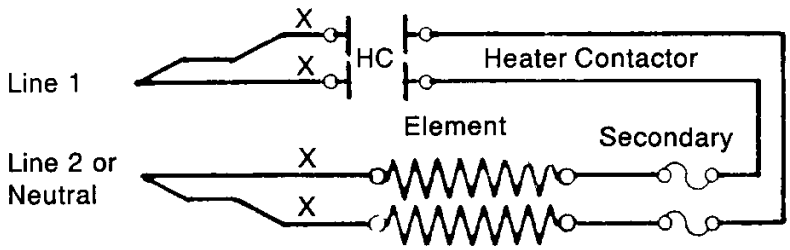
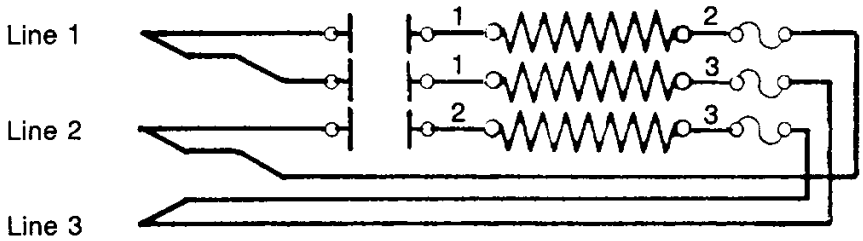
BASIC ELECTRIC HEAT WIRING DIAGRAMS



BASIC SINGLE PHASE 120 to 600V.

Neutral used on 120 and 277V only.

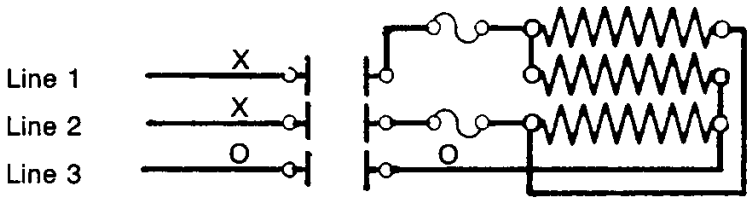
Ohms of each Element calculated individually based on total Heater Watts divided by the number of Elements unless they are not all equal. Manual Resets and Thermal Fusible Links are used for Secondary Protection. Alternate locations shown by X. EXCEPTION--No Neutral through a Secondary! Manual Resets are also used in control circuits of Back-up Contactors as a Secondary and as a specified Third Level Protection.



BASIC THREE-PHASE DELTA

Available at 208 through 600V to 48 Amps per Delta group.

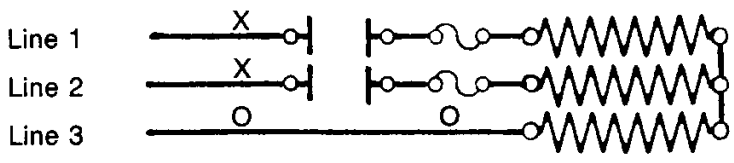
Ohms are calculated on individual Elements, the same as for Single Phase. Delta wired Heaters are balanced load, designed for connection to any Delta or Star power source if the voltages are compatible. Secondary Protection location is optional but preferred in series with power line to the Element. Connected at 6 ends, each end draws half the Amps of each of 3 Supply Lines.



THREE-PHASE DELTA VARIATION

"ALL POLES BREAK"

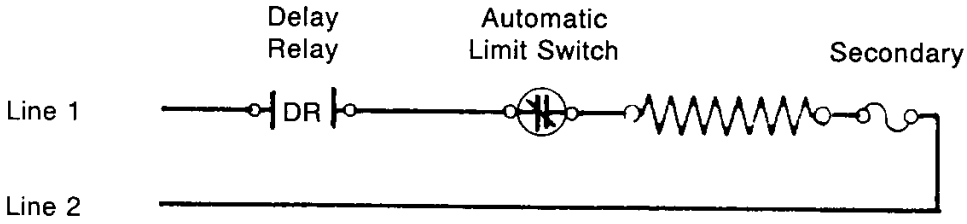
Same Ohms calculation. Contactor and Manual Resets must carry total Line Amps. 0 indicates Optional Manual Resets. X shows alternate locations.



BASIC THREE-PHASE STAR OR WYE DESIGN

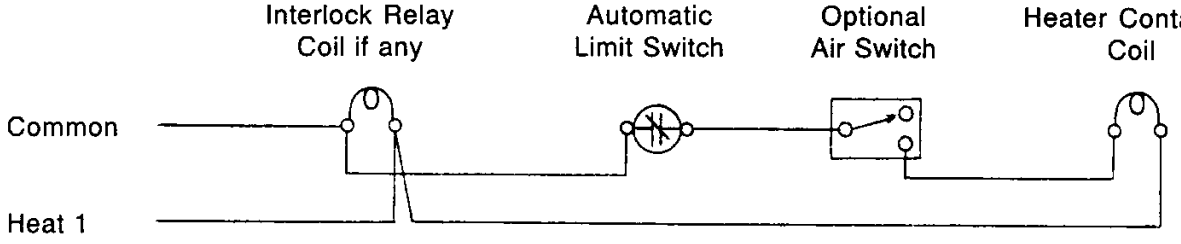
FOR ANY THREE-PHASE POWER 208 to 600V.

STAR ELEMENT OHMS — First divide Volts by $\sqrt{3}$. Use that to apply $R = E^2/P$.
You may prefer to use an alternate method as follows:
Square Supply Voltage and divide by TOTAL Watts of the 3 Star Elements.



BASIC SEQUENCER DIAGRAM

Heaters with Delay Relays (Sequencers) controlling Elements must have load carrying Automatic Limit Switches so located in the circuit that Heating Elements will be quickly de-energized during any over-heating circumstance. If more than one Delay Relay is used, it is necessary to select Sequencers with timings that will allow wiring for Fan to be first on and last off.

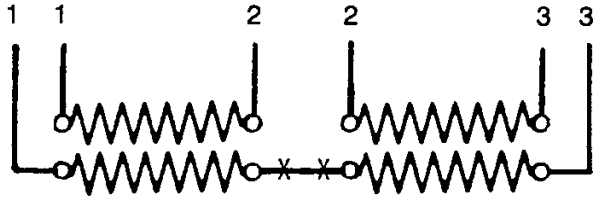


BASIC CONTROL CIRCUIT

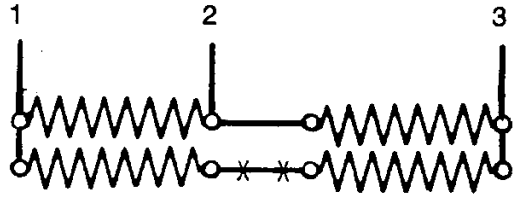
All of these "basic" diagrams are expanded by addition of other components and/or the use of multiples of each basic Heater within the same enclosure.

BELOW ARE OTHER PHYSICAL LAYOUTS OF ELEMENTS ONLY AS THEY WOULD APPEAR IN TWO LAYERS OF FRAME. ELEMENT ENDS MAY BE JOINED INSIDE OR OUTSIDE OF CONTROL BOX.

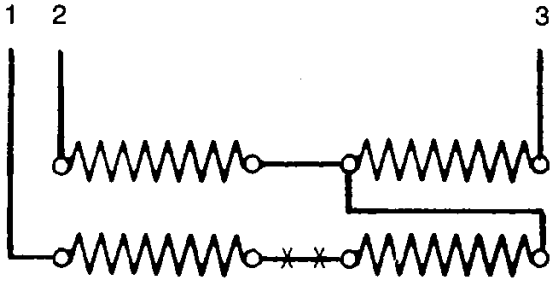
Half-Element jumpers are indicated by —X—X— and not used on whole Elements.



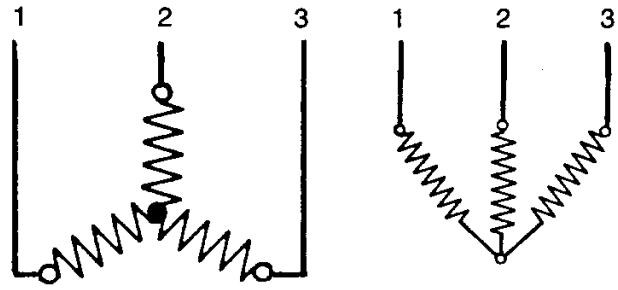
3 Phase Delta with 6 connecting points, each at half the Delta load amperage.



Same Delta with only 3 connections, each at full Delta load amperage.



3 Phase Star or Wye 3 point connection



Star wiring shown on some diagrams

Many additional layouts are employed in the design of physically larger Heaters.