

HMD 402A / 402S Humidity module specifications

1. Application

Ghitron HMD series humidity module consists of a HCZ sensor and MCU base circuit designed, The HMD 402A module is provide I²C digital output for user application. HMD402S for low power operation.

Feature	Application
Wide humidity operation range	Air condition, Humidifier, Dehumidifier.
Direct data output easy operation	Humidity controller, Humidity transmitter.
Long-term stability	Hygrometer, Hygro-recorder.
Small and economical	Clock, Weather-forecast barometer.
Low power for battery operation	Wireless Sensor Network application.

2. Electrical characteristics :

- 2.1 Sensing element (Humidity) : HMD 402A Humidity sensor “ GHITRON HCZ”
- 2.2 Supply Voltage (Vin) : 2.0 ~ 3.3V HMD402A
1.8 ~ 3.3V HMD402S
- 2.3 Current Consumption: 0.7mA (Sleep mode <= 2uA ,HMD402S only)
- 2.4 Operating Range
Temperature: 0 to 50°C
Humidity: < 95%RH (no condensation)
- 2.5 Storage:
Temperature: -20 to 70°C
Humidity: 90%RH or less
- 2.6 Humidity Detecting Range: 10~90%RH
- 2.7 Accuracy
Humidity: ±3.0%RH at 25°C, 60%RH, Vin=3.30VDC
Temperature: ±1.0°C at 0-40°C, Vin=3.30VDC
- 2.8 Output
I2C: 2 byte temperature + 2 byte humidity
Speed 100 KHz
- 2.9 Accuracy humidity (Reference): at 25 °C, Vin 3.3 VDC

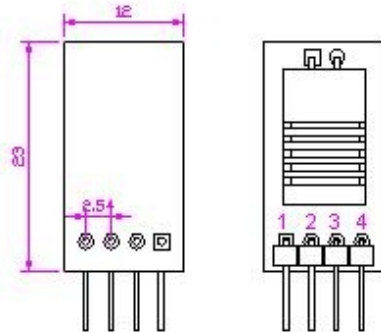
Humidity (%RH)	30	40	50	60	70	80
Accuracy(%RH)	+5	+4	+3	+3	+4	+5

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	App. No.	ENG

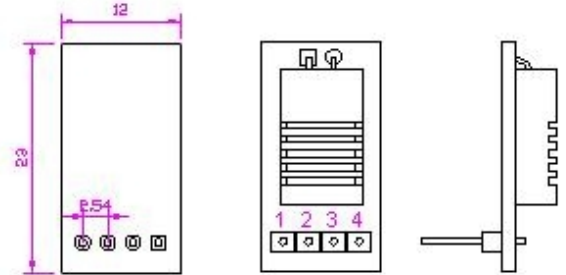
3. Configuration & Dimensions (Units :mm) :

3.1 Model No. HMD 402A Drawing (PCB size 23x12x1.2mm)

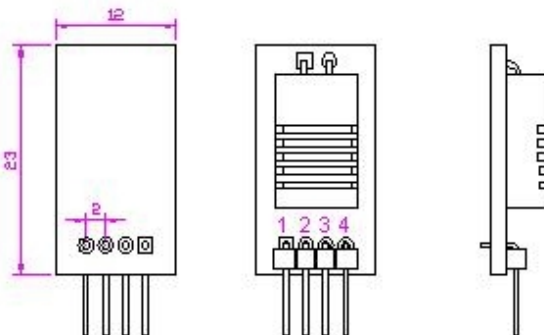
HMD 402A-1



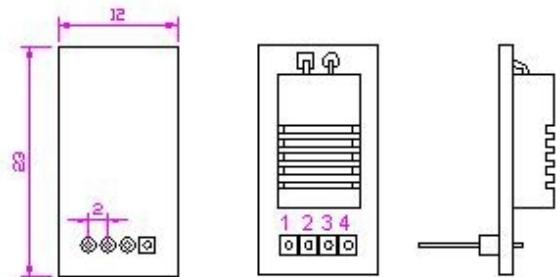
HMD 402A-2



HMD 402A-3



HMD 402A-4



3.2 Terminal Connection :

Terminal	Content.
1	SCL
2	DC 3.3V
3	GND
4	SDA

4. Typical Applications :

4.1 I²C Digital output

I2C 7 bits address = 1010011, 0x53H

ADDRESS = 1010011x

Write = 10100110, 0xA6H

Read = 10100111, 0xA7H

COMMAND

Temp = 00001010, 0x0AH

Temp = 00001011, 0x0BH

Humidity = 00011000, 0x18H

Respond Data

1 byte (resolution 0.5 °C)

2 byte (resolution 0.1 °C)

2 byte (resolution 0.1 %)

4.2 Digital output format

Temp = 00001010, 0AH 1 byte

Output Data = 000 ~ 170 = -25.0 ~ 60.0° C

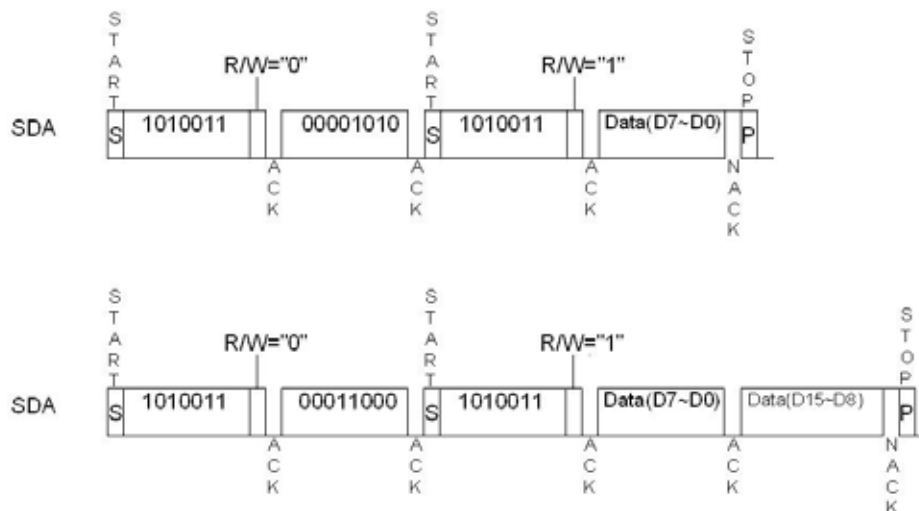
Temp = 00001011, 0BH 2 byte

Output Data = 000 ~ 800 = -20.0 ~ 60.0 °C

Humidity = 00011000, 18H 2 byte

Output Data = 100 ~ 905 = 10.0 ~ 90.5 %RH

4.3 Output waveform :



4.4 Application software: (C code for microchip 16Fxxxx 8 bits MCU)

```

void Read_HMD402_H(void)
{
    IdleI2C();           // ensure module is idle
    StartI2C();         // Start condition
    I2C_Done();         // Wait Start condition completed

    Runt=WriteI2C(0xA6); // write 0xA6 address cmd
    I2C_Done();         // Clear SSPIF flag

    Runt=WriteI2C(0x18); // write write 0x18 data.
    I2C_Done();         // Clear SSPIF flag

    RestartI2C();       // initiate Restart condition
    I2C_Done();

    // Delay();         // delay 1 - 10uS, if need..

    Runt=WriteI2C(0xA7); // write read 0xA7 address cmd
    I2C_Done();         // Clear SSPIF flag

    HMD402.Temp[1]=ReadI2C(); // Enable I2C Receiver & wait BF=1 until received data
    I2C_Done();         // Clear SSPIF flag

    AckI2C();           // Generate Acknowledge to HMD402
    I2C_Done();

    HMD402.Temp[0]=ReadI2C(); // Enable I2C Receiver & wait BF=1 until received data
    I2C_Done();         // Clear SSPIF flag

    NotAckI2C();        // Generate Non Acknowledge to HMD402
    I2C_Done();
    StopI2C();          // send STOP condition
    I2C_Done();         // wait until stop condition is over
}

```

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	App. No.	ENG

5. Order Form :

HMD 402A/402S Configure of definition.	
Input Voltage:HMD402A HMD402S	2.0 ~ 5.0V (recommend <= 3.3V) 1.8 ~ 3.3V
Temperature Humidity Output	l ² C
Terminal Connector: HMD 402A-1 / 402S-1 HMD 402A-2 / 402S-2 HMD 402A-3 / 402S-3 HMD 402A-4 / 402S-4	2211R-04G (4 pins, Pitch=2.54mm, 90°) 2211S-04G (4 pins, Pitch=2.54mm, 180°) 2210R-04G (4 pins, Pitch=2.00mm, 90°) 2210R-04G (4 pins, Pitch=2.00mm, 180°)
Sensor: HMD 402A-x-1 / 402A-x-1 HMD 402A-x-2 / 402A-x-2	J3A : standard type. J32A : water proof sensor
PCB coating: HMD 402A-x-x-0 / 402S-x-x-1 HMD 402A-x-x-1 / 402S-x-x-2	None PCB With silicon coating .

6. Reliability test :

No.	ITEM	METHOD	REQUIREMENT
6.1	Impact test	To drop Module 3time at random on to a hard wooden plate from 1meter above high.	No crack or damage ◦ Δ%RH < ±5%RH
6.2	Vibration test	Vibration test in X-Y-Z axis for 30min. under 10-55Hz , 1.5mm(10-55-10Hz)amplitude.	No crack or damage ◦ Δ%RH < ±5%RH
6.3	Heat resistance	temperature : 70°C , test time : 1000 hours.	Δ%RH < ±5%RH
6.4	Cool resistance	temperature : -30°C , test time : 1000 hours.	Δ%RH < ±5%RH
6.5	Humidity resistance	temperature : 60°C , humidity : 90%RH test time : 1000 hours.	Δ%RH < ±5%RH
6-6	Temperature cycle test	temperature : 85°C(30 min)↔ , -30°C (30 min) cycle : 100 times	Δ%RH < ±5%RH

Remarks :

- (1) All standard figures are based on humidity variation under 60%RH(25°C)
- (2) Upon completion of all tests. The module will be left over under nominal environment and humidity for 24hours.

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	App. No.	ENG

7. Packing :

There are 50 pieces of modules to be packed in one tray.

8. Caution remarks on operation :

8.1 To avoid direct application of DC voltage on humidity sensor.

8.2 To protect sensor from dewfall and drenching.

8.3 To avoid and operation of humidity sensors in the following environmental ambient.

8.3.1 Salt

8.3.2 Inorganic gas Sulfide dioxide, Chlorine, Ammonium, etc.

8.3.3 Organic gas Alcoholic, Glycols, Aldehydes, etc.

8.4 Recommendable operation & storage condition

Temperature range 10~40 °C

Humidity Range 90%RH or Less.

8.5 Do not store humidity sensors long period of time in an 70 °C ambient, due to some occasion of degradation on sensor housing case.

Remark : We have the right to revise specification and product configurations without notice.

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	<p>App. No.</p>	<p>ENG</p>