SEN6x – Using the Integrated Heater of SHT4x in High-Humidity Environments

Enable creep-free operation of the SHT4x integrated in the SEN6x

This application note provides instructions on how to activate the heater function of the SHT4x sensor integrated in the SEN6x module. Prolonged exposure to high humidity levels (above approximately 90% RH) can cause a reversible positive offset, known as *creep*, as excess water becomes trapped in the polymer. The thermal energy generated by the heater accelerates the removal of this excess moisture, ensuring accurate and stable humidity measurements.
For more information about the working principles and detailed guidance on when to use the heater, please refer to the SHT4x creep mitigation application note [1].

Contents

1 Creep Mitigation

The SHT4x sensor integrated in the SEN6x module delivers optimal performance when operated within its recommended temperature and humidity range: 5 °C – 60 °C and 20 %RH – 80 %RH. Prolonged exposure outside these conditions, especially at relative humidity levels above 90 %RH, may cause a reversible, positive RH offset known as *creep*, resulting in distorted measurements. By using the internal heater of the SHT4x, the creep can be efficiently mitigated. Two different *application scenarios* are distinguished for the heater function:

1. **Continuous creep mitigation:** When the sensor is continuously exposed to high-humidity conditions, periodically activating the heater for short intervals can significantly reduce or even eliminate creep.

2. **Single-shot creep mitigation:** When the sensor operates in variable or undefined environments, activating the heater briefly before each measurement minimizes the impact of potential creep offset.

The following section describes how to activate the SHT4x heater in the SEN6x module using ControlCenter. Depending on the *application scenario* and device design, the heating frequency must be adjusted accordingly. For further details, refer to the SHT4x application note on creep mitigation [1].

2 Activate Heater in ControlCenter

To activate the heater function in ControlCenter, begin by connecting the SEN6x to the SensorBridge, and then connect the entire setup to a laptop or PC. Once connected, the SEN6x should appear in the left sidebar of ControlCenter (see **Figure 1**).

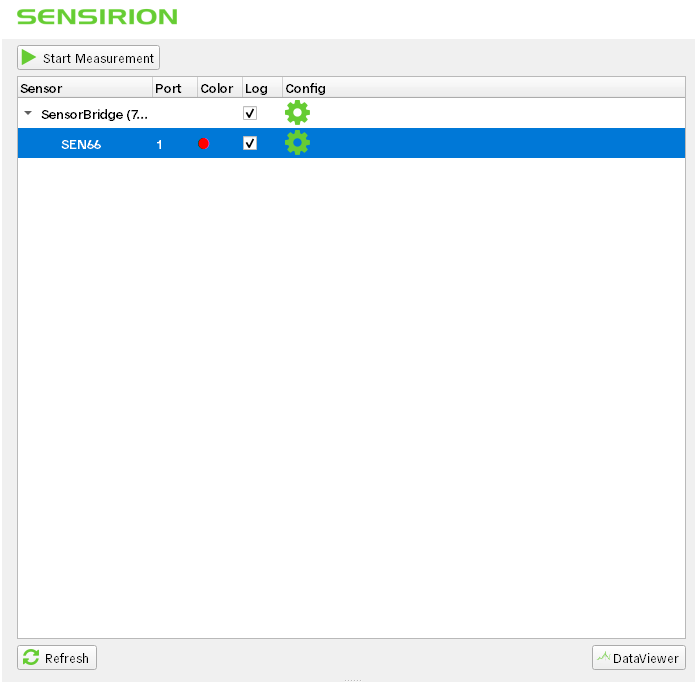

Figure 1: SEN6x is visible in the ControlCenter sidebar after being connected to the SensorBridge and a laptop or PC.

Next, click the gear icon to open the configuration settings for the SEN6x. In the configuration window, select the RHT tab, as we want to activate the heater for the integrated SHT4x sensor.
At the bottom of this section, you'll find the option: *"Activate the inbuilt SHT heater with 200 mW. Can be used to reverse creep at high humidity."* (See **Figure 2**)
Click *Activate* to enable the heater. Once activated, the measured temperature should begin to rise rapidly, indicating that the heater is functioning.

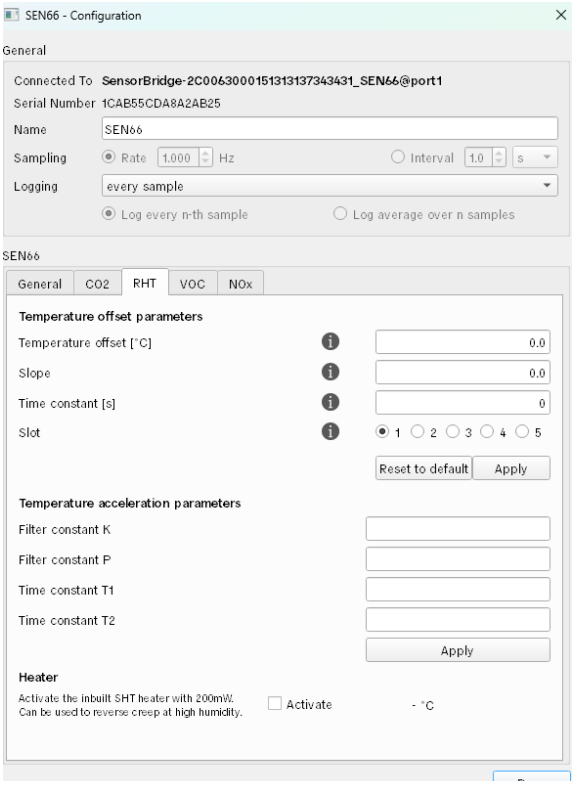

Figure 2: Activating the integrated heater via the SEN6x configuration settings in ControlCenter.

3 Activate Heater with I²C-Commands

While heater activation via ControlCenter is primarily intended for testing and demonstration purposes, real-world applications require control through I²C commands to fully leverage the heater's benefits. Specifically, there are two I²C commands available for operating the internal heater of the SHT4x sensor in the SEN6x. These commands are outlined in the following sections. For guidance on how frequently to issue these commands, please consult the SHT4x application note on creep mitigation [1].

3.1 Activate SHT Heater

This command allows you to use the inbuilt heater in SHT sensor to reverse creep at high humidity. This command activates the SHT sensor heater with 200mW for 1s. The heater is then automatically deactivated again. For firmware versions with an Execution Time of 20ms in the table below (**Table 1**), the **Get SHT Heater Measurements** (see **3.2**) command can be polled to check whether the heating is finished to trigger another cycle to maximize the duty cycle. Older firmware version do not yet support **Get SHT Heater Measurements**.

Wait at least 20s after the activation of the heater before starting a new measurement to get coherent temperature values (heating consequence to disappear).

Activate SHT Heater

Command ID	0x6765			
Available in	Idle mode			
Execution Time	Firmware Version	SEN62	>=4.2	20 ms
		SEN63C	>=5.0	
		SEN65	>=5.0	
		SEN66	>=4.0	
		SEN68	>=7.0	
		SEN69C	>=9.0	
	Older Firmware Versions			1300 ms
Max. RX Data With CRC	0 Bytes			
TX Data	None			
RX Data	None			

Table 1: Activate SHT Heater Command for SEN6x.

3.2 Get SHT Heater Measurements

This command is used to get the measurement values when the SHT sensor heating is finished.
Note: This command is only available from the *Firmware Version* specified in the table below (see **Table 2**). It must be used after the **Activate SHT Heater** command. The command can be queried every 50ms to check if the heating cycle is finished and measurements are available.

Get SHT Heater Measurements			
Command ID	0x6790		
Firmware Version	SEN62	>=4.2	
	SEN63C	>=5.0	
	SEN65	>=5.0	
	SEN66	>=4.0	
	SEN68	>=7.0	
	SEN69C	>=9.0	
Available in	Idle mode		
Execution Time	20 ms		
Max. RX Data With CRC	6 Bytes		
TX Data	None		
RX Data	Byte #		Description
	0	MSB	SHT Relative Humidity: int16 If the SHT heating is completed, this value indicates the scaled relative humidity of the SHT4x sensor. Value is scaled with factor 100: RH [%] = value / 100 *Note: If this value is not available, 0x7FFF is returned.*
	1	LSB	
	2	CRC	
	3	MSB	SHT Temperature: int16 If the SHT heating is completed, this value indicates the scaled temperature of the SHT4x sensor. Value is scaled with factor 200: T [°C] = value / 200 *Note: If this value is not available, 0x7FFF is returned.*
	4	LSB	
	5	CRC	

Table 2: Get SHT Heater Measurements Command for SEN6x.

4 Bibliography

[1] Sensirion AG, "Creep mitigation SHT4xX" 2022. [Online]. Available: https://sensirion.com/resource/application_note/sht4xx/creep_mitigation. [Accessed Jan 2026].

5 Revision History

Date	Version	Pages	Changes
January 2026	1.0	all	Initial version

Important Notices

Warning, Personal Injury

Do not use this product as safety or emergency stop devices or in any other application where failure of the product could result in personal injury (including death). Do not use this product for applications other than its intended and authorized use. Before installing, handling, using or servicing this product, please consult the data sheet and application notes. Failure to comply with these instructions could result in death or serious injury.

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ESD Precautions

The inherent design of this component causes it to be sensitive to electrostatic discharge (ESD). To prevent ESD-induced damage and/or degradation, take customary and statutory ESD precautions when handling this product. See application note "ESD, Latchup and EMC" for more information.

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- the defective product shall be returned to SENSIRION's factory at the Buyer's expense; and
- the warranty period for any repaired or replaced product shall be limited to the unexpired portion of the original period.

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