

## Smoke Control Listed Heat Pump Controller — Single Stage

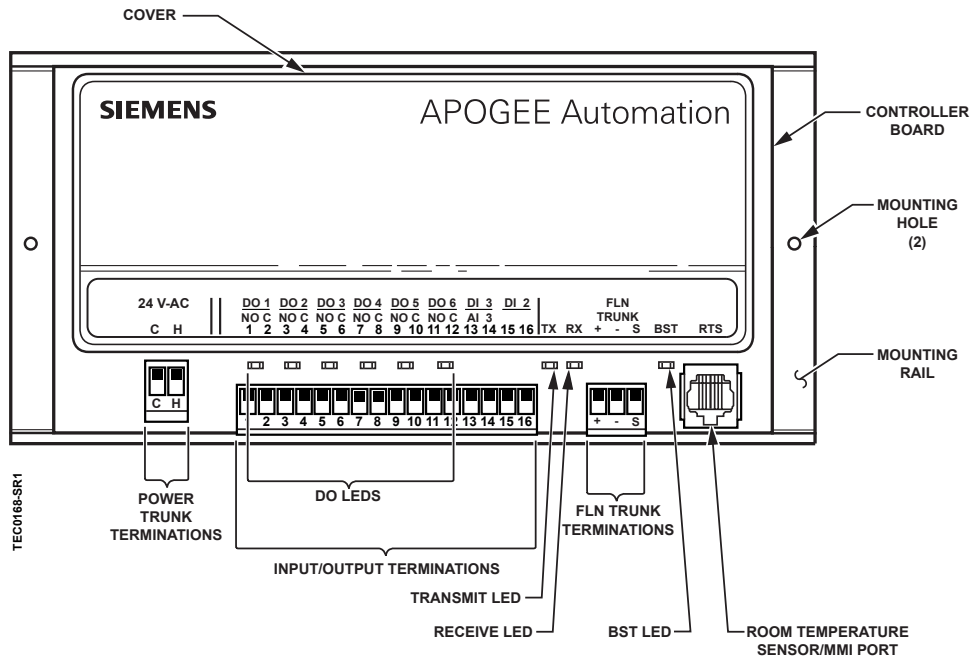


Figure 1. Smoke Control Listed Heat Pump Controller — Single Stage.

### Control Applications

2070 through 2072

### Product Description

The Terminal Equipment Controller (TEC) provides high performance DDC of pressure-independent, variable-air-volume zone-level routines. The TEC can operate stand-alone or can be networked to perform complex HVAC control functions.

The TEC can also be used as part of a Siemens engineered smoke control system. The TEC are used to initiate the operations of dampers and fans but the smoke control strategy will be initiated from any of the APOGEE field panels and not by the TEC.

These instructions explain how to field install or replace a Heat Pump Controller — Single Stage (for single and dual compressor heat pump applications).

### Product Numbers

540-105K Smoke Control Listed Heat Pump Controller — Single Stage

Shipping carton includes a controller assembly, mounting rail, and two self-tapping screws.



#### CAUTION:

Keep the unit in its static-proof bag until installation.

### Accessories

540-658P25 Low cost temporary temperature sensor that enables space control if the permanent room or duct sensor is not installed.

## Parts for Smoke Control Compliance

540-155K	Smoke Control Listed Small Equipment Controller Enclosure
550-002K	Smoke Control Listed Large Equipment Controller Enclosure
ZBX-XXXX <sup>a</sup>	Smoke Control Listed Large Equipment Controller Enclosure
5041MWCB	UL Listed Class 2 transformer with 120/240/277/480 Vac 50/60 HZ 0.4A primary w/ hub and 24Vac 50VA secondary w/ hub and circuit breaker
10041MWCB	UL Listed Class 2 transformer with 120/240/277/480 Vac 50/60 HZ 0.5A primary w/ hub and 24Vac 96VA secondary w/ hub and circuit breaker
KELE AM-2483-OA	UL Listed Class 2 Transformer with primary 120V 60 HZ 0.2A secondary 24 Vac 30 VA
529-804	Receptacle assembly consisting of a UL Listed 2x4 junction box and UL Listed receptacle

a. Enclosure part number ZB-X-XXXX, where the first X can be 9 or any letter from A to N represents the type of TEC module installed/to be installed in the enclosure, and XXXX can be any 4 alphanumeric characters represent the TEC HVAC application.



For smoke control application, primary rating is only 120V/ 60 HZ

## Parts for CE Compliance:

550-705	Clamp-on ferrite filter (10 pack).
588-100 series	Approved 2-RJ11 RTS cable in 25', 50', or 100' (7.6 m, 15.2 m, 30.48 m).

## Caution Notation



### CAUTION:

Equipment damage or loss of data may occur if you do not follow the procedures as specified.

## Expected Installation Times

10 minutes.

## Required Tools and Materials

- Electro-Static Discharge (ESD) wrist strap
- Flat-blade screwdriver (1/8-inch blade width).
- Small flat-blade screwdriver
- Cordless drill/driver set
- 1/4-inch (6.35 mm) hex nut bit

## Prerequisites

- Heat pump installed
- 24 Vac Class 2 power source
- Supply power to the unit is OFF
- If required, controller enclosure installed
- Room temperature sensor installed (optional). (If desired, a low-cost temporary temperature sensor is available that plugs into the RTS port of the TEC (P/N 540-658P25), providing temperature input and actual space control until the permanent room or duct sensor is installed.)



If the controller is being installed on a box with 1 or more stages of electric heat, the 550-809 MOV with pre-terminated spade connectors must be installed across the manufacturer-supplied airflow switch. MOV's can be installed at the time the controller is factory mounted; coordinate with the box manufacturer prior to order placement. For field installation, reference document 540-986.

## Instructions



All wiring must conform to NEC and local codes and regulations.

## Transformer Installation for Smoke Control Applications

### P/N 5041MWCB and 10041MWCB

1. Mount the transformer to a facility installed UL Listed junction box (2x4 or 4x4).

Mount the integral conduit nipple through the knock-out on the junction box.

2. Connect the secondary wires to the TEC using UL Listed CL2 or equivalent cables.

### P/N KELE AM-2483-OA

1. Use Siemens receptacle box assembly (P/N 529-804), installed only inside the enclosure (P/N: 550-002K).
2. Plug the transformer (P/N KELE AM-2483-OA) in to the receptacle.
3. Connect the secondary wires to the TEC using UL Listed CL2 or equivalent cables.

## Controller Installation

1. Secure the mounting rail (Figure 1) in the controller's desired location.
2. Place the ESD wrist strap on your wrist and attach it to a good earth ground.
3. Remove the controller from the static proof bag and snap it into place on the mounting rail.
4. Connect the FLN (Figure 2).

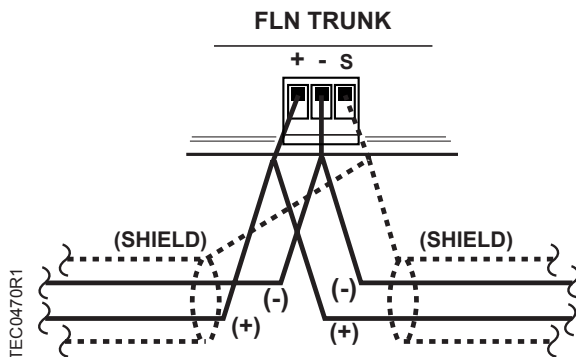


Figure 2. FLN Wiring.



### CAUTION:

Do not ground the shield.

5. Connect the point wiring (see Wiring Diagrams).
6. Plug the room temperature sensor cable into the RTS port (Figure 1).
7. Connect the power trunk (Figure 3). DO NOT apply power to the controller.

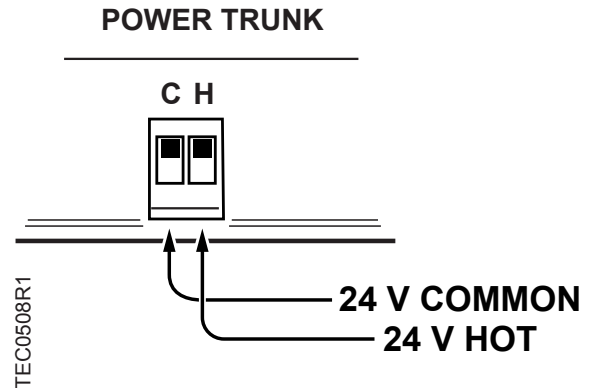


Figure 3. Power Trunk Wiring.

The installation is complete.

## Smoke Control Compliance

The following instructions and information apply if used for smoke control sequence.

1. If used for Smoke Control, install Smoke Control Listed product, enclosure and transformer (see *Product Numbers* and *Accessories* sections).
2. Input Rating:

- 24V 60 HZ 42 VA

Digital Output (DO) Electrical Ratings:

- Transformer P/N 5041BCWB: maximum 6VA per DO/ maximum 30 VA total.
- Transformer P/N 10041BCWB: maximum 6VA per DO/ maximum 36 VA total.
- Transformer P/N AM-2483-OA: maximum 6VA per DO/ maximum 16 VA total.

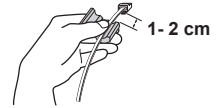
3. The room temperature sensor (RTS) is installed in the same room as the TEC.
4. Connection from the TEC to the APOGEE field panel is maximum 4000 feet, 24 AWG minimum.
5. Wiring Range:

- Transformer: primary 14 AWG
- 24 Vac Input Power: 14 to 18 AWG
- DO: AI: 18 to 20 AWG
- DI: 18 AWG
- LAN: 20 to 24 AWG
- RST: 24 AWG

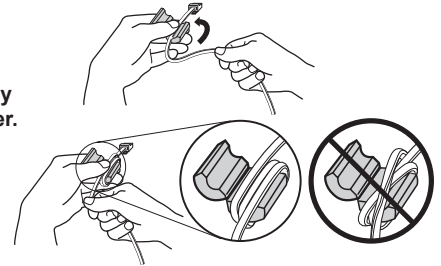
6. Refer to the following documents when used configuring for smoke control application:

- 125-1806: Smoke Control Systems Application and Engineering Manual
- 125-1816: Smoke Control System Application Guide
- 125-1817: NFPA and UL Standards Relevant to Smoke Control System Application Guide

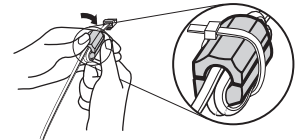
**1** Place the filter 1-2 cm from the end of the cable or wiring to be shielded.



**2** Wind the cable tightly twice around the filter.



**3** Close the filter and wrap with a zip tie.



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Figure 4. Ferrite filter(s) for CE Compliance.

## CE Compliance

If CE compliance is required, a ferrite filter must be placed approximately 1–2 cm from the end of the cable being shielded (RTS cable and the point wiring for AI3/DI3) (Figure 4).

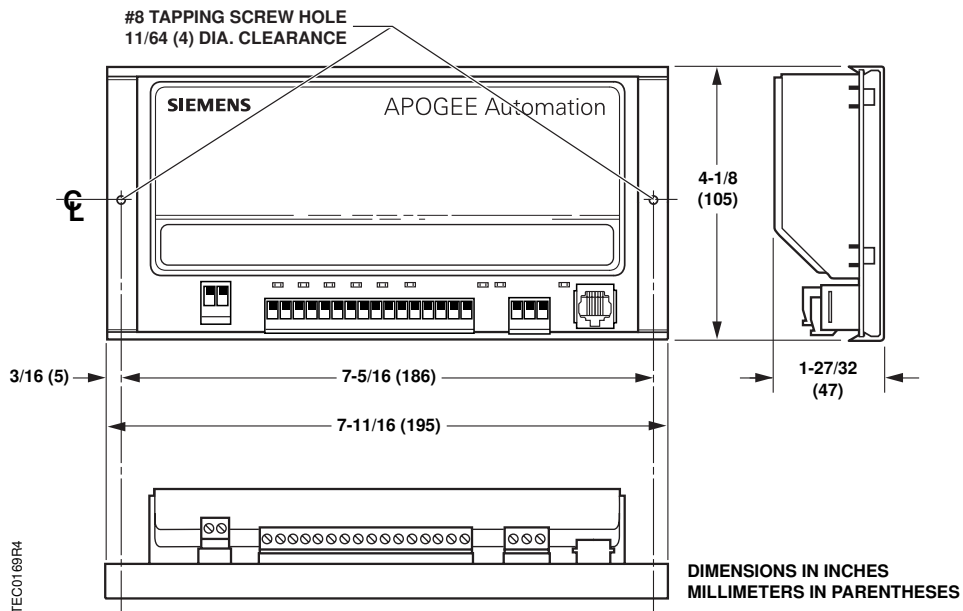


Figure 5. Dimensions.

# Wiring Diagrams



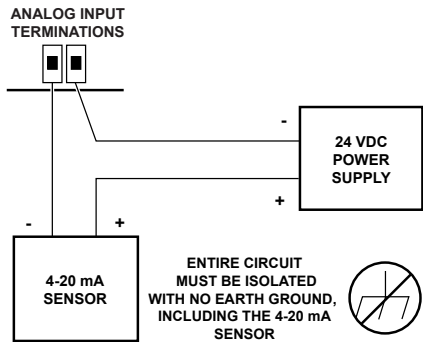
**CAUTION:**

The controller's DOs control 24 Vac loads only. The maximum rating is 6 VA for each DO. Use an interposing 24 Vac relay module (such as P/N [550-054, 550-048, 550-050, 550-052, 540-147]) for any of the following:

- VA requirements higher than maximum
- Separate transformers to power the load
- Power limited Direct Current (DC) power requirements



The 24Vac relay module and the circuit described in Figure 6 are not applicable for smoke control application.

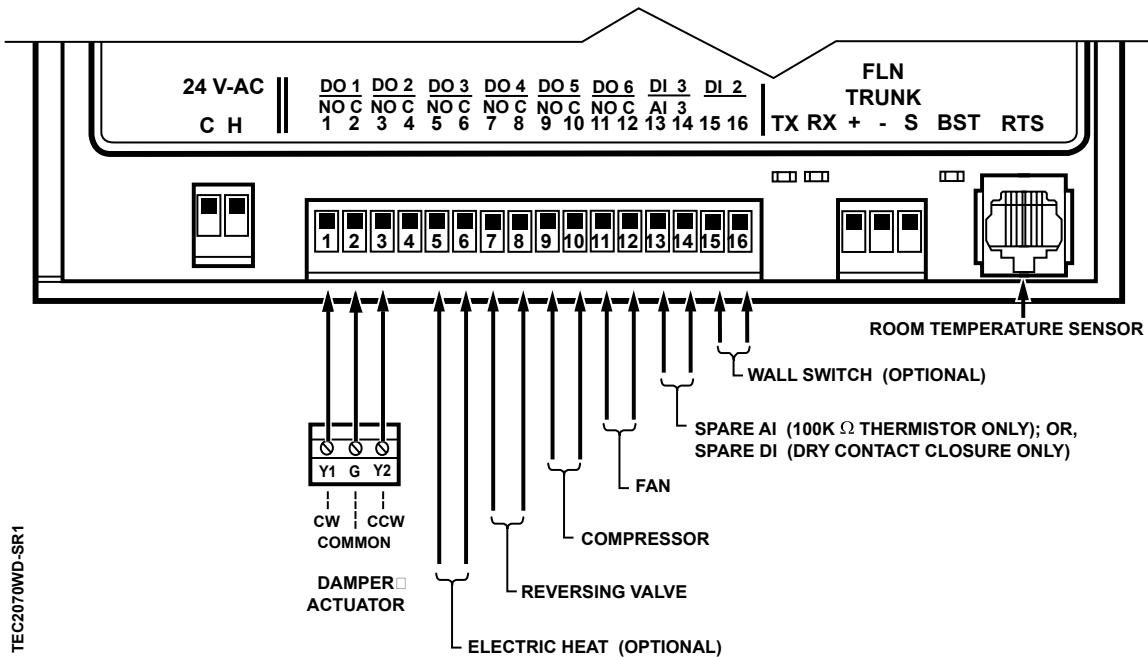


**CAUTION:**

Each 4-20mA sensor requires a SEPARATE, dedicated power limited 24 VDC power supply. DO NOT use the same transformer to power both the sensor and controller.

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**Figure 6. Special Wiring Requirements for 4–20 mA Sensors.**



**Figure 7. Application 2070 (Single Compressor Heat Pump with Reversing Valve Control).**

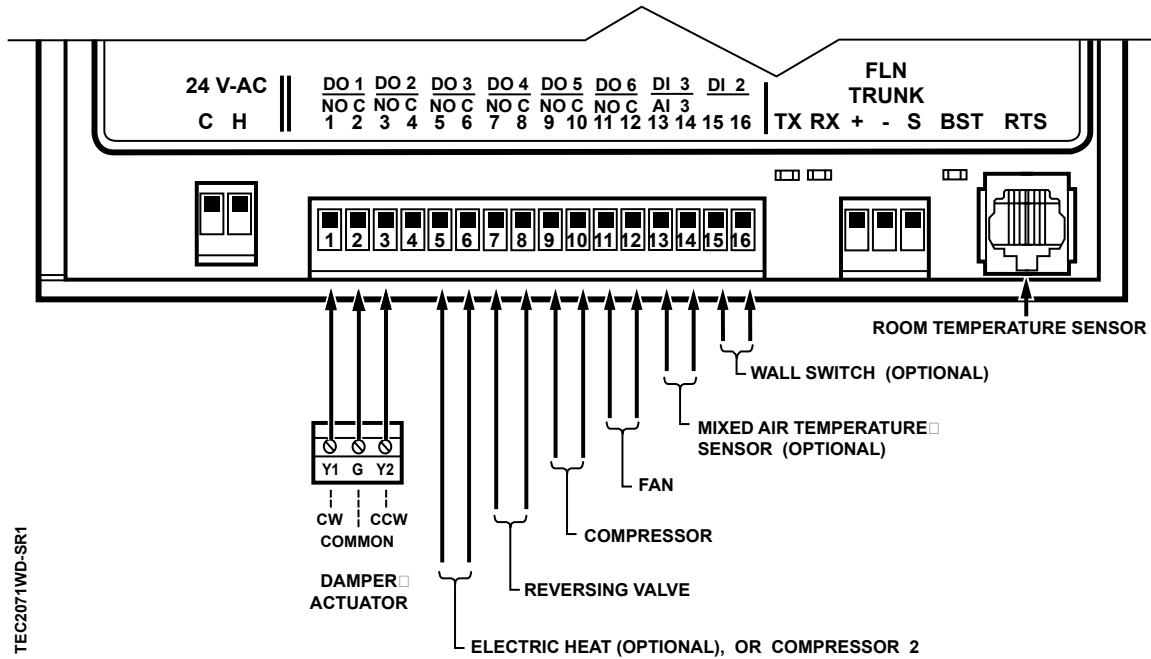


Figure 8. Application 2071 (Two Compressor Heat Pump with Reversing Valve Control and Mixed Air Control).

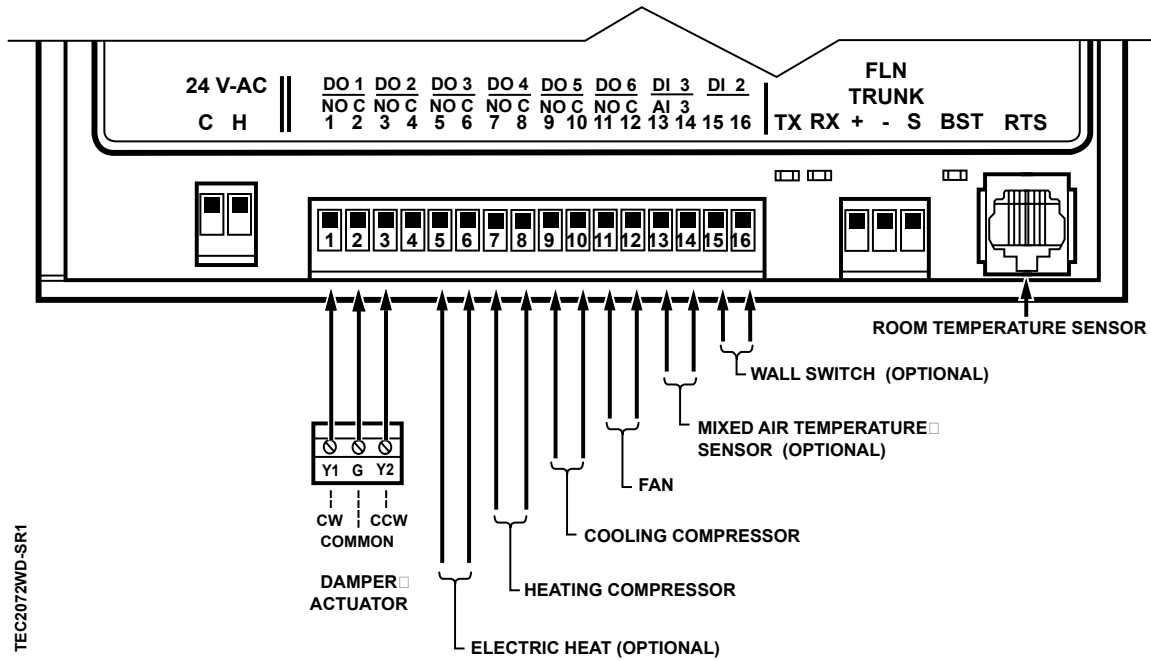


Figure 9. Application 2072 (Heating and Cooling Heat Pump without Reversing Valve Control and with Mixed Air Control).

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