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Walfront FS400-SHT2X

Walfront FS400-SHT2X Temperature and Humidity Sensor User Manual

Model: FS400-SHT2X

Brand: Walfront

1. INTRODUCTION

This manual provides detailed instructions for the installation, operation, and maintenance of the Walfront FS400-SHT2X Temperature and Humidity Sensor. Please read this manual thoroughly before using the product to ensure proper function and longevity. This sensor is designed for accurate environmental monitoring in various settings.

2. PRODUCT OVERVIEW

2.1 Key Features

- **Digital Design:** Features a digital design with a resolution of up to 14 bits for precise measurements.
- **Internal Self-Calibration:** No external calibration is required, simplifying setup and maintenance.
- **Integrated Measurement:** Close combination of temperature and humidity sensing for convenient data acquisition.
- **High Reliability:** Designed for high reliability and long-term stability in various operating conditions.
- **I2C Serial Interface:** Easy integration with microcontrollers and data acquisition systems.
- **Compact Structure:** Suitable for field applications and product integration due to its compact design.

2.2 Components

The Walfront FS400-SHT2X sensor package typically includes:

- 1 x FS400-SHT2X Temperature Humidity Sensor
- 1 x Connection Cable

Visual representation of the sensor and its components:



Figure 1: The complete Walfront FS400-SHT2X sensor unit, featuring the white cylindrical sensor head, the black cable, and the four colored wire terminals (red, black, green, yellow) at the end, along with a blue tag indicating pin assignments.



Figure 2: A detailed view of the sensor's white, porous cylindrical head, which houses the sensing elements, connected to a metallic housing and the cable.



Figure 3: This image shows the four colored wires (red, black, green, yellow) with their respective crimped terminals, ready for connection. The blue tag with pin assignments is also visible.

3. SPECIFICATIONS

3.1 Technical Specifications

Parameter	Value
Model	FS400-SHT2X
Temperature Measurement Range	-20°C ~ 100°C
Working Conditions (Temperature)	-40°C ~ 120°C
Working Conditions (Humidity)	0 ~ 99% RH
Storage Conditions (Temperature)	-20°C ~ 80°C
Storage Conditions (Humidity)	0 ~ 95% RH

Parameter	Value
Housing Material	Stainless steel, plastic
Line Length	Approx. 150cm / 59.1in
Weight	Approx. 115.8g / 4.1oz
Voltage	3.3V
Humidity Accuracy	±1.8% to ±3% (depending on series variant)
Temperature Accuracy	±0.2°C to ±0.3°C (depending on series variant)
I2C Serial Interface	Yes

4. SETUP

4.1 Installation Guidelines

Follow these steps for proper installation of your Walfront FS400-SHT2X sensor:

- Power Supply:** Ensure a stable 3.3V DC power supply is available for the sensor. Connect the **VCC** (red wire) to the positive power supply and **GND** (black wire) to the ground.
- I2C Connection:** Connect the **SDA** (green/blue wire) to the data line and **SCK** (yellow/white wire) to the clock line of your I2C master device (e.g., microcontroller). Refer to the blue tag on the cable for specific pin assignments.
- Placement:** Position the sensor in the environment where temperature and humidity measurements are required. Ensure adequate airflow around the sensor head for accurate readings. Avoid direct exposure to water, corrosive substances, or extreme physical stress.
- Integration:** Integrate the sensor with your microcontroller or data acquisition system using the I2C serial interface. Programming libraries for SHT2x series sensors are widely available for common platforms like Arduino or Raspberry Pi.

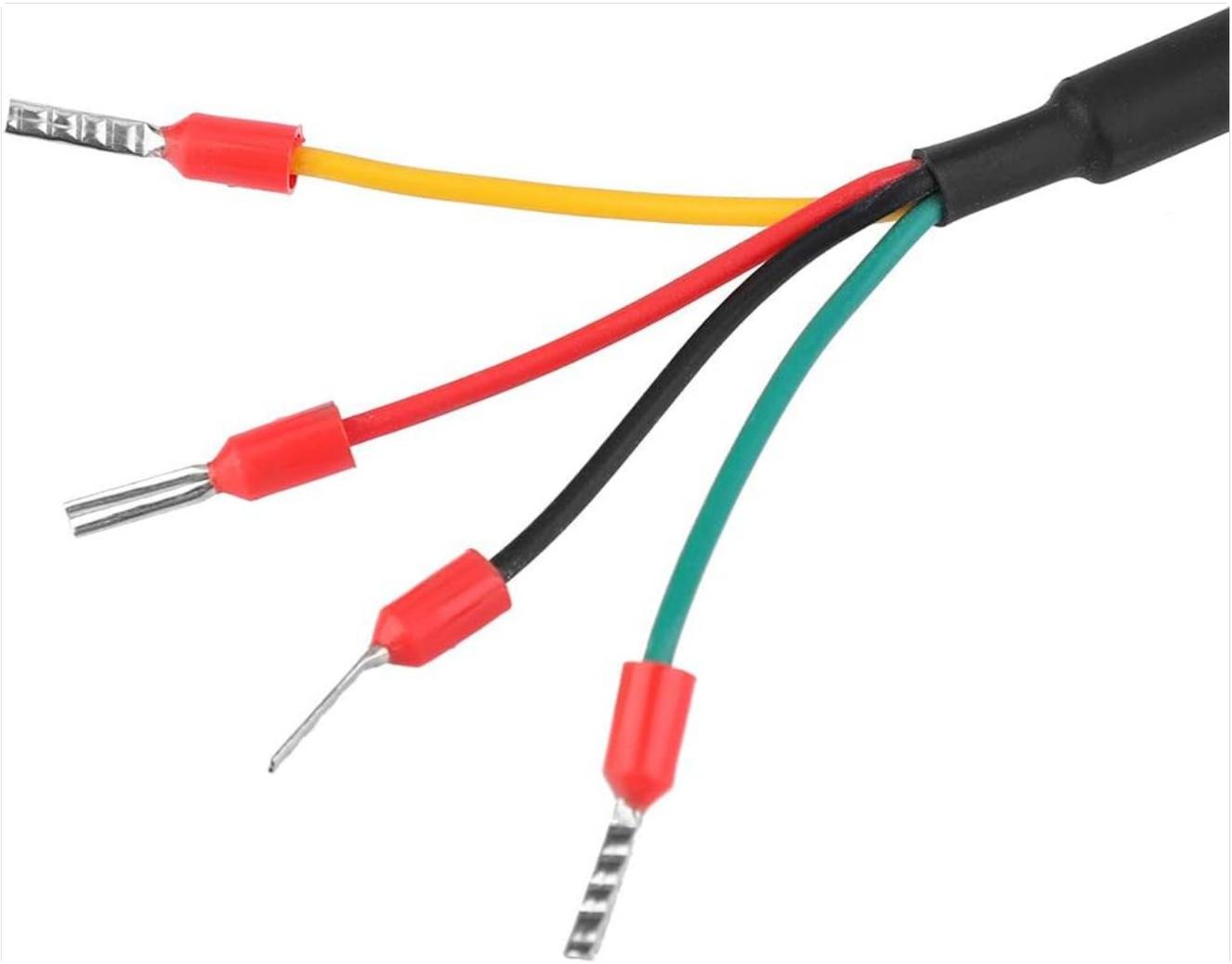


Figure 4: This image highlights the blue tag attached to the sensor cable, clearly labeling the wire colors and their corresponding I2C functions: SDA (green/blue), SCK (yellow/white), VCC (red), and GND (black).

5. OPERATING INSTRUCTIONS

5.1 Basic Operation

Once correctly wired and powered, the sensor will begin taking measurements. Data can be read from the sensor via the I2C interface.

Reading Data:

1. Initialize the I2C communication on your microcontroller or host system.
2. Send the appropriate command to the sensor to request temperature or humidity data. Refer to the sensor's datasheet for specific I2C commands.
3. Read the 14-bit digital output from the sensor.
4. Convert the raw digital data into actual temperature (in °C) and humidity (in %) values using the sensor's datasheet conversion formulas.

The sensor features internal self-calibration, meaning no manual calibration steps are typically required for accurate operation.

6. MAINTENANCE

6.1 Care and Maintenance

- **Cleaning:** Keep the sensor head clean and free from dust or debris. Use a soft, dry cloth for cleaning. Avoid using harsh chemicals, solvents, or abrasive materials, as these can damage the sensing elements.
- **Environment:** Operate the sensor within the specified working conditions (-40°C to 120°C, 0-99% RH) to ensure optimal performance and longevity. Exposure to conditions outside these ranges may affect accuracy or damage the sensor.
- **Inspection:** Periodically inspect the cable and connections for any signs of wear, cuts, or damage. Ensure all connections remain secure.
- **Storage:** When not in use, store the sensor in a dry, clean environment within the specified storage conditions (-20°C to 80°C, 0-95% RH). Protect it from mechanical shock and electrostatic discharge.

7. TROUBLESHOOTING

7.1 Common Issues and Solutions

- **No Readings / Incorrect Readings:**
 - Verify all wiring connections (VCC, GND, SDA, SCK) are correct and secure according to the pinout.
 - Ensure the power supply voltage is stable at 3.3V.
 - Check your I2C communication code for errors, including addressing and data request sequences.
 - Confirm the sensor is operating within its specified environmental conditions.
 - Inspect the sensor head for any obstructions, dust, or physical damage.
- **Intermittent Readings:**
 - Check for loose connections or damaged cables. Replace if necessary.
 - Ensure proper shielding if operating in an electromagnetically noisy environment.
 - Verify the I2C pull-up resistors are correctly implemented on the SDA and SCK lines (typically 4.7kΩ to 10kΩ).

8. APPLICATIONS

8.1 Typical Applications

The Walfront FS400-SHT2X sensor is suitable for a wide range of environmental monitoring applications due to its accuracy and robust design:

- Computer room monitoring for optimal operating conditions.
- Warehouse environmental control to protect goods from humidity and temperature fluctuations.
- Construction site condition monitoring, including concrete curing.
- Agricultural greenhouses and flower nurseries for climate management.
- General HVAC and climate control systems.
- Industrial process monitoring.



I2C serial interface is easy to integrate



Close combination of temperature and humidity for convenient dew point measurement



Figure 5: A visual representation of diverse environments where the Walfront FS400-SHT2X sensor can be effectively utilized, such as plant cultivation, concrete testing, and industrial monitoring.

9. WARRANTY AND SUPPORT

9.1 Warranty Information

For specific warranty terms and conditions, please refer to the retailer or manufacturer's official website. Warranty coverage typically includes defects in materials and workmanship under normal use.

9.2 Customer Support

For technical assistance, troubleshooting, or further inquiries regarding the Walfront FS400-SHT2X sensor, please contact Walfront customer support through their official channels or the retailer from whom the product was purchased. Have your product model and purchase information ready for efficient service.

