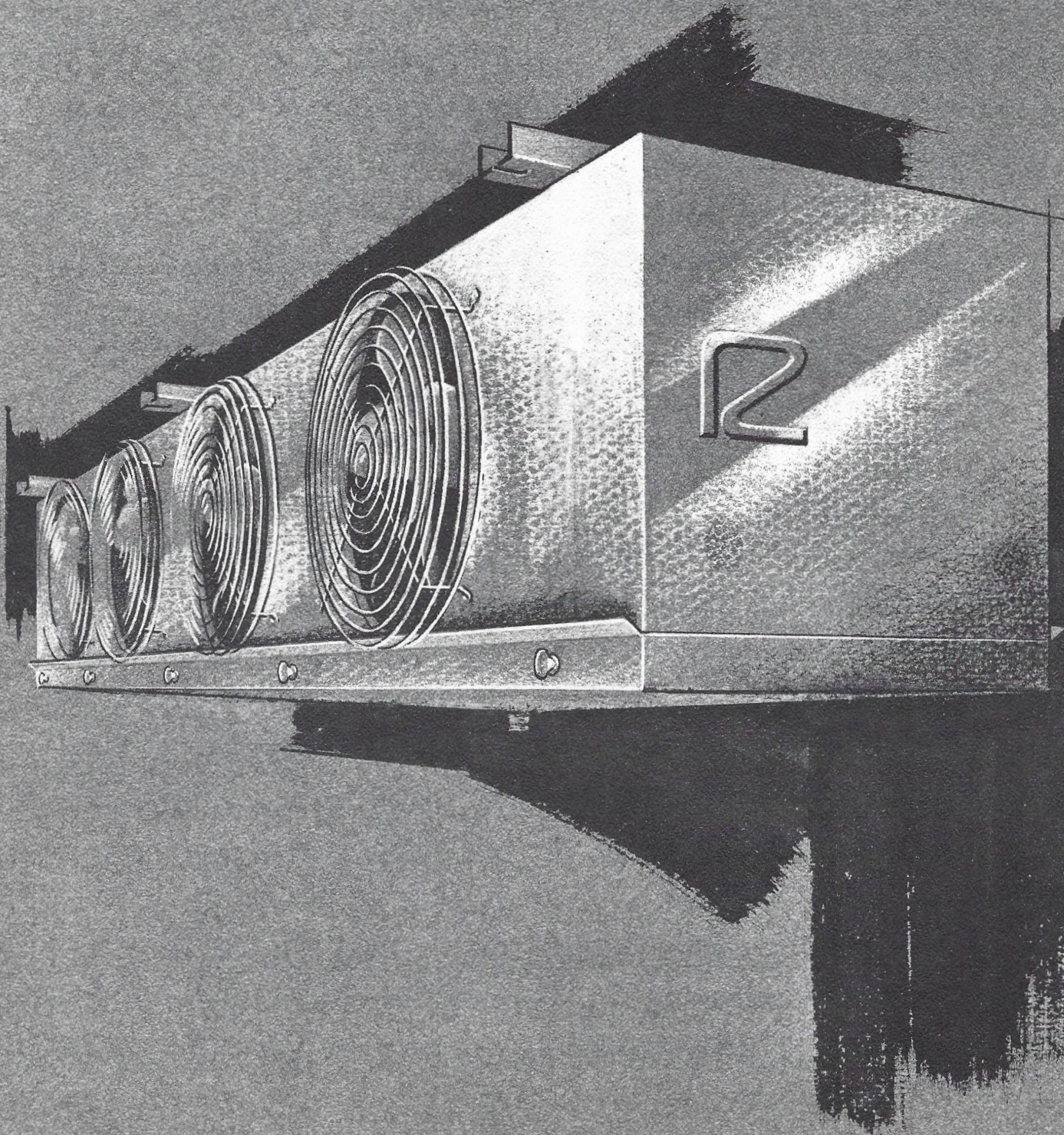




# RUSSELL LIGHTNING DEFROST SYSTEM





**RUSSELL COIL COMPANY  
LIGHTNING ELECTRIC  
DEFROST SYSTEMS**

**THE RUSSELL LIGHTNING DEFROST SYSTEM** is designed to keep RUSSELL unit coolers performing at maximum efficiency.

**OPERATION IS SIMPLE** Defrost is initiated by a time clock and terminated by temperature. Sufficient electrical heat is applied in the right places for rapid, complete defrost, even under variable conditions. Temperature termination of the defrost and fan delay controls automatically prevents wasteful overheating and minimizes box and product temperature rise.

**NORMAL REFRIGERATION CYCLE** Wiring diagrams all show the timer contacts in refrigeration cycle position. Fans are running. Liquid line solenoid valve is open. Box temperature is controlled by a thermostat either in the compressor line circuit or the liquid line solenoid valve circuit.

**DEFROST OPERATION** At the initiation of a defrost, the timer contacts are reversed from the position shown. Fans stop. Compressor is stopped either by the timer or by the pressure control. Heaters are energized.

**DEFROST TERMINATION AND COIL RE-COOLING CYCLE** At approximately 55° F. the defrost terminating thermostat contacts make from red to black. This automatically resets the timer to the refrigeration cycle position. The compressor starts. The fans, however, wired through the brown contact of the defrost termination and fan delay thermostat do not start until this control returns to the cold position. This prevents air circulation across a warm evaporator and possible water blow-off into the room.

A heater thermostat is standard equipment on all RUSSELL LIGHTNING DEFROST SYSTEMS. This control prevents the unit from overheating in case of a malfunction which may prevent the heaters from turning off.

Drain lines must be heated within the cold space with electrical heating tape and trapped outside the cold area where it cannot freeze.

**THE FOLLOWING WIRING DIAGRAMS SHOW TYPICAL CONTROL CIRCUITS FOR THE VARIOUS TYPES OF RUSSELL UNIT COOLERS.**

**NOTES ON RUSSELL LIGHTNING DEFROST SYSTEMS**

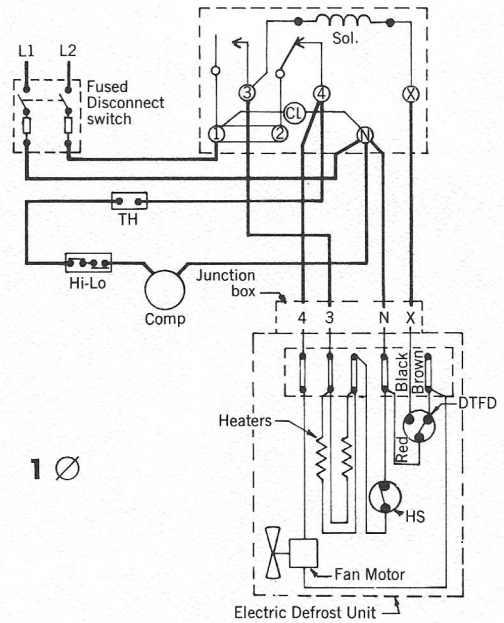
- Note 1. On initial start of the system, the fans will not run until the fan delay thermostat is cooled to approximately 30°.
- Note 2. When unit motor current exceeds 16 amp. and a fan delay is used with the defrost system, a fan contactor must be provided since the capacity of the fan delay switch is 16 amp. maximum.
- Note 3. Maximum timer contact rating — 40 amps — 2 H.P.
- Note 4. When an electric drain line heater is used, it may be connected across terminals "N" and "3".

**WIRING DIAGRAMS FOR**

**DIAGRAM 1./ PARAGON NO. 8145-0 OR -20 TIMER**

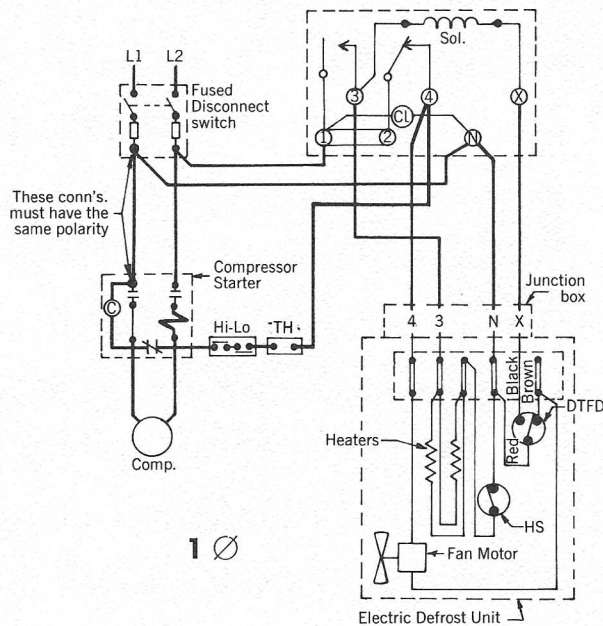
**LEGEND**

- PARAGON TIMERS**  
**No. 8145-0/115v/1 Ø**  
**No. 8145-20/230v/1 Ø**
- TH Box Thermostat
  - LLS Liquid Line Solenoid
  - Sol Timer Release Solenoid
  - Hi-Lo High-Low Pressure Switch
  - DTFD Defrost Termination and Fan Delay
  - HS Heater Safety
  - C Holding Coil
  - CL Clock Motor
- Field Wiring  
 — Factory Wiring



Box thermostat controls line current to compressor. Timer turns off compressor during defrost. Heater current controlled directly by timer. Do not use C.P.R. valve with this system. It is recommended that a pressure limit expansion valve be used on this evaporator.

**DIAGRAM 2./ PARAGON NO. 8145-0 OR -20 TIMER**

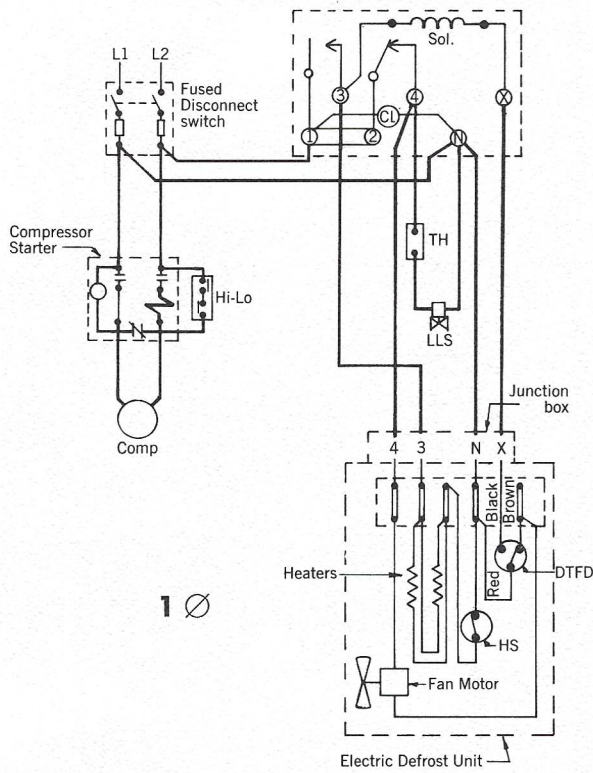


Box thermostat controls compressor starter. Timer turns off compressor during defrost. Heater current controlled directly by timer. Do not use C.P.R. valve with this system. It is recommended that a pressure limit expansion valve be used on the evaporator.



# RUSSELL LIGHTNING ELECTRIC DEFROST

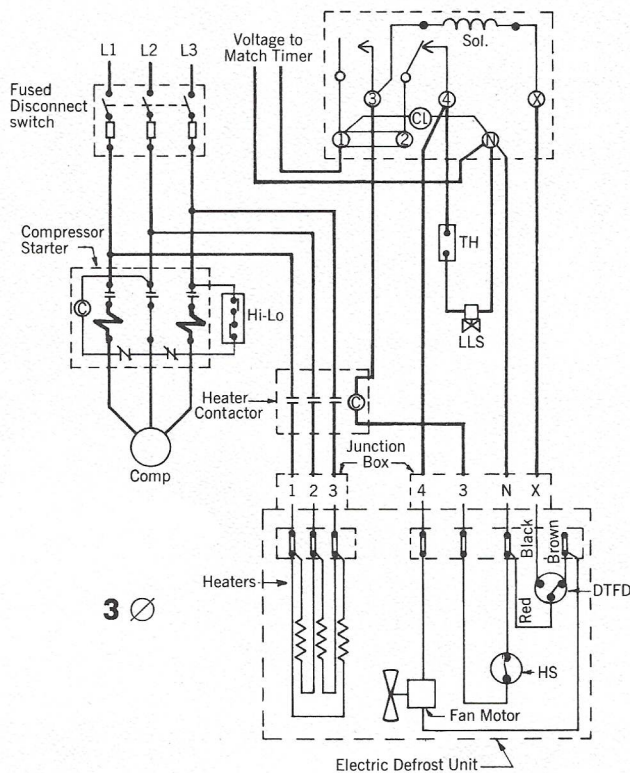
DIAGRAM NO. 3./ PARAGON NO. 8145-0 OR -20 TIMER



1 ∅

Box thermostat controls liquid line solenoid. Compressor shuts off from pressure control. Heater current controlled directly by timer.

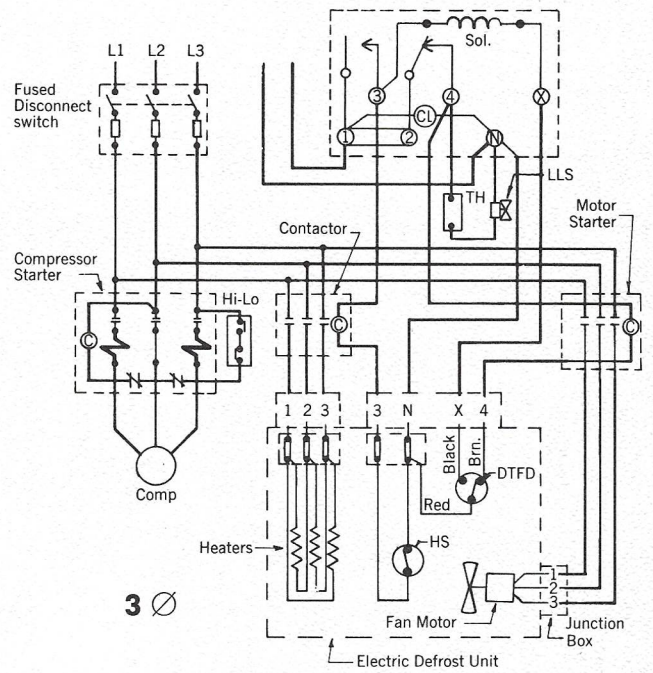
DIAGRAM NO. 4./ PARAGON NO. 8145-0 OR -20 TIMER



3 ∅

Heaters controlled by contactor. Box thermostat controls liquid line solenoid. Compressor shuts off from pressure control. Heaters controlled by contactor either single or 3 phase. (3 phase shown).

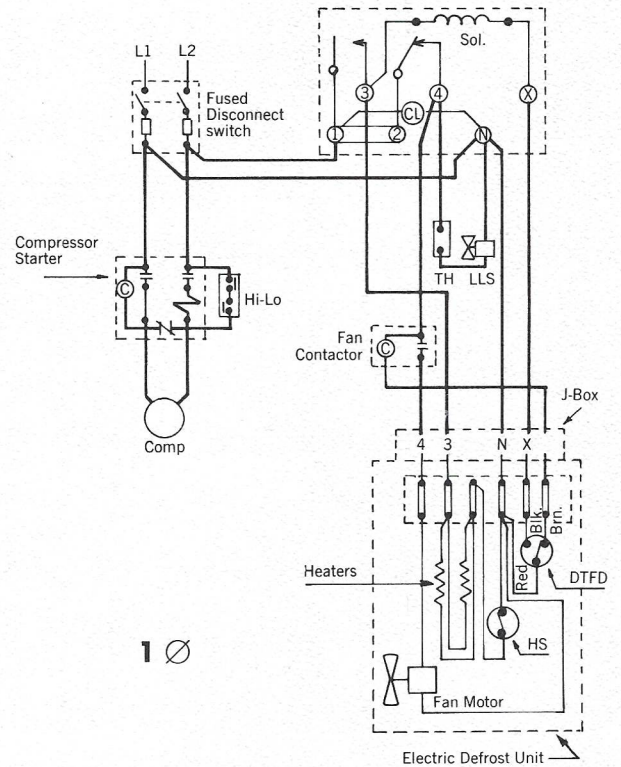
DIAGRAM NO. 5./ PARAGON NO. 8145-0 OR -20 TIMER



3 ∅

Separate controls circuit. Box thermostat controls liquid line solenoid. Compressor shuts off from pressure control. Heaters controlled by contactor, fan motors controlled by magnetic starter. Either can be single or 3 phase.

DIAGRAM NO. 6./ PARAGON NO. 8145-0 OR 8145-20 TIMER



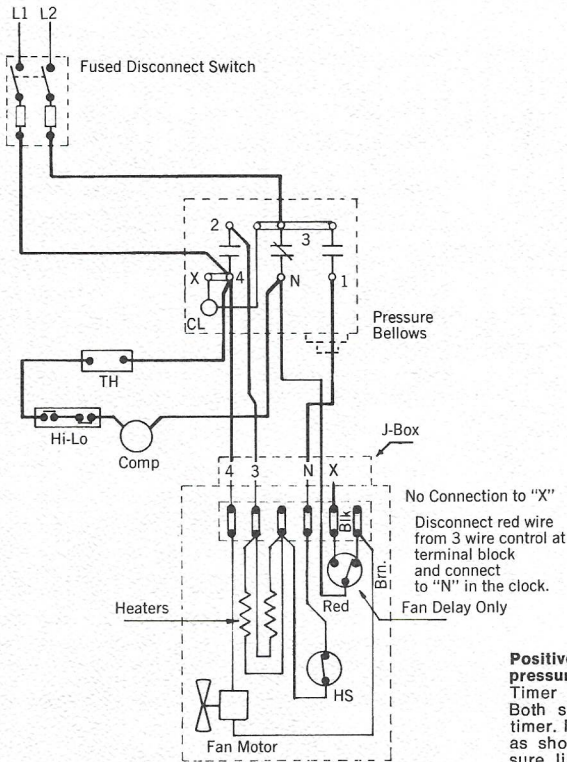
1 ∅

Separate fan contactor for motor current that exceeds 16 amps. Box thermostat controls liquid line solenoid. Compressor shuts off from pressure control. Heater controlled directly by timer. Fan motors controlled by contactor.

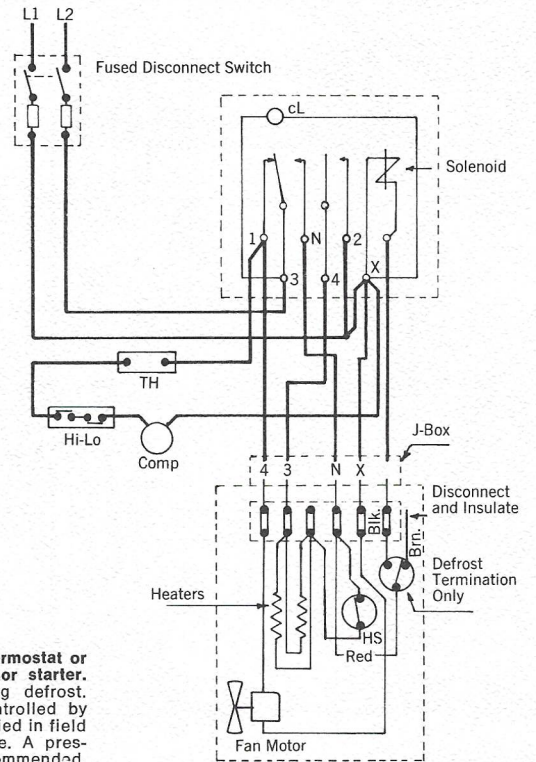


# WIRING DIAGRAMS FOR RUSSELL LIGHTNING ELECTRIC DEFROST

**DIAGRAM NO. 7. / PARAGON NO. 8247-0 OR -20**  
(Defrost terminated by pressure rise.)

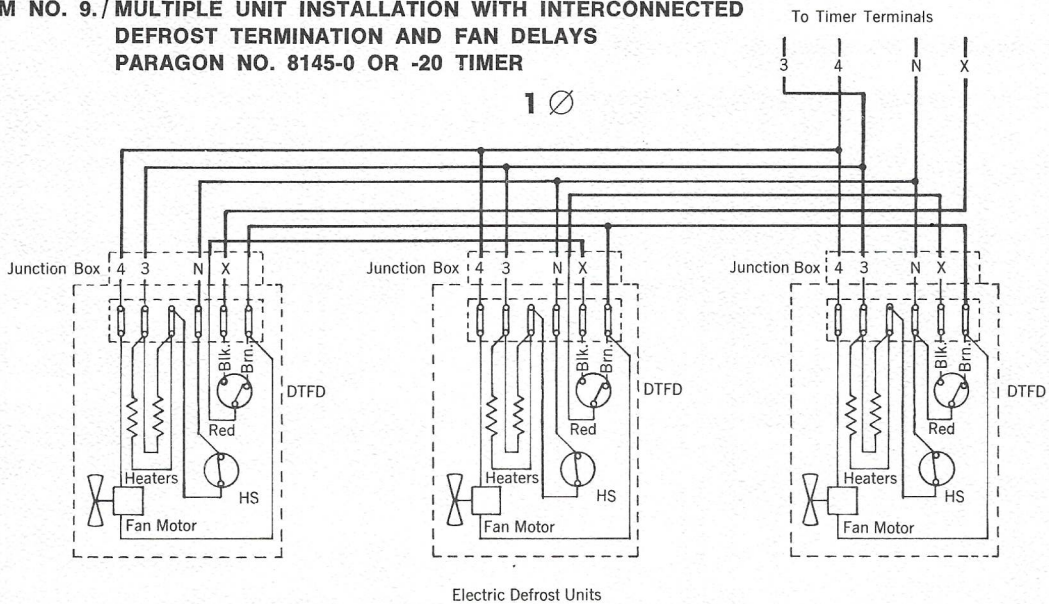


**DIAGRAM NO. 8. / PARAGON NO. 8143-0 OR -20**  
(Defrost terminated by temperature rise.)



**Positive heater disconnect. Box thermostat or pressure switch controls compressor starter. Timer turns off compressor during defrost. Both sides of heater line are controlled by timer. Factory wiring must be modified in field as shown. Do not use C.P.R. valve. A pressure limit expansion valve is recommended.**

**DIAGRAM NO. 9. / MULTIPLE UNIT INSTALLATION WITH INTERCONNECTED DEFROST TERMINATION AND FAN DELAYS**  
PARAGON NO. 8145-0 OR -20 TIMER



**Note 1.** On multiple unit installations the defrost will not terminate until all units are defrosted. All of the fans will start as soon as any of the units are cooled to 30°.

**Note 2.** On multiple evaporator systems, the total fan motor load of all units must not exceed 16 amps...the maximum rating of the terminating thermostats. If the fan load is greater than 16 amps, a contactor must be used.

**RUSSELL COIL COMPANY**

221 SOUTH BERRY STREET • BREA, CALIFORNIA 92621 Phone (714) 529-1935 • LOS ANGELES (213) 691-3246

A Subsidiary of Ardco, Inc.