Honeywell

T7100D,E,F Microelectronic Commercial Thermostats and Q7100A,C,D Subbases

FEATURES

- **Minimum off time for cooling compressor and heat pumps.**

- **Field configurable (select models) for:**
  — **°F or °C temperature display;**
  — **automatic or manual changeover;**
  — **electric or conventional heat fan operation.**

- **Up to two light emitting diodes (LEDs) for easy reference.**

- **Remote temperature sensor and setback timer capability (select models).**

- **System test simplifies troubleshooting.**

APPLICATION

The T7100 Microelectronic Commercial Thermostats and Q7100 Subbases provide electronic control of 18 to 30 Vac single zone heating, ventilating and air conditioning (HVAC) equipment.

Contents

CE

SPECIFICATIONS

IMPORTANT

The specifications given in this publication do not include normal manufacturing tolerances; therefore, an individual unit may not exactly match the listed specifications. Also, this product is tested and calibrated under closely controlled conditions, and some minor differences in performance can be expected if those conditions are changed.

T7100 Models:
See Table 1.

Table 1. T7100 Thermostat Models.

Model	Use With	System[a]	Fig.
T7100D	Q7100A	Conventional	17 and 19
T7100E	Q7100C,D	Heat pump	18 and 20-22
T7100F	Q7100A,C,D	Conventional or heat pump	17-22

[a]Depends on the model.

Q7100 Models:
See Table 2.

Table 2. Q7100 Subbase Models.

Q7100	Use With	System	Stages[a] Heat	Cool	Fig.
A	D or F	Conventional	1 or 2	1 or 2	17 and 19
C	E or F	Heat pump	1, 2 or 3	1 or 2	18 and 20-22

[a]Depends on the model.

Electrical Rating:
   Input Power: 18 to 30 Vac, 50/60 Hz.
   Load Rating: See Table 3.

Table 3. Maximum Amperes at 18 to 30 Vac.

Relay	Running (A)	Inrush (A)
Heat	.02 to 1.5	3.5 at 200,000 cycles
Cool	.02 to 1.5	7.5 at 100,000 cycles
Fan, Reversing Valve, Emergency Heat	.02 to 0.5	2.5 at 200,000 cycles

Temperature:
   Setpoint Range:
      40° to 90°F (4° to 32°C).
   Display Range:
      Controlled: 30° to 110°F (1° to 43°C).
      Outdoor: -30° to 120°F (-34° to 49°C).
   Display Updates:
      Controlled: updated every minute.
      Outdoor: displayed on demand and updated every
         10 minutes.
   Differential:
      3°F (1.5°C). Fixed on D and E models.
      2°F (1°C). Adjustable from 2°-10°F (1-5°C) on
         F models.

Minimum Off Time (Cooling and Heat Pumps):
5 minutes ± 0.5.

Operating Ambient Temperature:
40° to 110*F (4° to 43°C).

Shipping Temperature Range:
Minus 20° to 130°F (-29° to 54°C).

Approvals:
European Community Mark (CE) Listed.

Operating Relative Humidity Range:
5% RH to 90% RH, noncondensing.

Mounting:
The thermostat mounts on a subbase. The subbase mounts horizontally on a wall or 2 in. x 4 in. outlet box with the screws provided. Leveling is not required.

ORDERING INFORMATION

When purchasing replacement and modernization products from your TRADELINE® wholesaler or distributor, refer to the TRADELINE® Catalog or price sheets for complete ordering number.

If you have additional questions, need further information, or would like to comment on our products or services, please write or phone:
   1.   Your local Home and Building Control Sales Office (check white pages of your phone directory).
   2.   Home and Building Control Customer Logistics
        Honeywell Inc., 1985 Douglas Drive North
        Minneapolis, Minnesota 55422-4386

In Canada—Honeywell Limited/Honeywell Limitée, 35 Dynamic Drive, Scarborough, Ontario M1V 4Z9.
International Sales and Service Offices in all principal cities of the world. Manufacturing in Australia, Canada, Finland, France, Germany, Japan, Mexico, Netherlands, Spain, Taiwan, United Kingdom, U.S.A.

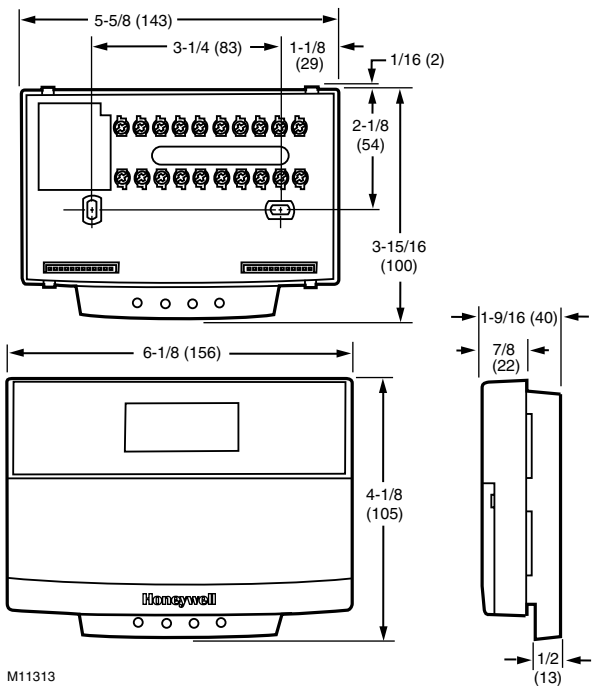**Dimensions:**
See Fig. 1.

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Fig. 1. Thermostat dimensions in in. (mm).

♲ RECYCLING NOTICE

If this control is replacing a control that contains mercury in a sealed tube, do *not* place your old control in the trash.

Contact your local waste management authority for instructions on recycling and the proper disposal of the old thermostat.

INSTALLATION

When Installing this Product…

1. Read these instructions carefully. Failure to follow the instructions can damage the product or cause a hazardous condition.
2. Check the ratings given in the instructions and on the product to make sure the product is suitable for your application.
3. Installer must be a trained, experienced service technician.
4. After completing installation, use these instructions to checkout the product operation.

⚠ WARNING

Electrical Shock Hazard.
Power Supply can cause electrical shock.
Disconnect power supply before beginning installation.

Location

Subbase Without Remote-Mounted Temperature Sensor
Install the subbase about 5 ft (1.5m) above the floor in an area with good air circulation at average temperature. See Fig. 2.

Do not install the subbase where it can be affected by:
— drafts, or dead spots behind doors and in corners.
— hot or cold air from ducts.
— radiant heat from sun or appliances.
— concealed pipes and chimneys.
— unheated (uncooled) areas such as an outside wall behind the thermostat.

Subbase With Remote-Mounted Temperature Sensor(s)
Install the subbase in an area that is accessible for setting and adjusting the temperature and settings.

Install the remote-mounted sensor(s) about 5 ft (1.5m) above the floor in an area with good air circulation at average temperature. See Fig. 2.

Do not mount the sensor(s) where it can be affected by:
— drafts, or dead spots behind doors and in corners.
— hot or cold air from ducts.
— radiant heat from sun or appliances.
— concealed pipes and chimneys.
— unheated (uncooled) areas such as an outside wall behind the thermostat.

If more than one remote sensor is required, arrange them in a temperature averaging network consisting of two, three, four, five or nine sensors. See Fig. 3 through 7.
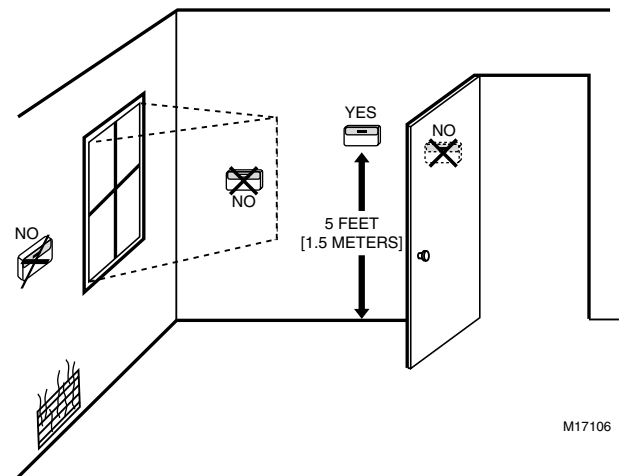

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Fig. 2. Typical location of thermostat or remote-mounted sensor.

Fig. 3. Two T7047G Sensors providing temperature averaging network for T7100/Q7100 Thermostat/Subbase.

Fig. 4. Two T7047C Sensors and one T7047G Sensor providing temperature averaging network for T7100/Q7100 Thermostat/Subbase.
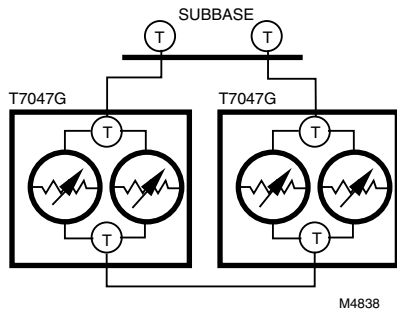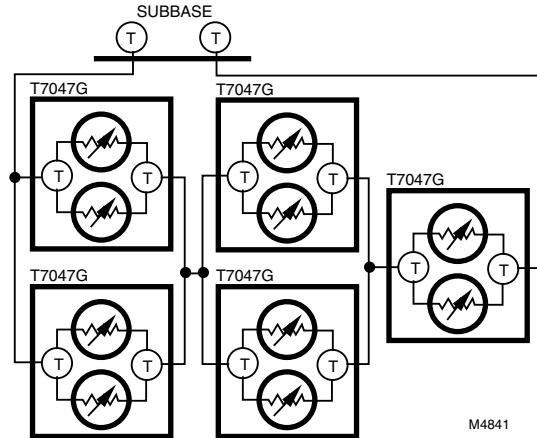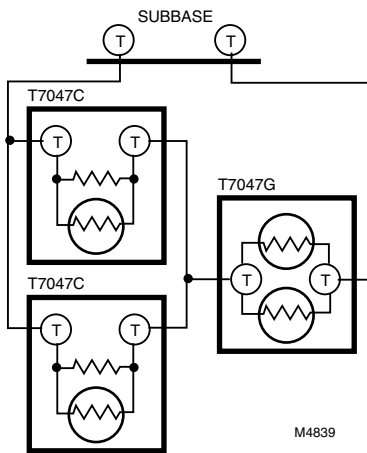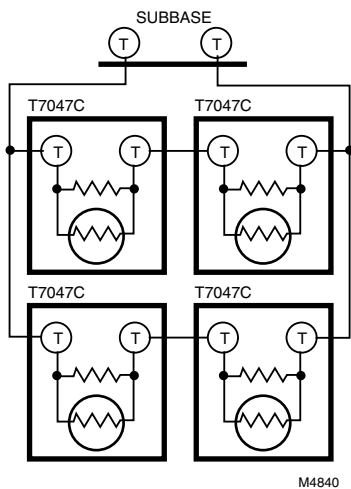

Fig. 5. Four T7047C Sensors providing temperature averaging network for T7100/Q7100 Thermostat/Subbase.

Fig. 6. Five T7047G Sensors providing temperature averaging network for T7100/Q7100 Thermostat/Subbase.
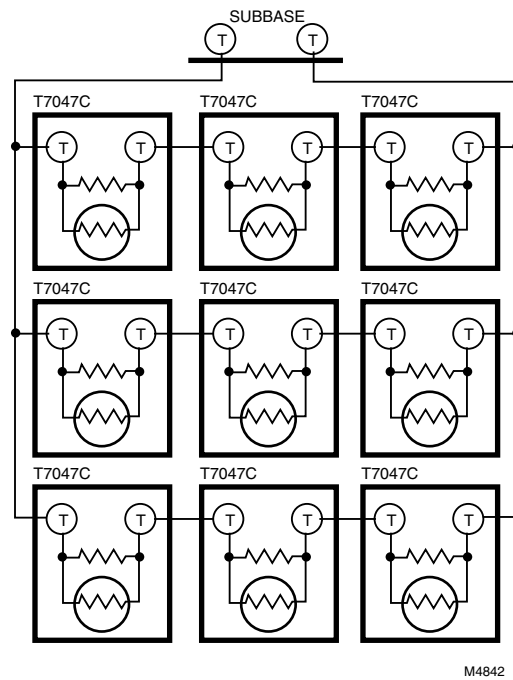

Fig. 7. Nine T7047C Sensors providing temperature averaging network for T7100/Q7100 Thermostat/Subbase.

Subbase Installation

The subbase can be mounted horizontally on the wall or on a 2 in. x 4 in. wiring box.

1. Position and level the subbase (for appearance only). The thermostat functions properly even when not level.
2. Use a pencil to mark the mounting holes. See Fig. 8.
3. Remove the subbase from the wall and drill two 3/16 inch holes in the wall (if drywall) as marked. For firmer material such as plaster, drill two 7/32 inch holes.
4. Gently tap anchors (provided) into the drilled holes until flush with the wall.
5. Position the subbase over the holes, pulling wires through the wiring opening.
6. Loosely insert the mounting screws into the holes.
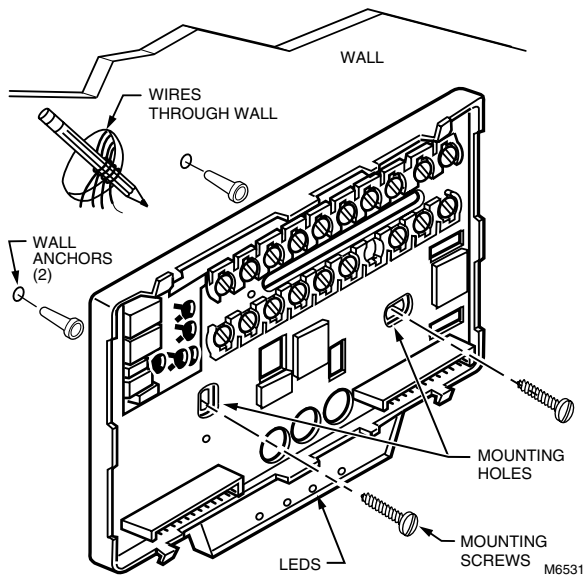7. Tighten mounting screws.
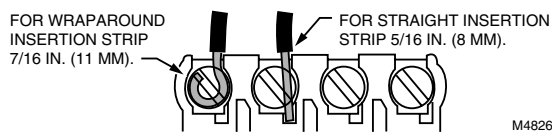
Fig. 8. Mounting the subbase.

Fig. 9. Proper wiring technique.

WIRING

All wiring must comply with local electrical codes and ordinances. Follow equipment manufacturer wiring instructions when available. Refer to Fig. 16 through 21 for typical hookups. A letter code is located near each terminal for identification. Refer to Table 4 for terminal designations.

⚠ WARNING

Electrical Shock Hazard.
Power Supply can cause electrical shock.
Disconnect power supply before beginning installation.

1. Loosen the terminal screws on the back of the thermostat and connect the system wires. See Fig. 9.

IMPORTANT
> *Use 18 gauge, color-coded thermostat cable for proper wiring.*

2. Securely tighten each terminal screw.
3. Push excess wire back into the hole.
4. Plug the hole with nonflammable insulation to prevent drafts from affecting the thermostat.

Table 4. Terminal Designations and Descriptions.

Standard Terminal Designations	Typical Connection	Function	Terminal Type
B	Heating changeover valve or damper	Output	24V powered contact
D, D	Remote setback timer	Input	Dry contact
E	Emergency heat relay	Output	24V powered contact
G	Fan relay	Output	24V powered contact
O	Cooling changeover valve	Output	24V powered contact
R	24V system transformer	Input	—
RC	24V cooling transformer	Input	—
RH	24V heating transformer	Input	—
T, T	Remote temperature sensor	Input	—
W	Heating relay or valve coil	Output	24V powered contact
W1	Stage 1 heating relay	Output	24V powered contact
W2	Stage 2 heating relay or auxiliary heat relay	Output	24V powered contact
W3	Auxiliary heat relay	Output	24V powered contact
X	Common	Input	—
X1, X2, X3, X4	User-defined Light Emitting Diodes (LED)	Annunciation	—
Y, Y1	Compressor contactor 1	Output	24V powered contact
Y2	Compressor contactor 2	Output	24V powered contact

Mounting Thermostat on Subbase

Mount the thermostat on the subbase after the subbase is installed.

1. Engage the tabs at the top of the thermostat and subbase. See Fig. 10.
2. Press the lower edge of the case to close and latch.

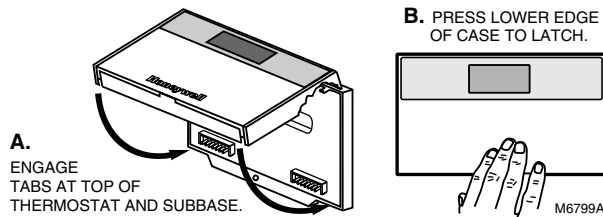NOTE: To remove the thermostat from the wall, first pull out at the bottom of the thermostat then remove the top.

Fig. 10. Mounting thermostat on subbase.

Using Thermostat Keys

The thermostat keys are used to:
- set temperature,
- display present setting,
- configure Installer Setup,
- check Self-Test.

Select models have keys to:
- temporarily override the temperature,
- set the system operation,
- set the fan operation.

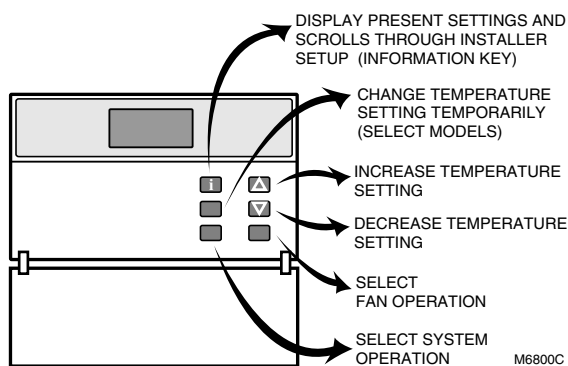See Fig. 11 for the location of the keys.

Fig. 11. Thermostat key locations, descriptions.

SETTINGS

System and Fan Settings

System settings control the thermostat operation as follows:
Em. Heat (Q7100C only): Emergency heat relay is automatically controlled by the thermostat. The cooling system is off. The compressor is de-energized.
Heat: The thermostat controls the heating.
Off: Both the heating and cooling are off.
Cool: The thermostat controls the cooling.
Auto: The thermostat automatically changes between heating and cooling operation, depending on the indoor temperature.

Fan settings control the system fan as follows:
On: Fan operates continuously.
Auto: Equipment controls fan.

The system default setting is Heat and the fan default setting is Auto. Use the keys to change to the desired settings. See Fig. 11.

NOTE: Always press the keys with your fingertip or similar blunt tool. Sharp instruments like a pen or pencil point can damage the keyboard.

Temperature Settings

The default setpoint for heat is 70°F (21°C) and for cool is 78°F (25.5°C). Press the increase ▲ or decrease ▼ key to change the present setting. To change between heat and cool, press the Information $\boxed{i}$ key until the setting to be changed appears. Press the increase ▲ or decrease ▼ key to adjust the setting.

Override Temperature Settings (Select Models)

The T7100 temperature settings can be overridden in three ways:
— Using the Override key (T7100F only), acting as a toggle.
— Using a remote setback timer.
— Using an occupancy sensor.

The temperature settings change based on the Installer Setup 27.

NOTE: The Installer Setup 27 is factory set at zero degrees so this setting must be changed for the temperature to change.

The Override key temporarily changes the current temperature to a preset offset. The remote timer and occupancy sensor opens (temporary setpoint) or closes (comfort setpoint) contacts according to the setting. See Table 5.

Table 5. Examples of Temperature Overrides.

System Setting	Comfort Setpoint	Installer Setup Number 27 Setting	Temporary Setpoint
Heat	68°F	10°F	58°F
Cool	74°F	10°F	84°F

Always check the display to determine if the thermostat is controlling to the comfort, temporary or remote setpoint. Temporary is displayed when the Override key is pressed or the occupancy sensor or remote setback timer is energized.

⚠ CAUTION

Equipment Damage.
Driving multiple T7100 overrides from a single source will cause electrical damage.
The override terminals on the T7100 must be activitated from a dedicated source.

If you need to drive several T7100 Thermostats from a single source, use an isolation relay at each T710 and connect the isolation relay contacts to the D terminals of each T7100.

Setting Keypad Lockout Switch

The DIP switch on the back of the thermostat activateds the Installer Setup lockout feature. DIP switch 1 must be set to the ON position (up) to activate the lockout feature. See Fig. 12. The factory setting is off (down). Remove the thermostat from the wallplate and set the switch to ON if keypad lockout is desired. The level of lockout is determined by the Installer Setup number 40.
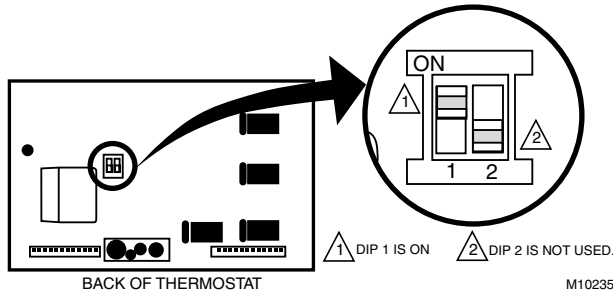

Fig. 12. Set Installer Setup lockout DIP switch 1 on back of thermostat.

INSTALLER SETUP

NOTE: For most applications, the thermostat factory settings do not need to be changed. Review the factory settings in Table 6 and if no changes are necessary, go to the Installer System Test section.

The Installer Setup is used to customize the thermostat to specific systems. Installer Setup numbers are listed in Table 6. The table includes all the configuration options available.

A combination of key presses is required to use the Installer Setup features.
— To enter the Installer Setup, press and hold the Information ⓘ key with the increase ▲ and decrease ▼ keys until the first number is displayed. All display segments appear for approximately three seconds before the number is displayed. See Fig. 13 and 14.

— To advance to the next Installer Setup, press the Information ⓘ key.
— To change a setting, use the increase ▲ and decrease ▼ keys.
— To exit the Installer Setup, press and hold the Information ⓘ key until the display returns to normal (approximately three seconds). The display scrolls the numbers backward to get to the normal display. The Installer Setup is automatically exited if no key presses are made for five minutes.
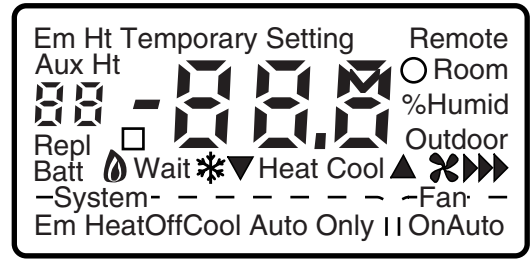
Fig. 13. LCD display of all segments.
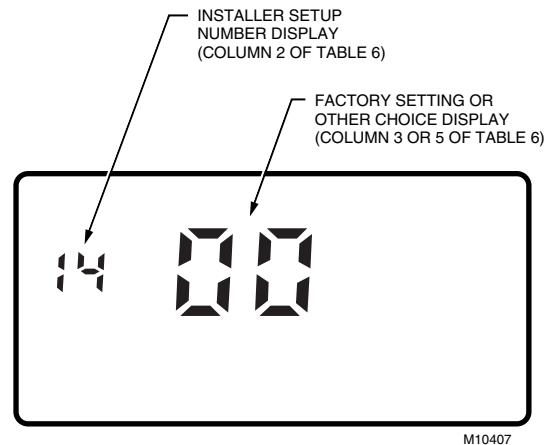
Fig. 14. Installer Setup and setting display.

⚠ CAUTION

Equipment Damage.
Equipment can be damaged by the system running without the fan.
Heat pump and electric heat systems must be configured to 01 in Installer Setup 02.

IMPORTANT
Only configurable numbers are shown on the device. Example: If the thermostat does not have the changeover feature, Installer Setup 12 is not displayed. Review Table 6 factory settings and mark desired changes in the Actual Setting column. When the Installer Setup is complete, review the settings to confirm that they match the system.

Table 6. Thermostat Installer Setup Options.

Select	Mode Number (Press ⓘ key to change)	Factory-Setting		Other Choices (Press ▲ or ▼ key to change)		Actual Setting
		Display	Description	Display	Description	
Application (T7100F only).	01	00	Conventional equipment application (Q7100A).	01	Heat pump application (Q7100C,D) (fan operation is automatically selected so go to number 03).	
Fan operation[a],[b].	02	00	Conventional applications where equipment controls fan operation in heat mode.	01	Heat pump and electric heat applications where thermostat controls fan operation in heat mode.	
Output stages of heating.	03	Depends on subbase	Stage of heat.	01, 02 or 03	01—One stage of heat. 02—Two stages of heat. 03—Three stages of heat.	
Heating cycle rate[a].	04	Depends on model	Stage 1.	03, 04, 06, 08, 09	03—3 cph used for hot water systems or high efficiency furnaces. 04—4 cph (factory setting for heat pump systems). 06—6 cph used for conventional systems. 08—8 cph (factory setting for conventional systems). 09—9 cph used for electric heat systems.	
	05[a]		Stage 2.			
	06[a]		Stage 3.			—
	07[a]	09	Emergency heat.			
Output stages of cooling (T7100F only).	08	02	Two stages of cool.	00 or 01	00—No cooling. 01—One stage cooling.	
Cooling cycle rate (T7100F only).	09	04	Stage 1 at 4 cph.	03	03—3 cph.	
	10	04	Stage 2 at 4 cph.			
Changeover (T7100F only).	12	00	System setting key is operational.	01 or 02	01—Heat, Cool, Off (no Auto). 02—Auto only.	
Degree temperature display.	14	00	Temperature is displayed in °F.	01	Temperature is displayed in °C.	
Displaying temperature (T7100F only).	15	00	Temperature is displayed.	01	Temperature is not displayed.	
Extended fan operation in heating (T7100F only)[b].	19	00	No extended fan operation after the call for heat ends.	01	Fan operation is extended 90 seconds after the call for heat ends.	
Extended fan operation in cooling (T7100F only).	20	00	No extended fan operation after the call for cool ends.	01	Fan operation is extended 90 seconds after the call for cool ends.	
Fan keys adjustment (T7100F only).	21	00	Fan key is operational.	01	Fan key is continuously in the Auto position.	
Remote sensing (T7100F only).	22	00	Remote sensing not activated.	01	Remote sensing activated.	

Table 6. Thermostat Installer Setup Options *(continued).*

Select	Mode Number (Press i key to change)	Factory-Setting		Other Choices (Press ▲ or ▼ key to change)		Actual Setting
		Display	Description	Display	Description	
Temperature averaging network (T7100F only)c.	23	00	Temperature averaging disabled.	01	Temperature averaging between local sensor and remote sensor(s) activated.	
Keypad lockout level (T7100F).	25	0	No lockout.	1-2	1—View setpoints only. 2—Lockout all keys.	
Heating/cooling override (T7100F only).	27	00	No temperature change when override key pressed.	01 - 15	°F the temperature setting is changed when the override key is pressed. Temporary is displayed.	
Deadband (T7100F only).	30	02	Heating and cooling setpoints can be set no closer than 2°F.	03 - 10	Heating and cooling setpoints can be set no closer than the chosen value.	
Interstage control point (T7100F select models only).	31	01 (Conventional) or 02 (Heat pump).	Temperature has to change 1°F or 2°F before the system calls for the next stage.	00 - 12	Temperature has to change the chosen value before the system calls for the next stage.	
Minimum on time (T7100F only).	32	02	2-minute minimum on time for heating and cooling.	00 or 01	No minimum on time or 1 minute minimum on time for heating and cooling.	
Minimum off time for the compressor.	33	04	4-minute minimum off time for the compressor.	00, 01, 02, 03 or 05	Minimum number of minutes (0 thru 5) the compressor is off between calls for the compressor.	
Temperature range stops in heating (T7100F only).	34	90	Highest heating setpoint allowed.	40 - 89	Temperature range (1°F increments) for heating setpoint.	
Temperature range stops in cooling (T7100F only).	35	45	Lowest cooling setpoint allowed.	46 - 99	Temperature range (1°F increments) for cooling setpoint.	
Temperature display adjustment.	37	00	No difference in displayed temperature and actual room temperature.	01 - 06	01—Display adjusts to 1°F higher than actual room temperature. 02—Display adjusts to 2°F higher than actual room temperature. 03—Display adjusts to 3°F higher than actual room temperature. 04—Display adjusts to 1°F lower than actual room temperature. 05—Display adjusts to 2°F lower than actual room temperature. 06—Display adjusts to 3°F lower than actual room temperature.	
Minimum off times in heating (T7100F only).	38	02	2 minute minimum off time.	00, 01, 03, 04 or 05	Minimum number of minutes (0 thru 5) the heating equipment will be off between calls for heat.	

a Available on select models.
b Number 02 must be set to 01 to extend fan operation.
c Number 22 must be set to 01 and remote sensor(s) must be installed.
d Keypad lockout is enabled and disabled by DIP switch 1 on back of thermostat.

IMPORTANT

　　Review the settings to confirm that they match the system. Press i *to exit the Installer Setup.*

INSTALLER SELF-TEST

Use the Installer Self-Test to check the thermostat configurations and operation. Refer to Table 7 for a list of the available Self-Tests.

To start the Self-Test:

NOTE: The minimum off time for compressors is bypassed during the Installer Self-Test.

Press and hold the increase ▲ and decrease ▼ keys at the same time until two zeros appear. All segments of the LCD will be displayed before the two zeros appear. See Fig. 15 and 16.
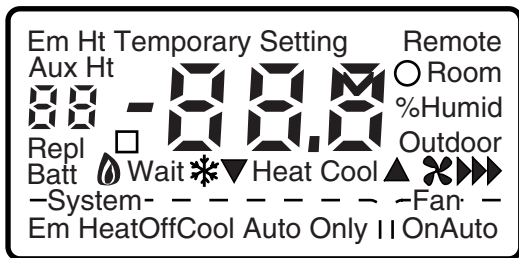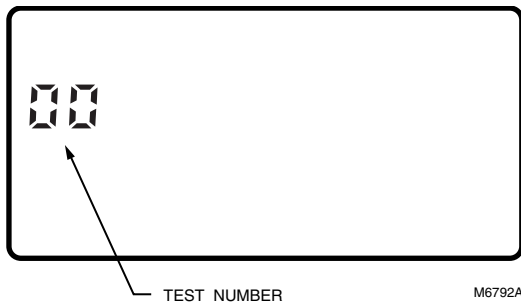

Fig. 15. LCD display of all segments.

IMPORTANT
Models with system and fan switches must set the switches to the equipment that is being checked for the equipment to operate.

Fig. 16. Test number display.

Table 7. Tests available in the Installer Self-Test.

Test Number	Self-Test Description
10-19	Heating equipment can be turned on and off.
20-29	Emergency heat (Q7100C only) equipment can be turned on and off.
30-39	Cooling equipment can be turned on and off.
40-49	Fan equipment can be turned on and off.
60-69	Keyboard key tests.
70-79	Thermostat information including date code and software versions are displayed.

Refer to Table 8 for the directions and results of the specific tests.

NOTE: Press and hold the increase ▲ and decrease ▼ keys together for three seconds to exit the Self-Test. The Self-Test times out after five minutes without any key presses.

Thermostat Information

1.   Press the Information $\boxed{i}$ key to access the thermostat information.

2.   Press the increase ▲ key to display the production date code. The first two large digits are the month and the third digit is the last digit of the year (Example: 026=February 1996).
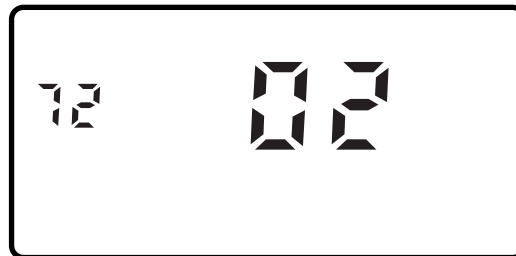
3.   Press the increase ▲ key again to display the software identification code. (Example: 02 = software ID code 2).

4.   Press the increase ▲ key again to display the software revision number (Example: 001=Revision number 1).

5. Press the increase ▲ key again to display the EEPROM identification code. (Example: 222 = EEPROM ID 222).

6. Press and hold the increase ▲ and decrease ▼ keys together, until the room temperature is displayed, to exit the Self-Test. The Self-Test times out after five minutes without any key presses.
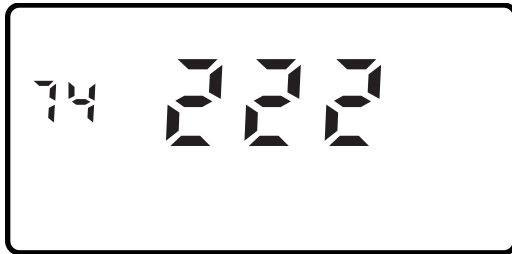
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Table 8. Installer Self-Test Options.

Key to Press	Test Number	Description
Heating Equipment Self-Test		
ⓘ	10	Enter heating equipment Self-Test.
▲	11	Stage-one heat turns on. When Installer Setup number 01 is 01 or 02 is 01, the system fan is also energized.
▲	12	Stage-two heat turns on. Stage-one heat and system fan remain on.
▲	13	Stage-three heat turns on. Stage-one and stage-two heat remain on.
▼	12	Stage-three heat turns off.
▼	11	Stage-two heat turns off.
▼	10	Stage-one heat and system fan turn off.
Emergency Heating Equipment Self-Test (with select models of Q7100C subbase)		
ⓘ	20	Change from heating to emergency heating equipment Self-Test.
▲	21	Emergency heat turns on. System fan also turns on.
▼	20	Emergency heat turns off.
Cooling Equipment Self-Test		
ⓘ	30	Change from heating or emergency heating to cooling equipment Self-Test.
▲	31	Stage-one cool and system fan turn on.
▲	32	Stage-two cool and system fan turn on.
▼	31	Stage-two cool and system fan turn off.
▼	30	Stage-one cool and system fan turn off.
Fan Equipment Self-Test		
ⓘ	40	Change from cooling to fan equipment Self-Test.
▲	41	Fan turns on.
▼	40	Fan turns off.
Key Test[a]		
ⓘ	60	Displays 2.
▲	60	Displays 4.
▼	60	Displays 3.
Override	60	Displays 5.
System[a]	60	Displays 0.
Fan[a]	60	Displays 1.

[a]Available on select models.

OPERATION

Thermal Performance

During severe weather, the thermostat actually controls closer to the setpoint than a electromechanical control. This is because the heat anticipator is replaced by two electronic control strategies—cycling by heat anticipation and proportional plus integral control.

Electronic cycling by heat anticipation acts like a traditional heat anticipator except that it never needs adjusting for various control circuit load currents. It cycles off the heating system slightly before the room temperature reaches the setpoint to keep the heat remaining in the ductwork from overheating the room.

In severe weather, a conventional control with a heat anticipator tends to turn off the system too soon so the effective setpoint is somewhat below the setpoint. In very cold weather, the difference between setpoint and effective control point can be 5°F or 6°F (2°C or 3°C) with a conventional control. This phenomenon is called *droop*.

Proportional plus integral action eliminates droop by adjusting the on time of the stage that is cycling longer or shorter until the control point matches the setpoint. The thermostat maintains the space temperature within 1°F of the setpoint.

The *zero droop* performance provides improved occupant comfort and energy savings. Occupants do not need to continually adjust thermostat settings to maintain desired temperature, even during severe weather.

Operation Sequence

The thermostat energizes specific terminals, depending on the Fan and System settings. The LCD displays the time, room temperature, system and fan selection. Symbols are displayed when the heating, cooling or fan is energized. See Tables 9 and 10 for specific information.

NOTE: Not all the subbase models have all the terminals listed in the Energize column.

Table 9. Conventional Thermostat Sequence of Operation.

Selection		Call	Energize	Display
Fan	System			
Auto	Off	None	None	None
On	Off	None	G	�
Auto	Cool	None	O	None
Auto	Cool or Auto	Stage 1 Cooling	O, G and Y or O, G and Y1	✳ and ✿
Auto	Cool or Auto	Stage 2 Cooling	O, G and Y2	✳ and ✿
Auto	Heat	None	B	None
Auto	Heat or Auto	Stage 1 heating	B and W[a] or B and W1[a]	🔥 and ✿
Auto	Heat or Auto	Stage 2 heating	B and W2[a]	🔥 and ✿
Auto	Auto	None	O or B[b]	None

[a] When Installer Setup 02 is set to 01 (electric heat), G is energized and the fan symbol is also displayed.
[b] Based on last piece of equipment called (cooling = O or heating = B) and Installer Setup selection.

Table 10. Heat Pump Thermostat Sequence of Operation.

Selection		Call	Energize	Display
Fan	System			
Auto	Off	None	None	None
On	Off	None	G	✿
Auto	Cool	None	O	None
Auto	Cool or Auto	Stage 1 Cooling	O, G and Y, or O, G and Y1	✳ and ✿
Auto	Cool or Auto	Stage 2 Cooling	O, G and Y2	✳ and ✿
Auto	Heat	None	B	None
Auto	Heat or Auto	Stage 1 heating	B and W, B and W1, or B and Y1[a]	🔥 and ✿
Auto	Heat or Auto	Stage 2 heating	B and W2, or B and Y2[a]	🔥, ✿, and Aux Ht[b]
Auto	Heat or Auto	Stage 3 heating	B, Y1, Y2 and W3	🔥, ✿, and Aux Ht
Auto	Em Heat	None	B and X1	Em Ht
Auto	Em Heat	Stage 1 heating	B, X1 and E	🔥, ✿, and Em Ht
Auto	Em Heat	Stage 2 heating	B, X1, E and W2	🔥, ✿, Em Ht and Aux Ht
Auto	Auto	None	O or B[c]	None

[a] Three-stage heat model only.
[b] Aux Ht does not appear if it is a three-stage heat system.
[c] Based on last piece of equipment called (cooling = O or heating = B) and Installer Setup selection.

Minimum-Off Timing

A minimum-off timer assures that the cooling compressor or heat pump compressor does not come on again for at least five minutes after it turns off. The minimum-off timer is triggered when the compressor goes off and when the system switch is changed. If the compressor turns off when the setpoint is changed, then the minimum-off timer is triggered. The minimum-off timer operates during the first stage of both heating and cooling on the heat pump thermostat models and during cooling only on the standard application models.

Emergency Heat (select models)

When the system is set for Emergency Heat, the auxiliary heat is stage one and the compressor stages are locked off. Depending on the model, the fan can be activated when Emergency Heat is used.

Fan Control

The fan is on when these conditions are present (it can take up to 20 seconds for the fan to turn on):

Fan On: The fan is energized continuously.
Fan Auto: The fan runs only with the heating and cooling system.

Select models allow the installer the option of electric or conventional heat fan operation in the Installer Setup. When set for electric heat systems, the fan comes on at the same time as the heat when energized by the thermostat. The fan is energized by the plenum switch when set for conventional heating system.

Override Temperature (select models)

The T7100 temperature settings can be overridden when using the Override key, a remote setback timer, or a occupancy sensor. When using the override feature, the temperature settings change according to the Installer Setup 27 setting.

When the Override key (select T7100F models) is pressed, the thermostat temporarily changes from the comfort setpoint to the temporary setpoint by the amount set in Installer Setup 27. See Table 11. Pressing the key a second time cancels the temporary setting.

The normal contact state (comfort setpoint) when using a remote timer or occupancy sensor is closed. The temporary contact state (temporary setpoint) is open.

NOTE: Pressing the Override key at any time changes the state of the contacts.

Table 11. Examples of Temperature Overrides.

System Setting	Comfort Setpoint	Installer Setup 27 Setting	Temporary Setpoint
Heat	68°F	10°F	58°F
Cool	74°F	10°F	84°F

Always check the display to determine if the thermostat is controlling to the comfort, temporary or remote setpoint. Temporary is displayed when the thermostat is operating at the temporary setpoint.
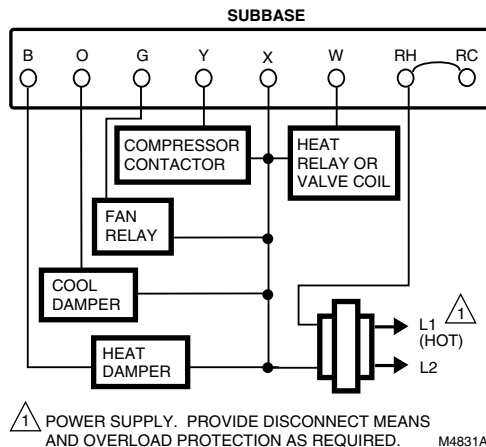
WIRING DIAGRAMS (FIG. 17-22)

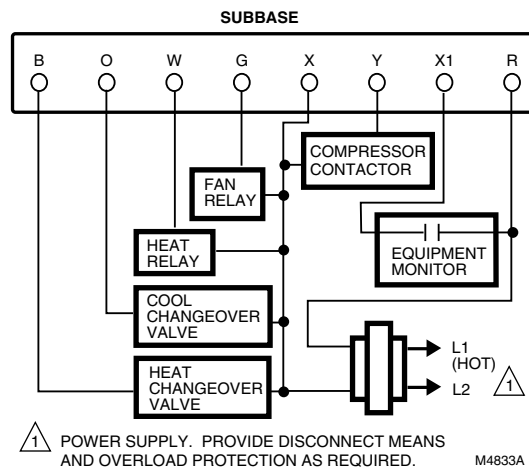**Fig. 17. Typical hookup of Q7100A1044 in a one-stage heat and one-stage cool conventional system.**

Fig. 18. Typical hookup of Q7100C1024 in a one-stage heat and one-stage cool heat pump system.
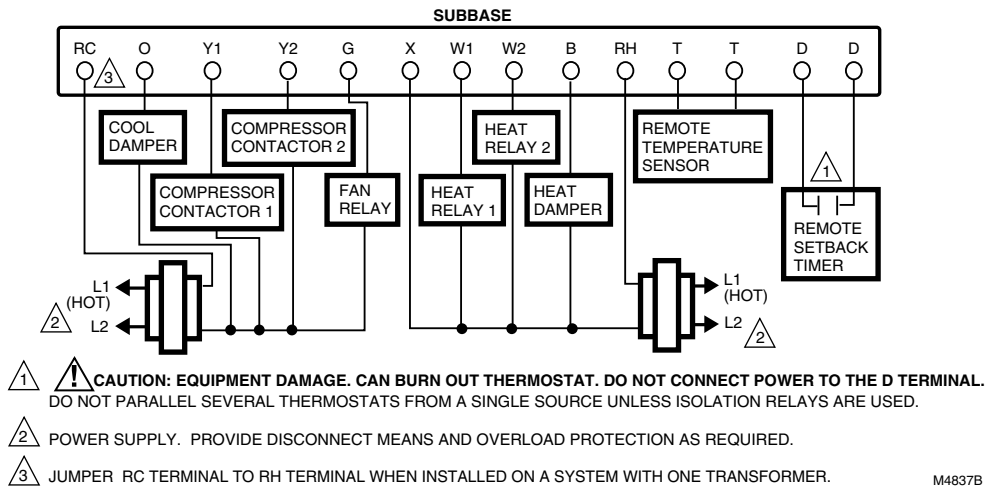
△1 ⚠ **CAUTION: EQUIPMENT DAMAGE. CAN BURN OUT THERMOSTAT. DO NOT CONNECT POWER TO THE D TERMINAL.** DO NOT PARALLEL SEVERAL THERMOSTATS FROM A SINGLE SOURCE UNLESS ISOLATION RELAYS ARE USED.

△2 POWER SUPPLY. PROVIDE DISCONNECT MEANS AND OVERLOAD PROTECTION AS REQUIRED.

△3 JUMPER RC TERMINAL TO RH TERMINAL WHEN INSTALLED ON A SYSTEM WITH ONE TRANSFORMER.

M4837B

Fig. 19. Typical hookup of Q7100A1010 in a two-stage heat and two-stage cool conventional system with two transformers.

△1 ⚠ **CAUTION: EQUIPMENT DAMAGE. CAN BURN OUT THERMOSTAT. DO NOT CONNECT POWER TO THE D TERMINAL.** DO NOT PARALLEL SEVERAL THERMOSTATS FROM A SINGLE SOURCE UNLESS ISOLATION RELAYS ARE USED.

△2 POWER SUPPLY. PROVIDE DISCONNECT MEANS AND OVERLOAD PROTECTION AS REQUIRED.

△3 EM. HT. RELAY DOES NOT CYCLE TO TURN OFF THE EM. HEAT. GO TO SYSTEM SELECTION AND CHOOSE HEAT.
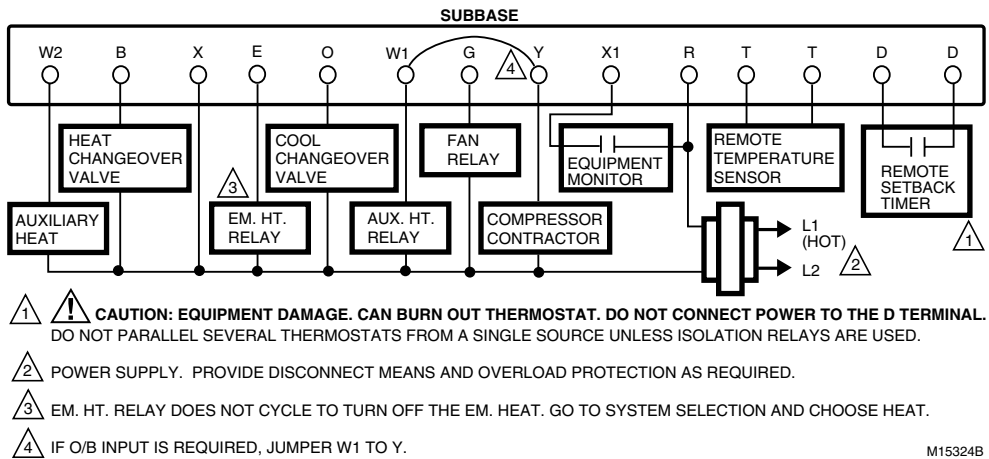
△4 IF O/B INPUT IS REQUIRED, JUMPER W1 TO Y.

M15324B

Fig. 20. Typical hookup of Q7100C1016 in two-stage heat, one-stage cool heat pump system. Includes remote temperature sensor, remote setback timer.
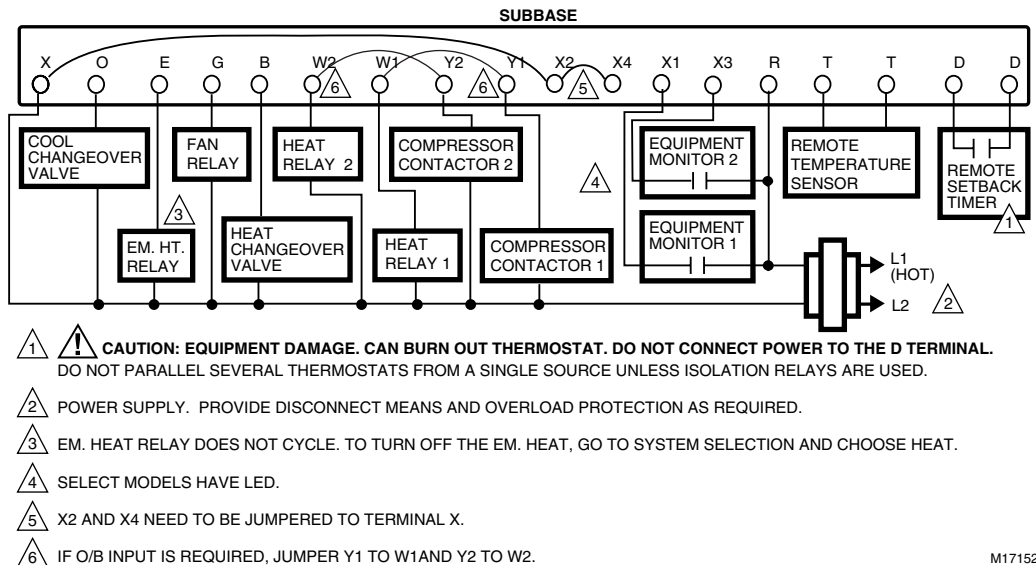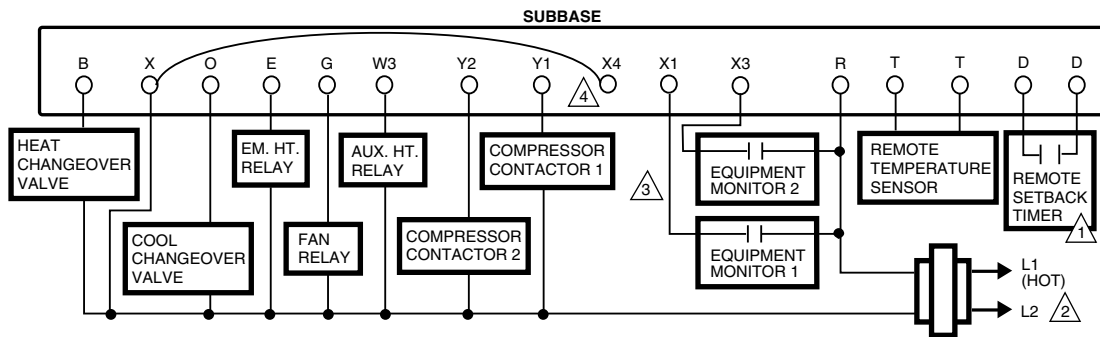

△1 ⚠ **CAUTION: EQUIPMENT DAMAGE. CAN BURN OUT THERMOSTAT. DO NOT CONNECT POWER TO THE D TERMINAL.** DO NOT PARALLEL SEVERAL THERMOSTATS FROM A SINGLE SOURCE UNLESS ISOLATION RELAYS ARE USED.

△2 POWER SUPPLY. PROVIDE DISCONNECT MEANS AND OVERLOAD PROTECTION AS REQUIRED.

△3 EM. HEAT RELAY DOES NOT CYCLE. TO TURN OFF THE EM. HEAT, GO TO SYSTEM SELECTION AND CHOOSE HEAT.

△4 SELECT MODELS HAVE LED.

△5 X2 AND X4 NEED TO BE JUMPERED TO TERMINAL X.

△6 IF O/B INPUT IS REQUIRED, JUMPER Y1 TO W1 AND Y2 TO W2.

M17152

Fig. 21. Typical hookup of Q7100C1008 in two-stage heat, two-stage cool heat pump system. Includes remote temperature sensor, remote setback timer.

CAUTION: EQUIPMENT DAMAGE. CAN BURN OUT THERMOSTAT. DO NOT CONNECT POWER TO THE D TERMINAL. DO NOT PARALLEL SEVERAL THERMOSTATS FROM A SINGLE SOURCE UNLESS ISOLATION RELAYS ARE USED.

POWER SUPPLY. PROVIDE DISCONNECT MEANS AND OVERLOAD PROTECTION AS REQUIRED.

SELECT MODELS HAVE LEDS.

X4 NEEDS TO BE JUMPERED TO TERMINAL X.

M15325A

Fig. 22. Typical hookup of Q7100C1073 in three-stage heat, one-stage cool heat pump system. Includes remote temperature sensor, remote setback timer.

TROUBLESHOOTING GUIDE

Symptom	Possible Cause	Action
Display does not come on.	Thermostat is not being powered.	• Check that X terminal is connected to the system transformer. • Check for 24 Vac between X and R or RH terminals. — If missing 24 Vac: — Check if the circuit breaker is tripped; if so, reset the circuit breaker. — Check if the system fuse is blown; if so, replace the fuse. — Check if the power switch on the HVAC equipment is in the Off position; if so, set to the On position. — Check wiring between thermostat and HVAC equipment and replace any broken wires and tighten any loose connections. — If 24 Vac is present, proceed with troubleshooting.
Temperature display is incorrect.	Room temperature display has been reconfigured.	Enter Installer Setup 37 and reconfigure the display.
	Thermostat is configured for °F or °C display.	Enter Installer Setup 14 and reconfigure the display.
	Bad thermostat location.	Relocate the thermostat.
	Display shows two dashes and a degree sign.	Installer Setup 22 is set for remote sensing and the sensor is missing or the circuit is open or shorted.
Temperature settings will not change. (Example: Cannot set the heating higher or the cooling lower.)	The upper or lower temperature limits were reached.	Check the temperature setpoints: • Heating limits are 40 to 90°F (7 to 31°C). • Cooling limits are 45 to 99°F (9 to 37°C).
Heating does not come on.	No power to the thermostat.	• Check that X terminal is connected to the system transformer. • Check for 24 Vac between X and R or RH terminals. — If missing 24 Vac: — Check if the circuit breaker is tripped; if so, reset the circuit breaker. — Check if the system fuse is blown; if so, replace the fuse. — Check if the system switch at the equipment is in the Off position; if so, set to On position. — Check wiring between thermostat and HVAC equipment and replace any broken wires and tighten any loose connections. — If 24 Vac is present, proceed with troubleshooting.

(continued)

Troubleshooting Guide *(continued)*

Symptom	Possible Cause	Action
Heating does not come on. *(continued)*	Thermostat minimum Off time is activated and wait indicator is displayed (T7100F only).	• Wait up to five minutes for the system to respond. • Enter Installer Setup 38 (T7100F only) and reconfigure minimum On time (if required).
	System selection is not set to Heat.	Set system selection to Heat.
	O or B terminal miswired (select models).	Check system description to determine whether changeover should be energized in heat (B) or cool (O). Rewire if necessary.

Cooling does not come on.	No power to the thermostat.	• Check that X terminal is connected to the system transformer.
		• Check for 24 Vac between X and R or RC and Y terminals.
		  — If missing 24 Vac:
		    — Check if the circuit breaker is tripped; if so, reset the circuit breaker.
		    — Check if the system fuse is blown; if so, replace the fuse.
		    — Check if the system switch at the equipment is in the Off position; if so, set to the On position.
		    — Check wiring between thermostat and HVAC equipment and replace any broken wires and tighten any loose connections.
		  — If 24 Vac is present, proceed with troubleshooting.

	Thermostat minimum Off time is activated.	• Wait up to five minutes for the system to respond. • Enter Installer Setup 33. Reconfigure minimum Off time (if required).
	System selection is not set to Cool.	Set system selection to Cool.
	O or B terminal miswired (select models).	Check system description to determine whether changeover should be energized in heat (B) or cool (O). Rewire if necessary.
System on indicator (flame=heat, snowflake=cool) is lit, but no heat is being delivered.	Fan operation set for 00 (conventional heat) when it should be set for 01 (electric heat) (T7100D,F only).	Enter Installer Setup 02 and reconfigure the fan operation.
	Conventional heating equipment turns on the fan when the furnace has warmed up to a setpoint (T7100D,F only).	Wait a minute after seeing the On indicator and then check the registers.
	Heating equipment is not operating.	Verify operation of heating equipment in Self-Test.

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