

# T7300F Multistage Conventional or Heat Pump Programmable Commercial Thermostat

## GUIDE SPECIFICATION

### 1.0 GENERAL

#### 1.1 Overview

The contractor shall furnish, install, and place in operating condition an HVAC control system described herein. All units shall be located in accordance with the plans.

#### 1.2 Type of System

##### 1.2.1 System Requirements

- a. Control up to three heating and two cooling stages for heat pump or three heating and three cooling stages for gas heat, electric heat or compressor cooling applications.
- b. Permit seven day programming.
- c. Provide two occupied and two unoccupied periods per day.
- d. Offer automatic heat/cool changeover with 2°F minimum deadband.
- e. Provide override capability for a 1, 3, 8 or 12 hour period.
- f. Include a comfort adjust feature to modify setpoints for the override duration.
- g. Provide Proportional plus Integral (P + I) temperature control.
- h. Permit automatic or manual changeover between heating and cooling setpoints.
- i. Display room temperature in °F, °C or no room temperature display.
- j. Display time in 12 or 14 hour clock format.
- k. Disable system and fan selections so both are in AUTO continuously.
- l. Use multiple remote sensors (optional).
- m. Use both local and remote temperature sensor (optional).
- n. Use in conjunction with an economizer (optional).
- o. Setpoint range stops for lowest cooling setpoint temperature and highest heating setpoint temperature (optional).
- p. Permit deadband between heating and cooling setpoints to be adjustable between 2°F and 10°F (optional).
- q. Permit extended fan operation after calls for heating or cooling are completed (optional).

##### 1.2.2 System Components

- a. Seven day programmable thermostat.
- b. Subbase.
- c. Duct mount return air sensor (optional).
- d. Wall mount sensor (optional).
- e. Discharge air sensor (optional).

#### 1.3 Codes and Standards

- 1.3.1 The system shall comply with applicable provisions of ASHRAE 90-75.
- 1.3.2 These specifications are based on equipment from Honeywell to set a standard for design and quality.

#### 1.4 Wiring

- 1.4.1 All wiring meets National Electrical Codes and local electrical codes.



### 1.5 Testing Guarantee Service

- 1.5.1 Prior to installation, the contractor shall provide copies of submittals.
- 1.5.2 The contractor is responsible for assuring that conduit and wire quantity, size, and type are suitable for the equipment supplied.
- 1.5.3 Upon completion, the contractor shall conduct a total system test for the owner and engineer.
- 1.5.4 All components, parts, and assemblies supplied by the manufacturer shall be guaranteed against defects in materials and workmanship for 12 months. Warranty service shall be performed by the contractor.

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## 2.0 SEQUENCE OF OPERATIONS

The heating and cooling setpoints shall be individually adjustable for both the occupied and unoccupied periods. The thermostat shall have a minimum deadband of 2°F (no mechanical heating or cooling shall operate within this deadband). Space temperature deviation above the cooling setpoint or below the heating setpoint shall generate a demand signal to control the system as follows.

### 2.1 Heating

- 2.1.1 The thermostat shall control the heating output based on the demand signal communicated from the thermostat program, taking into account both space temperature deviation (proportional error) and the duration of that temperature deviation (integral error).
- 2.1.2 The thermostat shall energize heating equipment when space temperature falls below heating setpoint.
- 2.1.3 In heat pump applications, auxiliary heat shall be controlled at 2°F below heating setpoint.

### 2.2 Cooling

- 2.2.1 The thermostat shall control the cooling output based on the demand signal communicated from the thermostat program, taking into account both space temperature deviation (proportional error) and the duration of that temperature deviation (integral error).
- 2.2.2 The thermostat shall energize cooling equipment when space temperature exceeds cooling setpoint.
- 2.2.3 A solid state enthalpy changeover control shall determine the capability of the outdoor air to provide free cooling (optional). The system shall operate as follows:
  - a. Free Cooling Available From Outdoor Air: On a call for cooling, the system shall enable the economizer to provide free cooling. If this does not meet the space demand, the system shall call for mechanical cooling to satisfy the programmed setpoint.
  - b. Free Cooling Not Available From Outdoor Air: On a call for cooling, the system shall hold the economizer to minimum position and cooling shall be energized to satisfy the programmed setpoint.

### 2.3 Economizer Interface

The auxiliary relay contacts of the subbase shall be connected to the economizer's minimum position potentiometer.

- 2.3.1 Occupied Period: The auxiliary relay contact will close, allowing the economizer to operate normally and be available for free cooling if outdoor conditions permit.
- 2.3.2 Unoccupied Periods: The auxiliary relay contact will open, defeating the economizer minimum position.

### 2.4 Heating Setback and Cooling Setup

Initiation of heating setback or cooling setup for each of 7 days shall be provided by a programmed time schedule manually entered into the thermostat. When all or a portion of a manually programmed schedule is unavailable, the thermostat shall control to the default program as follows:

Table Of Default Program

	Occupied	Unoccupied
Heating Setpoints	70°F (21°C)	55°F (13°C)
Cooling Setpoints	78°F (26°C)	90°F (32°C)
Start Times	8:00 am	10:00 pm

## 2.5 Setpoint Recovery from Unoccupied to Occupied

The thermostat shall employ Intelligent Recovery™. This shall select the optimum time to begin building warm up or cool down based on setpoints and occupied program as follows:

- 2.5.1 Heat pump: 5°F per hour in heating and cooling.
- 2.5.2 Conventional heat/cool: 3°F per hour in heating. 5°F per hour in cooling.

## 2.6 Fan Operation

Fan operation shall be selectable as follows:

### 2.6.1 Heat Pump Applications

- a. Intermittent: fan is energized with calls for heating or cooling in the occupied and unoccupied periods.
- b. Continuous Occupied: fan is energized continuously in the occupied periods and energized with calls for heating and calls for cooling in the unoccupied periods.
- c. Continuous Recovery: fan is energized continuously in the occupied periods and in the recovery mode. Fan is also energized with calls for heating and calls for cooling in the unoccupied periods.

### 2.6.2 Conventional Heat/Cool Applications

- a. Intermittent: fan is energized with calls for heating (optional) or cooling in the occupied and unoccupied periods.
- b. Continuous Occupied: fan is energized continuously in the occupied periods and energized with calls for heating (optional) and calls for cooling in the unoccupied periods.
- c. Continuous Recovery: fan is energized continuously in the occupied periods and in the recovery mode. Fan is also energized with calls for heating (optional) and calls for cooling in the unoccupied periods.

## 2.7 Heating and Cooling Operation Minimum On and Off Times

The thermostat shall incorporate a program to maintain minimum-stage operation in both the heating and cooling:

### 2.7.1 Heat Pump Applications

- a. Cooling: 2 minutes on and 4 minutes off
- b. Heating: 2 minutes on and 4 minutes off

### 2.7.2 Conventional Heat/Cool Applications

- a. Cooling: 2 minutes on and 4 minutes off
- b. Heating: 2 minutes on and 4 minutes off

## 2.8 Power Interruption

The system shall cycle off and provide timed restaging of heating or cooling equipment upon restoration of power. The restaging operation shall occur according to minimum stage operation times incorporated in the thermostat. A power interruption is enunciated by a blank LCD display.

- 2.8.1 During a power interruption less than 2 hours, the thermostat retains all programmed occupied and unoccupied start times and temperatures as well as the present time and day.
- 2.8.2 During a power interruption greater than 2 hours, the thermostat retains all programmed occupied and unoccupied start times and temperatures. Only the present time and day will need to be reprogrammed.

**2.9 Calibration**

- 2.9.1 No calibration and no adjustment shall be required for mixed air temperature, throttling range, reset ratio, band width, or discharge air temperature.
- 2.9.2 Temperature setting displayed on thermostat shall be adjustable within  $\pm 3^{\circ}\text{F}$  of measured room temperature (optional).

**2.10 Security**

Two levels of security shall exist:

- 2.10.1 A keypad lockout switch located on the back of the thermostat shall allow for three types of keypad lockout.
  - a. Lock out all keys on the thermostat.
  - b. Lock out all keys on the thermostat except System and Fan settings, temporary setpoint adjustments, and clock and day adjustments.
  - c. Lock out thermostat installer setup mode only.
- 2.10.2 Thermostat shall allow for door to be locked by use of two Allen head screws to lock the cover and not allow access to the keypad.

**2.11 Overrides**

Temperature setpoints can be overridden in three ways:

- 2.11.1 Thermostat shall allow for a 1, 3, 8 or 12 hour timed override from unoccupied setpoint to occupied setpoint from the thermostat keypad. In addition the thermostat shall allow for the adjustment of the occupied setpoint during the timed override from the keypad.
- 2.11.2 Thermostat shall allow for a 1, 3, 8 or 12 hour timed override from unoccupied setpoint to occupied setpoint from a remote sensor with a temporary occupied key (optional). In addition the thermostat shall allow for the adjustment of the occupied setpoint during the timed override from a remote sensor with warmer/cooler keys (optional).
- 2.11.3 Thermostat shall allow for a continuous override to the unoccupied setpoint from the thermostat keypad.

## 3.0 MAJOR EQUIPMENT

Model Number	Description	Features
T7300F2002	Commercial programmable thermostat; taupe color.	<ul style="list-style-type: none"> <li>• 7-day programming</li> <li>• 2 occupied and 2 unoccupied periods per day</li> <li>• System and fan setting fixed to AUTO only</li> </ul>
T7300F2010	Commercial programmable thermostat; taupe color.	<ul style="list-style-type: none"> <li>• 7-day programming</li> <li>• 2 occupied and 2 unoccupied periods per day</li> <li>• Selectable for automatic or manual changeover</li> </ul>
Q7300A2008	Commercial programmable subbase; taupe color.	<ul style="list-style-type: none"> <li>• 1-heat/1-cool applications</li> <li>• Remote sensor capability</li> <li>• 2 field configurable LEDs</li> </ul>
Q7300A2016	Commercial programmable subbase; taupe color.	<ul style="list-style-type: none"> <li>• 2-heat/2-cool applications</li> <li>• Remote sensor capability</li> <li>• Discharge air sensor capability</li> <li>• Includes dry auxiliary contacts for economizer control</li> <li>• 2 field configurable LEDs</li> </ul>
Q7300A2040	Commercial programmable subbase; taupe color.	<ul style="list-style-type: none"> <li>• 2-heat/1-cool applications</li> </ul>
Q7300A2057	Commercial programmable subbase; taupe color.	<ul style="list-style-type: none"> <li>• 2-heat/2-cool applications</li> <li>• Includes O and B terminals for changeover control</li> </ul>
Q7300C2004	Commercial programmable subbase; taupe color.	<ul style="list-style-type: none"> <li>• 2-heat/1-cool heat pump applications</li> <li>• O and B terminals available for changeover control.</li> <li>• Remote sensor capability</li> <li>• Discharge air sensor capability</li> <li>• Includes dry auxiliary contacts for economizer control</li> <li>• 2 field configurable LEDs</li> </ul>
Q7300C2012	Commercial programmable subbase; taupe color.	<ul style="list-style-type: none"> <li>• 2-heat/2-cool heat pump applications</li> <li>• O and B terminals available for changeover control.</li> <li>• Remote sensor capability</li> <li>• Discharge air sensor capability</li> <li>• Includes dry auxiliary contacts for economizer control</li> <li>• 2 field configurable LEDs</li> </ul>
Q7300C2053	Commercial programmable subbase; taupe color.	<ul style="list-style-type: none"> <li>• 3-heat/2-cool heat pump applications</li> <li>• O and B terminals available for changeover control.</li> <li>• Remote sensor capability</li> </ul>
Q7300D2002	Commercial programmable subbase; taupe color.	<ul style="list-style-type: none"> <li>• 3-heat/2-cool heat pump applications</li> <li>• Remote sensor capability</li> <li>• Discharge air sensor capability</li> <li>• Includes dry auxiliary contacts for economizer control</li> <li>• 2 field configurable LEDs</li> </ul>
Q7300D2010	Commercial programmable subbase; taupe color.	<ul style="list-style-type: none"> <li>• 2-heat/1-cool heat pump applications</li> <li>• Remote sensor capability</li> <li>• Discharge air sensor capability</li> <li>• Includes dry auxiliary contacts for economizer control</li> <li>• 2 field configurable LEDs</li> </ul>
Q7300G2005	Commercial programmable subbase; taupe color.	<ul style="list-style-type: none"> <li>• 3-heat/3-cool applications</li> <li>• Remote sensor capability</li> <li>• Discharge air sensor capability</li> <li>• Includes dry auxiliary contacts for economizer control</li> <li>• 2 field configurable LEDs</li> </ul>
Q7300L2004	Commercial programmable subbase; taupe color.	<ul style="list-style-type: none"> <li>• Used with ML7984 Valve Actuator in 2-heat/1-cool applications</li> <li>• Two speed fan capability</li> <li>• Auxiliary dry contacts for damper control during occupied mode</li> <li>• Auxiliary dry contacts for water pump interlock during heat mode</li> <li>• 2 field configurable LEDs</li> </ul>

## 4.0 OPTIONS

### 4.1 Remote Temperature Sensors

- 4.1.1 T7022A1022—Duct Mount Return Air Sensor (continuous fan required).
- 4.1.2 T7047C2007—Remote Space Sensor.
- 4.1.3 T7047G2008—Remote Space Sensor (use with one-half of an averaging sensor network).
- 4.1.4 T7147A2000—Remote Space Sensor and Override Module.
- 4.1.5 T7147A2018—Remote Space Sensor and Override Module with WARMER/COOLER switches.

### 4.2 System Accessories

- 4.2.1 T675A—Remote Bulb Temperature Control, low ambient compressor lockout.
- 4.2.2 W859F—Economizer Control Packages.
- 4.2.3 W7459—Solid State Economizer Control Packages.
- 4.2.4 M7514—Damper Actuators.
- 4.2.5 C7400—Solid State Enthalpy Sensor.
- 4.2.6 R8222—Switching Relay.
- 4.2.7 W950—Status Panels.
- 4.2.8 ML7984—Direct Coupled Valve Actuator.



**Home and Building Control**

Honeywell Inc.  
Honeywell Plaza  
P. O. Box 524  
Minneapolis, MN 55408-0524

**Honeywell Latin American Division**

Miami Lakes Headquarters  
14505 Commerce Way Suite 500  
Miami Lakes FL 33016

**Home and Building Control**

Honeywell Limited-Honeywell Limitée  
155 Gordon Baker Road  
North York, Ontario  
M2H 3N7

**Honeywell Europe S.A.**

3 Avenue du Bourget  
1140 Brussels  
Belgium

**Honeywell Asia Pacific Inc.**

Room 3213-3225  
Sun Hung Kai Centre  
No. 30 Harbour Road  
Wanchai  
Hong Kong

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