

# Intelligent Building Solutions

## Installation Manual



### **CTS 2020 SRB THERMOSTAT UNIT**

- Surface mounting

**CIB-tech**

# Introduction

The CTS 2020 SRB is a digital thermostat with a local temperature sensor, and the possibility of connecting an external temperature sensor instead of the internal one.

The CTS 2020 SRB device is part of the CIB-tech automation system; temperature control can be accessed both locally and via the CIB-tech system.

## Additional Equipment Required

### 1. Functional CIB-tech system

A minimal number of essential CIB-tech components to make a functional CIB-tech system<sup>1</sup>

### 2. External temperature sensor (optional)

If an external (remote) temperature sensor is required, either the internal sensor or a suitable different CIB-tech temperature sensor can be connected to the CTS 2020 SRB via a 3-wire cable<sup>2</sup>

**NOTE:** IBS provides various encapsulated or enclosed versions of easy to install, SMT16030-based temperature sensors<sup>3</sup>.

### 3. Electrical valve controller (for liquid agent systems)

For liquid thermal agent based heating or cooling systems a two-state (on/off) valve controller (e.g. thermal drive actuator) is required for temperature control<sup>4</sup>.

**NOTE:** Some heat exchangers (radiators) may already have built-in actuators.

# Technical Specifications

## Electrical characteristics

### ● Power Supply

The CTS 2020 SRB functions as a node in a CIB-tech system, being powered from the CIB-tech system's power supply via the CIB-tech connector.

- Operating voltage range: 20 to 28V DC (nominal 24V DC)
- Supply current
  - Standby current : 15mA
  - Maximum current: 45mA

### ● Power rating (voltage-free relay output)

- Rated AC voltage: 250V AC
- Rated DC voltage: 30V DC (resistive load)
- Rated current: 5A

### ● Power output (for temperature sensor)

- Output voltage: 5V DC
- Maximum output current: 100mA

1 See "CIB-tech installation manual" for details.

2 For details on SMARTECs SMT16030 digital temperature sensor visit SMARTEC home page: <http://www.smartec.nl/>.

3 For details, visit IBS homepage or see "IBS equipment list".

4 See "Recommended equipment to be used with CIB-tech" for details

- **Signal Input (from temperature sensor)**
  - Duty-cycle measurement input:
    - supported input voltage levels: 0 - 5V
    - input impedance: >1.5KOhm

**NOTE:** The maximum cable length between CTS 2020 SRB and the SMT16030 temperature sensor is 20 m

### Temperature measurement

- Measured temperature range: -45°C to +130°C
- Temperature resolution: 1°C
- Typical accuracy<sup>4</sup>: ±0.7°C

### Mechanical characteristics

The CTS 2020 SRB has a white, flat, wall-mounted enclosure with ventilation slots.

- Dimensions: 121mm W x 70mm L x 25mm D
- Weight: 125g

### Environmental characteristics

- Operating temperature: -10°C to 85°C
- Storage temperature: -25°C to 100°C

## Key Features

- Large LCD display and touch-sensitive buttons
- Bistable relay output: maintains contact state in case of network power failure;
- Programmable output type: N.O. (normally open) or N.C. (normally closed);
- Two operating modes: heating or cooling;
- Programmable weekly temperature schedule;
- Desired temperature can be set remotely via the CIB-tech system or using the local LCD display and buttons;
- Current measured temperature and desired temperature is viewable remotely via the CIB-tech system or on the local LCD display;
- High speed temperature acquisition (up to 40 samples/second);
- 256-entry temperature history with configurable logging interval;
- Internal bi-color LED, indicating the current heating/cooling control state
  - green: heating/cooling is off
  - red: heating/cooling is on

**NOTE:** The LED is a troubleshooting aid and only visible if the cover of the CTS 2020 SRB is removed

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<sup>4</sup> Accuracy depends on the type of SMT16030 used.

# Installation

The CTS 2020 SRB is meant to be installed on a wall with a small size pattress box behind it. Note that the CTS 2020 SRB does not cover a standard 60mm pattress box - the use of a smaller size box is advised, such as the ABB 10 805.

The CTS 2020 SRB can be installed on any flat surface such as a wall (without pattress box behind it), but it is difficult to do in the small space and the number of wires.

## Recommended installation location:

If the CTS 2020 SRB is used with its internal temperature sensor (no external temperature sensor is connected to it), it should be installed on a neutral wall (an internal wall that is not heated or cooled from its other side), as far as possible from doors and windows at a height of circa 1,5 m. A good airflow around the device should also be considered. If the airflow around the CTS 2020 SRB is poor, the temperature measured by the device will not reflect the average perceived temperature of the room. Ventilation holes on the bottom and top side of the CTS 2020 SRB must not be covered. Also, please note that mounting the CTS 2020 SRB in an area prone to sudden, large humidity or temperature changes may interfere with the operation of the thermostat's touch sensitive keys and is strongly advised against.

## To install the device:

- use a pointy object to push in the locking tabs through the indicated holes on the bottom side of the cover; this will release the cover of the CTS 2020 SRB;
- remove the top cover of the device; care should be taken not to damage the flexible cable that connects the base part to the cover;
- mount the base of the device via the two mounting holes;
- connect the wires to the device (see connection diagrams below);
- if required, cut out the side cable hole on the cover of the CTS 2020 SRB;
- replace the top cover of the device (make sure that the top and bottom clips are securely engaged);

**NOTE:** the CIB-tech system must be powered off when installing the CTS 2020 SRB and it should be powered on only after the top cover of the CTS 2020 SRB is replaced. Opening the top cover of the CTS 2020 SRB while it is powered may be dangerous depending on the voltage of the controlled valve actuator, and may also temporarily latch the touch keys (in a pressed or unpressed state).

## Part description

- **LCD:**
  - numerical LCD display<sup>1</sup>
- **Up/Down:**
  - touch key to view / raise desired temperature<sup>1</sup>
  - touch key to view / lower desired temperature<sup>1</sup>
- **Mounting holes:**
  - holes for mounting the device
- **Cable hole:**
  - cable entry hole on the bottom of the device
- **Cut out cable hole:**
  - location where the plastic box can be cut out for an alternate cable entry point.

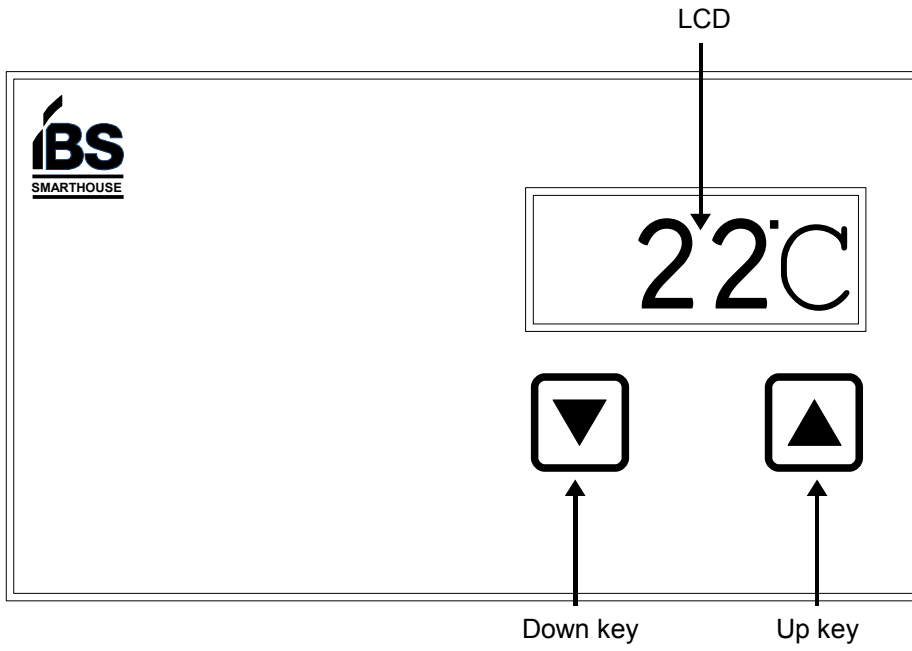
**NOTE:** This is only recommended if bottom cable entry is not possible

- **Ventilation:**
  - slots on the sides of the enclosure
- **Cover release hole:**
  - holes permitting access to the tabs holding the top cover.

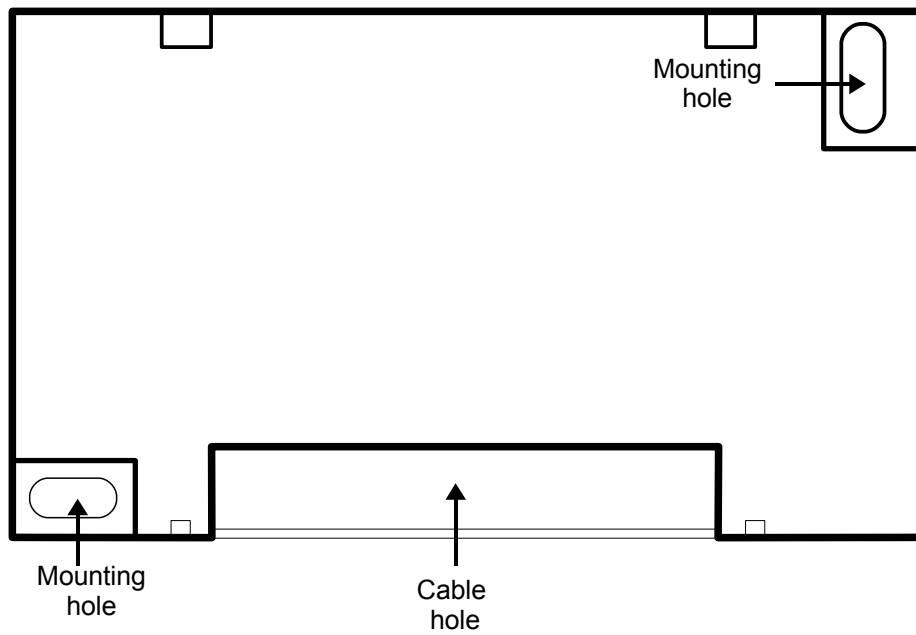
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<sup>1</sup> For details, see below "User interface" section

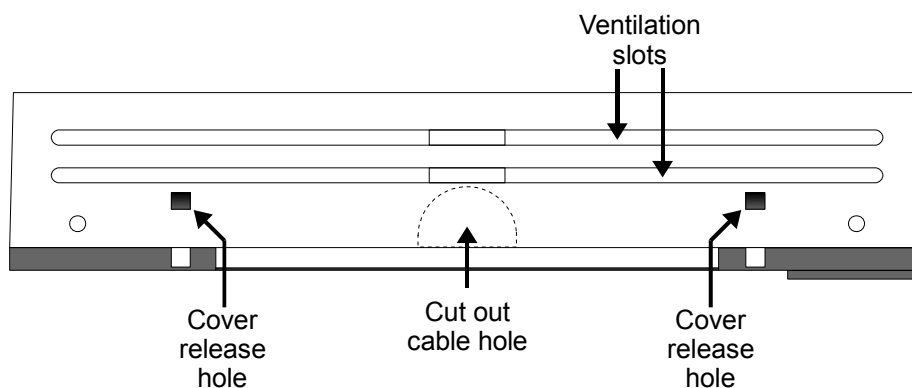
# Top View



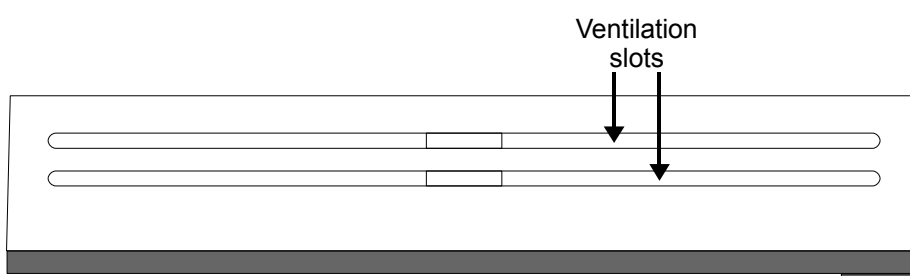
# Bottom view



## Bottom side view



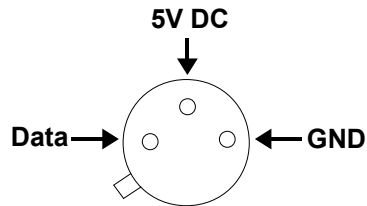
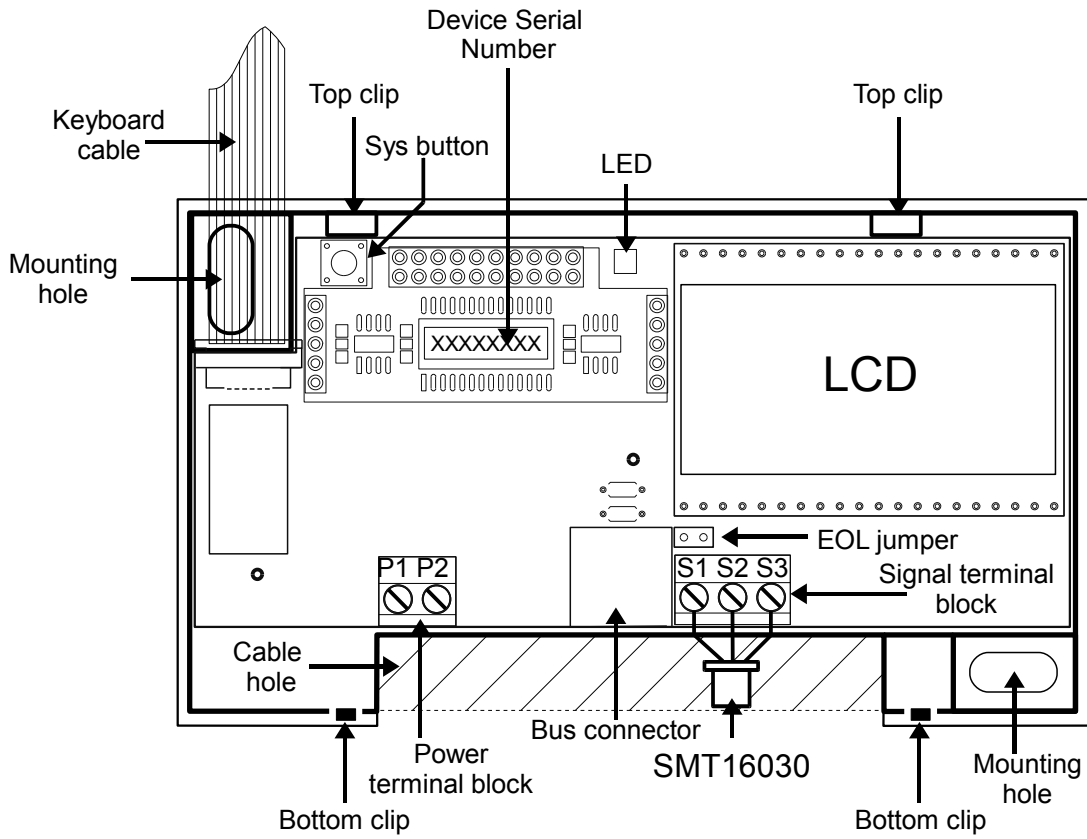
## Top side view



- **Sys button:**
  - pushbutton for CIB-tech system configuration
- **LED:**
  - indicator LED for heating/cooling state (only visible if top cover is removed);
- **Bus connectors:**
  - 4P4C modular jack connectors for CIB-tech connection<sup>1</sup>
- **EOL jumper:**
  - CIB-tech system's End Of Line jumper<sup>1</sup>
- **Device serial number:**
  - Unique serial number
  - used to identify every CIB-tech device
  - this number is also electronically encoded in the device.
- **Top and bottom clips:**
  - clips holding the top cover in place
- **Keyboard cable:**
  - flat flexible cable connecting the base part of the CTS 2020 SRB to the the top cover housing the touch keys
- **SMT16030:**
  - TO18 type temperature sensor connected to the terminal block
  - if an external temperature sensor is required, you can connect this or a suitable different CIB-tech temperature sensor remotely via a 3-wire cable
- **Signal terminal block:** terminals for connecting the temperature sensor:
  - S1. Temperature sensor - +5V
  - S2. Temperature sensor - Data
  - S3. Temperature sensor - GND
- **Power terminal block:** terminals of the switch output:
  - P1. Relay contact 1
  - P2. Relay contact 2

<sup>1</sup> See “CIB-tech installation manual” for details.

# Top view with removed cover



TO18 type SMT16030 with terminals towards viewer

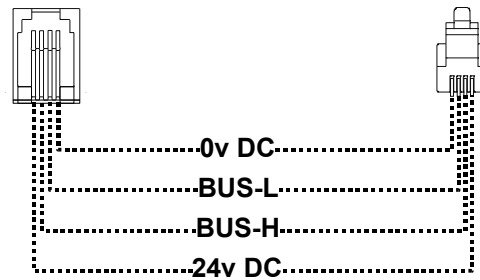
**NOTE:** In the schematic above a TO18 type SMT16030 is shown. To connect other types of SMT16030, please consult the SMARTEC website for the SMT16030 data sheet.

## Wiring diagrams

### Connection to CIB-tech system:

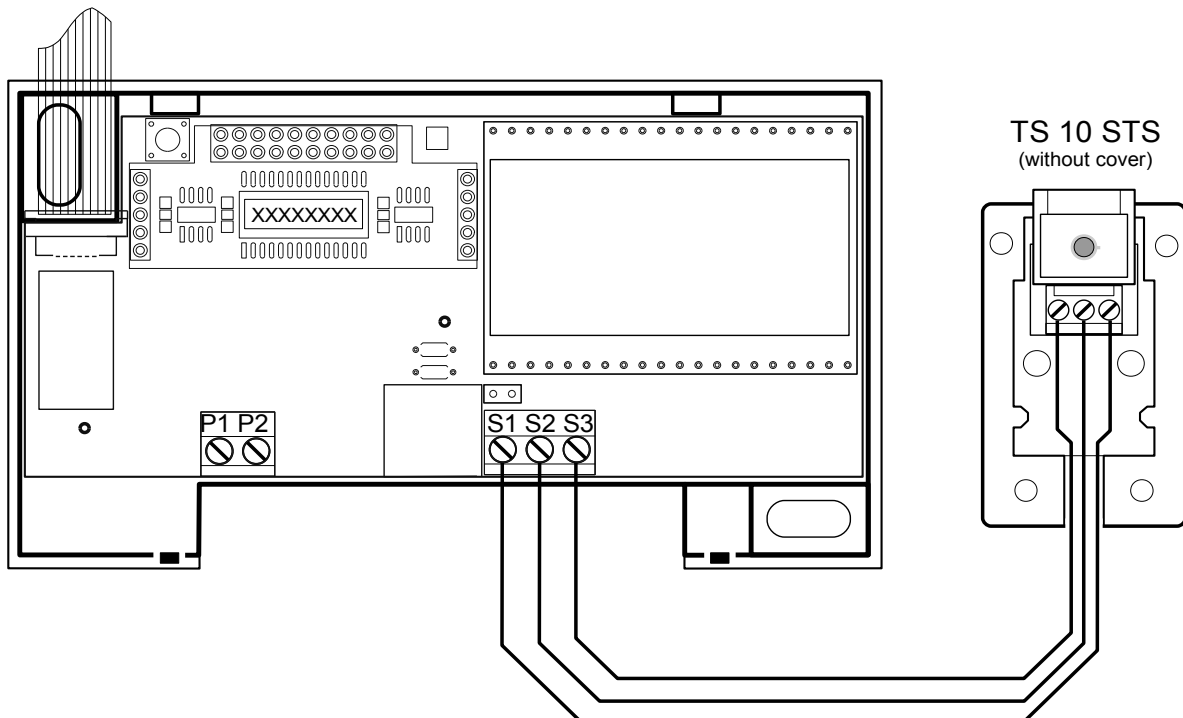
Use the CTS 2020 SRB device's 4P4C modular jack connector to connect it to the CIB-tech systems bus. This device is meant to be the last element of a CIB-tech bus line. If the device must be used as not the last element in the CIB-tech systems (chain-like) bus, a Bus Linker<sup>1</sup> can be used. In such situations the EOL jumper must be removed<sup>2</sup>.

### BUS connection



### Connecting external temperature sensor and valve actuator / fan-coil unit

Connection example with enclosed, wall mounting temperature sensor TS 10 STS :

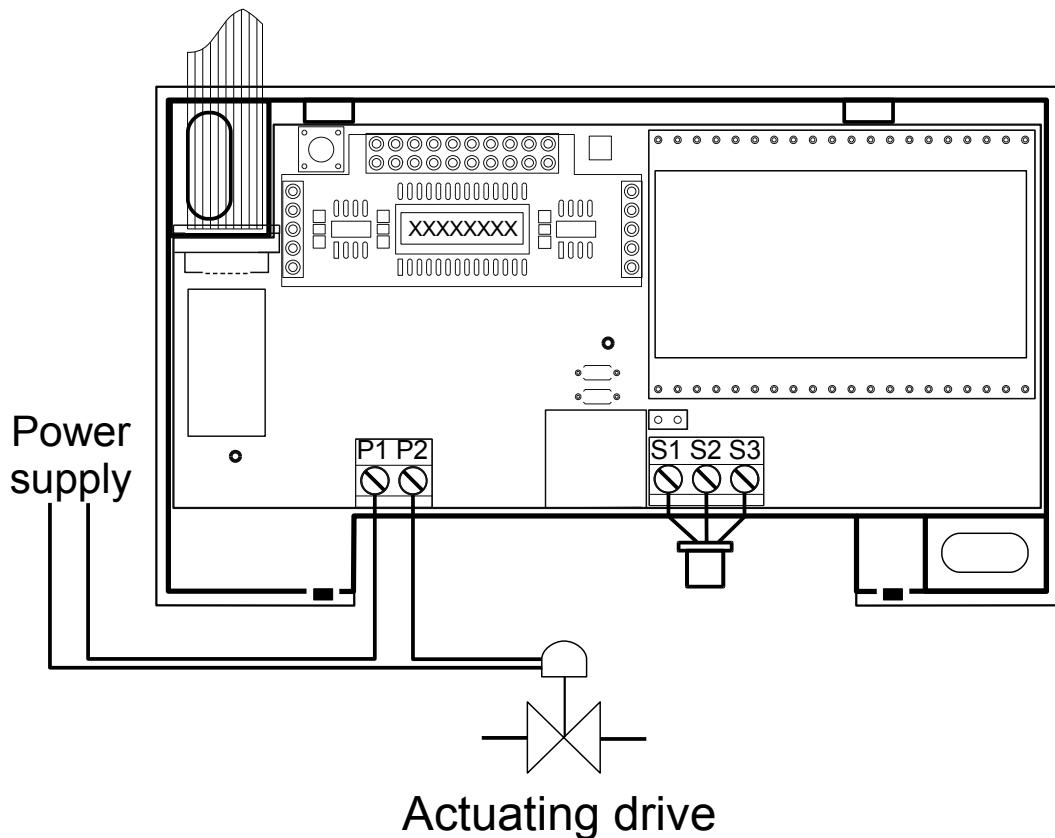


1 IBS product BL-1C2RJ92RJ or compatible device can be used. See IBS product list for details.

2 See "CIB-tech installation manual" for details.



Connection example for actuating drive:



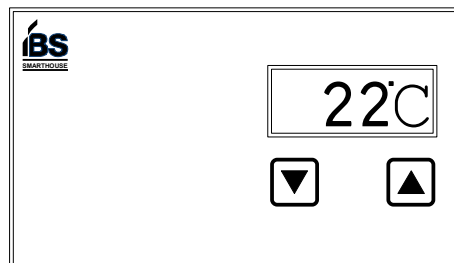
The typical actuator power supply voltage is 230VAC or 24V AC/DC depending on actuating drive type.

## Device operation

The thermostat has a large LCD display with two touch sensitive keys, and operates in one of three functional modes:

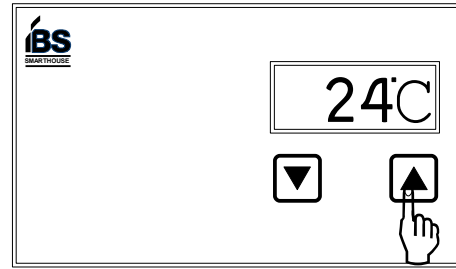
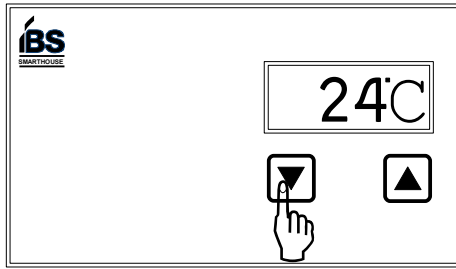
### 1. Display current temperature:

The CTS 2020 SRB displays the current measured temperature - this is the default mode. The CTS 2020 SRB always returns to this mode if there are no keys pressed for at least 3 seconds.



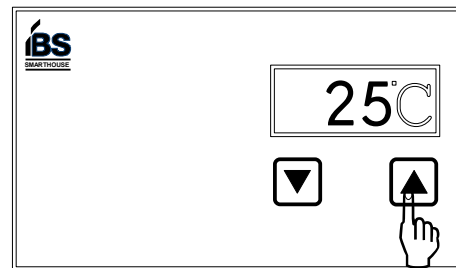
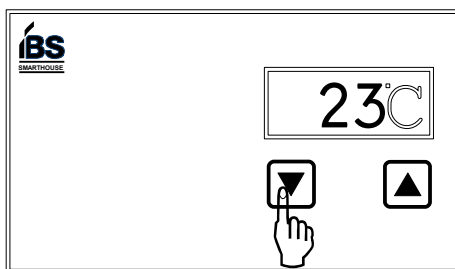
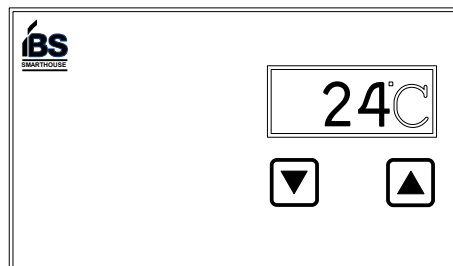
### 2. Display desired temperature:

The CTS 2020 SRB displays the desired (set point) temperature. The CTS 2020 SRB switches to this mode if the **Up** or **Down** key is pressed briefly for less than 2 seconds, once the key is released, the CTS 2020 SRB returns to **Temperature display** mode.



### 3. Change desired temperature:

The CTS 2020 SRB displays and allows changing of the desired (set-point) temperature. The CTS 2020 SRB enters this mode if the **Up** or **Down** key is pressed for more than 2 seconds. Once the CTS 2020 SRB enters this mode, the Celsius sign (°C) on the display will blink and the desired temperature can be increased or decreased by repeatedly pressing or just holding the corresponding **Up** or **Down** key. If none of the keys are pressed for at least 3 seconds, the CTS 2020 SRB returns to **display measured temperature** mode and saves the changed set-point temperature.



**NOTE:** the user interface keys use capacitive sensing and can be operated by a finger but not by mechanical pressure with other objects. Do NOT attempt to apply pressure on the keys with other objects. Also, when installed in areas prone to large, sudden changes of humidity such changes may cause the keys to temporarily “latch up” as if being continuously touched, resulting in random changes to the set-point temperature. The CTS 2020 SRB should recover in a short while from such latch-ups; also, powering off then powering back on the CTS 2020 SRB forces a re-calibration of the keys that should eliminate the condition.

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