DIGITAL THERMOSTATS FOR AIR TERMINAL UNITS
DIGITAL ROOM THERMOSTAT

Propotional Action Control for VAV and Bypass Air Terminal Units F2000LV-A Series

1- Heating
2- Cooling
3- Set point temperature
4- DC 0-10V analog output
5- Turn ON/OFF
6- Down
7- Up
8- Mode switch (cooling/heating)

Buttons and LCD Display

Models and Descriptions

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<tr>
<th>Type</th>
<th>Model</th>
<th>Characteristics</th>
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<tr>
<td>Room Thermostat</td>
<td>F2000LV-A-N</td>
<td>1x0-10V output for an actuator of VAV or Bypass air terminal with cool/heat manual switch.</td>
</tr>
<tr>
<td>VAV, CAV systems</td>
<td>F2000LV-A01</td>
<td>1x0-10V output for an actuator, 1X on/off contact output for a 1-stage heater. Cool/heat manual switch.</td>
</tr>
<tr>
<td>Power Supply</td>
<td>F2000LV-A02</td>
<td>1x0-10V output for an actuator, 2X on/off contact output for a 2-stage heater. Cool/heat manual switch.</td>
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Standard Features

- Designed to control the room temperature for VAV and Bypass air terminals with 1x0-10V VDC output to cooling/heating or 2x-10 VDC outputs to cooling and heating dampers. Also one or two relay outputs to control one or two stages electric aux. heater.
- LCD can display working status such as room temperature, set point, analog output, etc. Makes reading and operating easy and accurate
- All models feature user-friendly setting buttons.
- Up to two-stage electric aux. Heater control makes temperature controlling more accurate and energy saving.
- Large set point adjustment, the min and max limit of temperature preset by end users.
- Low temperature protection.
- Celsius or Fahrenheit degree selectable.
- Cooling/heating mode auto changeover or manual switch selectable.
- 12 Hours Timer Option can be preset 0.5-12 hours to turn off the thermostat automatically.
- Two parts structure and quick wire terminal blocks make mounting easily.
- Infrared Remote Control (Optional)
- Blue backlight (Optional)
- RS 485 communication interface (optional) makes the thermostat connection with a PC or the center control system.

Standard Specifications F2000LV-A Series

- Power Supply: 24 VAC ± 20% 50/60HZ
- Electrical Rating: 2 amp load per terminal
- Sensor: NTC 5k
- Temperature control range: 5 - 60°C (41 - 95°F)
- Accuracy: ± 0.5°C (1°F) @ 25°C
- Analog Output: One or two analog outputs
  - Voltage DC 0V-DC 10V
  - Current 1 mA
- Protection Class: IP30
- Environment Condition:
  - Operating temperature: 0 - 50 °c
  - Operating humidity: 5 - 95% RH
  - Storage temperature: -10 - 60°C
  - Storage humidity: <95% RH
- Display: LCD
- Net Weight: 240g
- Dimensions: 120mm(L)x90mm(W)x24mm(H)
- Material and Colors: PC/ABS Fireproofing house with white color
- Mounting Standard: Mounting on the wall, or 2"x4" 65mmx65mm pipe box

Mounting and Dimensional Details

LCD Display Details
DIGITAL ROOM THERMOSTAT


Important Safety Information
- Always turn off power before mounting, removing, and cleaning thermostat.
- Read all of the information in this manual before mounting the thermostat.
- Notice of the supply power voltage of the thermostat is 24 VAC. Do not mount it on voltages higher than 24VAC±10%.

Mounting and Wiring
- Cut off power and simultaneously depress the 2 clips on either of the sides of the thermostat gently with your nails or other unsharp tools to open the thermostat cover.
- Mount the wall plate first and make sure wires will be drilled through holes on the wall plate. See Fig 1. There are two dimensions usable.
- Connect wires to terminal strip. Wiring diagrams is as figure 2 and figure 3. K1 means the 1st stage relay, and K2 means the 2nd stage relay. K2 is useless for F2000LV-A01, K1 and K2 are useless for F2000LV-A-N.
- Mount the cover on the wall plate.

Operation
1. After electrifying, OFF displays on the right-down corner of LCD.
2. Press power key to turn on the thermostat. Then room temperature displays on LCD. Press ▲ or ▼ to see the set point.
3. Setting temperature: press ▲ or ▼ key and 0.5 ° changes each time. When adjusting, the number of temperature is blinking, it indicates that the set point is not be confirmed until 6 seconds, it stops to blink and return back to display room temperature. Then the setting is confirmed. The range of adjusting temperature is from 5° to 35°.
4. Locking set point: Press ▲ and ▼ keys at the same time about 5 seconds, then the symbol appears on the right top of LCD and the temperature is locked. After that, you cannot adjust set point.
5. Unlocking set point: Under the locking mode, press ▼ keys at the same time about 5 seconds until symbol disappears and the temperature is unlocked. Then you can adjust the room temperature as you want.
6. Switch working mode: Press switch key to switch heating or cooling. After the working mode has been selected and its symbol blinks on the left of LCD for about 6 seconds, the mode is confirmed.
7. Lock the working mode of cooling or heating: press switch for more than 6 seconds up to symbol appearing on the right of LCD. It means that the working mode is locked successfully. Now you cannot switch working mode by pressing switch key.

Figure 1. Wall Plate
Figure 2. Wiring Diagram
Figure 3. Connection
Figure 4. Analog Output
8. Unlock the working mode: press switch for more than 6 seconds up to symbol disappearing on the LCD. 

The first stage heating: Under the heating mode, if the system temperatures at the set point -1°C, the first stage heating is on with symbol appearing. If the room temperature at the set point +1°C, the first stage heating is off with symbol disappearing. Under the cooling mode, you may preset the 1st relay is not work or on work. If you set it on work, the control way is like in heating mode.

10. The second stage heating (just for F2000LV-A02):
   - Under heating mode, if the room temperature at the set point-3°C (differential temperature which is set in Advanced Setup), the second stage heating is on. If the room temperature at the set point, the output is limited by maximum.
   - Under the cooling mode, if the room temperature > the set point, the output is limited by maximum.

Advanced Setup (V.LV-12-S_27)
Cut off power first, simultaneously depress the 2 clips on either of the sides of the thermostat gently to open the cover of the thermostat. Then you may change the parameters in Advanced Setup.

When DIP1=ON, press switch to select the parameters and press▲or▼key to set values. The parameters guiding symbol will display on the upper line of LCD.

DIP1: ON- set parameters (see below table)    OFF- normal operation  (factory preset: OFF)
DIP2: ON- Fahrenheit display     OFF- Celsius display  (factory preset: OFF)
DIP3: ON- the relays doesn't work in heating OFF- the relays works in heating  (factory preset: OFF)
DIP4: ON- the 1st relay doesn't work in cooling OFF: the 1st relay works in cooling (factory preset: ON)

When DIP4=ON, press switch to set values. The parameters guiding symbol will display on the upper line of LCD.

Attention:
1. The damper actuator is controlled by the analog output between the minimum limited and the maximum limited. Under the cooling mode, if the thermostat temperature < the set point, the output is limited by minimum; If the room temperature > the set point, the output is limited by maximum.
2. The scale bars corresponds with 0~10V output (see figure 4). The symbol on the right of LCD running indicates the analog output is more than 0V DC.

RESET: Put the DIP1 up to ON and then turn the thermostat on, keep to press power key for about 40 seconds until the thermostat turning off. Then the reset is successfully. All parameters will be returned back the defaults.

Special Attention:
On the circuit board, you may see there is a X1 jumper at upper of the terminal P1. The relay will be a dry contact output when X1 jumper is disconnection (default) or will be a source contact output when X1 jumper is connection.

### Parameters Table

<table>
<thead>
<tr>
<th>Guiding Symbol</th>
<th>Parameter</th>
<th>Set Range</th>
<th>Default</th>
</tr>
</thead>
<tbody>
<tr>
<td>E1</td>
<td>The minimum limited of the analog output in heating</td>
<td>0V<del>max (corresponding 0V</del>max DC)</td>
<td>20 (VDC)</td>
</tr>
<tr>
<td>E2</td>
<td>The maximum limited of the analog output in heating</td>
<td>Minimum<del>99 (corresponding min</del>10V DC)</td>
<td>99 (VDC)</td>
</tr>
<tr>
<td>E3</td>
<td>The minimum limited of the analog output in cooling</td>
<td>0V<del>max (corresponding 0V</del>max DC)</td>
<td>20 (VDC)</td>
</tr>
<tr>
<td>E1E2</td>
<td>The maximum limited of the analog output in cooling</td>
<td>Minimum<del>99 (corresponding min</del>10V DC)</td>
<td>99 (VDC)</td>
</tr>
<tr>
<td>E1E3</td>
<td>Adjusting the change rate of the analog output</td>
<td>0.5 ~ 99.5 (The less is the number, the quicker is the change of analog output).</td>
<td>5</td>
</tr>
<tr>
<td>E2E3</td>
<td>Just for adjusting before leaving factory</td>
<td>0 (don't change it)</td>
<td></td>
</tr>
<tr>
<td>E1E2E3</td>
<td>Just for adjusting before leaving factory</td>
<td>0 (don't change it)</td>
<td></td>
</tr>
<tr>
<td>E1 +</td>
<td>Just for adjusting before leaving factory</td>
<td>7.5 (don't change it)</td>
<td></td>
</tr>
</tbody>
</table>

**E1**
- The state of thermostat electrifying after power broken
- The state of thermostat electrifying when X1 jumper is disconnection

**E2**
- The delay time of 0VAC output as pressing power key to turn off
- The delay time of 0VAC output as pressing power key to turn off

**E3**
- Un-effective for the model
- Measured temperature modification

**E1E2E3**
- The delay time of 0VAC output (just for F2000LV-A02)
- The delay time of 0VAC output (just for F2000LV-A02)

**E1**
- The state of analog output once room temperature reaches at the set point
- The state of analog output once room temperature reaches at the set point

**E2**
- Set the maximum limit of the set point

**E3**
- Set the differential of temperature for starting the second stage heating (just for F2000LV-A02)
- Set the differential of temperature for starting the second stage heating (just for F2000LV-A02)