Models
STLD24A (fan & heat-cool)
STLD24B (fan & °F/°C)

Description
Connected directly to the CMMB Remote I/O Board via Modbus, the STLD24 Modbus LCD Thermostat provides internal and external temperature sensors, LCD display and operational commands without using up a BACnet address.

Features
- Backlit LCD with simple icon and text driven menus
- Built-in temperature sensor
- External temperature sensor input (10 KΩ)
- Adjustable setpoints
- Selectable Fahrenheit or Celsius scale
- Set Modbus baud rate via thermostat menu (9600, 19200, 38400 or 57600 bps)
- Set Modbus address via thermostat menu or via DIP switch.

Technical Specifications

<table>
<thead>
<tr>
<th>Specifications</th>
<th>STLD24A</th>
<th>STLD24B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inputs</td>
<td>1 Analog input (external temperature sensor 10Kohms)</td>
<td></td>
</tr>
<tr>
<td>Electrical Connection</td>
<td>4 or 5 wire cable</td>
<td></td>
</tr>
<tr>
<td>Setpoint Range</td>
<td>10°C to 40°C [50°F to 104°F]</td>
<td></td>
</tr>
<tr>
<td>External Sensor Range</td>
<td>-40°C to 100°C [-40°F to 212°F]</td>
<td></td>
</tr>
<tr>
<td>Control Accuracy</td>
<td>Temperature: ±0.4°C [0.8°F]</td>
<td></td>
</tr>
<tr>
<td>Power Supply</td>
<td>22 to 26 Vac 50/60Hz</td>
<td></td>
</tr>
<tr>
<td>Power Consumption</td>
<td>1 VA</td>
<td></td>
</tr>
<tr>
<td>Rated Impulse</td>
<td>330 V</td>
<td></td>
</tr>
<tr>
<td>Communication</td>
<td>Modbus RTU, 8 bits, 2 stop bits, no parity</td>
<td></td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>0°C to 50°C [32°F to 122°F]</td>
<td></td>
</tr>
<tr>
<td>Storage &amp; Transport Temperature</td>
<td>-30°C to 50°C [-22°F to 122°F]</td>
<td></td>
</tr>
<tr>
<td>Relative Humidity</td>
<td>5 to 95% non condensing</td>
<td></td>
</tr>
<tr>
<td>Housing Degree of Protection</td>
<td>IP 30 (EN 60529)</td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>160 g. [0.36 lb]</td>
<td></td>
</tr>
<tr>
<td>Dimensions</td>
<td>A = 2.85” (73mm)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B = 4.85” (123mm)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>C = 1.00” (24mm)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>D = 2.36” (60mm)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>E = 3.27” (83mm)</td>
<td></td>
</tr>
</tbody>
</table>

Interface
For standard operational commands and their related display, refer to the Operational Mode section on page 4. The display interface is also fully customizable. Upon receiving specific BACnet commands, the CMMB can send a Modbus command to the thermostat to display specified text and icons. Refer to the Modbus Configuration section on page 5 for more information.
Mounting Instructions

**CAUTION:** Remove power to avoid a risk of malfunction.

A. Remove the captive screw that's holding the base and the front cover of the thermostat together.
B. Lift the front cover of the thermostat to separate it from the base.
C. Pull all wires through the holes in the base.
D. Secure the base to the wall using wall anchors and screws (supplied). Make the appropriate connections.
E. Mount the control module on the base and secure using the screw.

**PCB Overview**

Once connected to the CMMB, ensure that the number of STLD24 thermostats is enabled via the CMMB BACnet network.

**DIP Switches (DS1)**

1-4: Modbus Address
Address is sum of 4 switches +1 (binary logic +1)
1 = OFF: 0 | ON: 1
2 = OFF: 0 | ON: 2
3 = OFF: 0 | ON: 4
4 = OFF: 0 | ON: 8
5: End of Line (EOL)
5 = OFF: None
   ON: 120Ω termination (last node)

**Mode Selection (JP1)**

RUN = Set jumper to RUN for normal operation.
PGM = Set jumper to PGM to enter programming mode. To exit, set jumper back to RUN. All changes will be saved.

**Terminal Strip (TB1)**

1 = Common
2 = 24 Vac
3 = n/a
4 = External temperature sensor (optional)
5 = n/a
6 = A+ (Modbus)
7 = B- (Modbus)

**Modbus Service Port**

Terminals 6 (A+) and 7 (B-) must be connected to the CMMB module.
Programming Mode

The Mode Selection jumper (JP1) must be in the “PGM” position. Refer to PCB Overview on page 2. To exit, set jumper back to the “RUN” position. All changes will be saved.

1. “INSIDE TEMP SENSOR OFFSET”
   - Default: Internal sensor’s temperature reading.
   - Range: 10-40ºC [50-104ºF] | max. offset ± 5ºC
   - Increment: 0.1ºC [0.2ºF]
   - Compare the displayed temperature reading with a known value from a thermometer. To offset or calibrate the sensor, use the arrows key to set the desired temperature reading. This is useful for thermostats installed in areas where the temperature read is slightly different than the room’s actual temperature. For example, a thermostat placed right under the air diffuser.

2. “EXTERN TEMP SENSOR OFFSET”
   - Default: External sensor’s temperature reading.
   - Range: 0-50ºC [41-122ºF] | max. offset ± 5ºC
   - Increment: 0.1ºC [0.2ºF]
   - Compare the displayed temperature reading with a known value from a thermometer. To offset or calibrate the sensor, use the arrows key to set the desired temperature reading. This is useful for sensors installed in areas where the temperature read is slightly different than the room’s actual temperature. The thermostat displays “EROR” and the warning symbol if there’s a short or the sensor is not connected.

3. “ADJUST MINIMUM USER SETPNT”
   - Default: 15ºC [59ºF]
   - Range: 10-40ºC [50-104ºF]
   - Increment: 0.5ºC [1.0ºF]
   - In operational mode, the user cannot lower the setpoint to below the value entered here. The minimum value is restricted by the maximum value set in Step 4.

4. “ADJUST MAXIMUM USER SETPNT”
   - Default: 30ºC [86ºF]
   - Range: 10-40ºC [50-104ºF]
   - Increment: 0.5ºC [1.0ºF]
   - In operational mode, the user cannot increase the setpoint to above the value entered here. The maximum value is restricted by the minimum value set in Step 3.

5. “ADJUST INTERN SETPNT”
   - Default: 22ºC [72ºF]
   - Range: 10-40ºC [50-104ºF]
   - Increment: 0.5ºC [1.0ºF]
   - Select the desired set point temperature. The user can also change this value (see Operational Mode on page 4). The setpoint value is restricted by the minimum user setpoint (Step 3) and maximum user setpoint (Step 4).
6. "DISPLAY INSIDE TEMP SENSOR"
   Default: Yes
   Range: Yes / No
   This unit can display either the internal or external temperature. To display the internal temperature, select Yes and go to Step 8. To display the external temperature, select No and in the next step select Yes. If no is selected in both steps 6 and 7, the thermostat will not display any value.

7. "DISPLAY EXTERN TEMP SENSOR"
   Default: No
   Range: Yes / No
   This unit can display either the internal or external temperature. To display the external temperature, select Yes. The "Display Inside Temp Sensor" must be set to No (see Step 6). If no is selected in both steps 6 and 7, the thermostat will not display any value.

8. "ADJUST COMPORT BAUDS RATE"
   Default: 57.6
   Range: 9.6 / 19.2 / 38.4 / 57.6 (values in kBps)
   Select the desired Modbus baud rate for communication.

9. "SELECT MODBUS ADDRESS"
   Default: 1
   Range: 1-247
   Increment: 1
   To change this value via the programming menu, the Modbus Address DIP switches must all be in the "OFF" position (see PCB Overview on page 2). Otherwise, this step is read-only and will display the current address determined by the DIP switches.

Operational Mode

The Mode Selection jumper (JP1) must be in the "RUN" position. Refer to PCB Overview on page 2.

Power Up
Upon power up, the LCD illuminates and all segments appear for 2 seconds. The thermostat then displays its current version for 2 seconds.

LCD Backlight
Pressing any key on the thermostat illuminates the LCD for 4 seconds.

Temperature Display
The thermostat can display the internal sensor temperature, the external sensor temperature, or none. This is defined by the selected settings in steps 6 and 7 on page 4. If "- - -" is displayed, the temperature sensor is not connected or short circuited.

Operation (Model STLD24B)
Each thermostat can be configured to operate differently by selecting a configuration via Modbus. Refer to register 14 (E) in the Modbus Configuration section on page 5.

- **Model STLD24B**
  - Press any arrow key twice to display the setpoint. Press again to adjust setpoint.
  - Press once to toggle between °F and °C.
Operation (Model STLD24A)
Each thermostat can be configured to operate differently by selecting a configuration via Modbus. Refer to register 14 or E in the Modbus Configuration section on page 5.

Modbus Configuration

Modbus: RTU, 8 bits, 2 stop bits, no parity.
Functions: 03 Read Holding Register, 06 Write Single Register, 16 Write Multiple Registers
Error Codes: 02 illegal data address, 03 illegal value, 06 slave device busy
Defaults: Address: 01 | Baud Rate: 57,600
Read/Write: W?: writable register, w: writable, cx: writable under specific conditions, blank: read only.
Factors: No real number in Modbus register, use factor to calculate real number. Factor could be 1, 10 or 100
Register = Real number * Factor | Real number = Register / Factor.

When writing a register that contains a bit string, if this one is writable (conditional or not), the write will always be accepted. Bits that are reserved or not writable will be ignored and will keep their actual state. Use READ-MODIFY-WRITE sequence.

<table>
<thead>
<tr>
<th>Register</th>
<th>Name</th>
<th>W?</th>
<th>Description</th>
<th>Notes</th>
<th>Default</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEC</td>
<td>HEX</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 0</td>
<td>Mdsb_Add</td>
<td>w1</td>
<td>HB= Device ID</td>
<td>HB= 12 (STLD)</td>
<td>3073 LO1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>LB= Modbus address</td>
<td>LB= 1-247</td>
<td></td>
</tr>
<tr>
<td>1 1</td>
<td>Mdsb_BaudRate</td>
<td>w</td>
<td>Baud rate of device Factor: / 100</td>
<td>Type: Unsigned, Factor: 0.01. Values: 9600, 19200, 38400, 57600</td>
<td>576 0240</td>
</tr>
<tr>
<td>2 2</td>
<td>Product_Version</td>
<td>w</td>
<td>Firmware version</td>
<td>For example: 101</td>
<td>-</td>
</tr>
<tr>
<td>3 3</td>
<td>System_Status_Config</td>
<td>w2</td>
<td>HB: System configuration – Writable</td>
<td>HB: System Configuration b8: Display internal temperature (ºC or ºF) (0: No, 1:Yes) b9: Display external temperature (ºC or ºF) (0: No, 1:Yes) b10-b15: Reserved for future use</td>
<td>256 0100</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>LB: System status – Read only</td>
<td>LB: System Status b0: Internal temperature sensor fault (0: Normal, 1:Fault) b1: Reserved for future use b2: Reserved for future use b3: External temperature sensor fault (0: Normal, 1:Fault) b4: Thermostat in programming mode b5-b7: Reserved for future use</td>
<td></td>
</tr>
<tr>
<td>4 4</td>
<td>Intern.Temp</td>
<td></td>
<td>Internal temperature sensor reading Factor: x 100 ºC</td>
<td>Type: Signed, Factor: 100. Unit: ºC, Values: 0 – 50.00 ºC</td>
<td>- -</td>
</tr>
<tr>
<td>5 5</td>
<td>Temp.Setpoint</td>
<td>w</td>
<td>Temperature setpoint Factor: x 10 ºC</td>
<td>Type: Signed, Factor: 10. Unit: ºC, Values: range defined by Min/Max Setpoint</td>
<td>220 00DC</td>
</tr>
</tbody>
</table>

* Modbus address is writable via Modbus if all DIP switches are “OFF”.
* Low byte of register (LB) is masked. A write will not affect this part of register. Only high byte of register (HB) can be modified via Modbus (writable).
## Register Name W? Description Notes Default

<table>
<thead>
<tr>
<th>DEC</th>
<th>HEX</th>
<th>W?</th>
<th>Register Name</th>
<th>DEC</th>
<th>HEX</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>6</td>
<td>w</td>
<td>Min.Temp.Setpoint</td>
<td>6</td>
<td>0096</td>
</tr>
<tr>
<td>7</td>
<td>7</td>
<td>w</td>
<td>Max.Temp.Setpoint</td>
<td>7</td>
<td>012C</td>
</tr>
<tr>
<td>8</td>
<td>8</td>
<td>w</td>
<td>Intern.Temp.Offset</td>
<td>8</td>
<td>00</td>
</tr>
<tr>
<td>9</td>
<td>9</td>
<td></td>
<td>Reserved for future use</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>A</td>
<td></td>
<td>Reserved for future use</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>B</td>
<td></td>
<td>Reserved for future use</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>C</td>
<td>w</td>
<td>Extern.Temp</td>
<td>12</td>
<td>0000</td>
</tr>
<tr>
<td>13</td>
<td>D</td>
<td>w</td>
<td>Extern.Temp.Offset</td>
<td>13</td>
<td>00</td>
</tr>
<tr>
<td>14</td>
<td>E</td>
<td>w</td>
<td>ButtonStatus</td>
<td>14</td>
<td>256</td>
</tr>
<tr>
<td>15</td>
<td>F</td>
<td>w</td>
<td>Let7_6</td>
<td>15</td>
<td>0000</td>
</tr>
<tr>
<td>16</td>
<td>10</td>
<td>w</td>
<td>Let5_4</td>
<td>16</td>
<td>0000</td>
</tr>
<tr>
<td>17</td>
<td>11</td>
<td>w</td>
<td>Let3_2</td>
<td>17</td>
<td>0000</td>
</tr>
<tr>
<td>18</td>
<td>12</td>
<td>w</td>
<td>Let1_</td>
<td>18</td>
<td>0000</td>
</tr>
<tr>
<td>19</td>
<td>13</td>
<td>w</td>
<td>Dig4_3</td>
<td>19</td>
<td>0000</td>
</tr>
<tr>
<td>20</td>
<td>14</td>
<td>w</td>
<td>Dig2_1</td>
<td>20</td>
<td>0000</td>
</tr>
</tbody>
</table>

**Register**
- **DEC**: Decimal Value
- **HEX**: Hexadecimal Value
- **W?**: Writable

**Description**
- Minimum temperature setpoint
- Maximum temperature setpoint
- Internal temperature sensor offset
- External temperature sensor reading
- External temperature sensor offset
- Button configuration – Writable
- External temperature sensor reading
- External temperature sensor offset
- Button configuration – Writable

**Notes**
- Type: Signed, Factor: 100. Unit: ºC, Value: range 5.0 - Max Temp Setpoint
- Type: Signed, Factor: 100. Unit: ºC, Value: range Min Temp setpoint - 45.0 ºC
- Type: Signed, Factor: 100. Unit: ºC, Value: ± 5.00 ºC
- Type: Signed, Factor: 100. Unit: ºC, Value: 0 - 50.00 ºC
- Type: Signed, Factor: 100. Unit: ºC, Value: 0 - 50.00 ºC
- Type: Signed, Factor: 100. Unit: ºC, Value: ± 5.00 ºC

**Default**
- 150
- 300
- 00
- -
- 00
- 256

---

**Char HEX [flash]**
- A 41 [C1]
- B 42 [C2]
- C 43 [C3]
- D 44 [C4]
- E 45 [C5]
- F 46 [C6]
- G 47 [C7]
- H 48 [C8]
- I 49 [C9]
- J 4A [CA]
- K 4B [CB]
- L 4C [CC]
- M 4D [CD]
- N 4E [CE]
- O 4F [CF]
- P 50 [D0]
- Q 51 [D1]
- R 52 [D2]
- S 53 [D3]
- T 54 [D4]
- U 55 [D5]
- V 56 [D6]
- W 57 [D7]
- X 58 [D8]
- Y 59 [D9]
- Z 5A [DA]
- 0 30 [B0]
- 1 31 [B1]
- 2 32 [B2]
- 3 33 [B3]
- 4 34 [B4]
- 5 35 [B5]
- 6 36 [B6]
- 7 37 [B7]
- 8 38 [B8]
- 9 39 [B9]
- space 20

**Enter the Hexadecimal value in brackets to flash the letter or digit.**

**Digits only appear if the both internal and external temperature display is deactivated.**

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3 Low byte of register (LB) is masked. A write will not affect this part of register. Only high byte of register (HB) can be modified via Modbus (writable).
<table>
<thead>
<tr>
<th>Register</th>
<th>Name</th>
<th>W?</th>
<th>Description</th>
<th>Notes</th>
<th>Default</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEC</td>
<td>HEX</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>Icon1</td>
<td>w</td>
<td>16 status icons group 1 (0: OFF, 1: ON)</td>
<td></td>
<td>0 0000</td>
</tr>
<tr>
<td>22</td>
<td>Icon1Blink</td>
<td>w</td>
<td>16 status icons group 1 for flashing. Use same binary values as Icon1. Set to 1, to flash icon.</td>
<td></td>
<td>0 0000</td>
</tr>
<tr>
<td>23</td>
<td>Icon2</td>
<td>w</td>
<td>16 status icons group 2 (0: OFF, 1: ON)</td>
<td></td>
<td>0 0000</td>
</tr>
<tr>
<td>24</td>
<td>Icon2Blink</td>
<td>w</td>
<td>16 status icons group 2 for flashing. Use same binary values as Icon1. Set to 1, to flash icon.</td>
<td></td>
<td>0 0000</td>
</tr>
<tr>
<td>25</td>
<td>Icon3</td>
<td>w</td>
<td>16 status icons group 3 (0: OFF, 1: ON)</td>
<td></td>
<td>0 0000</td>
</tr>
<tr>
<td>26</td>
<td>Icon3Blink</td>
<td>w</td>
<td>16 status icons group 3 for flashing. Use same binary values as Icon1. Set to 1, to flash icon.</td>
<td></td>
<td>0 0000</td>
</tr>
</tbody>
</table>