

# Heat Pump Controller— Multi-Stage Start-up Procedures

This document presents start-up procedures for the Heat Pump Controller—Multi-Stage (Applications 2273 and 2274 only). See Figure 1.

**NOTE:** Update each controller at the field panel immediately after you complete the controller start-up procedures and have made all other changes to the controller's point database (including tuning, etc.)

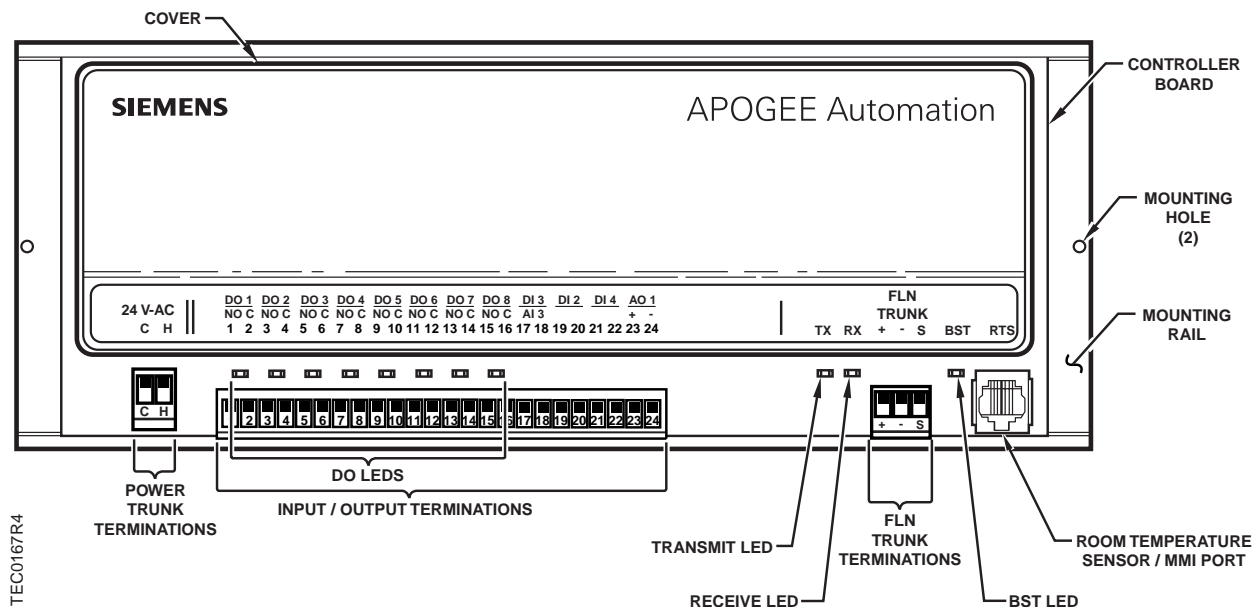


Figure 1. Heat Pump Controller—Multi-Stage.

## Verifying Power to Controller

Verify that the Heat Pump Controller—Multi-Stage is powered up. Check that the BST LED on the controller is flashing. If the BST LED does not flash on/off once per second, see the iKnow troubleshooting tool or contact Field Support.

## Setting the Application

**NOTE:** If you are going to enter an LCTLR point at the field panel, keep track of the controller address, application, override time, duct shape, and duct dimensions you enter at the portable operator's terminal. You will be required to enter these values again at the field panel.

1. Using the portable operator's terminal, display the STARTUP report.
2. Set APPLICATION (Point 2) to the appropriate Heat Pump Controller—Multi-Stage application. See Table 1 for application names and numbers.

**Table 1. Heat Pump Controller—Multi-Stage Applications.**

Application	Revision HM10 or later
Multiple Compressor Heat Pump with Reversing Valve Control and Mixed Air Control	2273
Multiple Heating and Cooling Heat Pump Compressor without Reversing Valve Control and with Mixed Air Control. <b>NOTE:</b> This application can be used for DX cooling and gas valves.	2274
Slave Mode	2290

**NOTE:** After you set the application, the controller will go through a shut-down/load sequence as it switches from slave mode to the application selected. After the application loads and the OVERVIEW report displays, continue with the following procedures.

## Enabling the Damper Actuator

### For Floating-type Damper

1. Display the STARTUP report.
2. Set MTR TIMING (Point 51) to the running time of the actuator. See Table 2.

**Table 2. Damper Actuator Run Time  
(For Floating-Type Dampers Only).**

Damper Actuator	Setting (seconds)	
	50 Hz	60 Hz
GDE131.1P	125	90
GLB131.1P	150	125
PTS4 electronic-to-pneumatic transducer from ACT	—	90

3. If the damper rotation angle is a value other than 90°, set DMPR ROT ANG (Point 56) to the appropriate value. (Rotation angle for the PTS4 is 90°.)
4. Enable the damper actuator by setting MTR SETUP (Point 58) according to Table 3.

**Table 3. Motor Enable/Reverse Values for MTR SETUP (Point 58)  
(For Floating-Type Dampers Only).**

Motor 1 Not Used	Motor 1 Enabled	Motor 1 Enabled and Reversed
0	1	3

**NOTE:** When MTR SETUP is changed, the damper actuator will calibrate. Wait until the actuator has completed its calibration.

5. Command the damper closed with DMPR COMD (Point 48). Verify that it closes and remains closed. If not, adjust the setting for MTR SETUP according to Table 3.
6. If the damper still does not close, the actuator has been installed or set up incorrectly. See the damper actuator installation instructions, setup information, Table 3, or the iKnow troubleshooting tool, or contact Field Support.

## For Spring-Return Damper (0 to 10V)

1. Display the STARTUP report.
2. Set DAMPER TYPE (Point 38) to **SPRING**.
3. Do one of the following:
  - If the damper should **open** as the voltage increases (normally closed), leave AO DIR.REV (Point 39) at its default value of 0.
  - If the spring-return damper should **close** as the voltage increases (normally open), set AO DIR.REV to 1.

## Setting DO DIR.REV

### Application 2273:

If the normal (de-energized) state of the reversing valve is cooling, leave DO DIR.REV (Point 59) at its default value of 0.

If the normal (de-energized) state of the reversing valve is heating, set DO DIR.REV to 4.

**NOTE:** When REV VALVE (Point 44) is changed from normally cooling to normally heating by setting DO DIR.REV to 4, its value will change to reflect the appropriate state of the reversing valve, HEAT/COOL.

## Setting Number of Compressors

**Application 2273:** If using one compressor, leave CMP TOTL (Point 75) at its default value of 1. Otherwise, set CMP TOTL to the number of compressors used. Valid entries are **0, 1, 2, or 3**.

**Application 2274:** If using one heating compressor, leave HTG CMP TOTL (Point 75) at its default value of 1. Otherwise, set HTG CMP TOTL to the number of compressors used for heating. Valid entries are **0, 1, or 2**.

## Setting Compressor Minimum OFF and ON Times

If the default values are not appropriate, display the main application report and set the points for compressor minimum OFF and ON times according to the specifications for the equipment being used:

### Application 2273:

Compressor 1	CMP1 MIN OFF	(Point 87), default = 3 min
	CMP1 MIN ON	(Point 88), default = 3 min
Compressor 2	CMP2 MIN OFF	(Point 27), default = 3 min
	CMP2 MIN ON	(Point 28), default = 3 min
Compressor 3	CMP3 MIN OFF	(Point 36), default = 3 min
	CMP3 MIN ON	(Point 37), default = 3 min

### Application 2274:

Cooling Compressor 1	CLG1 MIN OFF	(Point 32), default = 3 min
	CLG1 MIN ON	(Point 33), default = 3 min
Cooling Compressor 2	CLG2 MIN OFF	(Point 36), default = 3 min
	CLG2 MIN ON	(Point 37), default = 3 min
Heating Compressor 1	HTG1 MIN OFF	(Point 87), default = 3 min
	HTG1 MIN ON	(Point 88), default = 3 min
Heating Compressor 2	HTG2 MIN OFF	(Point 27), default = 3 min
	HTG2 MIN ON	(Point 28), default = 3 min

## Setting Stages of Electric Heat

1. Display the STARTUP report.
2. Do one of the following:
  - If using one stage of electric heat, leave EHTG STG CNT (Point 76) at its default value of **1**.
  - If not using electric heat, set EHTG STG CNT to **0**.

## Setting Stages of Cooling

**Application 2274:** If using one cooling compressor, leave CLG CMP TOTL (Point 77) at its default value of 1. Otherwise, set CLG CMP TOTL to the number of compressors used for cooling. Valid entries are **0**, **1**, or **2**.

## Enabling Free Cooling

If free cooling is not used, leave FREE CLG (Point 23) at its default value of DISABL.

If free cooling is desired, add the appropriate PPCL statements at the field panel to command FREE CLG on when free cooling is available and off when it is not available, and set FREE CLG to **ENABLE**.

## Enabling Night Mixed Air Control

If mixed air control is desired during night mode, enable it by setting NGT MA CTL (Point 91) to **YES**.

## Setting Room Temperature Setpoints

### If the Controller is to Use a Setpoint Dial

1. Display the SETPOINTS report.
2. If the room temperature sensor has a setpoint dial, and if RM STPT DIAL (Point 13) is used by the controller, set STPT DIAL (Point 14) to **YES**.

**NOTE:** If STPT DIAL is set to YES, DAY HTG STPT (Point 7) and DAY CLG STPT (Point 6) are not used. The value of RM STPT DIAL is used.

3. Set the night setpoints to the appropriate values:
  - NGT CLG STPT (Point 8)
  - NGT HTG STPT (Point 9)
4. Set RM STPT MIN (Point 11) and RM STPT MAX (Point 12) for the minimum and the maximum allowable room temperature setpoint values, respectively. Valid values range from 55°F to 95°F (13°C to 35°C).

## If No Setpoint Dial is Used

1. Display the SETPOINTS report.
2. Verify that STPT DIAL (Point 14) is set to **NO**.
3. Set the following points to the appropriate values:
  - DAY CLG STPT (Point 6)
  - DAY HTG STPT (Point 7)
  - NGT CLG STPT (Point 8)
  - NGT HTG STPT (Point 9)

## Setting Override Time

1. Display the STARTUP report.
2. If using night override, set OVRD TIME (Point 20) to the number of whole hours that an override should last. If set at zero (the default), then night override is disabled.

## Setting Fan to Cycle with Compressor

If the fan is to cycle during day mode with the compressor(s), set CYCLE FAN (Point 60) to **YES**. Otherwise, the fan will be on all the time in day mode.

## Enabling Wall Switch

If a wall switch is used for day/night control, enable it by setting WALL SWITCH (Point 18) to **YES**.

## Setting Suggested Point Values

The following are suggested point values for various heat pump configurations. Set these values as appropriate for your configuration.

**Table 4. Application 2273: Suggested Point Values for Heat Pump Configurations with 1 Compressor.**

Point Number	Descriptor	1 Compressor 0 Elec Heat Stages	1 Compressor 1 Elec Heat Stages	1 Compressor 2 Elec Heat Stages	1 Compressor 3 Elec Heat Stages
61	FREE CLG ON	40%	40%	40%	35%
62	FREE CLG OFF	20%	20%	20%	15%
76	EHTG STG CNT	0	1	2	3
81	EHEAT 1 ON	–	80%	80%	70%
82	CMP1 ON	60%	60%	60%	55%
83	CMP1 OFF	40%	40%	40%	35%
84	RVAL SWITCH	30%	30%	30%	30%
85	SWITCH LIMIT	5%	5%	5%	5%
94	EHEAT 2 ON	–	–	98%	85%
95	EHEAT 3 ON	–	–	–	98%

**Table 5. Application 2273: Suggested Point Values for Heat Pump Configurations with 2 or 3 Compressors.**

Point Number	Descriptor	2 Compressors 0 Elec Heat Stages	2 Compressors 2 Elec Heat Stages	3 Compressors 0 Elec Heat Stages	3 Compressors 1 Elec Heat Stage
16	CMP2 ON	70%	70%	70%	55%
17	CMP2 OFF	50%	50%	50%	40%
34	CMP3 ON	–	–	90%	70%
35	CMP3 OFF	–	–	70%	55%
61	FREE CLG ON	30%	30%	30%	25%
62	FREE CLG OFF	10%	10%	10%	10%
75	CMP TOTL	2	2	3	3
76	EHTG STG CNT	0	2	0	1
81	EHEAT 1 ON	–	85%	–	85%
82	CMP1 ON	50%	50%	50%	40%
83	CMP1 OFF	30%	30%	30%	25%
84	RVAL SWITCH	30%	30%	30%	30%
85	SWITCH LIMIT	5%	5%	5%	5%
94	EHEAT 2 ON	70%	98%	–	–



**Table 6. Application 2274: Suggested Point Values for Heat Pump Configurations with 0 or 1 Compressor.**

Point Number	Descriptor	0 Heating Compressors 1 Cooling Compressor 1 Electric Heat Stage	0 Heating Compressors 2 Cooling Compressor 1 Electric Heat Stage	1 Heating Compressor 1 Cooling Compressor 0 Electric Heat Stages
30	CLG CMP1 ON	60%	50%	60%
31	CLG CMP1 OFF	40%	30%	40%
34	CLG CMP2 ON	–	70%	–
35	CLG CMP2 OFF	–	50%	–
61	FREE CLG ON	40%	30%	40%
62	FREE CLG OFF	20%	10%	20%
75	HTG CMP TOTL	0	0	1
76	EHTG STG CNT	1	1	0
77	CLG CMP TOTL	1	2	1
81	ELEC HEAT ON	60%	60%	–
82	HTG CMP1 ON	40%	40%	60%
83	HTG CMP1 OFF	20%	20%	40%
85	SWITCH LIMIT	5%	5%	5%

**Table 7. Application 2274: Suggested Point Values for Heat Pump Configurations with 1 Heating and 1 or 2 Cooling Compressors.**

Point Number	Descriptor	1 Heating Compressor 1 Cooling Compressor 1 Electric Heat Stage	1 Heating Compressor 2 Cooling Compressors 1 Electric Heat Stage	1 Heating Compressor 2 Cooling Compressors 0 Electric Heat Stages
30	CLG CMP1 ON	60%	50%	50%
31	CLG CMP1 OFF	40%	30%	30%
34	CLG CMP2 ON	–	70%	70%
35	CLG CMP2 OFF	–	50%	50%
61	FREE CLG ON	40%	30%	30%
62	FREE CLG OFF	20%	10%	10%
81	ELEC HEAT ON	80%	80%	–
82	HTG CMP1 ON	60%	60%	60%
83	HTG CMP1 OFF	40%	40%	40%
85	SWITCH LIMIT	5%	5%	5%

**Table 8. Application 2274: Suggested Point Values for Heat Pump Configurations with 2 Heating and 1 or 2 Cooling Compressors.**

Point Number	Descriptor	2 Heating Compressors 1 Cooling Compressor 0 Electric Heat Stages	2 Heating Compressors 1 Cooling Compressor 1 Electric Heat Stage	2 Heating Compressors 2 Cooling Compressors 0 Electric Heat Stages
16	HTG CMP2 ON	70%	70%	70%
17	HTG CMP2 OFF	50%	50%	50%
30	CLG CMP1 ON	60%	60%	50%
31	CLG CMP1 OFF	40%	40%	30%
34	CLG CMP2 ON	—	—	70%
35	CLG CMP2 OFF	—	—	50%
61	FREE CLG ON	40%	40%	30%
62	FREE CLG OFF	20%	20%	10%
81	ELEC HEAT ON	—	90%	—
82	HTG CMP1 ON	50%	50%	50%
83	HTG CMP1 OFF	30%	30%	30%
85	SWITCH LIMIT	5%	5%	5%

## Setting Controller Address

Set CTLR ADDRESS (Point 1) to the appropriate address number.

**NOTE:** Update each controller at the field panel immediately after you complete the controller start-up procedures, and have made all other changes to the controller's point database (including tuning, etc.)

Start-up of the Heat Pump Controller—Multi-Stage is complete.