

SQS-TH-I-MH

LoRa® Wireless Temperature & Humidity Node — Meshtastic



Siliqs · <https://siliqs.net>

Document	Rev	Date	Notice
SQS-TH-I-MH Datasheet	Rev 0.1 (Preliminary)	Jul 2026	Siliqs © Limited standard files

Document Version

Version	Time	Description	Remark
Rev. 0.1	2026-07-24	Preliminary version (pre-hardware)	Living

Copyright Notice

All contents in these files are protected by copyright law, and all copyrights are reserved by Siliqs (hereinafter referred to as Siliqs). Without written permission, all commercial use of the files from Siliqs is forbidden, such as copy, distribute, reproduce the files, etc., but non-commercial purpose, downloaded or printed by individual are welcome.

Disclaimer

Siliqs reserves the right to change, modify or improve the document and product described herein. Its contents are subject to change without notice. These instructions are intended for your use only. This is a preliminary datasheet issued ahead of hardware; all values marked "preliminary" or "TBD" are subject to change after bring-up and characterization.

Trademarks

Meshtastic® is a registered trademark of Meshtastic LLC. Meshtastic software components are released under various licenses, see GitHub for details. No warranty is provided — use at your own risk. This product is independently developed and is not sponsored by, endorsed by, or affiliated with Meshtastic LLC.

LoRa® is a registered trademark of Semtech Corporation. LoRaWAN® is a registered trademark of the LoRa Alliance. Bluetooth® is a registered trademark of Bluetooth SIG, Inc. All other trademarks are the property of their respective owners.

CONTENTS

- 1. Description — 1.1 Overview / 1.2 Application Example / 1.3 Product Features
- 2. Specifications — 2.1 General / 2.2 Operating conditions
- 3. Hardware resource — 3.1 Block diagram / 3.2 Physical dimensions
- 4. Resource — 4.1 Relevant resource / 4.2 Contact Information

1. Description

1.1 Overview

The SQS-TH-I is a wireless temperature & humidity node. A TI HDC1080 digital sensor is built inside the enclosure; readings are delivered directly over a long-range LoRa network — no external transmitter, no field wiring, no configuration.

It ships in two power versions on identical hardware: SQS-TH-I is USB Type-C powered, while SQS-TH-I-B adds an internal 18650 lithium battery (recharged over USB) for self-powered, multi-year operation where power and cabling are hard to reach. USB Type-C also provides programming and console access, while BLE 5.0 enables wireless provisioning in the field. It runs Meshtastic as a self-healing private mesh.

This is the sensor-integrated sibling of the SQC485lv2 RS485 node: the same radio, power and enclosure platform, with the RS485 terminal replaced by an on-board environmental sensor.

A LoRaWAN variant (SQS-TH-I-LW) on the same hardware is planned; see the separate SQS-TH-I-LW datasheet when available.

1.2 Application Example

The SQS-TH-I reports temperature and humidity from places that are hard to wire — warehouses, silos, greenhouses, crawl spaces, remote cabinets, cold rooms.

1.2.1 Meshtastic mesh

Several SQS-TH-I nodes form a self-healing Meshtastic mesh with no dedicated gateway required, each node relaying for the others; a node with an internet uplink (MQTT) forwards the data to the cloud.

1.2.2 Two operating profiles (same unit, by setting)

- Low-power sensor (default): the node sleeps between reports and runs for years on the internal battery.
- Always-on relay: the node is set as a Meshtastic router to extend the mesh; in this role it does not sleep and should be powered continuously from USB.

1.3 Product Features

- Built-in TI HDC1080 temperature & humidity sensor ($\pm 0.2^{\circ}\text{C}$, $\pm 2\%$ RH typical)
- Long-range LoRa (Semtech SX1262), up to +22 dBm, Meshtastic self-healing mesh
- Two versions: SQS-TH-I USB-powered · SQS-TH-I-B self-powered (internal 18650, USB charging, automatic power-path)
- Multi-year battery life in low-power sensor profile — -B version (preliminary; see §2.2.2)
- Field provisioning over USB Type-C / BLE 5.0 — no re-flashing
- Automatic anti-condensation heater in the sensor (drives off dew above 95% RH)
- User-replaceable battery (-B version, front cover); indoor / sheltered use (non-waterproof)
- Shares the SQC485lv2 industrial enclosure and Ø70 label face

1.4 Ordering information

Table 1.4: Ordering information

Part number	Power	Battery	Typical use
SQS-TH-I-MH	USB Type-C 5 V	— (not fitted)	Mains/USB-powered spot; always-on relay
SQS-TH-I-MH-B	Internal 18650 + USB charging	18650 Li-ion (fitted)	Self-powered, multi-year, hard-to-wire sites

Both versions share one PCB, one enclosure and one firmware; the battery version (-B) additionally fits the 18650 cell. `~MH` denotes the Meshtastic radio; a LoRaWAN radio is offered as `~LW` / `~LW-B`.

2. Specifications

2.1 General specifications

Table 2.1: General specifications

Parameters	Description
MCU	32-bit CPU core (ESP32-C3)
LoRa chipset	Semtech SX1262
Sensor	TI HDC1080 temperature & humidity (I ² C, address 0x40)
Network	Meshtastic; default BW 500 kHz / SF9 at 922.5 MHz, note 1
Operating frequency	920 – 925 MHz
2.4 GHz wireless	BLE 5.0 (internal antenna)
Max. TX power	+22 dBm (firmware-configurable)
Max. receiving sensitivity	–148 dBm (SF12)
Power source	USB Type-C 5 V (base); internal 18650 Li-ion + USB charging (-B version), automatic power-path
Enclosure	Shared SQC485lv2 body, Ø70 label face; non-waterproof (open sensor vents)
Operating temperature	–40 ~ 85 ° C (electronics); battery narrows this, note 2
Operating humidity	0 ~ 100% RH (sensor range)
Antenna impedance	50 Ω

Note 1: Default Meshtastic configuration — custom LoRa config BW 500 kHz / SF9 at 922.5 MHz, within the 920–925 MHz band.

Note 2: The lithium battery charge temperature range (typ. 0–45 ° C) is narrower than the electronics. Charging is inhibited outside the safe range using the on-board temperature sensor. Final operating/charge limits are preliminary.

2.2 Operating conditions

2.2.1 Power supply

Table 2.2.1: Power supply

Parameter	Min.	Typical	Max.	Unit
Internal battery (18650 Li-ion, -B version)	2.75	3.7	4.2	V
USB Type-C input voltage	4.75	5.0	5.25	V
USB Type-C input current	—	—	500	mA
Regulated system rail	—	3.3	—	V

The base SQS-TH-I runs from USB Type-C. The SQS-TH-I-B additionally carries an internal 18650 cell: whenever USB is connected it runs from and charges over USB via an automatic power-path (ORing), and runs from the battery when USB is absent. Continuous USB power is recommended for the always-on relay profile (either version).

2.2.2 Power consumption & battery life (-B version, preliminary)

Removing the RS485 transceiver of the SQC485lv2 drops the deep-sleep floor to roughly 6 µA. On the battery version (SQS-TH-I-B) in the low-power sensor profile, battery life is therefore dominated by how briefly the node wakes to sense and transmit.

Table 2.2.2: Battery life estimate (18650 3000 mAh, 80 % usable, 1 report/hour)

Wake window per report	Avg. current	Estimated life
10 s @ 50 mA	~145 μ A	~690 days (~1.9 yr)
3 s @ 50 mA	~48 μ A	~2100 days (~5.7 yr)

Estimates only — to be confirmed by measurement on hardware. Figures apply to the low-power sensor profile; if the node is configured as an always-on relay it does not sleep and should run from USB.

2.2.3 Sensor performance

Table 2.2.3: Temperature & humidity sensor (TI HDC1080)

Parameter	Value
Temperature range	−40 ~ 125 ° C
Temperature accuracy	±0.2 ° C (typ., 14-bit)
Humidity range	0 ~ 100% RH
Humidity accuracy	±2% RH (typ., 14-bit)
Resolution	14-bit temperature / 14-bit humidity
Anti-condensation	Integrated heater, auto-triggered above 95% RH
Sensor standby current	~2.8 μ A @ 1 sample/s

In-enclosure accuracy and response time depend on the vent design and are affected by sensor placement; product-level figures will be confirmed after bring-up.

2.2.4 TX Power levels

Table 2.2.4: TX Power levels

Unit	Levels	TX Power
dBm	4	22 (default) / 17 / 14 / 10

2.2.5 Interface (connectors)

Table 2.2.5: Interface

Symbol / Name	Type	Function
USB-C	Connector	Charging / power / programming / console
LoRa ANT	On-board SMA connector	External LoRa antenna (sub-GHz)
2.4G ANT	Internal	BLE antenna
Sensor vents	Bottom-edge slots	Ambient air path to the internal sensor

2.2.6 RF / radio parameters

Table 2.2.6: RF / radio parameters (LoRa)

Parameter	Value
Operating frequency	920 – 925 MHz; default 922.5 MHz
Network	Meshtastic
Modulation	LoRa (CSS)
Bandwidth / spreading factor / coding rate	BW 500 kHz / SF9 / CR 4/5
Max TX power	+22 dBm (158 mW), firmware-configurable
Max receiving sensitivity	~ −123 dBm (SF9 / BW 500 kHz)

Listen Before Talk (LBT)

Supported (CAD + CSMA)

LoRa antenna

Abracon AANE-WH-0034 (SMA-M whip, ~3.5 dBi); alternate: KYOCERA AVX X9003088-3GDSMB (~2 dBi)

2.2.7 BLE / 2.4 GHz RF parameters

Table 2.2.7: BLE / 2.4 GHz RF parameters

Parameter	Value
Standard	Bluetooth Low Energy 5.0
Frequency range	2402–2480 MHz (40 channels) within the 2400–2483.5 MHz ISM band
Modulation	GFSK, adaptive frequency hopping (AFH)
Use	Wireless provisioning / commissioning (low power)
Antenna	Internal PCB antenna (not user-accessible)
Max conducted TX power	+3 dBm (2 mW), configurable

3. Hardware resource

3.1 Block diagram

Table 3.1: Functional blocks

Stage	Components	Function
Power	18650 Li-ion + TP4054 charger + USB-C	Battery power, USB charging, automatic power-path ORing
Core	32-bit MCU + SX1262 module	MCU, LoRa radio, internal 2.4 GHz antenna
Sensor	TI HDC1080 (I ² C)	On-board temperature & humidity, ambient-vented
USB	USB Type-C + ESD protection	Charging / programming / console

3.2 Physical dimensions

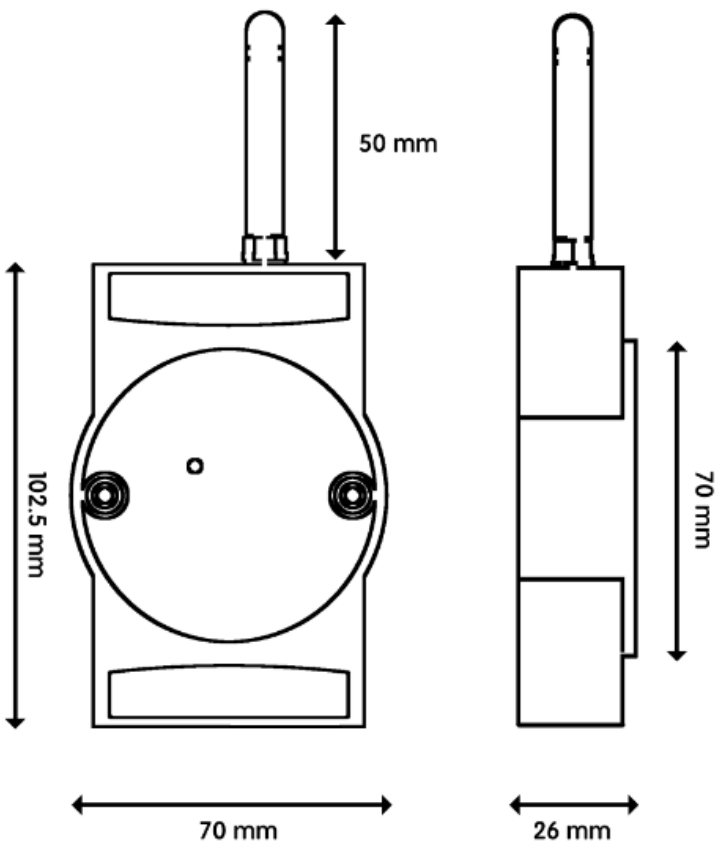
The enclosure is the compact rectangular body shared with the SQC485lv2, with a Ø70 raised circular label face on the front. Two mounting holes on the front face allow direct surface mounting. The LoRa SMA connector and USB Type-C port are on the top edge; the bottom edge carries the sensor vent slots (in place of the SQC485lv2 terminal block).

Table 3.2: Enclosure dimensions

Parameter	Value	Notes
Body (W × L × D)	60 × 102.5 × 23 mm	Shared SQC485l tooling
Front label-face diameter	Ø70 mm	Raised ~3 mm above body face
Overall height (incl. label face)	26 mm	Body 23 mm + label face 3 mm
Mounting holes	2 × Ø3.5 mm (through)	Ø8 counterbore
Mounting hole pitch	55 mm	Horizontal, centred on label face
Sensor vents	18 vertical slots, bottom edge	Ambient air path
LoRa antenna connector	SMA (female)	Top edge
USB Type-C	On top edge	Charging / power / console
Battery	Internal 18650, user-replaceable (-B version)	Access via front cover
Ingress protection	Non-waterproof (no IP rating)	Indoor / sheltered use

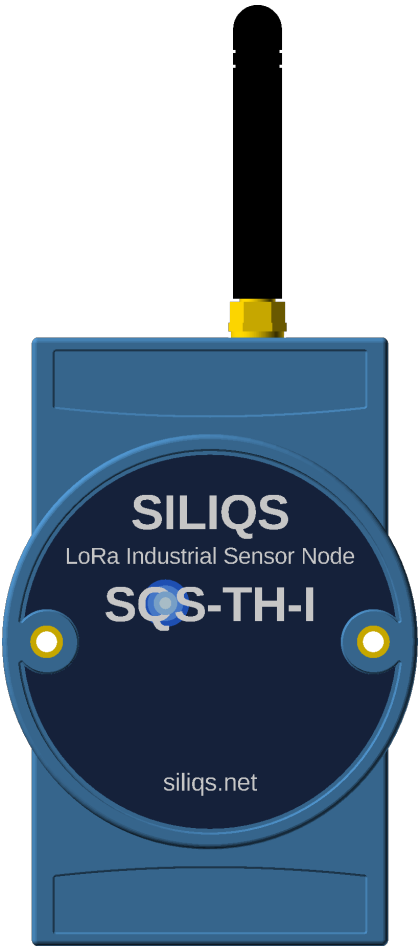
Dimensions exclude the external antenna. All values ± 0.5 mm (preliminary, from the mechanical model).

Figure 3.2: Dimension drawing (front & side views, mm)



SQS-TH-I — dimension drawing

Figure 3.3: Enclosure views



SQS-TH-I — front view



SQS-TH-I — isometric view

4. Resource

4.1 Relevant resource

- Meshtastic: <https://meshtastic.org>
- TI HDC1080 datasheet (SNHS004)
- Siliqs product page: <https://siliqs.net>

4.2 Contact Information

Siliqs (Guinea Technology Corporation) · <https://siliqs.net>

Preliminary datasheet. Issued ahead of hardware bring-up. Electrical, battery-life, and in-enclosure sensor figures are estimates and will be finalized after characterization. Regulatory (NCC) status derives from the shared SQC4851V2-MH platform and is pending confirmation.