Instructions for Field Retrofit of a Model 98 Temperature Controller in place of a Model 85 Temperature Controller

Introduction:

The following is a set of instructions for retrofitting a Model 98 Digital Temperature controller in place of an existing Model 85 Temperature controller.

This instruction bulletin is divided into the following sections:

1- Safety Precautions
2- Parts included in retrofit kit
3- Removal of existing Model 85 controller
4- Transformer Center Panel modifications
5- Model 98 controller and Thermocouple installation
6- Completing the retrofit installation
7- Reference Drawings

While a great effort has been done to assure that this instruction bulletin is accurate and provides enough detail to assure a problem free retrofit installation all retrofit installations are different and therefore your finished installation may vary from the photographs shown.

Section 1 - Safety Precautions:

DANGER

Hazardous Voltage. Risk of Shock, Burn or Explosion.

- **This equipment must be installed and serviced only by qualified electrical personnel.**
- **Turn off all power supplying this equipment before working on or inside equipment.**
- **Always use a properly rated voltage-sensing device to confirm power is off.**
- **Replace all devices, doors, and covers before turning on power to this equipment.**

Failure to follow these instructions will result in Death or Serious Injury

Read and understand this entire instruction bulletin as well as the instruction bulletin for the Model 98 Digital temperature Controller for Medium Voltage Transformers and the instruction bulletin that was provided with the transformer before installing, operating or maintaining this equipment.

Disconnect all power and verify that the transformer is de-energized before installing this equipment. Do not rely on visual indications such as switch position or fuse removal for determining a de-energized condition. Always assume that a terminal is energized unless it has been checked with a properly rated meter to ensure that the terminal is de-energized and grounded.

Section 2 - Parts included in retrofit kit:

The following parts are included in this retrofit kit. Please verify that you have all of the parts before beginning the retrofit procedure. If you are missing any of these items please contact a Square D Customer Service Representative for assistance.

A) Qty-1 Model 98 Temperature Controller pre-mounted and wired to mounting panel.

B) Model 98 Controller Fuses:

Qty-1 1 amp MDA-1
Qty-1 20 amp MDA-20

C) Hardware Package including:

Qty-5 3/8-16 x 1-1/4" Bolts	Qty-4 ¼-20 x 1" Bolts
Qty-5 3/8-16 Nuts	Qty-4 ¼-20 Nuts
Qty-5 3/8 Split Ring Lock Washers	Qty-4 ¼ Split Ring Lock Washers
Qty-10 3/8 Flat Washers	Qty-8 ¼ Flat Washers
2 Doz. Wire Tie's	Qty-4 Wire Clamps

D) Qty-1 Glastic Thermocouple Support Rod.

E) Qty-60ft Thermocouple Wire.

F) Qty-1 Model 98 Danger Decal, p/n 43500-169-09

G) Qty-6 Fan/Blower Danger Decal, p/n 43500-169-02

H) Model 98 Digital Temperature Controller Instruction Bulletin, p/n 43500-054-26

Section 3 - Removal of Existing Controller:

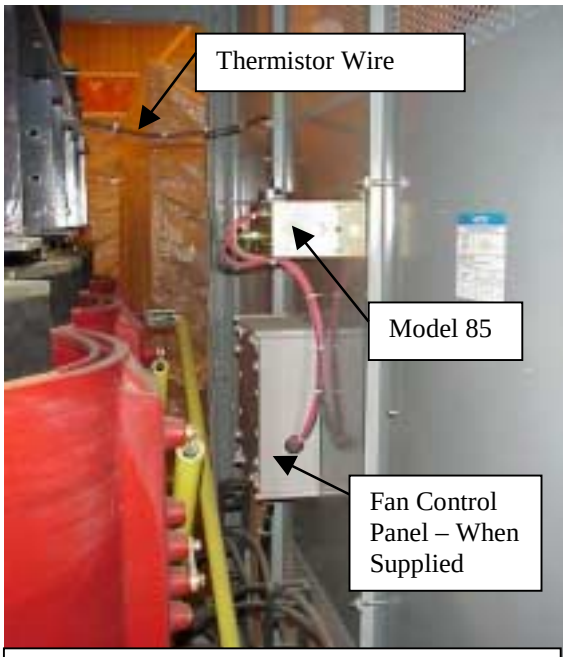


Photo 1. Typical Model 85 internal wiring.

Remove the transformer enclosure panels to gain access to the interior of the transformer. (Note: The front and rear center panels of the transformer are not removable.

Remove the existing thermister wiring from the transformer coils and cut all wire tie supports.

Disconnect all wiring from the rear on the Model 85. Note the locations of the wires and the wire numbers. The new Model 98 Controller wires will connect to these existing wires.

On units with a Fan Control Panel, disconnect all of the wiring coming from the Model 85 into the panel. Note the locations of the wire that you are removing, as the new Model 98 controller will connect to the same terminals.

Remove the Model 85 from its chassis and unbolt the chassis from the center panel.

Remove any remaining wiring and thermistor wire supports.

Section 4 - Transformer Center Panel modifications:

Photo 2. Typical Model 85 installation

Remove any exterior unit nameplates that are within the cutout or mounting panel area and save for later re-installation.

Refer to drawing 43534-105-93 located in the reference drawing section of this bulletin for the cutout size and mounting hole locations.

Before cutting the new opening be sure that there is adequate room for the new mounting panel to mount flush with the transformer center panel. Adjust the cutout location as necessary.

Take all necessary precautions to assure that no metal fillings fall into the transformer coils.

! CAUTION !

Before cutting the center panel verify that there are no wires, cables or other obstructions within the new cutout area!

Smooth any rough edges of the cutout before installing the new controller.

Section 5 - Model 98 Controller and Thermocouple Installation:

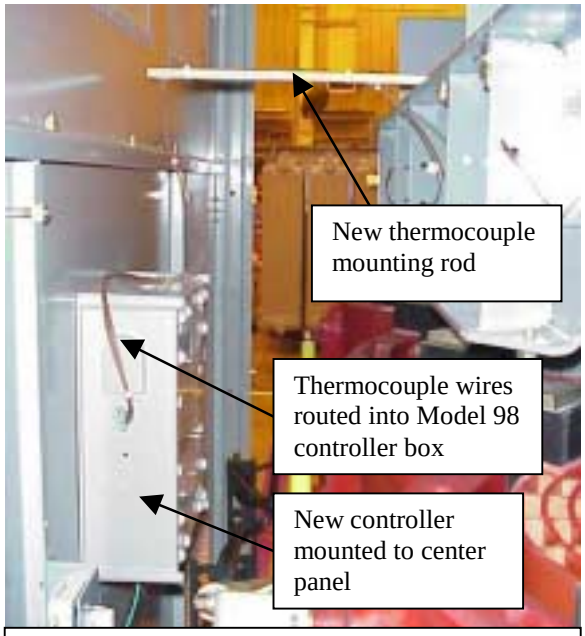


Photo 3. New Model 98 installation

After cutting a hole in the transformer center panel, mount the new controller using the provided hardware (3/8). On outdoor installations, seal the edges of the mounting panel with clear silicone.

On units with a Fan Control Panel, route the pig-tailed wires from the bottom of the Model 98 controller into the panel through the hole previously used by the old controller.

On units without the Fan Control Panel, splice the wires from the new Model 98 controller to the existing wires that were connected to the old Model 85.

Refer to wiring diagram 43540-040-11 located in the reference drawing section along with the previous controller wiring diagram that was furnished with the transformer for the wiring connections.

Install the thermocouple support rod to the top clamp as shown using the hardware provided (3/8). The support rod does not have to be centered. If the rod is too long it can be trimmed to fit inside the cabinet.

Section 5 - Model 98 Controller and Thermocouple Installation (cont'd):

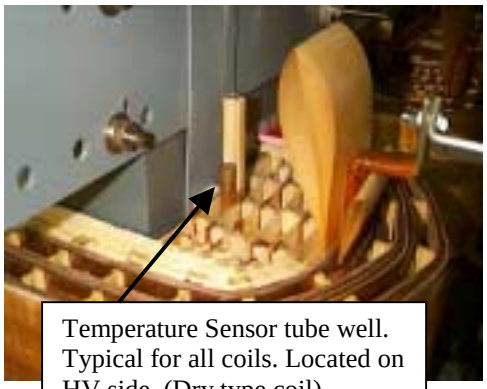


Photo 4A. Sensor well

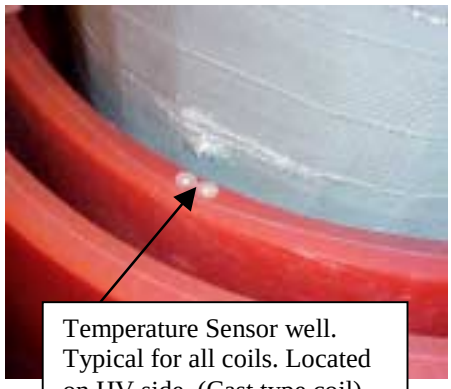


Photo 4B. Thermowell Hole

Photo 4C. Completed Thermocouple

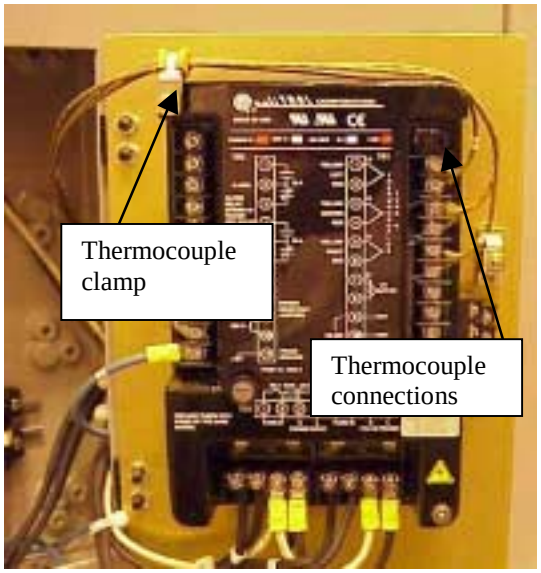


Photo 5. Thermocouple Connections

Next make the three thermocouples. Begin by cutting approximately 20 feet from the coiled thermocouple wire that is provided in the kit. Strip 1.0" from one end of the thermocouple wire. (Note: There is an outer covering of insulation and each of the bimetal wires is also insulated. This insulation must be removed as well). After completely stripping the wires, twist the ends together tightly (see photo 4C).

Starting on one phase of the transformer insert the stripped end of the thermocouple wire into the insulating tube or thermowell hole until it stops (approx. 4" for the tube and 2" for the hole) (see photos 4A and 4B).

Route the wire up to the transformer top core clamp and toward the glastic support rod. The thermocouple wire must be firmly supported so that proper clearance is maintained to the high voltage coil and leads. To keep the wires secure route or weave them through any available holes in the core clamp flange or gussets. The wire should not be coiled or allowed to sag. Route the wire under the rod and through the first hole closest to the transformer clamp. The wire is then routed along the top of the rod and then down through the second hole at the end of the rod and finally into the right side of the Model 98 control box (see photo 3). Fasten the wire to the support rod with wire ties.

Once all three thermocouple wires have been run into the Model 98 control box connect the thermocouple wires to the controller as shown in photo 5. Leave enough slack in the wires to allow full opening of the Model 98. Support the wires using the provided thermocouple clamp. See the wiring diagram 43540-040-11 in the reference drawing section of this bulletin for the wiring connections.

After completing the thermocouple wire connections seal the sensor wells in the coils with clear silicone.

Section 6 - Completing the Retrofit Installation:

Photo 6. Model 98 Decal Installation

Apply the Model 98 controller Danger decal, p/n 43500-169-09 next to the Model 98 controller. The decal can be applied above or below or to the right or left of the controller (see photo 6).

Apply the Fan/Blower Danger decals, p/n 43500-169-02, to the bottom core clamp near the fans or blowers. Apply three decals on the front and the remaining three decals to the back (see photo 7).

FUSING:
Two fuses are provided for the Model 98, a 1 amp and a 20 amp. If the Model 98 is wired to the Fan Control Panel then install the 1 amp fuse in the rear of the Model 98 in the 'F2' fuse location. If the Model 98 is directly controlling the fans/blowers, install the 20 amp fuse in the 'F2' fuse location.

NOTE: A 20 amp fuse is the maximum fuse size that can be installed in the Model 98. This 20 amp fuse may not provide adequate protection for smaller loads. If a smaller fuse is required, it is the installers responsibility to correctly size the smaller fuse based on all applicable National Electrical Code rules and the fan/blower power requirements.

Refer to the Model 98 Instruction Bulletin for Power Logic Monitoring connections and MODBUS-SY/MAX protocols.

Before energizing the Model 98 for the first time, please review the controller operation procedure in the Model 98 Instruction Bulletin, p/n 43500-054-26. Also refer to the transformer instruction manual that came with the transformer for any startup testing that is required before re-energizing the transformer.

! CAUTION !

When the controller is powered on, the fans or blowers will turn ON, then OFF after approximately one minute.

DANGER

Hazardous Voltage. Risk of Shock, Burn or Explosion.

- **Ensure all personnel, tools, controller wiring, and other work material or equipment are cleared from the transformer and the control box before turning ON power to the controller.**

- **Before applying power, make sure that all personnel and equipment are clear of the blowers or fans.**

- **Replace all devices, doors, and covers before turning on power to this equipment.**

Failure to follow these instructions will result in Death or Serious Injury

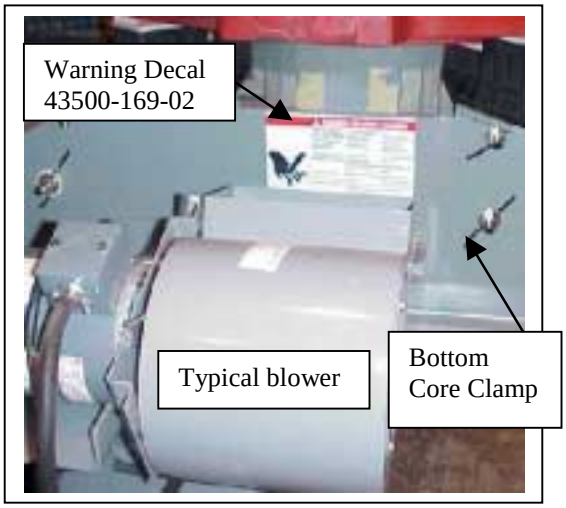
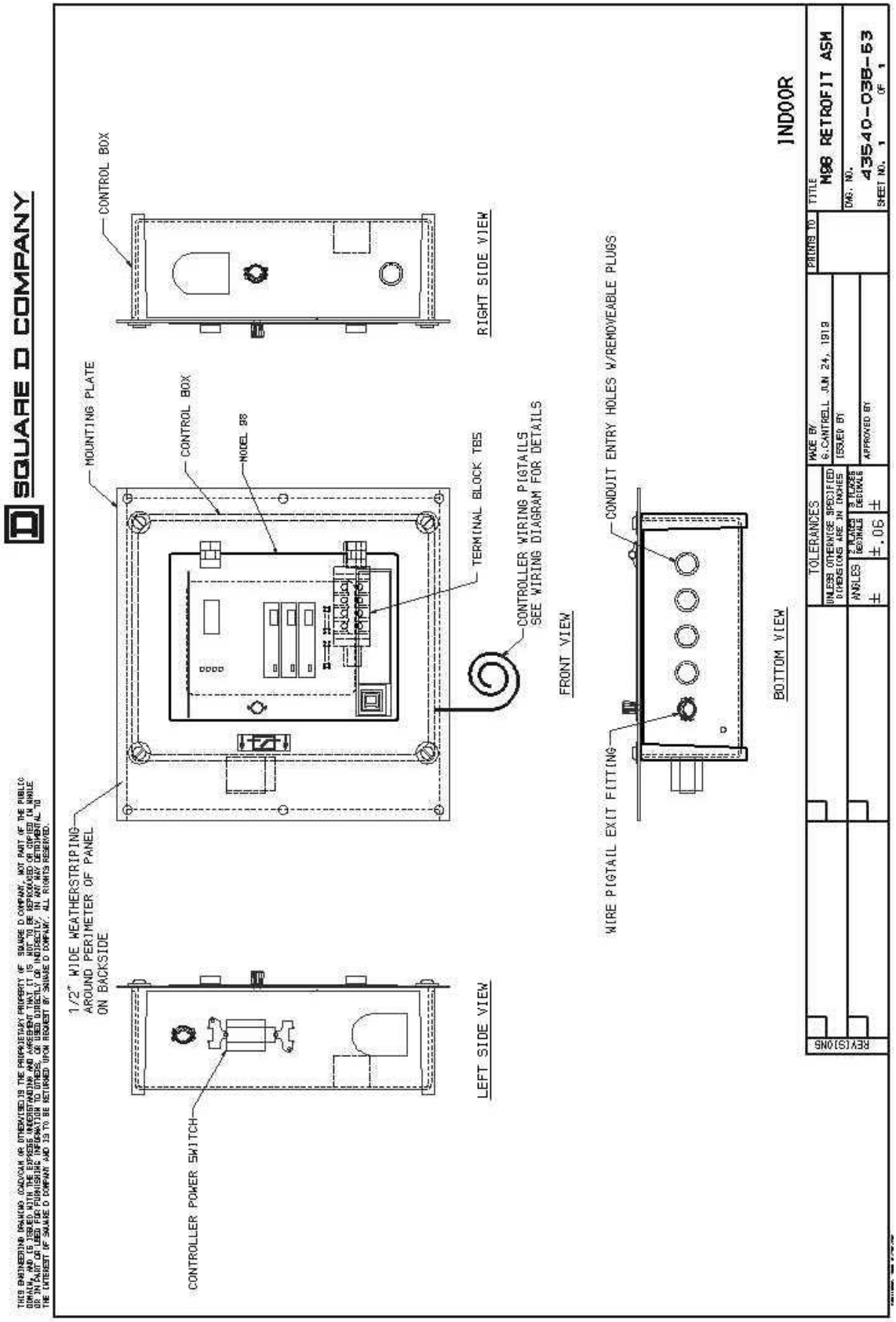


Photo 7. Fan/Blower Decal Installation

Section 7 – Reference Drawings:



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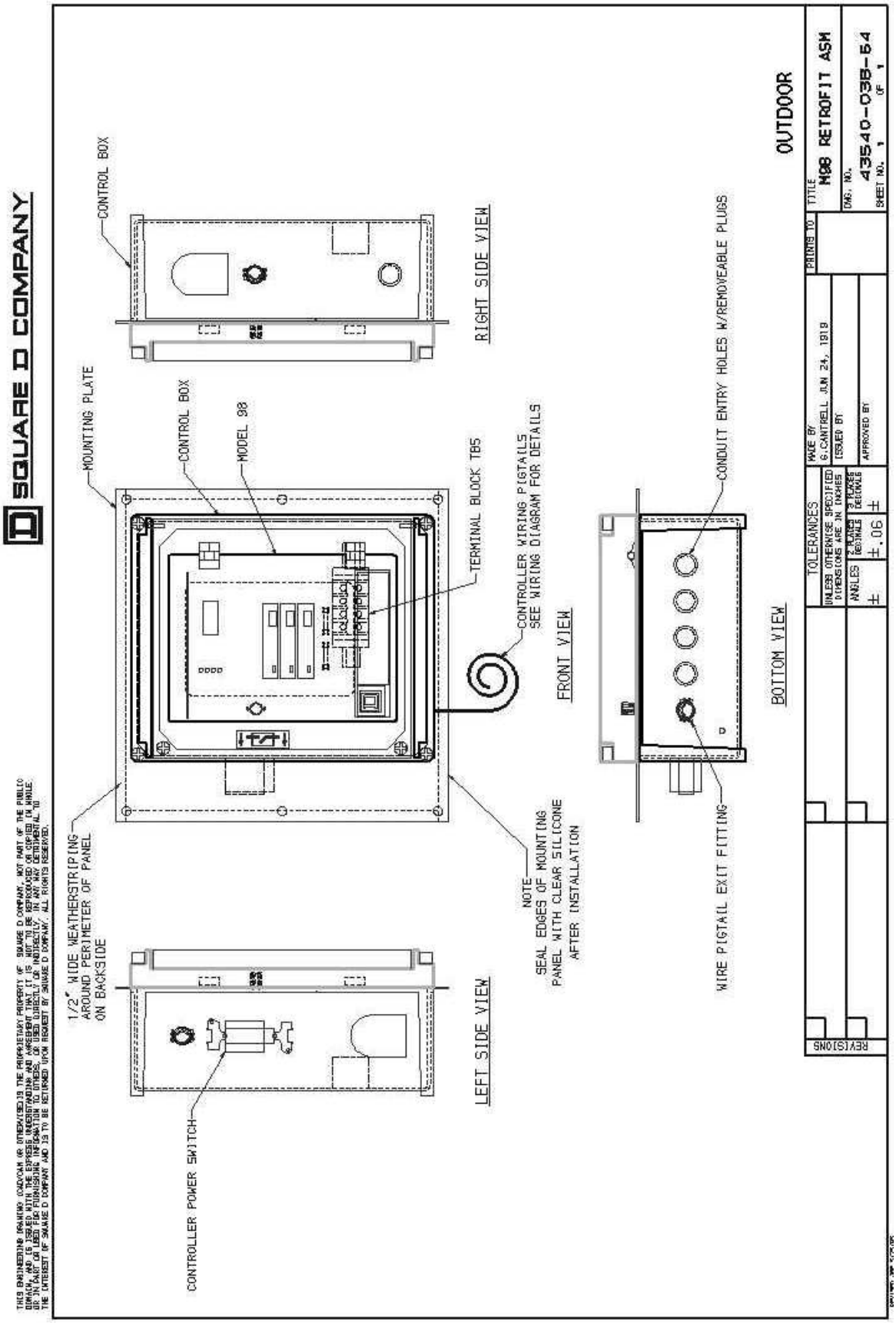

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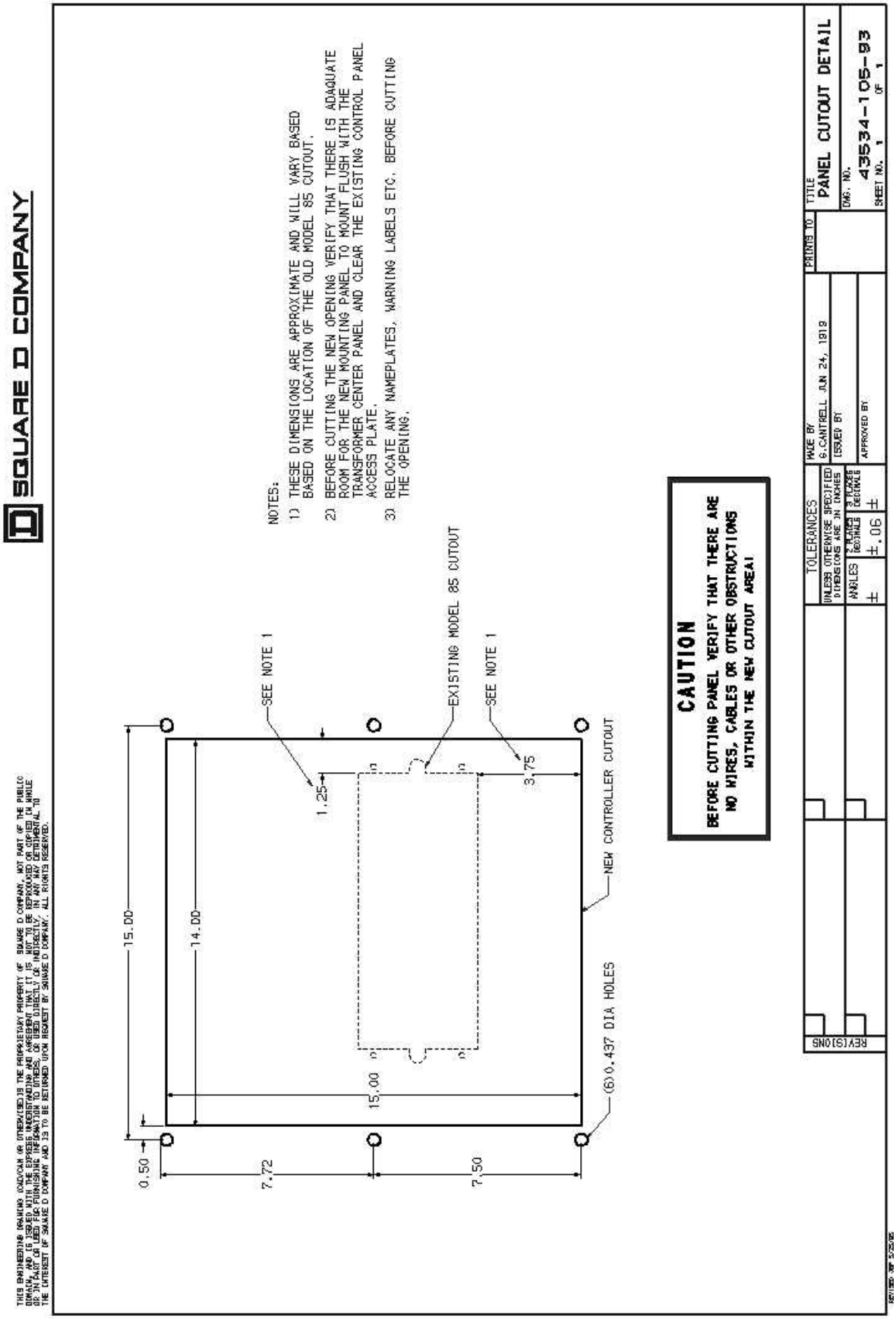

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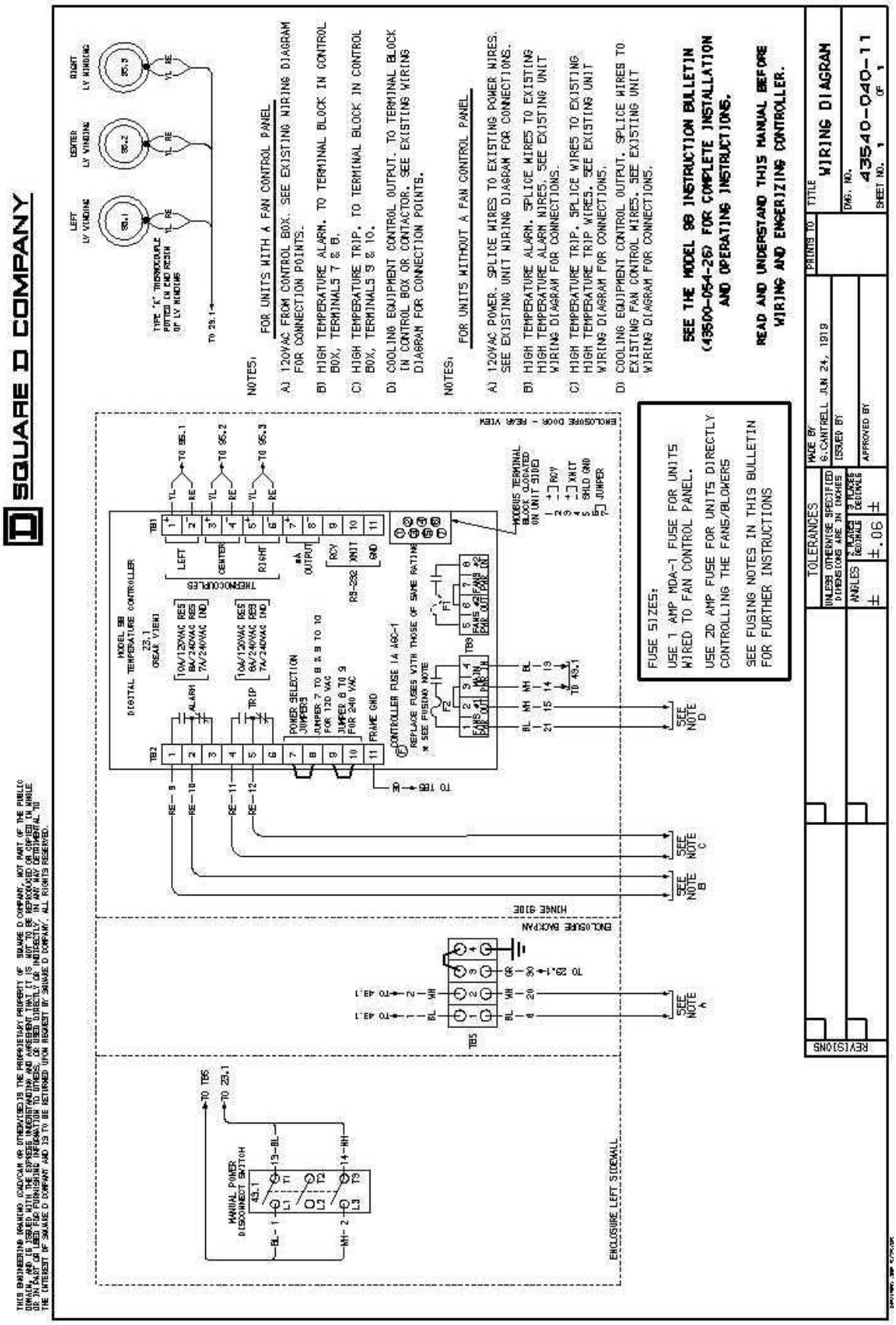
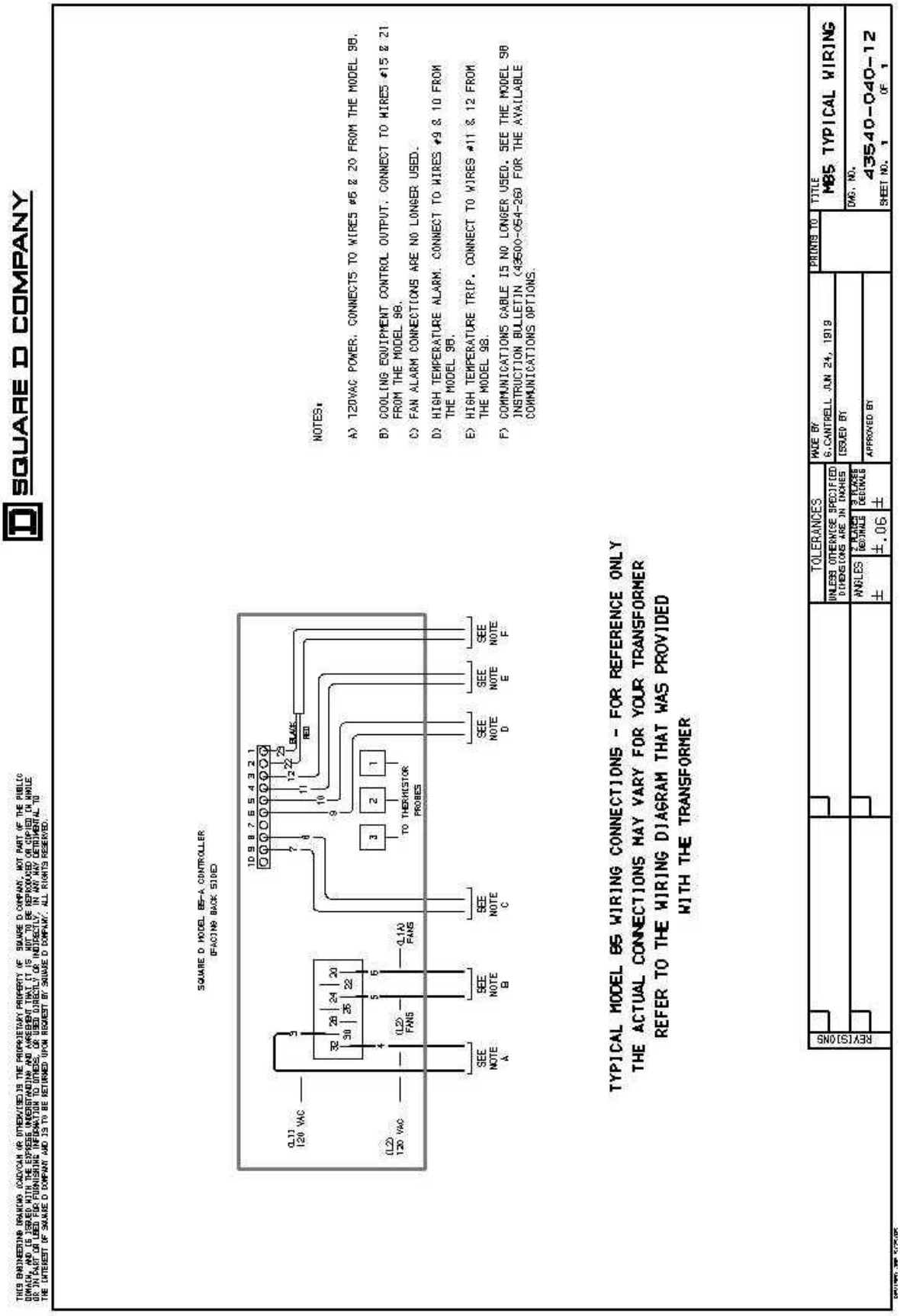
Section 7 – Reference Drawings (cont'd):