

SIEMENS



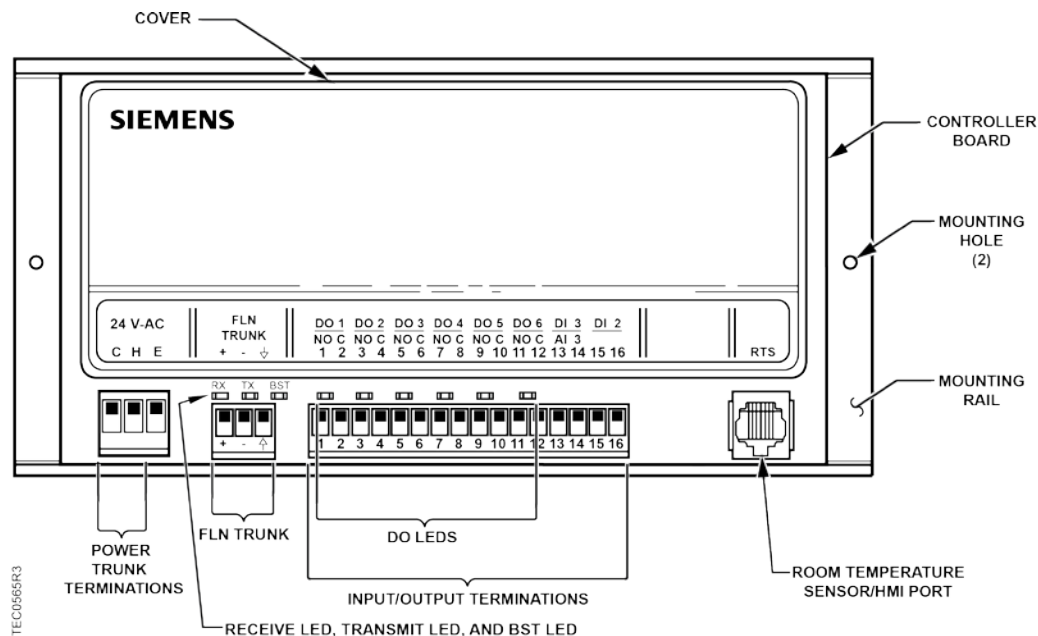
TEC Controller Heat Pump Single Stage

Start-up Procedures

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Before You Begin



Generic Controller I/O Layout. See *Wiring Diagram* for application specific details.

Communication and DO Indicators

The Siemens TEC Heat Pump Controller Single Stage has LEDs to indicate communication (yellow) and DO (digital output) status BST (green).

Verifying Power to the Controller

Verify that the controller 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 Technical Support for troubleshooting information.

Verifying Slave Mode Application

1. Verify that APPLICATION is set to 2090.
2. Display the STARTUP report.

Enabling Actuators



⚠ CAUTION

The controller's DOs control only 24 Vac loads.
The maximum rating is 12 VA for each DO.

The point that determines actuator run times is:

- MTR TIMING
1. Use and/or to set run time(s) for the actuator(s) used by your application.
 2. For damper rotation angles other than 90°, set DMPR ROT ANG to the appropriate value. The name of these points vary.

Damper Actuator Run Time		
Damper Actuator	Setting (seconds)	
	50 Hz	60 Hz
GDE131.1	125	90
GLB131.1	150	125
GQD131.1P (spring return)	150	125
PTS4 electronic-to-pneumatic transducer from ACT	-	90

1. Verify that the damper closes when commanding MTR1 COMD. If it does not close, reverse the action of the damper actuator by setting MTR SETUP to 3.
2. If the damper still does not close, the actuator has been installed or set up incorrectly. See the table in Using the Controller as a Point Extension Device for more setup information.



NOTE:

If you are going to enter an LCTLR point at the field panel, keep track of the controller address and override time you enter at the WCIS and PTEC Tool. You will be required to enter these values again at the field panel.

Setting the Application

Add the TEC to your job database and select one of the following applications.

Application	Application Number
Single Compressor Heat Pump with Reversing Valve	2070
Two Compressor Heat Pump with Reversing Valve Control and Mixed Air Control	2071

Application	Application Number
Heating and Cooling Heat Pump with Internal Reversing Valve and Mixed Air Control NOTE: This application can also be used for DX cooling and a gas valve.	2072
Slave Mode	2090

The controller will go through a shut-down/load sequence as it switches from slave mode to the selected application.

Setting DO DIR.REV

Applications 2070, and 2071:

If the normal (de-energized) state of the reversing valve is cooling, leave DO DIR.REV 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 is changed from normally cooling to normally heating by setting DO DIR.REV to 4, the following occurs:

For controllers with firmware revision HP01 and HP02 the HEAT/COOL text displayed for REV VALVE does not change. However, an asterisk (*) appears in the Priority column of the WCIS display for REV VALVE, indicating that the default value of the point differs from the current value.

For controllers with firmware revision HP10 or later, the value of REV VALVE will change to reflect the appropriate state of the reversing valve, HEAT or COOL.

Setting Number of Compressors

Application 2071:

If using one compressor, no change is required for CMP TOTL, which has a default value of 1. Otherwise, set CMP TOTL to the number of compressors used. Valid entries are 0 or 2.

Application 2072:

If using one heating compressor, no change is required for HTG CMP TOTL, which has a default value of 1. Otherwise, set HTG CMP TOTL to 0.

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 2070:

Compressor 1	CMP MIN OFF	default = 3 min
	CMP MIN ON	default = 3 min

Application 2071:

Compressor 1	CMP1 MIN OFF	default = 3 min
	CMP1 MIN ON	default = 3 min
Compressor 2	CMP2 MIN OFF	default = 3 min
	CMP2 MIN ON	default = 3 min

Application 2072:

Cooling Compressor	CLG1 MIN OFF	default = 3 min
	CLG1 MIN ON	default = 3 min
Heating Compressor	HTG1 MIN OFF	default = 3 min
	HTG1 MIN ON	default = 3 min

Setting Stages of Electric Heat and Cooling

Electric Heat

Check the hardware to verify the number of electric heat stages wired to the controller and set EHTG STG CNT to this value. (If not using electric heat, set EHTG STG CNT to 0.)

Applications 2071 and 2072:

If using one stage of electric heat, leave EHTG STG CNT at its default value of 1.



⚠ CAUTION

For installations using electric heat coils, ensure there is a fan flow switch or an electric interlock. Equipment damage can occur if electric heat is on without airflow.

Cooling

Application 2072:

If using one stage of cooling, leave CLG CMP TOTL at its default value of 1. Otherwise, set CLG CMP TOTL to 0, 1 or 2.

Free Cooling

Applications 2071 and 2072:

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

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

Enabling Night Mixed Air Control

If mixed air control is desired during night mode, (for example, free cooling when FREE CLG is enabled), enable it by setting NGT MA CTL to **YES**.

Setting Damper Minimum Position

Set DMPR MIN POS to percent open for minimum air (ventilation) during day/occupied mode.

Setting Room Temperature Setpoints

- Day (or OCC) cooling setpoint: DAY CLG STPT
 - Day (or OCC) heating setpoint: DAY HTG STPT
 - Night (or UOC) cooling setpoint: NGT CLG STPT
 - Night (or UOC) heating setpoint: NGT HTG STPT
1. If the room temperature sensor has a setpoint dial that will be used, set STPT DIAL to **YES**. Otherwise, set STPT DIAL to **NO**.
 - Set RM STPT MIN and RM STPT MAX for the minimum and maximum allowable room temperature setpoint values, respectively. Valid values range from 55° to 95°F (13° to 35°C). Default values are 55°F (13°C) for RM STPT MIN and 90°F (32°C) for RM STPT MAX.
 2. Setpoint dial configured with a heating/cooling deadband (default).
 - To allow the controller to operate with a heating/cooling deadband (functioning the same as provided when the setpoint dial is not present), use the following configuration:
 - Set the DAY HTG STPT less than the DAY CLG STPT by the deadband (or zero energy band) that is desired. (for example, DAY HTG STPT = 70°F; DAY CLG STPT = 74°F, providing a deadband of 4 degrees). Only the difference between these values is used to determine the setpoint that will be used.
 - As described below, the setpoint(s) for heating/cooling will be 1/2 of the deadband above or below the setpoint dial value.
 - ⇒ When HEAT.COOL equals HEAT, then:
 - ⇒ CTL STPT will equal $RM\ STPT\ DIAL - 0.5 * (DAY\ CLG\ STPT - DAY\ HTG\ STPT)$ and will be limited by RM STPT MIN and RM STPT MAX.
 - ⇒ When HEAT.COOL equals COOL, then:
 - ⇒ CTL STPT will equal $RM\ STPT\ DIAL + 0.5 * (DAY\ CLG\ STPT - DAY\ HTG\ STPT)$ and will be limited by RM STPT MIN and RM STPT MAX.
 - NOTE:** A space where the deadband is used can be more energy efficient than a space where the deadband is not being used.
 3. Setpoint dial configured for zero heating/cooling deadband.
 - When the job specification requires a common heating and cooling temperature setpoint, use the following configuration:
 - Set DAY HTG STPT equal to DAY CLG STPT. This will configure the setpoint deadband equal to zero.
 - If a setpoint deadband equals zero, then:
 - CTL STPT will equal RM STPT DIAL, and will be limited by RM STPT MIN and

RM STPT MAX.

NOTE: A space where the heating/cooling deadband is zero may be more comfortable than a space where the deadband is being used, but may use more energy.

4. Set the room temperature setpoints to the desired values. Heating setpoints are not present in cooling only applications.

Setting Override Time

If using night/unoccupied override, set OVRD TIME to the number of whole hours that an override should last. If OVRD TIME equals 0 (default), this feature is disabled.

Setting Fan to Cycle with Compressor

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

Enabling Wall Switch

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

Otherwise, leave WALL SWITCH at its default value of **NO**.

Setting Suggested Point Values

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

Application 2071: Suggested Point Values for Heat Pump Configurations with 1 & 2 Compressors				
Point Number	Descriptor	1 Compressor 0 Elec Heat Stages	1 Compressor 1 Elec Heat Stage	2 Compressors 0 Elec Heat Stages
16	CMP2 ON	--	--	70%
17	CMP2 OFF	--	--	50%
75	CMP TOTL	1	1	2
76	EHTG STG CNT	0	1	0
61	FREE CLG ON	40%	40%	30%
62	FREE CLG OFF	20%	20%	10%
81	EHEAT 1 ON	--	80%	--
82	CMP1 ON	60%	60%	50%
83	CMP1 OFF	40%	40%	30%

Application 2071: Suggested Point Values for Heat Pump Configurations with 1 & 2 Compressors				
Point Number	Descriptor	1 Compressor 0 Elec Heat Stages	1 Compressor 1 Elec Heat Stage	2 Compressors 0 Elec Heat Stages
84	RVAL SWITCH	30%	30%	30%
85	SWTICH LIMIT	5%	5%	5%

Application 2072: Suggested Point Values for Heat Pump Configurations.				
Point Number	Descriptor	0 Heating Compressors 1 Cooling Compressor 1 Elec Heat Stage	1 Heating Compressor 1 Cooling Compressor 0 Elec Heat Stages	1 Heating Compressors 1 Cooling Compressor 1 Elec Heat Stage
30	CLG CMP1 ON	60%	60%	60%
31	CLG CMP1 OFF	40%	40%	40%
61	FREE CLG ON	40%	40%	40%
62	FREE CLG OFF	20%	20%	20%
75	HTG CMP TOTL	0	1	1
76	EHTG STG CNT	1	0	1
77	CLG CMP TOTL	1	1	1
81	ELEC HEAT ON	60%	--	80%
82	HTG CMP1 ON	40%	60%	60%
83	HTG CMP1 OFF	20%	40%	40%
85	SWITCH LIMIT	5%	5%	5%

Setting Controller Address



NOTE:

If you are going to enter an LCTRL point at the field panel, keep track of the controller address and override time you enter at the WCIS. You will be required to enter these values again at the field panel.

Set the controller address by setting CTRL ADDRESS to the appropriate number. (Addresses 00 to 98 are valid; 00 to 31 are typically used.)

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 balancing, tuning, etc.).

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