**Model TLVT1**

**Digital Touchscreen Programmable Thermostat with Heat Pump**

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**Feature List**

- Thermostat / Heat/pump Selection (software selectable)
- Fan On / Auto
- Battery Powered (2 “AA” alkaline batteries)
- 7-day (Monday to Sunday), 4-timezone section and temperature program settings
- Temperature display in °F or °C
- Temperature Measurable Range : 32~77°F / 0~40°C
- Program Copy for fast programming
- EEPROM stores heat and cool program settings
- Program Override Mode (Temporary / Permanent)
- Real clock in 12 hr / 24 hr
- Filter, energy and UV lamp usage record
- Adjustable interval time for filter, energy and UV usage
- Energy Saving Index
- Defrost function
- Cleaning Screen mode
- Calendar
- Holiday Mode
- Security Mode

**Wiring**

- When two-transformer system is used, connect the wires to Rι and R6 accordingly to the diagram shown.
- When single-transformer system is used, connect Rι and R6 together.
- There are two wiring configurations: thermostat or heat-pump.
- Please select the configuration to be used and then connect the appliances accordingly.

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**Thermostat**

<table>
<thead>
<tr>
<th>Terminals</th>
<th>Device</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rι</td>
<td>24Vac supply for heater</td>
</tr>
<tr>
<td>R6</td>
<td>24Vac supply for cooler</td>
</tr>
<tr>
<td>W</td>
<td>1st stage heating</td>
</tr>
<tr>
<td>Wι</td>
<td>2nd stage heating</td>
</tr>
<tr>
<td>Y</td>
<td>1st stage cooling</td>
</tr>
<tr>
<td>Yι</td>
<td>2nd stage cooling</td>
</tr>
<tr>
<td>G</td>
<td>Fan</td>
</tr>
</tbody>
</table>

**Heat-pump**

<table>
<thead>
<tr>
<th>Terminals</th>
<th>Device</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rι</td>
<td>24Vac supply</td>
</tr>
<tr>
<td>E</td>
<td>Emergency Heat</td>
</tr>
<tr>
<td>Wι</td>
<td>Auxiliary Heat</td>
</tr>
<tr>
<td>Y</td>
<td>1st stage compressor</td>
</tr>
<tr>
<td>Yι</td>
<td>2nd stage compressor</td>
</tr>
<tr>
<td>G</td>
<td>Changeover valve for heat</td>
</tr>
<tr>
<td>B</td>
<td>Changeover valve for cool</td>
</tr>
</tbody>
</table>

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**Setup Mode**

There are 10 settings in the setup mode:

1. Calendar
2. 12 / 24 hour selection
3. °F / °C display selection
4. HE / HG selection
5. Thermostat / Heat-pump selection
6. Control system selection
7. Span and Differential selection
8. Delay / Long Delay selection
9. DST (Daylight Saving Time) Selection
10. Screen lock selection

To enter setup mode, press SYSTEM for 5 seconds. In setup mode, press EXIT to discard changes made to current setting and exit setup mode. Press CONFIRM to apply changes and proceed to next setting.

**Set Calendar**

Press “,” “,” to change year, month and day accordingly. Press CONFIRM to apply changes and proceed to next setting.

**12/24 hour**

Press “,” “,” to toggle between 12 and 24 hour mode. Press CONFIRM to apply changes and proceed to next setting.

**°C / °F Selection**

Press “,” “,” to toggle between °C or °F temperature unit. Press CONFIRM to apply changes and proceed to next setting.

**HE / HG Selection**

Press “,” “,” to toggle between HE / HG selection. Press CONFIRM to apply changes and proceed to next setting. When fan is in auto mode and HE is selected, fan will be turned on as long as heater / cooler is turned on. When fan is in auto mode and HG is selected, fan will only be turned on during cool mode.

**Thermostat / Heat-pump**

Press “,” “,” to toggle between thermostat and heat-pump selection.

*th represents thermostat.
*HP represents heat-pump.

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**Control System Selection**

Press “,” “,” to toggle between control system selection. Press CONFIRM to apply changes and proceed to next setting.

Selectable configurations are shown as follows:

**Program Override Mode**

Press **CONFM** to apply changes and proceed to next setting.

**Span and Differential Selection**

- “P” represents span setting.
- “d” represents differential setting.

Span and differential setting units will be changed according to the temperature unit selected by user. The selectable values are 0.5°C(1°F) / 1.0°C(2°F) / 1.5°C(3°F).

The default span and differential settings are 0.5°C / 1°F.

Press “,” “,” to change the values. Press CONFIRM to apply changes and proceed to next setting.

**Delay / Long Delay Selection**

Press “,” “,” to toggle between delay and long delay selection. Press CONFIRM to apply changes and proceed to next setting.

Delay for heat / cool on to prevent short cycling of system that may damage the appliance.

“dl” represents delay.
“ld” represents delay.

**Heat-pump**

<table>
<thead>
<tr>
<th>Terminals</th>
<th>24Vac setup for heater</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rι</td>
<td>2H2C</td>
</tr>
<tr>
<td>R6</td>
<td>Rι, Rι, W, Y, Yι</td>
</tr>
<tr>
<td>W</td>
<td>2H1C</td>
</tr>
<tr>
<td>Wι</td>
<td>Rι, Rι, W, Y, Yι</td>
</tr>
<tr>
<td>Y</td>
<td>2H2C</td>
</tr>
<tr>
<td>Yι</td>
<td>Rι, Rι, W, Y, Yι</td>
</tr>
</tbody>
</table>

**Date and Time**

- *Emergency Heat ( terminal : E ) is used for defrost control.
- Connect fan ( terminal : G ) if necessary.
- Connect fan ( terminal : G ) if necessary.
- Connect fan ( terminal : G ) if necessary.
- Connect fan ( terminal : G ) if necessary.

**DST (Daylight Saving Time)**

Press “,” “,” to toggle on/off of the DST function. *The DST used is based on USA time-zone.*
Secure Lock Selection
Press or to enable(ON) or disable(OFF) the security lock. If it is enabled, user is required to input a 4-digits password.

Press or on the left to change the password. P1 indicates that the 1st digit password (read from left) is selected. Press or on the right to select the digit. After setting all 4 digits, press to activate the security mode.

When security mode is activated, is shown on the LCD and all keys are disabled except . * If the password is 8888, all settings will restore to default upon pressing .

Disable the security lock
1. Press and user is required to enter the correct password.
2. If the password is correct, the security lock will be disabled.
   Otherwise, it remains locked.
3. * Security Lock cannot be maintained once power is lost.

View Calendar
1. Press the current weekday to view current date.
2. Press to exit the viewing.

Clock Setting
1. Press to enter the clock setting mode.
2. Firstly, the hour is shown. Press or to change the hour. Press to save the setting.
3. Then, the minute is shown. Press or to change the minute. Press to save the setting and exit clock setting.

Clean Screen Mode
1. Press to enter the cleaning screen mode.
2. The screen will show a 20-second countdown immediately after the key press.
3. During countdown, all keys are disabled.
4. When countdown reaches zero, press to exit clean screen mode, or press to repeat the countdown.

Usage
TLVTi can record the Filter, UV and energy usage. These counters count hourly. Each count is 4 digits long (0-9999). Filter usage counts when the fan is turned on; UV usage counts as long as TLVTi is powered on. Energy usage counts when heater/cool is turned on. When the counts reach the set limit, the corresponding usage icon will be shown on the screen.

View Usage
1. Press to enter the usage mode.
2. Filter, UV and Energy counter are shown alternatively by pressing .
3. Press to clear the current counter records.
4. Press to exit the usage mode.

Adjusting Usage Limit
1. Press and hold for 3 seconds during the usage mode.
2. Press or to change the internal time (0-9999).
3. Press to save the setting.

4. Press to exit the limit setting.

Defrost
When the room temperature is below 5 °C / 41 °F, HEATER will always be turned ON and COOLER will be turned OFF irrespective of the current control temperature set. 2nd stage heater, emergency and auxiliary heater may be turned on depending on the control system configuration. Defrost indicator will be shown on screen.

Program mode
Default programs are as the below:

Heat settings:

<table>
<thead>
<tr>
<th>Day</th>
<th>Mon</th>
<th>Tue</th>
<th>Wed</th>
<th>Thu</th>
<th>Fri</th>
<th>Sat</th>
<th>Sun</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time</td>
<td>6:00</td>
<td>6:00</td>
<td>6:00</td>
<td>6:00</td>
<td>6:00</td>
<td>6:00</td>
<td>6:00</td>
</tr>
<tr>
<td>Temp</td>
<td>(21 °C / 70 °F)</td>
<td>(21 °C / 70 °F)</td>
<td>(21 °C / 70 °F)</td>
<td>(21 °C / 70 °F)</td>
<td>(21 °C / 70 °F)</td>
<td>(21 °C / 70 °F)</td>
<td>(21 °C / 70 °F)</td>
</tr>
<tr>
<td>Mode</td>
<td>Cool</td>
<td>Cool</td>
<td>Cool</td>
<td>Cool</td>
<td>Cool</td>
<td>Cool</td>
<td>Cool</td>
</tr>
</tbody>
</table>

4. Press to go back to normal mode.
5. Press to save setting and go back to normal mode.
6. Press to copy the program.
7. During copying, the heat and cool setting temperatures are not valid, but still can be changed by pressing .
8. Press the other days to copy the program. The days that are copied will also be without .
9. Press again to finish the copy mode and return to program setting mode.

Override mode
1. Press to select permanent override, temporary override and program.
2. Default heat and cool setting temperature for override and permanent override mode is 26 °C / 79 °F.
3. Press / to change the override setting temperature in heat and cool mode respectively.
4. Temporary override mode returns to normal mode when new program starts if override time does not set.

Holiday Mode
1. Select system to temporary override.
2. Press and hold for about 3 seconds to enter holiday mode setting.
3. User may set the time interval for the holiday mode duration. Value on the left refers to number of hours and that on the right refers to number of days.
4. Press to adjust the value.
5. Press to apply changes, or to discard changes.
6. When holiday mode is activated, flashes.
7. The thermostat will keep using the current setting temperature until the holiday time duration reaches zero. It then returns to program mode.
8. To disable holiday mode, any one of the three methods can be done.
   i. Change system to permanent override mode.
   ii. Change system to normal mode.
   iii. Set the holiday time interval to zero.

System setting
In Normal mode, press and release to enter system mode. User may set the system used by pressing .

It follows the sequence below:

- (HEAT EM) → HEAT → COOL → AUTO → OFF → HEAT
- HEAT EM is the same as HEAT mode, except that it would turn on an emergency heat instead of compressor (Heat-pump)

Electrical Interface
Temperature measurement: 0-40 °C / 32-99 °F
Control temperature range: 5-35 °C / 41-95 °F
Temperature resolution: 0.5 °C / 1 °F
Temperature accuracy: ±0.5 °C / ±1 °F
Battery: 2 AA alkaline battery
Relay contact Voltage: 24Vac 50/60Hz
Relay contact Current: 1A Max

"LO" will be shown on the screen when room temperature is below 0 °C / 32 °F.
"HI" will be shown on the screen when room temperature is above 40 °C / 99 °F.
When one appliance is turned, will be shown on the screen as indication.
Similarly, will be shown on the screen when second appliance is turned on.

Emergency Heat
When it is activated, "EM." will be shown on the screen.

Auxiliary Heat
When it is activated, “AUX" will be shown on the screen.

FAN mode
Press to enter fan mode. In the fan mode, press to toggle the Fan controls (FAN ON or FAN AUTO).

FAN ON: Fan stays on all the time.
FAN AUTO: Fan turns ON whenever heating or Cooling is on (Depends on HE/HEG setting).

Energy saving index
The energy saving index is calculated based on the setting of your program. It is used as a reference for the user to know how likely the program is to conserve energy or consume more.

If the user sets a comfort program setting, the appliances are likely to be turned on a lot and “LOSE” may be shown on the screen. If the appliances are less likely to be turned on, “SAVING” may be shown on the screen.

The likelihood of saving energy or losing energy is converted to a percentage value for reference.
If the value is higher than 99%, “HI” will be shown on the screen.

Low battery
If the voltage batteries drop below 2.7V, icon will be on.