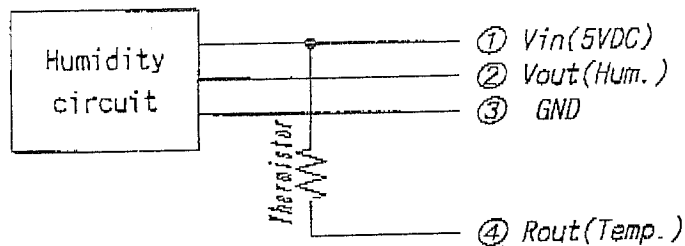
Main parts.

| No. | Parts   | Reference  |
|-----|---|------------|
| 1   | Printed board RHU-223                         | 1.6mm thk. |
| 2   | Humidity sensor HPR-MQ-M3<br>Sensor case FC-6 |            |
| 3   | Connector S4B-ZR-SM3A                         | JST        |

Terminal Connection

| Terminal No. | Connection                        |
|--------------|-----------------------------------|
| 1            | Power source 5VDC                 |
| 2            | Humidity output (voltage 0~5 VDC) |
| 3            | GND                               |
| 4            | Temperature output (Resistance)   |

Circuit



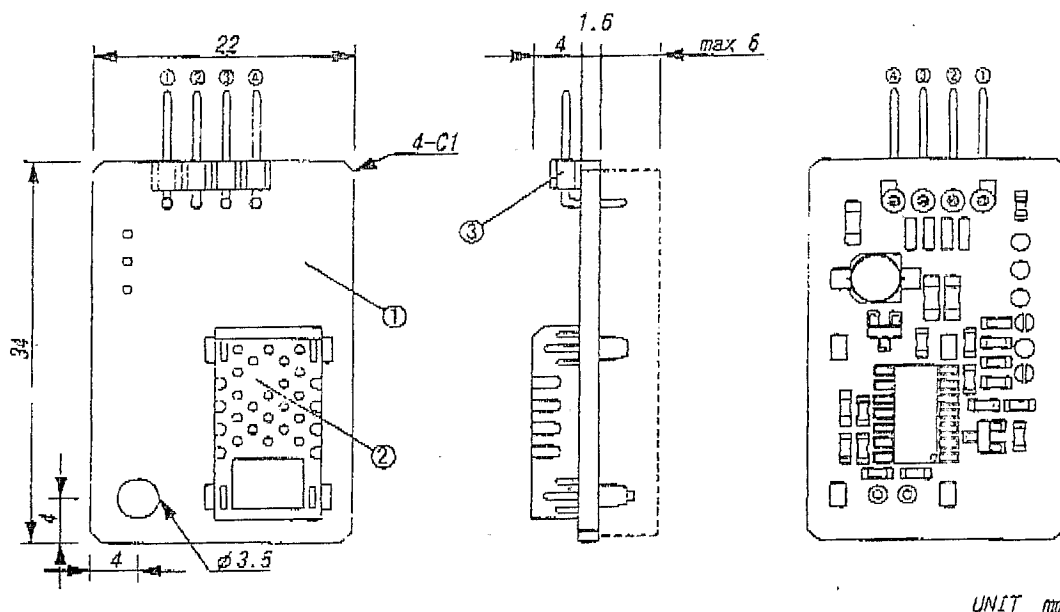
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Figure. 1.2 Configuration & Parts (Model : RHU-223B)



UNIT mm

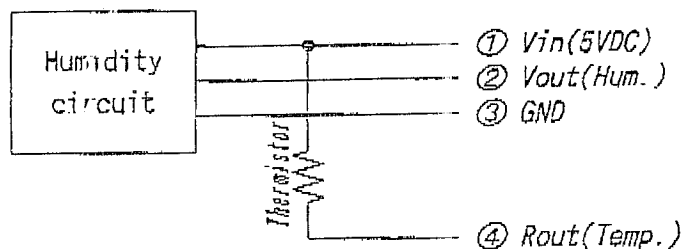
### Main parts.

| No. | Parts   | Reference     |
|-----|---|---------------|
| 1   | Printed board RHU-223                         | 1.6mm thk     |
| 2   | Humidity sensor HPR-MQ-M3<br>Sensor case FC-8 |               |
| 3   | Header FFC-4LAMEP                             | HONDA TSUSHIN |

### Terminal Connection

| Terminal No. | Connection                       |
|--------------|----------------------------------|
| 1            | Power source 5VDC                |
| 2            | Humidity output (voltage 0~5VDC) |
| 3            | GND                              |
| 4            | Temperature output (Resistance)  |

### Circuit



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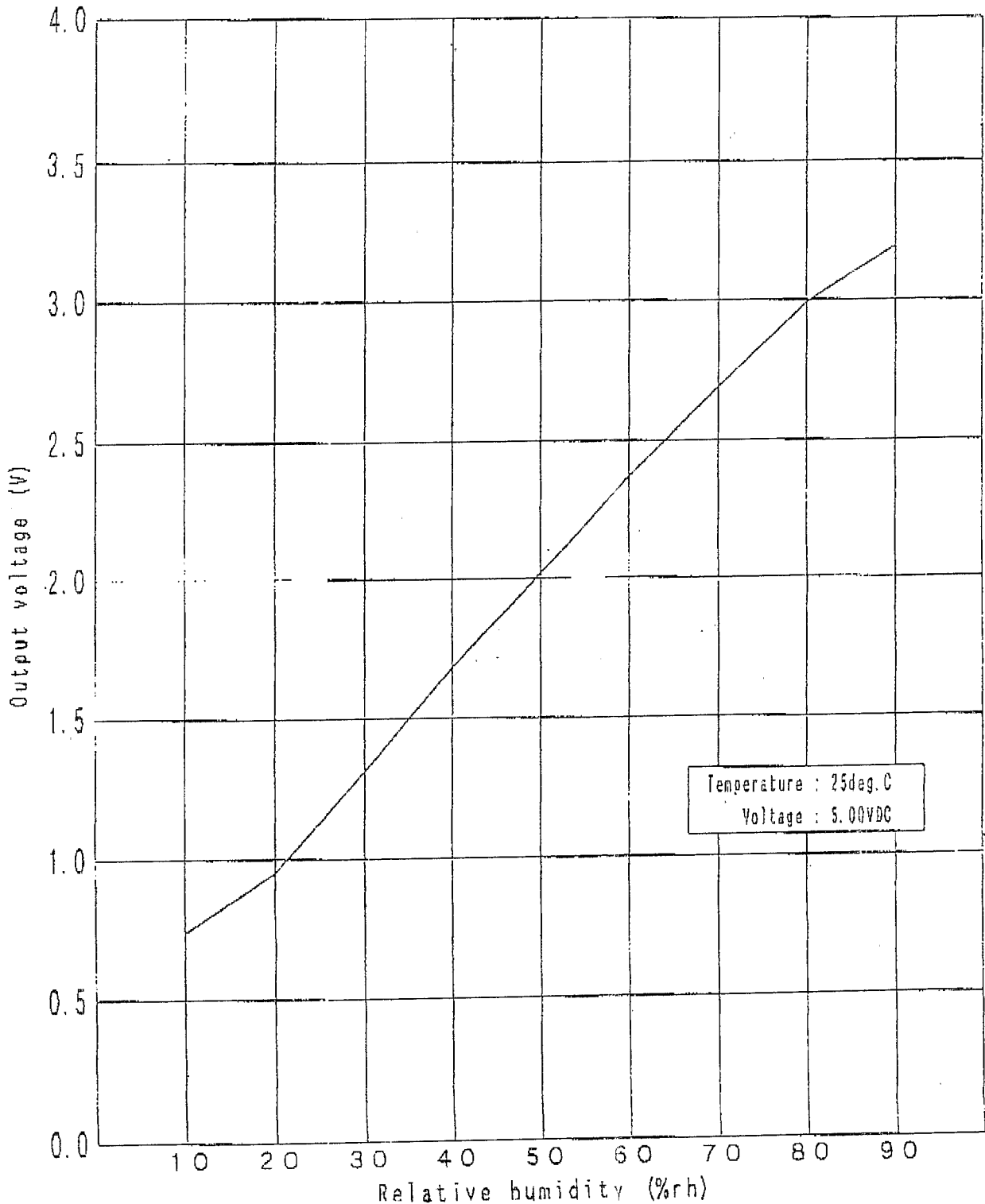
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Figure.2 Relative humidity - Voltage characteristics

The Relative humidity and voltage characteristics of this module are shown in the following graph.



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 电话(Tel):0755-3600718 3758073 邮编(PC):518033  
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QQ：195847376

地址：深圳市福田区福华路福庆街鸿图大厦 1602 室

电话：0755-83376549 83376489 83387030 83387016

传真：0755-83376182 83338339 邮编：518033 手机：(0)13902971329

深圳展销部：深圳华强北路赛格电子市场 2583 号 TEL/FAX：  
0755-83665529 25059422

北京分公司：北京海淀区知春路 132 号中发电子大厦 3097 号

TEL：010-81159046 82615020 13501189838 FAX：010-82613476

上海分公司：上海市北京东路 668 号上海赛格电子市场 2B35 号

TEL：021-28311762 56703037 13701955389 FAX：021-56703037

西安分公司：西安高新开发区 20 所(中国电子科技集团导航技术研究所)

西安劳动南路 88 号电子商城二楼 D23 号

TEL：029-81022619 13072977981 FAX:029-88789382

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