



## Multizone Combination Heating/Cooling Units Zone Mizer™

### Index 1 — Base Unit Identification

BASE UNIT			STARTING SERIAL NO.
Model	Series	V/Ph/Hz	
48MA016	531	208-230/3/60	Q4----
	621	460/3/60	
	121	575/3/60	
48MA024	531	208-230/3/60	Q4----
	621	460/3/60	
	121	575/3/60	
48MA028	531	208-230/3/60	Q4----
	621	460/3/60	
	121	575/3/60	

BASE UNIT			STARTING SERIAL NO.
Model	Series	V/Ph/Hz	
48MA030	511	208-230/3/60	Q4----
	601	460/3/60	
	101	575/3/60	
48MA034	511	208-230/3/60	Q4----
	601	460/3/60	
	101	575/3/60	
48MA040	511	208-230/3/60	Q4----
	601	460/3/60	
	101	575/3/60	

### Index 2 — Condensing (Cooling) Label Diagrams

BASE UNIT	COMPONENT ARRANGEMENT			WIRING SCHEMATIC		
	Label Diagram No.	Fig.	Page	Label Diagram No.	Fig.	Page
48MA016 (All Voltages)	48MA502504	2	4	48MA505974	3	5
48MA024 (208-230,460V)	48MA502504	2	4	48MA506914	4	6
48MA028 (208-230,460V)	48MA502504	2	4	48MA506914	4	6
48MA030 (208-230,460V)	48MA502504	2	4	48MA506914	4	6
48MA024 (575V)	48MA502504	2	4	48MA505984	5	7
48MA028 (575V)	48MA502504	2	4	48MA505984	5	7
48MA030 (575V)	48MA502504	2	4	48MA505984	5	7
48MA034 (All Voltages)	48MA504264	6	8	48MA504274	7	9
48MA040 (All Voltages)	48MA504264	6	8	48MA504274	7	9

Zone Control Board Component Location .....	Fig 1
Label Diagram, Control and Zoning (All Units), 48MA506644 .....	Fig 8
Label Diagram, Heating (48MA016-030) 48MA506724 .....	Fig 9
Label Diagram, Heating (48MA034-040) 48MA506634 .....	Fig 10
Timer Sequence Chart .....	Fig 11
Economizer Damper Control .....	Fig 12
Roll Filter Electrical Diagram .....	Fig 13
Remote Control Panel Connections .....	Fig. 14
Night Setback Wiring Connection Diagrams .....	Fig 15 through 19
Thermostat Connections .....	Fig 20 through 28

## LEGEND (Fig. 1-14)

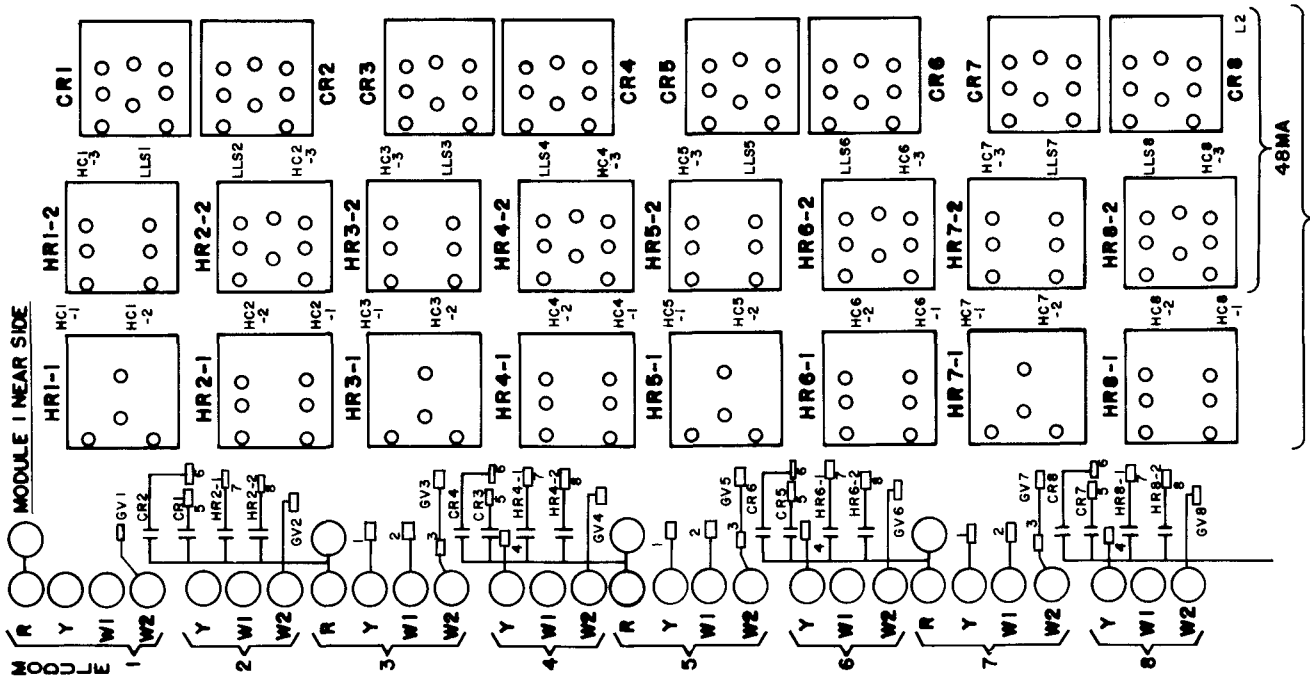
<b>AB</b>	— Accessory Board
<b>AFS</b>	— Airflow Switch
<b>APS</b>	— Air Pressure Switch
<b>C</b>	— Compressor Contactor
<b>Cap.</b>	— Capacitor
<b>CB</b>	— Circuit Breaker
<b>CCB</b>	— Compressor Circuit Breaker
<b>CCP</b>	— Capacity Control Pressurestat
<b>CH</b>	— Crankcase Heater
<b>CHR</b>	— Crankcase Heater Relay
<b>CL</b>	— Switch, Cooling Lockout
<b>CO</b>	— Convenience Outlet
<b>Compr</b>	— Compressor
<b>CR</b>	— Cooling Relay or Control Relay (Zone Control Board)
<b>DLT</b>	— Discharge Line Thermostat
<b>DS</b>	— Door Switch
<b>ECR</b>	— Economizer Relay
<b>ECT</b>	— Economizer Thermostat
<b>EXR</b>	— Exhaust Relay
<b>FCB</b>	— Fan Circuit Breaker
<b>FCPS</b>	— Fan Cycling Pressurestat
<b>FDM</b>	— Forced Draft Motor
<b>FL</b>	— Fusible Link
<b>FRS</b>	— Filter Media Runout Switch
<b>Fu</b>	— Fuse
<b>GV</b>	— Gas Valve
<b>Gnd</b>	— Ground
<b>HA</b>	— Heat Anticipator
<b>HC</b>	— Heater Contactor
<b>HPS</b>	— High-Pressure Switch
<b>HR</b>	— Holding Relay or Heater Relay (Zone Control Board)
<b>I</b>	— Ignitor
<b>IFC</b>	— Indoor Fan Contactor
<b>IFCB</b>	— Indoor Fan Circuit Breaker
<b>IFM</b>	— Indoor Fan Motor
<b>IP</b>	— Internal Protector
<b>IPP</b>	— Ignitor Power Pack
<b>LAT</b>	— Low Ambient Thermostat
<b>LLS</b>	— Liquid Line Solenoid
<b>LPS</b>	— Low-Pressure Switch
<b>LS</b>	— Limit Switch
<b>MCR (MC)</b>	— Master Cooling Relay
<b>MGV</b>	— Main Gas Valve

<b>MHR (MH)</b>	— Master Heating Relay
<b>MUR (MU)</b>	— Master Unit Relay
<b>N.C.</b>	— Normally Closed
<b>N.O.</b>	— Normally Open
<b>NS</b>	— Night Setback Switch
<b>OAT.</b>	— Outdoor Air Thermostat
<b>OFC</b>	— Outdoor Fan Contactor
<b>OFCB</b>	— Outdoor Fan Circuit Breaker
<b>OFM</b>	— Outdoor Fan Motor
<b>PGV</b>	— Pilot Gas Valve
<b>PI</b>	— Plug
<b>PS</b>	— Pilot Sensor
<b>R</b>	— Resistor
<b>RB</b>	— Relay Board
<b>RS</b>	— Rollout Switch
<b>Sw</b>	— Switch
<b>TB</b>	— Terminal Block
<b>TC</b>	— Thermostat, Cooling
<b>TH</b>	— Thermostat, Heating
<b>TM</b>	— Timer Motor
<b>Tran</b>	— Transformer
<b>WSV</b>	— Water Solenoid Valve
<b>ZB</b>	— Zone Board

	Receptacle
	Plug
	Terminal Block
	Terminal (Marked)
	Terminal (Unmarked)
	Circuit Board Terminal
	Splice
	Terminal, Circuit Board, Factory Connected
	Terminal, Circuit Board, Field or Accessory
	Factory Wiring
	Accessory or Field Wiring
	Circuit Board Run
	To indicate common potential only; not to indicate wire

### NOTES

1. Yellow primary wire (Tran) connected to for 208-230 v and 575 v, and to for 460-v units.
2. Use 105 C wire when replacing factory wiring.
3. Outdoor fan motors thermally protected.
4. Three-phase motors protected against primary single-phasing conditions.



SOME

Schematic Continued Below

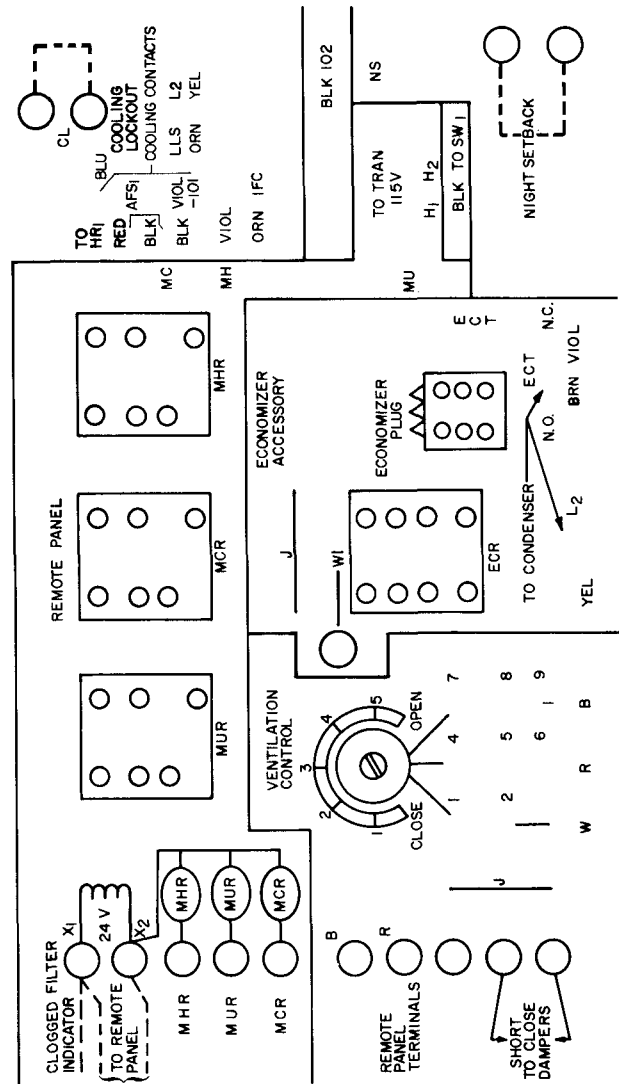
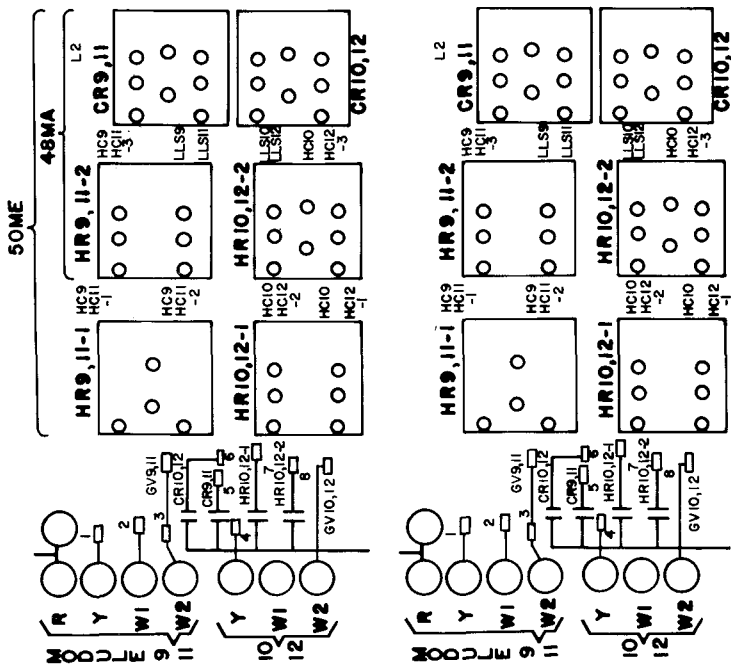


Fig. 1 — Zone Control Board Component Location



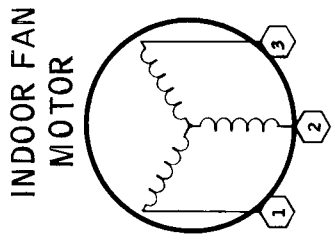
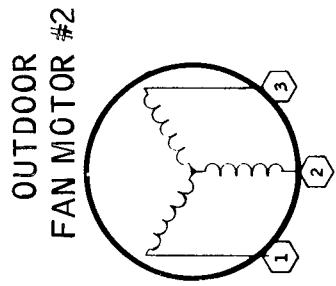
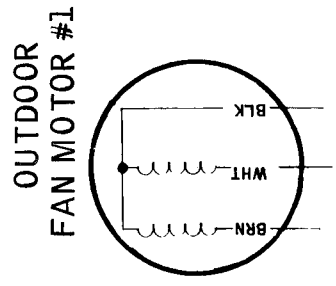
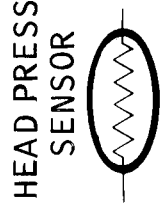
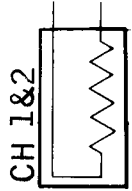
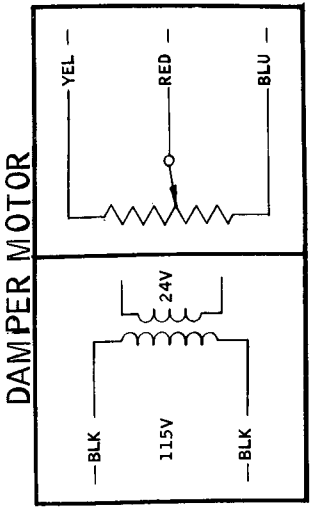
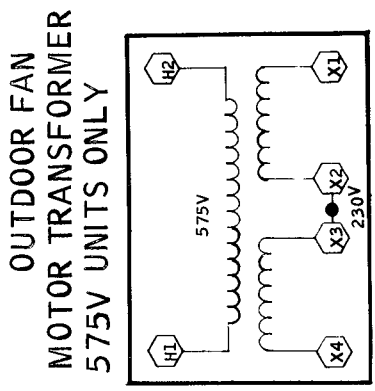
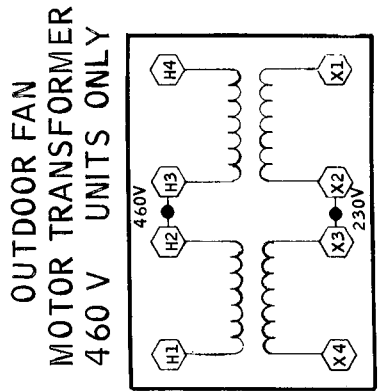
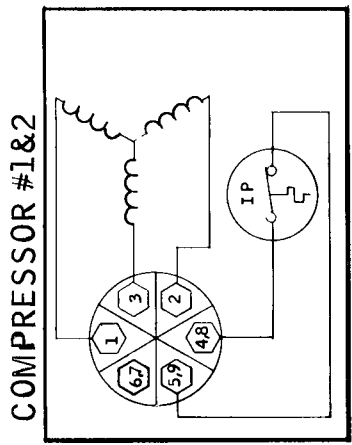
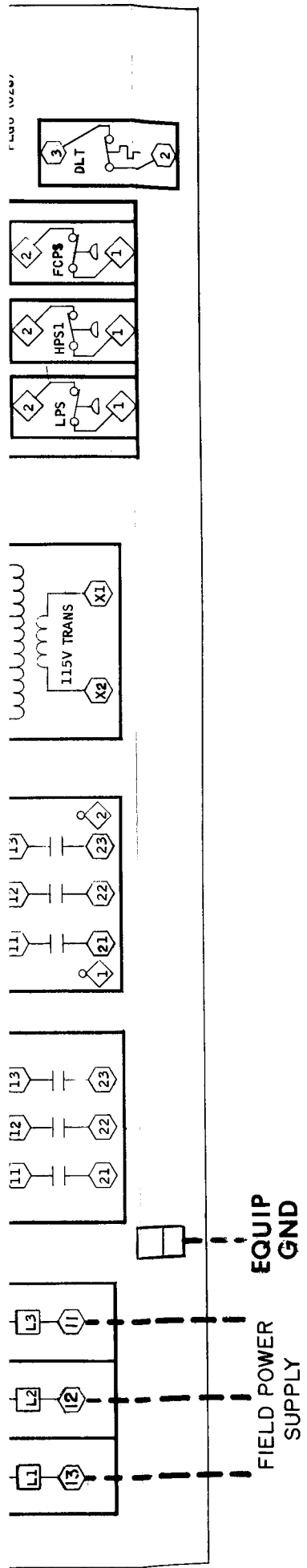
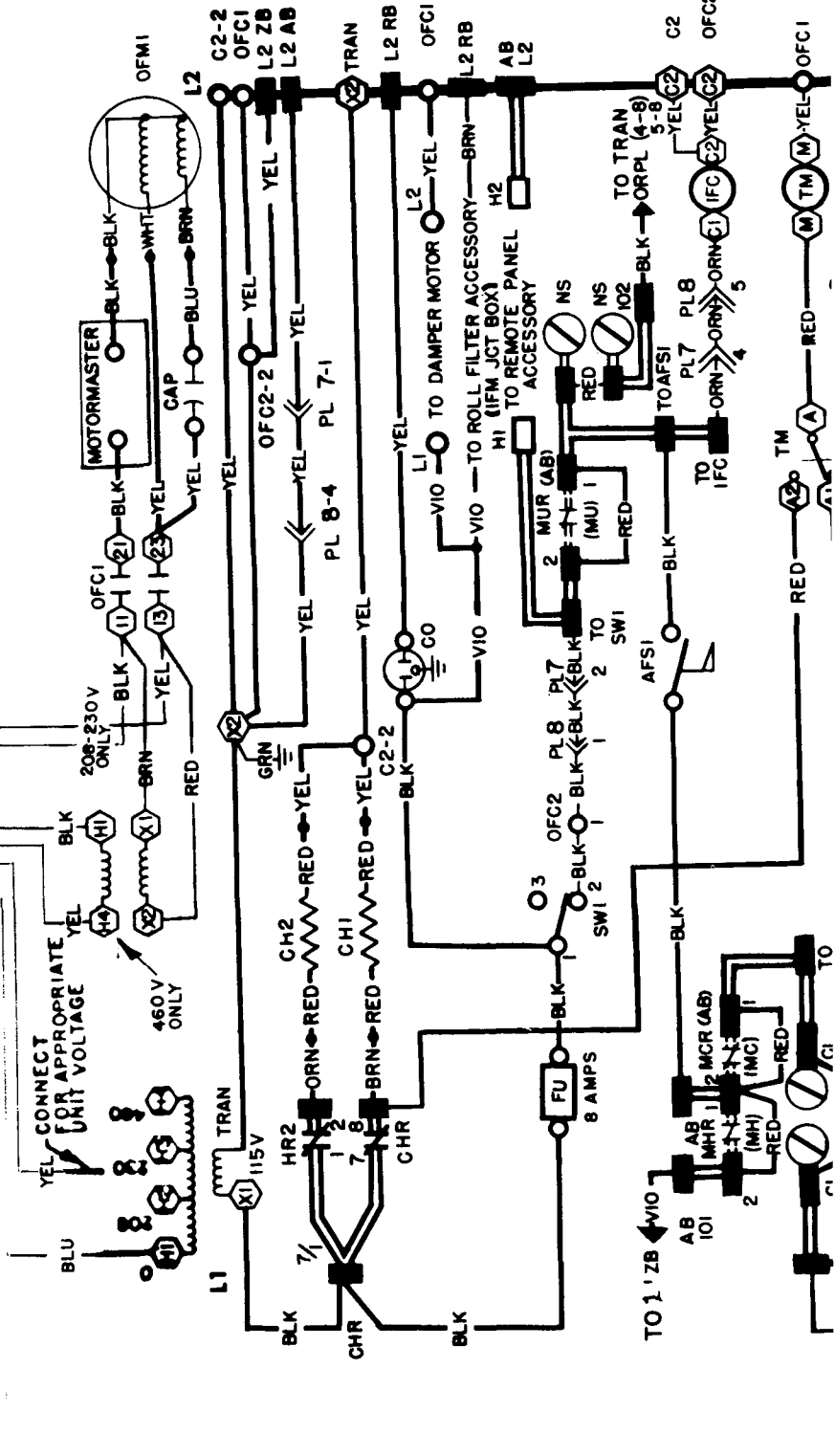
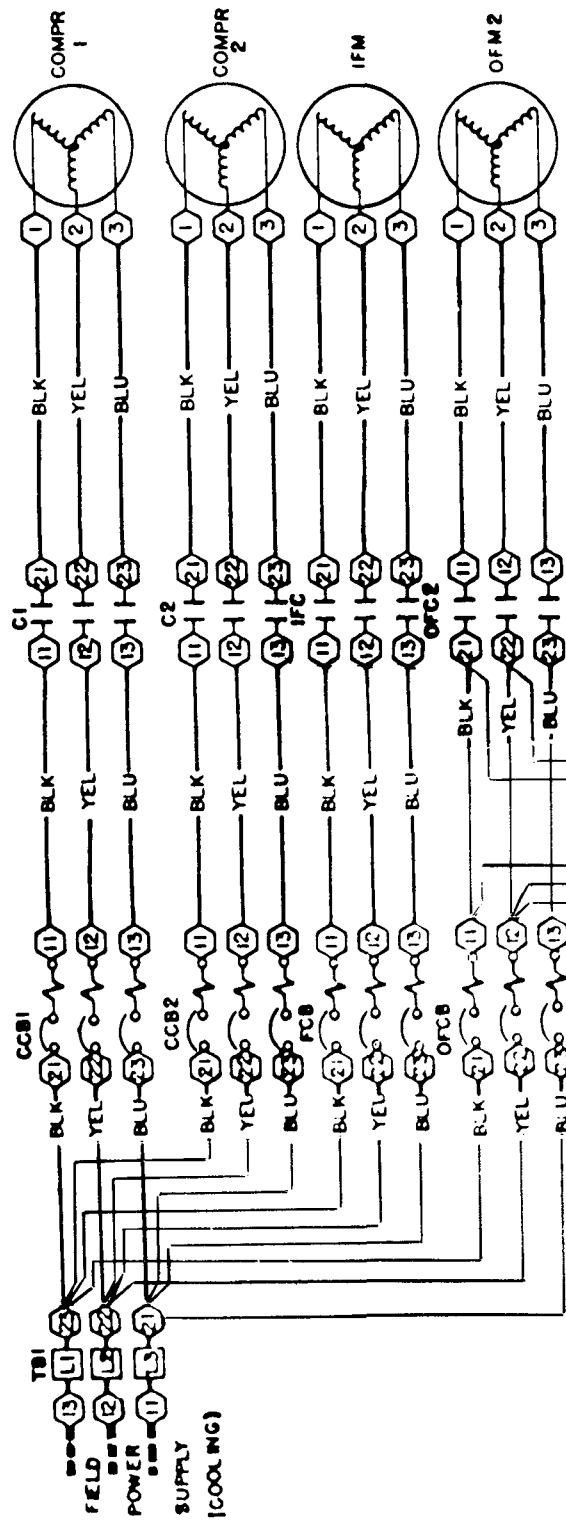


Fig. 2 — Condensing (Cooling) Component Arrangement; 48MA016,024,028 and 030 (All Voltages)







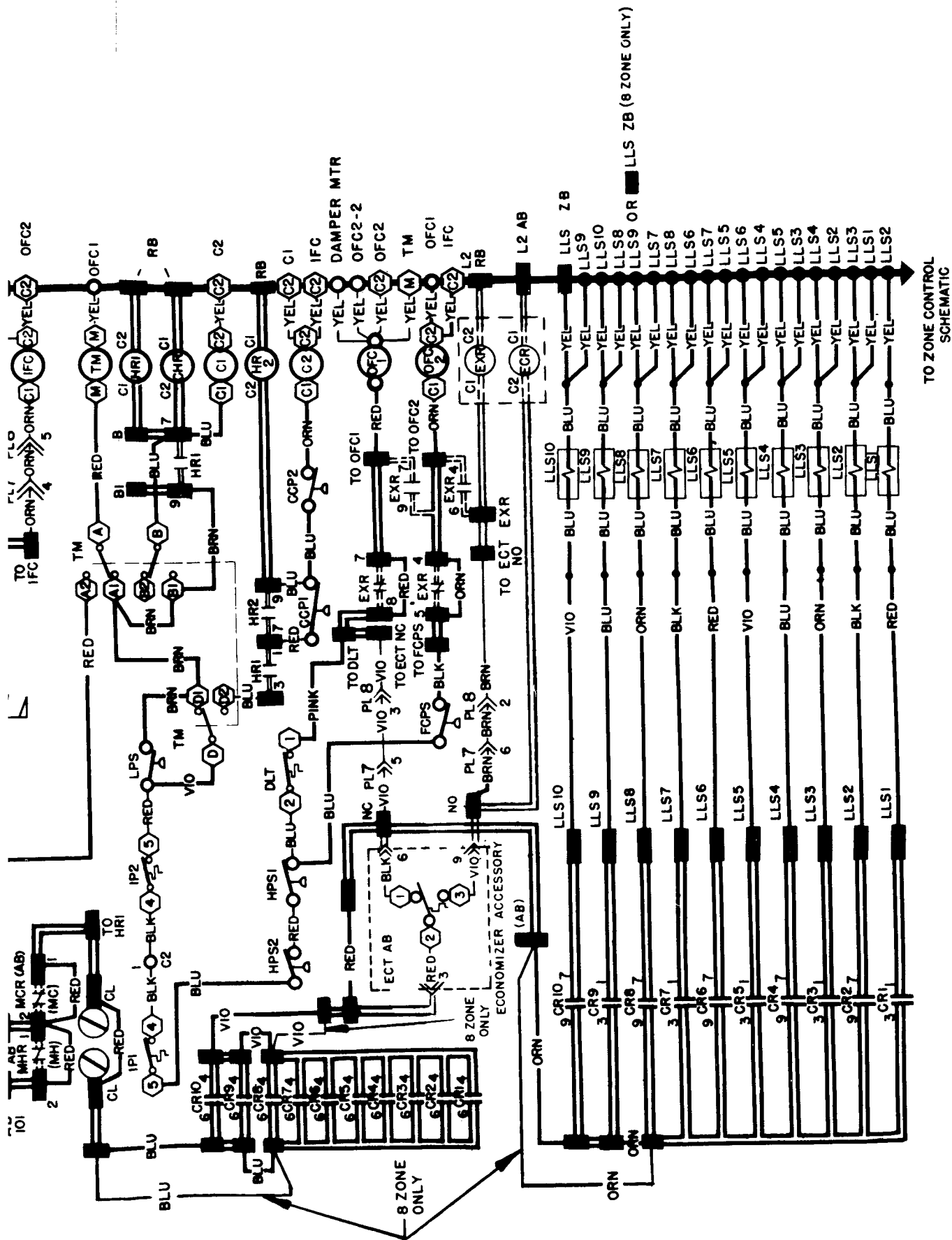
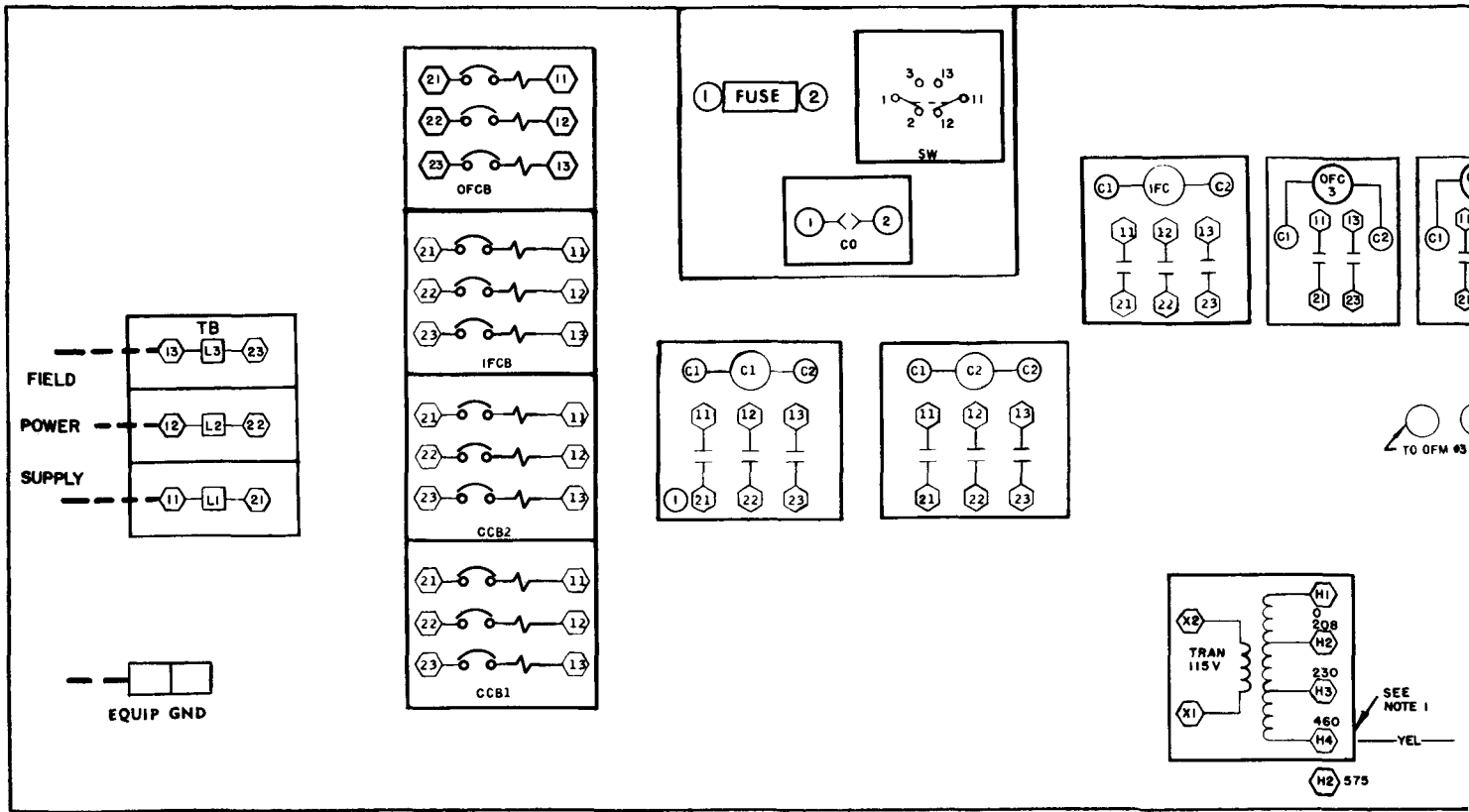


Fig. 4 — Condensing (Cooling) Wiring Schematic;  
48MA024,028 and 030 (208-230 and 460-v only)



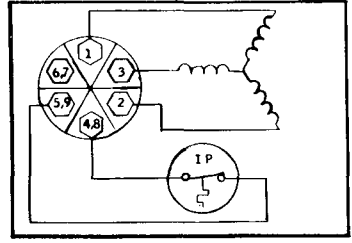




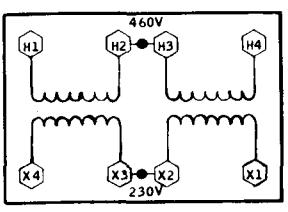
TO OFM 63

SEE NOTE 1  
YEL

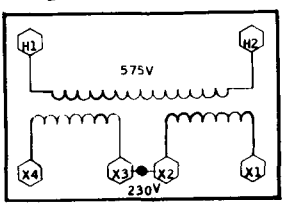
COMPRESSOR #1&2



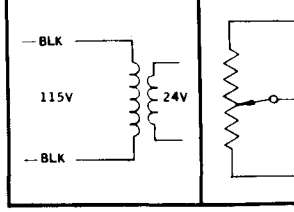
OUTDOOR FAN I MOTOR TRANSFORMER 460 V UNITS ONLY



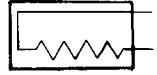
OUTDOOR FAN I MOTOR TRANSFORMER 575V UNITS ONLY



DAMPER MOTOR



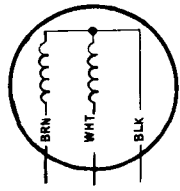
CH 1&2



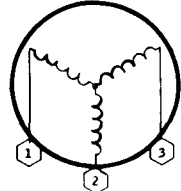
SENSOR



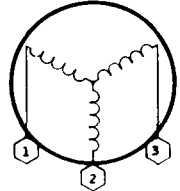
OUTDOOR FAN MOTOR #1



OUTDOOR FAN MOTOR #2 & #3

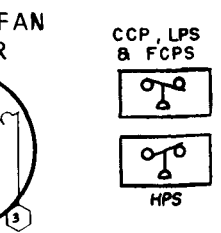
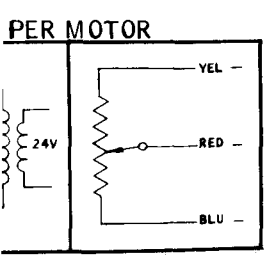
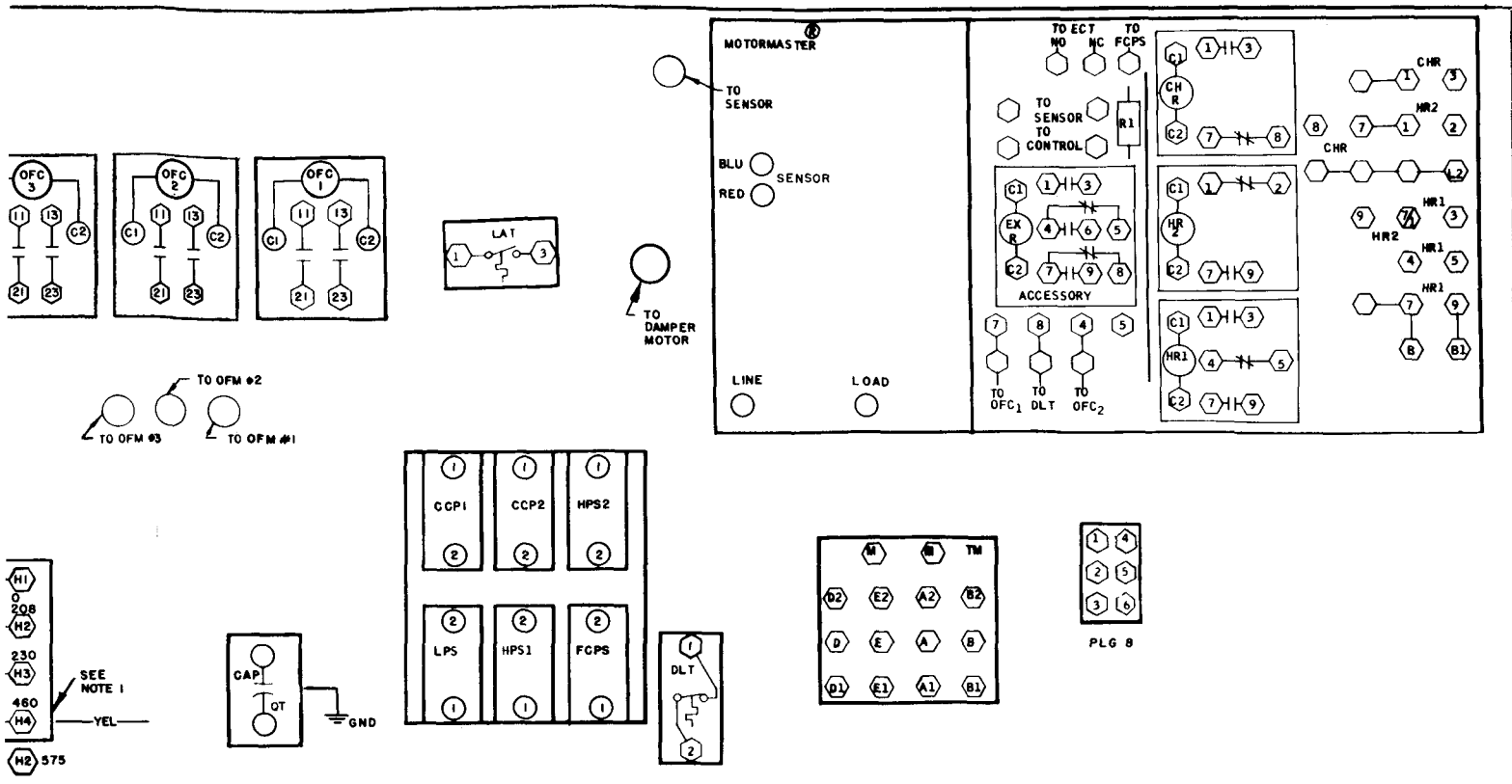


INDOOR FAN MOTOR



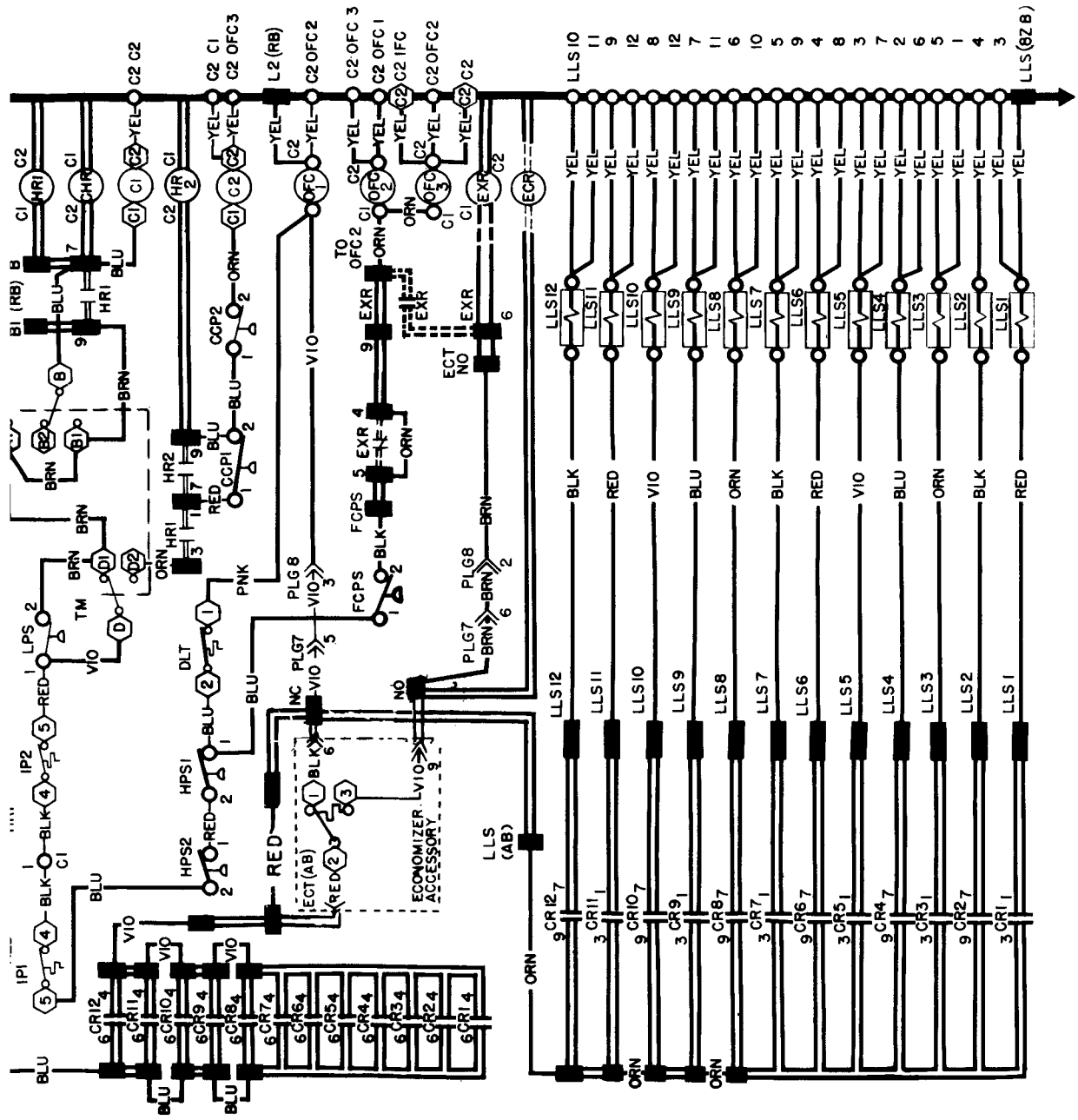
CCP, & F...  
9  
9  
H...

Fig. 6 — Condensing (Cooling) 48MA034 and 040



g (Cooling) Component Arrangement;  
34 and 040 (All Voltages)





TO ZONE CONTROL SCHEMATIC

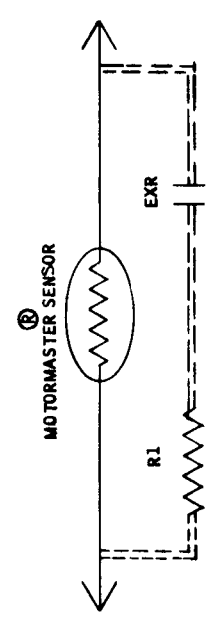


Fig. 7 — Condensing (Cooling) Wiring Schematic; 48MA034 and 040 (All Voltages)



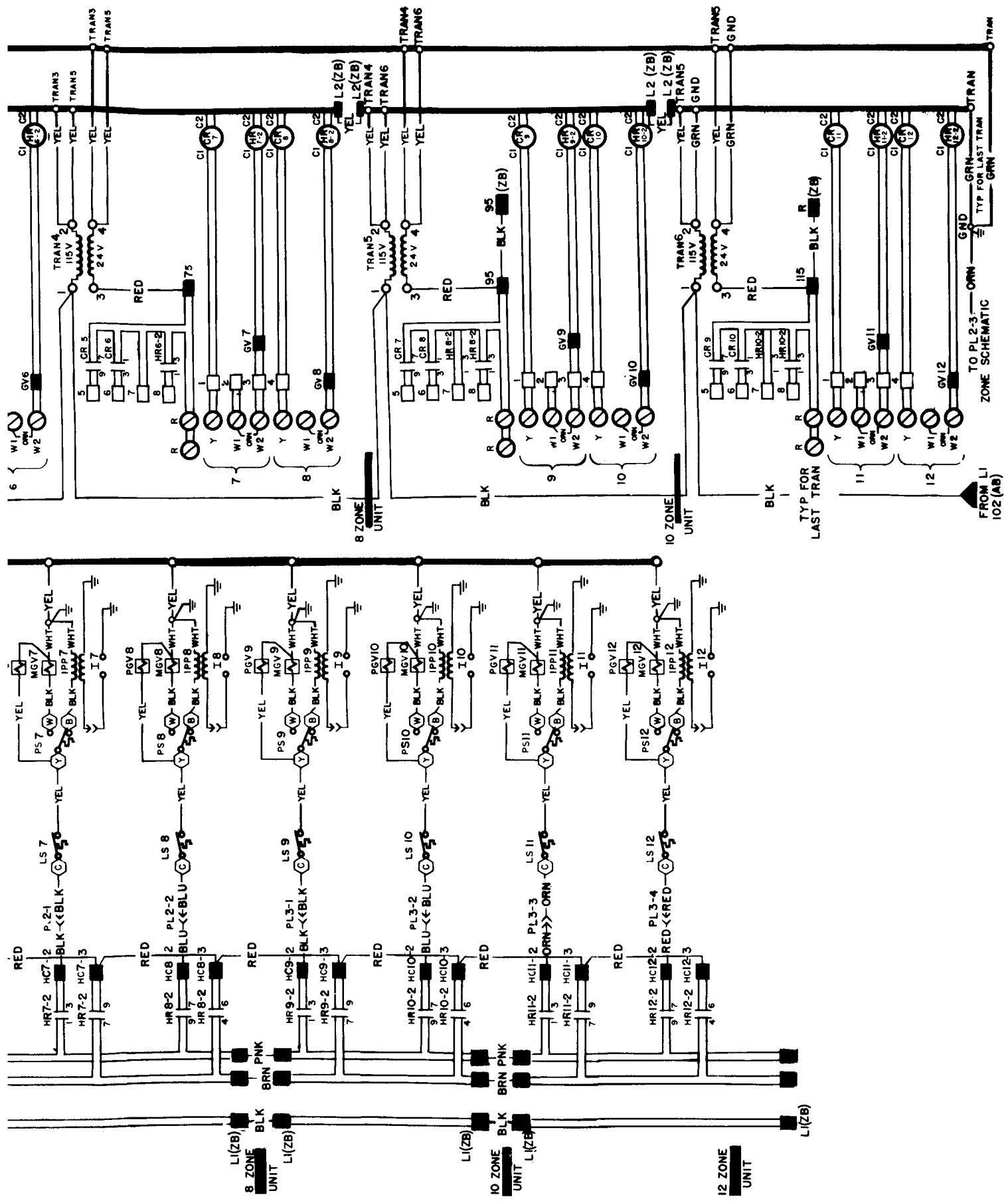
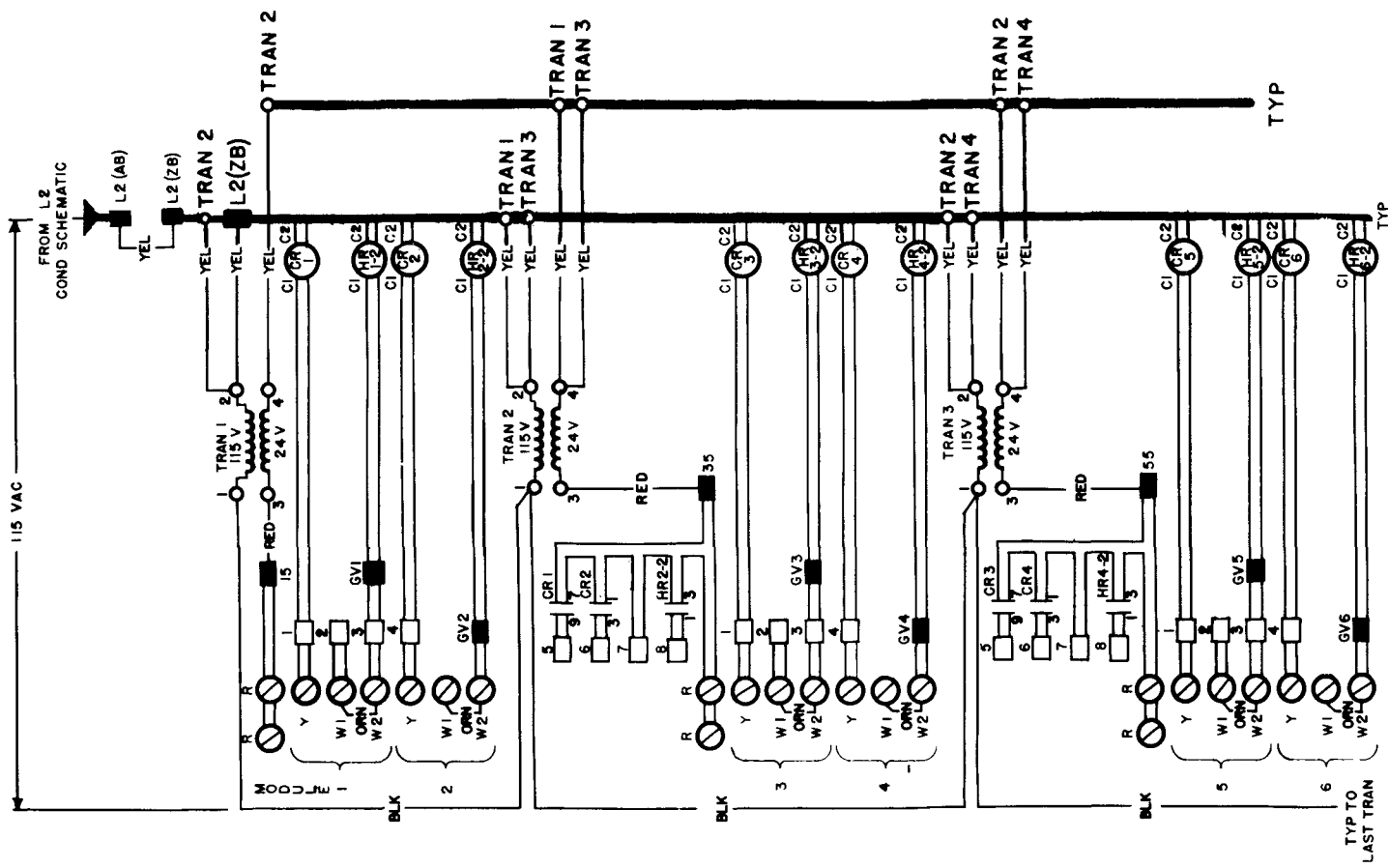
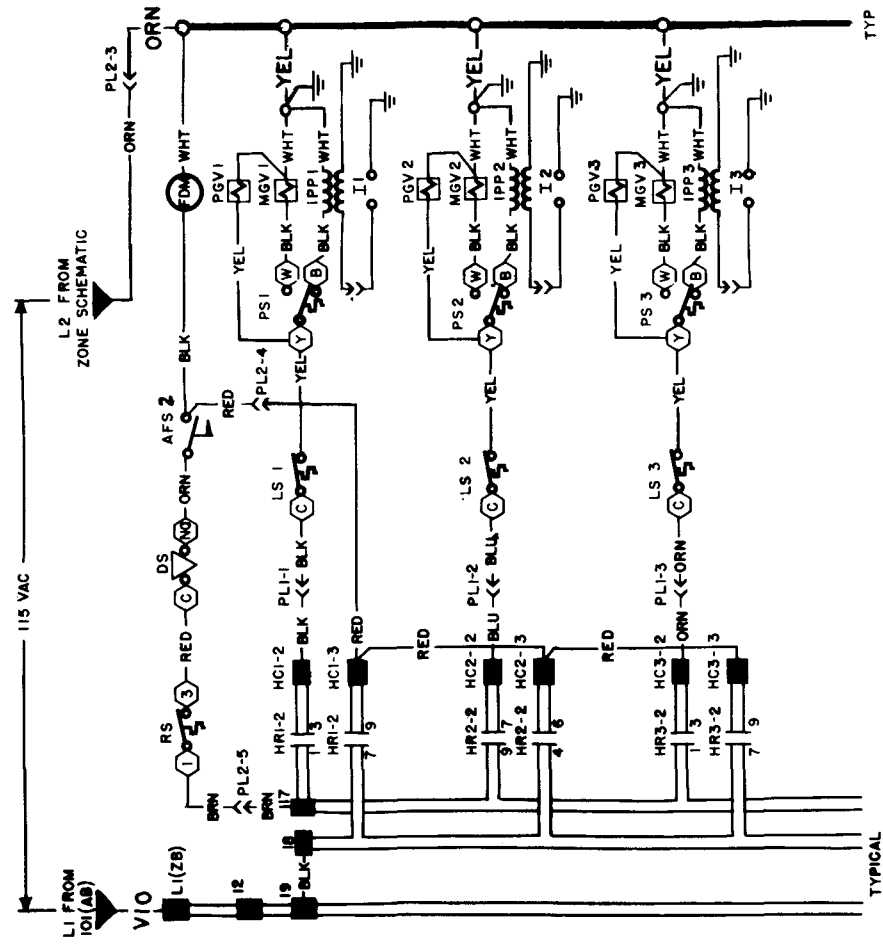


Fig. 8 — Label Diagram, Control and Zoning (All Units)



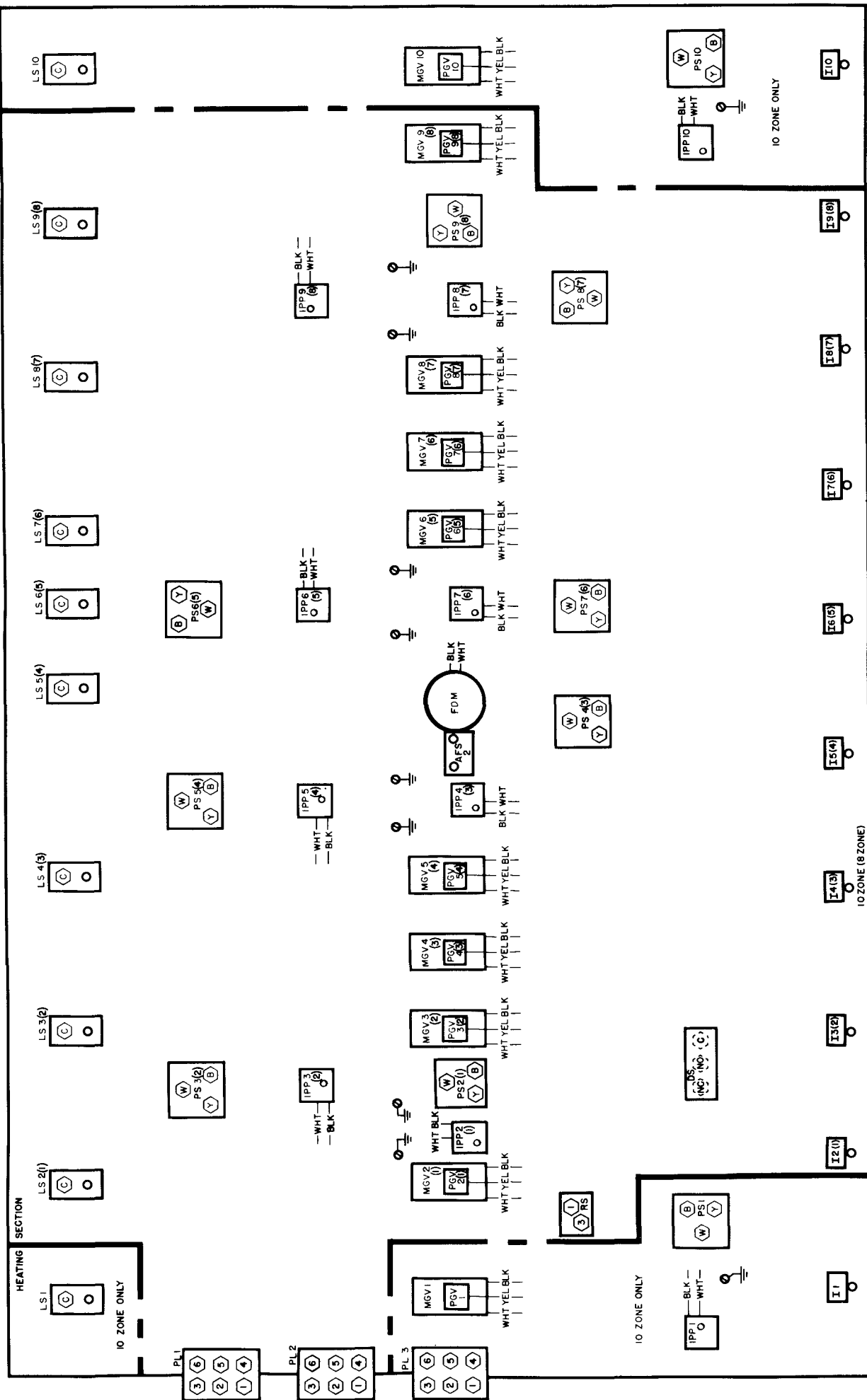


Fig. 9 — Label Diagram, Heating; 48MA016-030



HEATING SECTION

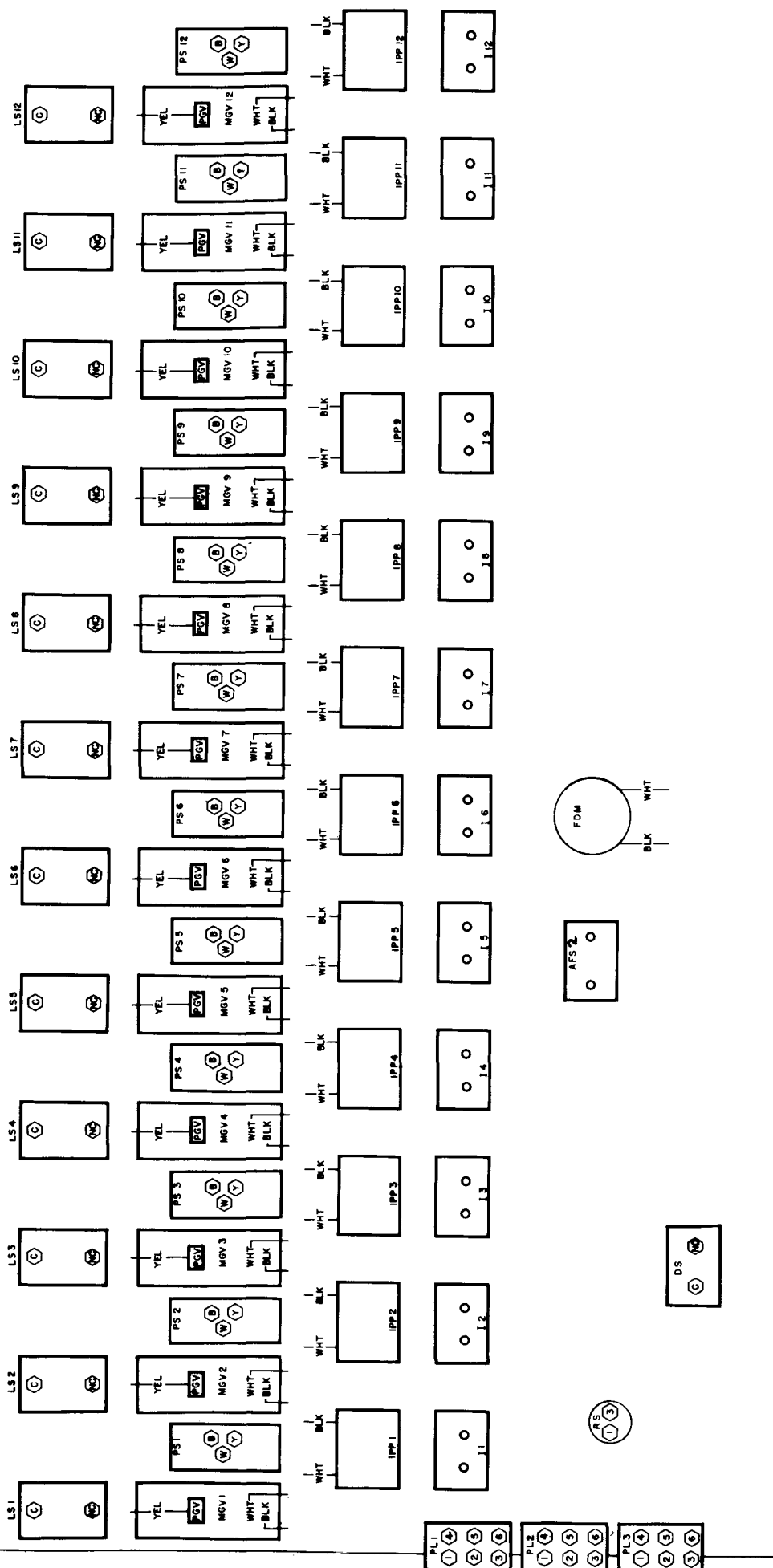


Fig. 10 — Label Diagram, Heating; 48MA034,040

## OPERATING SEQUENCE

When unit power is on and no zone thermostat is calling for cooling or heating, the indoor air fan and crankcase heaters are on. The outdoor air dampers are at the preset position.

**Cooling** — On call for cooling from a zone, compressor no. 1 with 2 unloaders, starts; a liquid line solenoid for that zone evaporator coil opens and outdoor air fan motor no. 1 starts. Compressor will load or unload in response to suction pressure as required. If additional cooling is required (i.e., more zones call for cooling), compressor no. 2 (no unloaders) will be energized and cycle as required.

If the heat load is not sufficient to balance capacity of compressor no. 1 in an unloaded condition, the hot gas bypass valve will meter hot gas to the outdoor air evaporator coil to supply additional load. The Motormaster® head pressure control will vary speed of outdoor air fan no. 1 to regulate the airflow across the condenser coil.

As required, outdoor air fan no. 2 (and no. 3) will cycle on and off in response to head pressure via a fan cycling switch.

**Heating** — On call for heating from a zone, the forced draft blower starts and pilot burner lights. The main burner ignites after pilot has been proven (in approximately 60 seconds).

**Reheat Humidity Control** can be achieved by wiring a humidistat in parallel with the cooling thermostat. If zone temperature drops below setting of heating thermostat because humidistat is closed, heating mode will be energized to maintain zone space temperature.

**Economizer Outdoor Air Control** — When outdoor air temperature drops to outdoor thermostat setting, the compressors are locked out. When a zone calls for cooling, the mixed air thermostat modulates the outdoor air dampers to permit cooling with outdoor air.

**THERMOSTAT SETTINGS** — Set outdoor air thermostat (economizer thermostat, ECT) at a temperature which will provide cooling with outdoor air only. This setting, when achieved, will lock out the compressor(s). A 45 F setting is suggested.

Then set mixed air thermostat (MAT.), as desired to provide mixed air of the correct temperature. This setting cannot be lower than the ECT setting. A 58 F setting is suggested.

**DAMPER POSITION** — When outdoor air damper is fully open, the return air damper will be closed and vice versa.

**Heating or Compressor Cooling** — Dampers will assume the ventilation position indicated by the ventilation control knob. If a remote control center is used, Day/Night switch must be at the DAY position.

If terminals in unit control box labeled SHORT TO CLOSE DAMPERS are shorted or if Day/Night switch is set at NIGHT position, outdoor air damper will close.

**Intermediate Season (Free Cooling)** — If outdoor air temperature drops below economizer thermostat (ECT) setting, the compressor(s) will remain off. The dampers will modulate to maintain the mixed air thermostat (MAT.) setting. If the outdoor air temperature rises above the ECT setting, the unit will operate as described in Heating or Compressor Cooling above.

**Exhaust Damper** — When unit is on economizer cycle (free cooling) and an exhaust damper is part of the unit, the exhaust relay is energized. The fan motor controls and the fan cycling pressure switches are bypassed so that outdoor air fans no. 2 and 3 operate at full speed.

When the return air damper is 25% closed, the exhaust damper begins to open. The outdoor air fans pull indoor return air through the open exhaust damper and discharge it to the outdoors.

**Roll Filter** — As filter media becomes clogged, an air pressure switch activates a drive motor to automatically advance clean filter media into the return airstream. A FILTER light can be used to indicate that filter media roll has been expended (see Remote Control Panel).

### Remote Control Panel

#### SYSTEM SWITCH SETTINGS

**OFF** — In this position, the master unit relay (MUR) is energized. This opens a set of normally closed MUR contacts, interrupting power to the control circuit with the exception of the following: the remote control panel accessory, the roll filter accessory, the damper motor, the convenience outlet and the crankcase heaters. The MUR also closes a set of normally open MUR contacts which close the outdoor air damper.

**COOL** — In this position, the master heating relay (MHR) is energized, opening a set of normally closed MHR contacts, interrupting power to the heating control section (heating is locked out).

**HEAT** — In this position, the master cooling relay (MCR) is energized opening a set of normally closed MCR contacts, interrupting power to the cooling section (cooling is locked out).

**AUTO.** — In this position, the zone thermostats are in control of the unit modules.

**OUTDOOR AIR CONTROL KNOB** — The outdoor air damper control knob on the front of remote control panel replaces the function of the VENTILATION CONTROL knob in the base unit zone control and thermostat control panel. Damper may be fully closed, set at any intermediate position, or fully open.

**DAY/NIGHT SWITCH** — This switch closes the outdoor air damper when at the NIGHT position. The outdoor air damper automatically returns to the preset position when set at DAY setting.

When a night setback system is used, this switch normally will override the night setback if set at DAY. The night setback system operates automatically when set at NIGHT setting.

**FILTER LIGHT** — Reduced airflow due to clogged filters will illuminate this light when the air pressure switch (APS) and standard filters are used. To reset APS, turn reset knob on front of APS.

The light will be illuminated if the filter runout switch (FRS) is used to indicate that roll filter media has been expended.

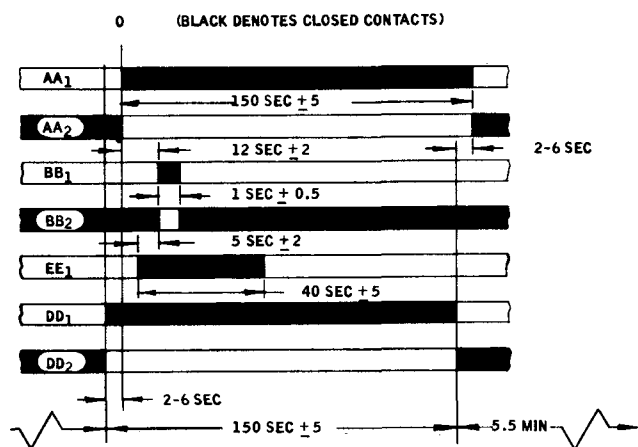


Fig. 11 — Timer Sequence Chart

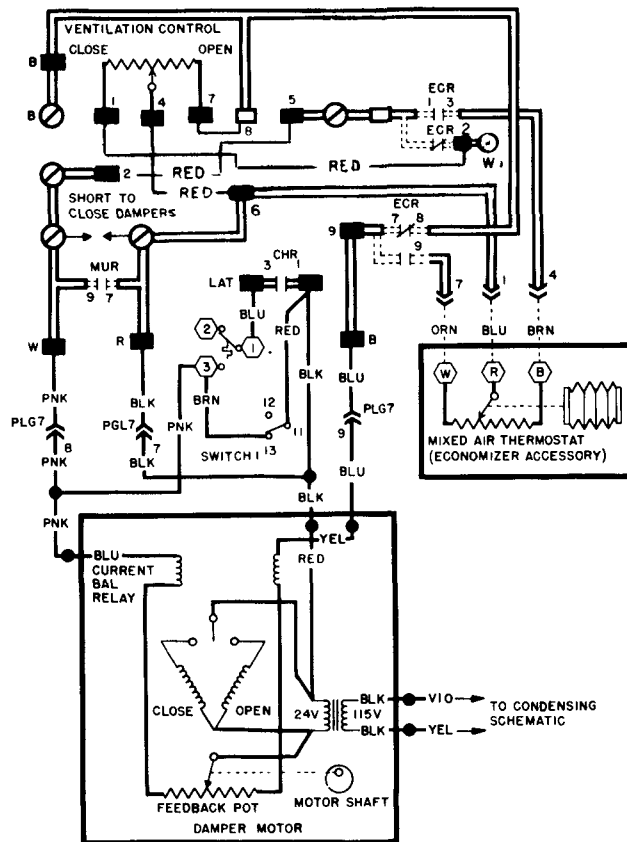


Fig. 12 — Economizer Damper Control

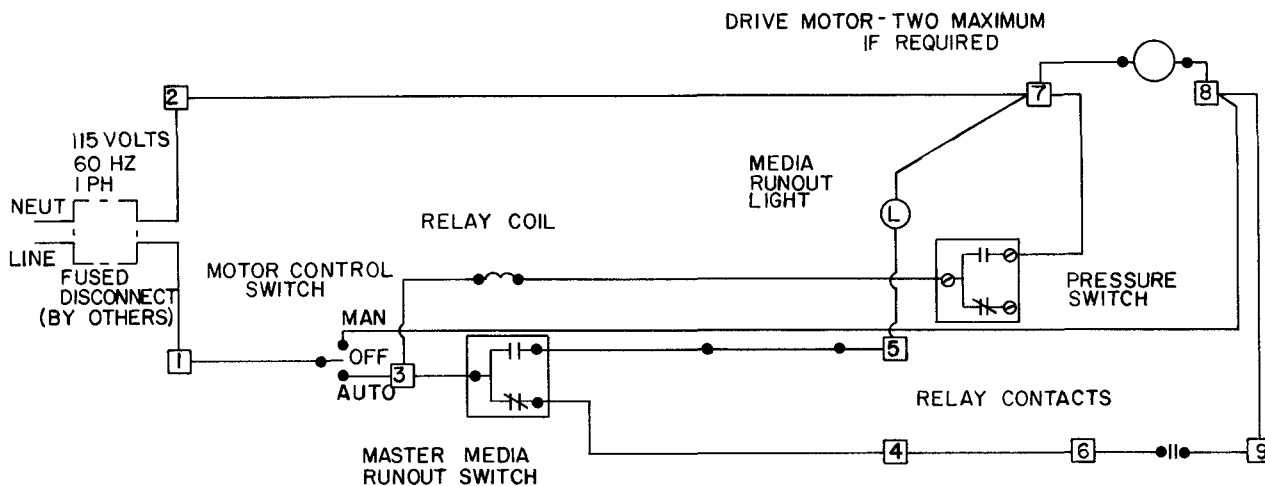
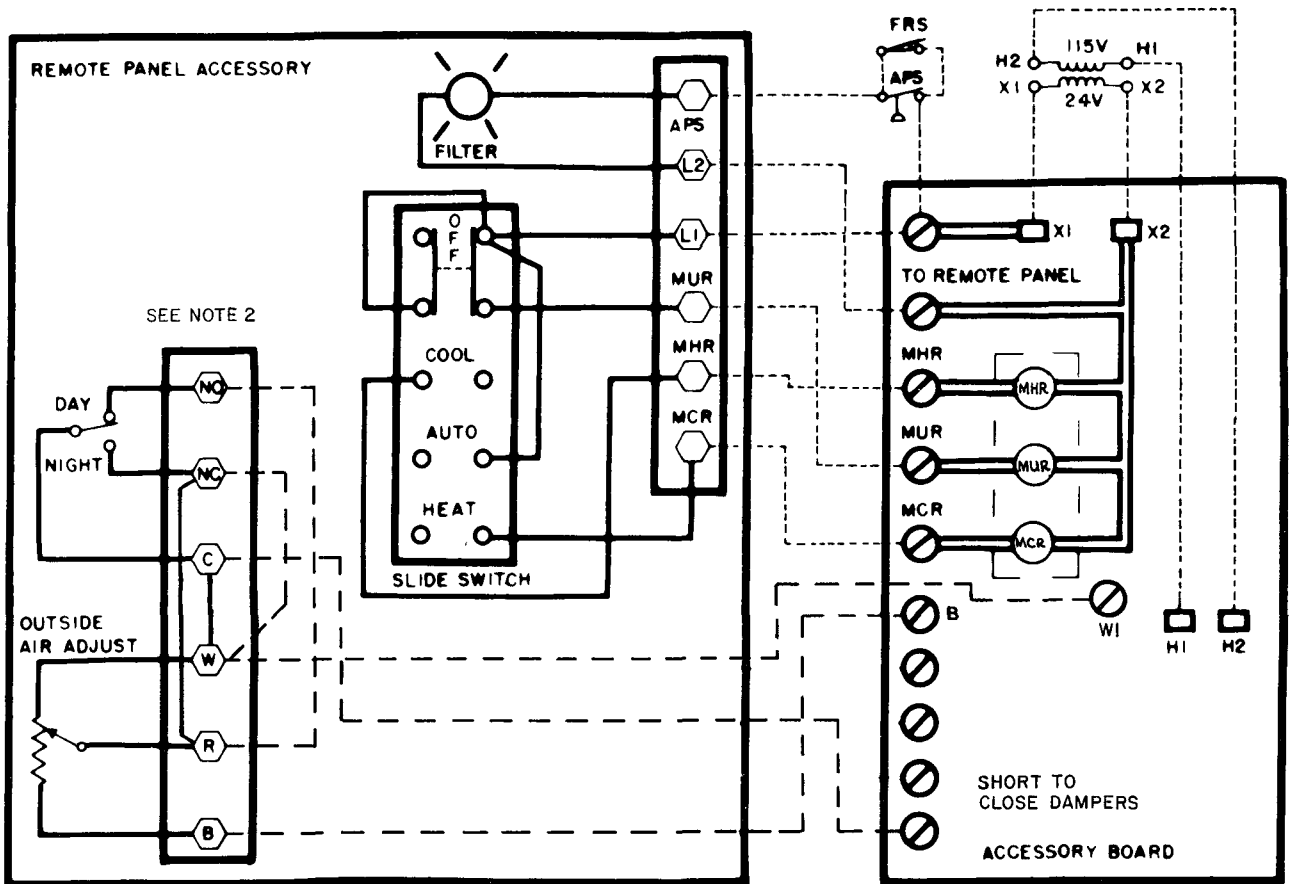
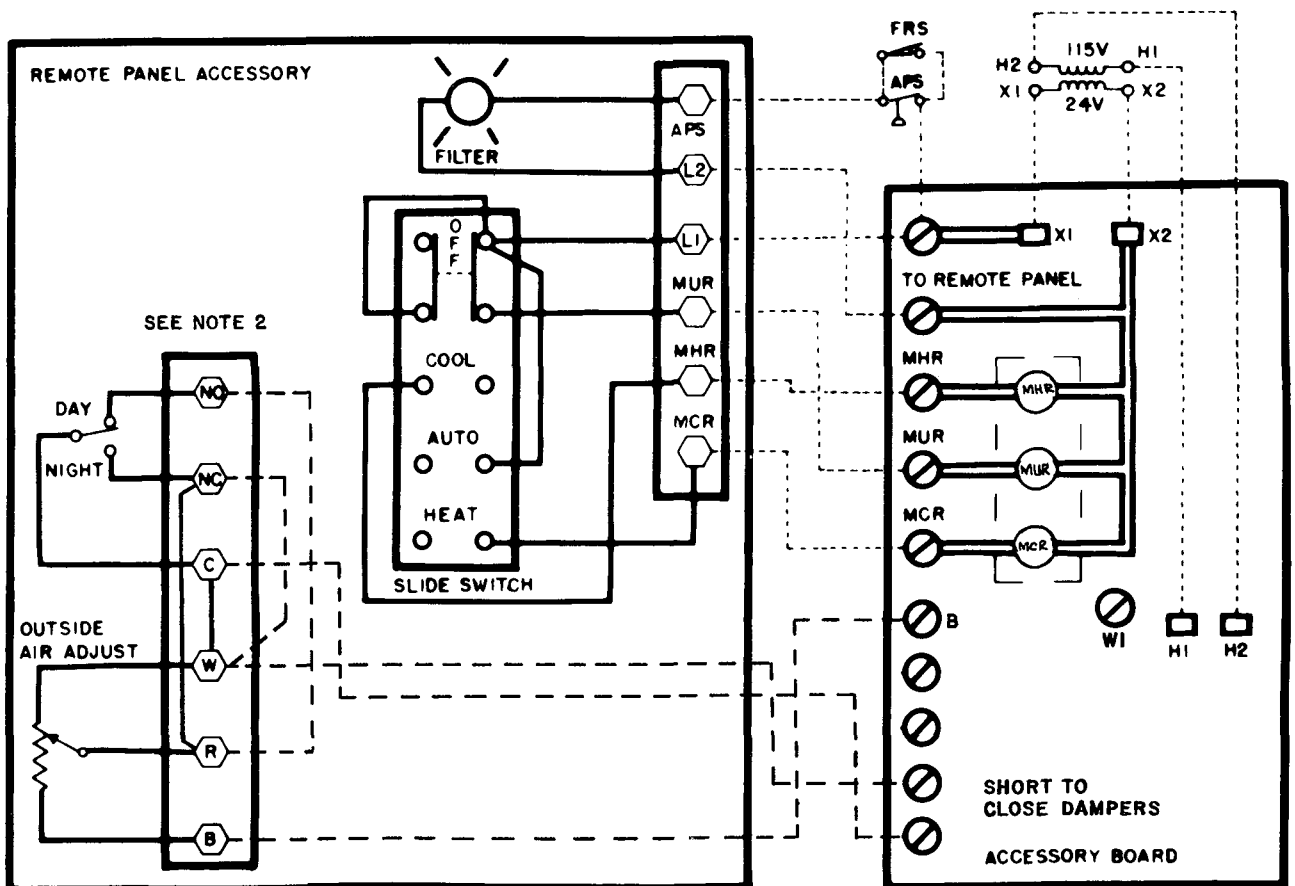


Fig. 13 — Roll Filter Electrical Diagram



WITH OPTIONAL ECONOMIZER



WITHOUT OPTIONAL ECONOMIZER

Fig. 14 — Remote Control Panel Connections (24 volt)

## JUMPER LOCATION CHART

### No economizer, no remote control panel

Under ventilation control knob:

- Terminal 1—2
- Terminal 4—6
- Terminal 7—9

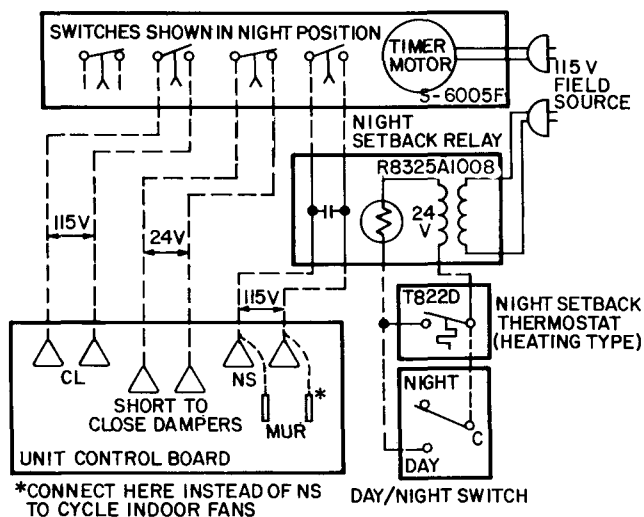
### Factory-installed economizer jumper installation

Under ventilation control knob:

- Relocate jumper from 1—2 to 1—W1
- Add jumper terminal 2—5
- Relocate jumper from 7—8 to 7—9

**Night Setback** — Night setback control can be added to a 48MA unit using field-supplied components. There are 3 sets of terminals on the accessory section of the unit zone control board (see Fig. 1). The terminals are used in combination to achieve the system desired. Terminal sets are: cooling lockout (CL), night setback (NS) and SHORT TO CLOSE DAMPERS. Red jumpers are factory wired across CL and NS; SHORT TO CLOSE DAMPERS are bare (see Fig. 1). If the circuit between CL terminals is broken, 115-v power to the compressor control circuit liquid line solenoids and economizer thermostat (if used) is shut off. If the circuit between NS terminals is broken, 115-v power to the zone control transformers is shut off. By replacing both jumpers with appropriate switches and connecting proper switch across SHORT TO CLOSE DAMPERS, NS control is attained. Although many versions of NS are possible, the 3 most common methods are detailed here.

#### METHOD NO. 1 — HEATING NIGHT SETBACK, COOLING LOCKED OUT, AND CONTINUOUS INDOOR FAN OPERATION



- CL — Cooling Lockout
- MUR — Master Unit Relay
- NS — Night Setback

Fig. 15 — Night Setback, Method #1

This automatic NS system requires a Honeywell S-6005F seven-day timer, a Honeywell R8325A1008 fan center (night setback relay) and a Honeywell T822D thermostat (heating type) 24-v service. In this system (see Fig. 14), when the timer reaches the NIGHT position, the switches are shown. CL opens, dampers close and NS opens. The fan continues to operate.

As the temperature falls, the NS thermostat located in the average temperature space energizes the NS relay (fan center) which in turn energizes the zone control transformers. The individual zones then heat until the NS thermostat is satisfied. The dampers remain closed and cooling is still locked out. If a Day/Night switch is used, the NS thermostat is overridden and heating is controlled by the normal thermostats.

Accessory remote panel assembly and/or accessory economizer may be used with this system if desired. Cycling indoor fans with NS thermostat is possible if the accessory remote panel is not used. Connect the field wiring to the MU terminals instead of the NS and the indoor fan contactor will cycle with the heaters. Although this system does not provide a time off delay for the fans after heater shutdown, test experience indicates that this is not a problem on these units.

#### METHOD NO. 2 — HEATING NIGHT SETBACK, COOLING LOCKED OUT AND CYCLING INDOOR FANS

This system requires a Carrier remote control panel assembly 48MA900041. Honeywell S-6005F seven-day timer, Honeywell R8325A1008 fan center (night setback relay) and a Honeywell T822C1090 thermostat (cooling type).

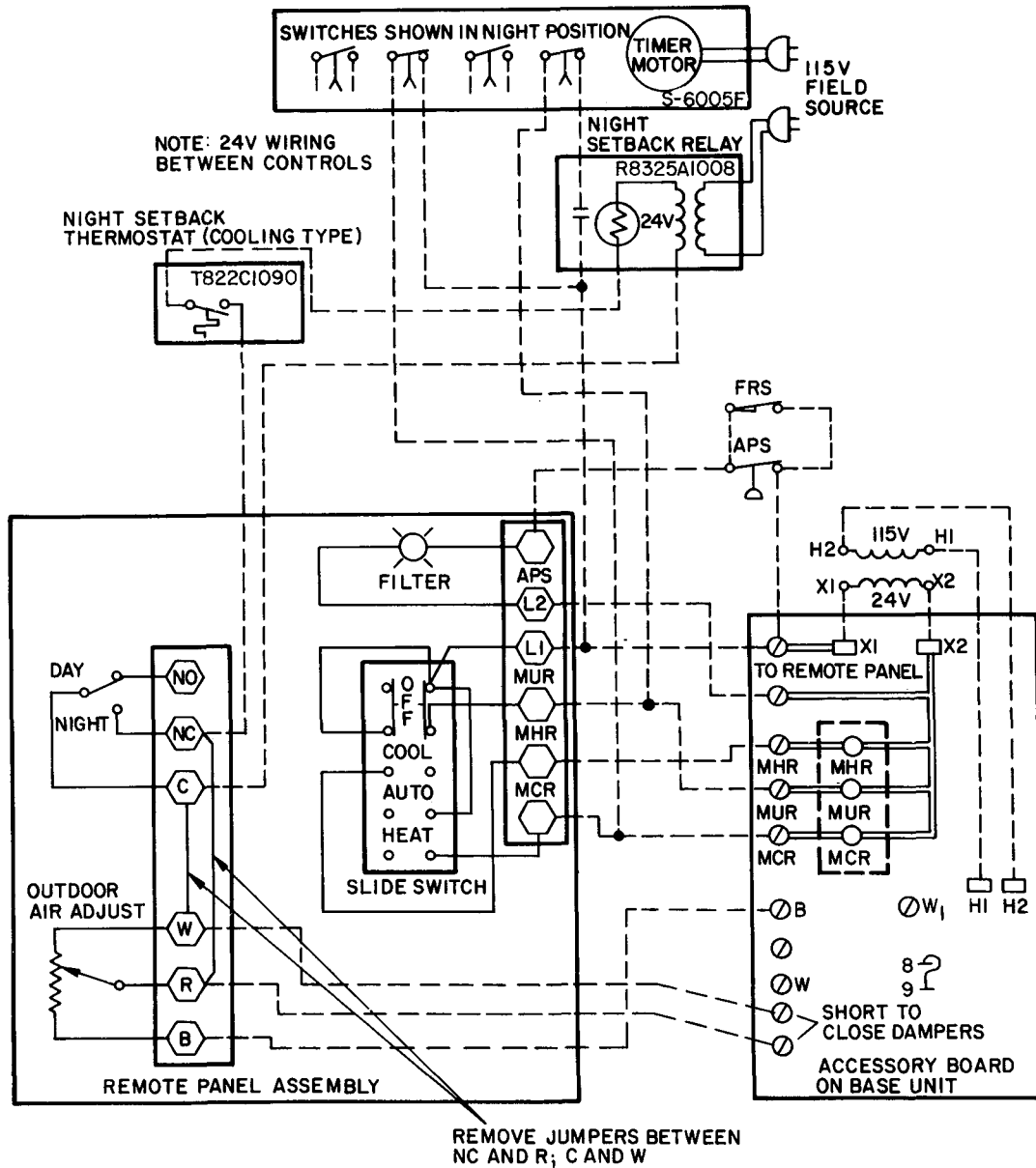
The number of candidate systems for NS increases with the use of the remote accessory panel. A typical system is shown in Fig. 16 and 17. The use of the master unit relay (MUR) and the master cooling relay (MCR) requires 24-v wiring only. Installing the timer and the NS relay in proximity to the remote control panel results in all wiring being located inside the building in one area.

In this system, the MUR is energized by the NS controls. This opens a set of normally closed contacts and shuts down the unit, including indoor fans. The outdoor air dampers are also closed by the MUR. Cooling lockout is attained by energizing the MCR. Energizing these relays turns the unit off and the NS system seems to work in reverse.

A cooling thermostat is used on heating NS. When temperature rises, the thermostat, in series with the night switch, energizes the NS relay. Its contacts close and, in series with the time clock contacts, energize the MUR. As the space temperature lowers to the NS setting, the NS thermostat de-energizes the NS relay which de-energizes the MUR, turning on the unit.

Again, the Day/Night switch overrides the NS clock and heating can occur because the NS relay is de-energized. The factory jumpers remain across CL and NS terminals.

This system opens the dampers when the indoor fans start. To keep them closed, short across the W-R terminals on the remote control panel or the SHORT TO CLOSE DAMPERS terminals during the NS period.

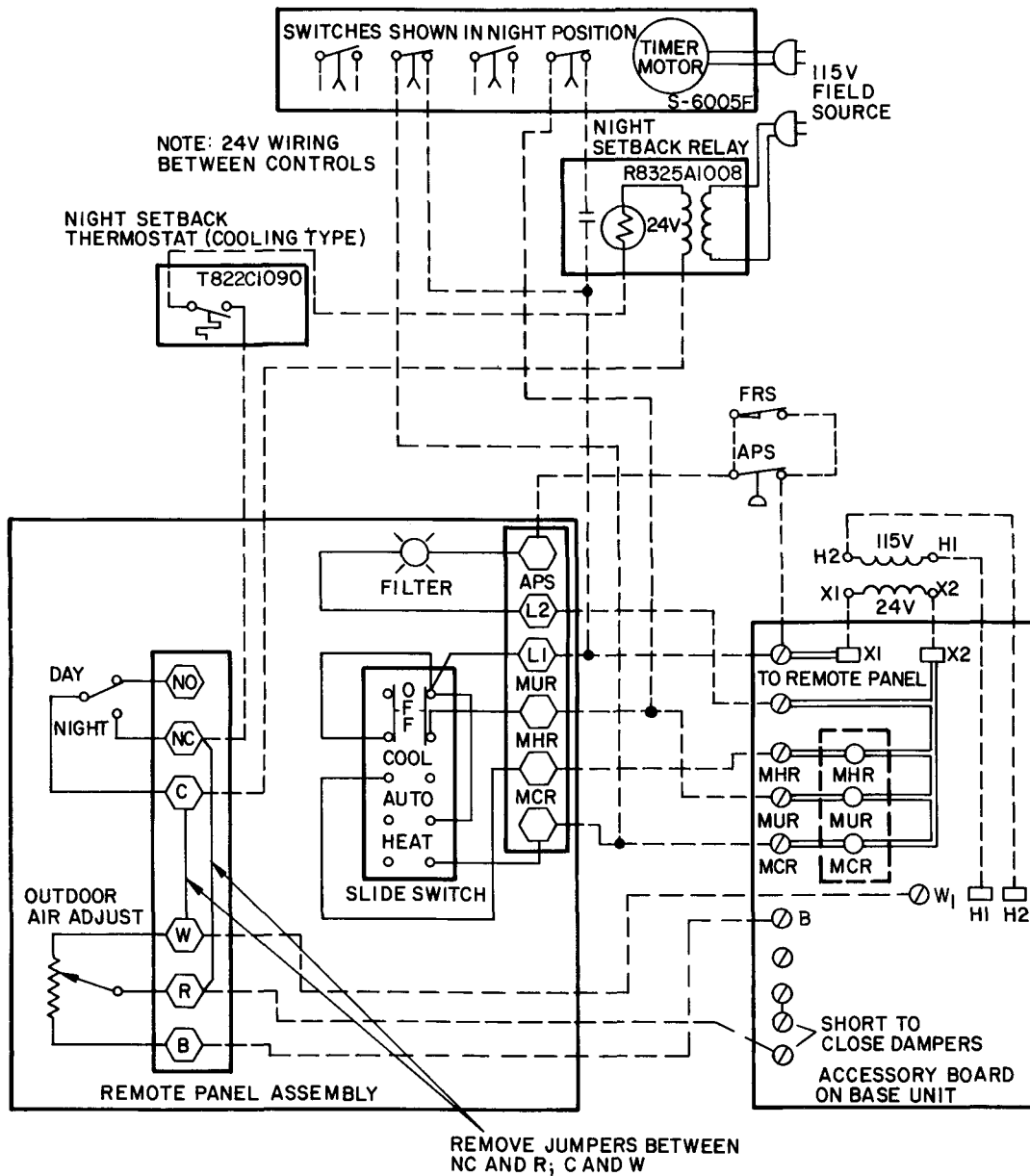


LEGEND

- APS — Air Pressure Switch
- FRS — Filter Media Runout Switch
- MCR — Master Cooling Relay
- MHR — Master Heating Relay
- MUR — Master Unit Relay

- or ○ Terminal (Circuit Board, Field or Accessory Conn)
- Accessory or Field Wiring
- Factory Wiring
- === Circuit Board Run

Fig. 16 — Night Setback, Method #2 — Without Economizer



LEGEND

- APS — Air Pressure Switch
- FRS — Filter Media Runout Switch
- MCR — Master Cooling Relay
- MHR — Master Heating Relay
- MUR — Master Unit Relay
- or ○ Terminal (Circuit Board, Field or Accessory Conn)
- Accessory or Field Wiring
- Factory Wiring
- === Circuit Board Run

Fig. 17 — Night Setback, Method #2 — With Economizer

**METHOD NO. 3 — USING ACCESSORY REMOTE PANEL, HEATING AND COOLING NIGHT SETBACK AND INDOOR FAN CYCLING**

This system requires a:

Carrier remote control panel assembly 48MA 900041

Carrier heating and cooling thermostat HH07AT174

Carrier subbase HH93AZ170

Night setback relay (Honeywell fan center R8227A)

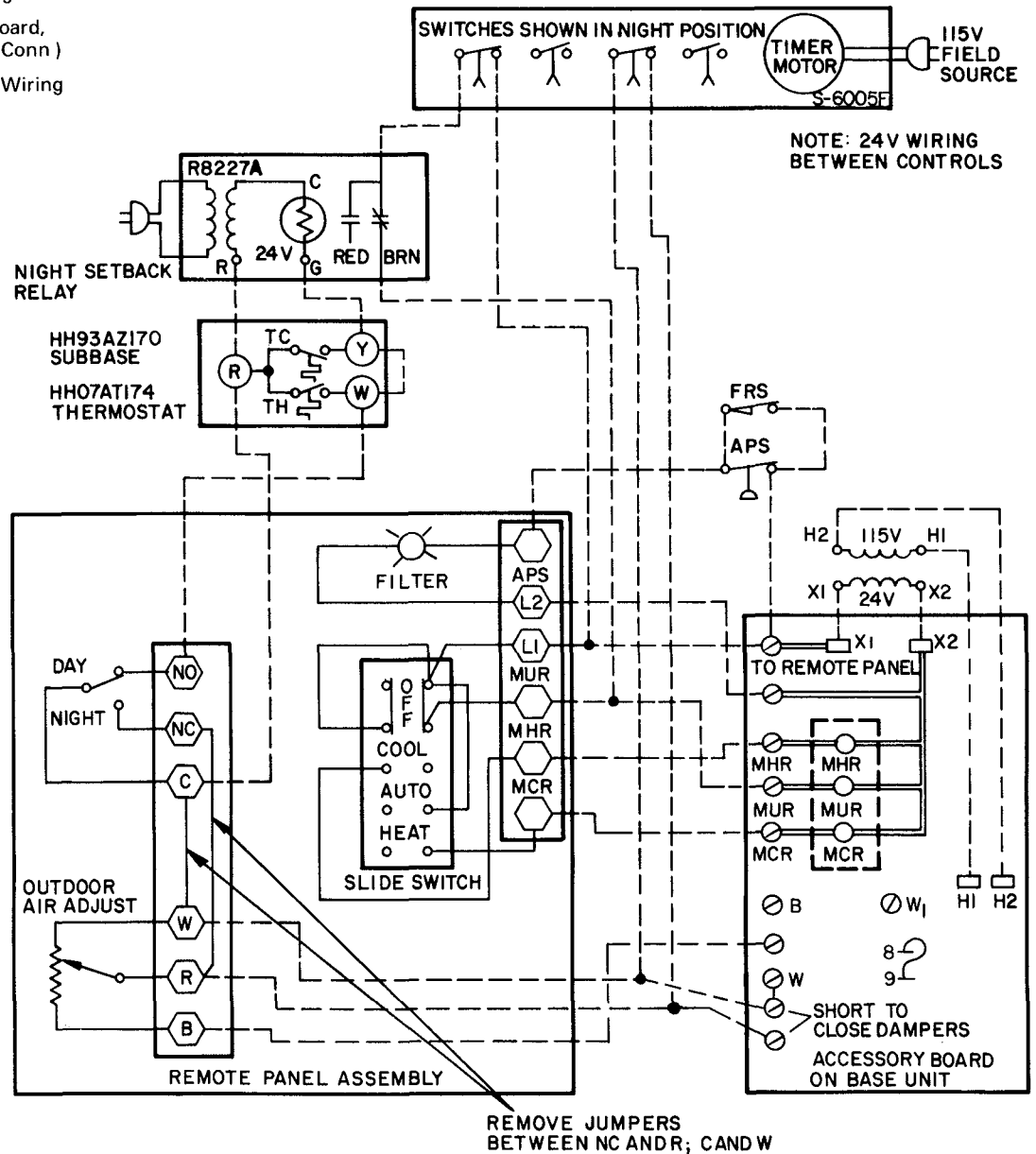
Seven-day timer (Honeywell S-6005F)

The system (Fig. 18, 19) is a proposed heating and cooling night setback with fan cycling. The thermostat is a standard Carrier part with no switches on the subbase. This requires a NS relay with normally closed contacts so an alternate Honeywell R8227A is required.

**LEGEND**

- APS** — Air Pressure Switch
- FRS** — Filter Media Runout Switch
- MCR** — Master Cooling Relay
- MHR** — Master Heating Relay
- MUR** — Master Unit Relay
- TC** — Thermostat, Cooling
- TH** — Thermostat, Heating

- or Terminal (Circuit Board, Field or Accessory Conn)
- Accessory or Field Wiring
- Factory Wiring
- Circuit Board Run



**Fig. 18 — Night Setback, Method #3 — Without Economizer**


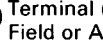
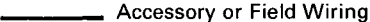


Because cooling is not locked out, the clock switches that close at night are used to directly close the outdoor air dampers by connecting across R and W on the remote panel accessory. Again the MUR shuts down the unit (including the indoor fans). When the NS thermostats reach their settings, the NS relay is energized, opening the NC contacts and de-energizing the MUR.

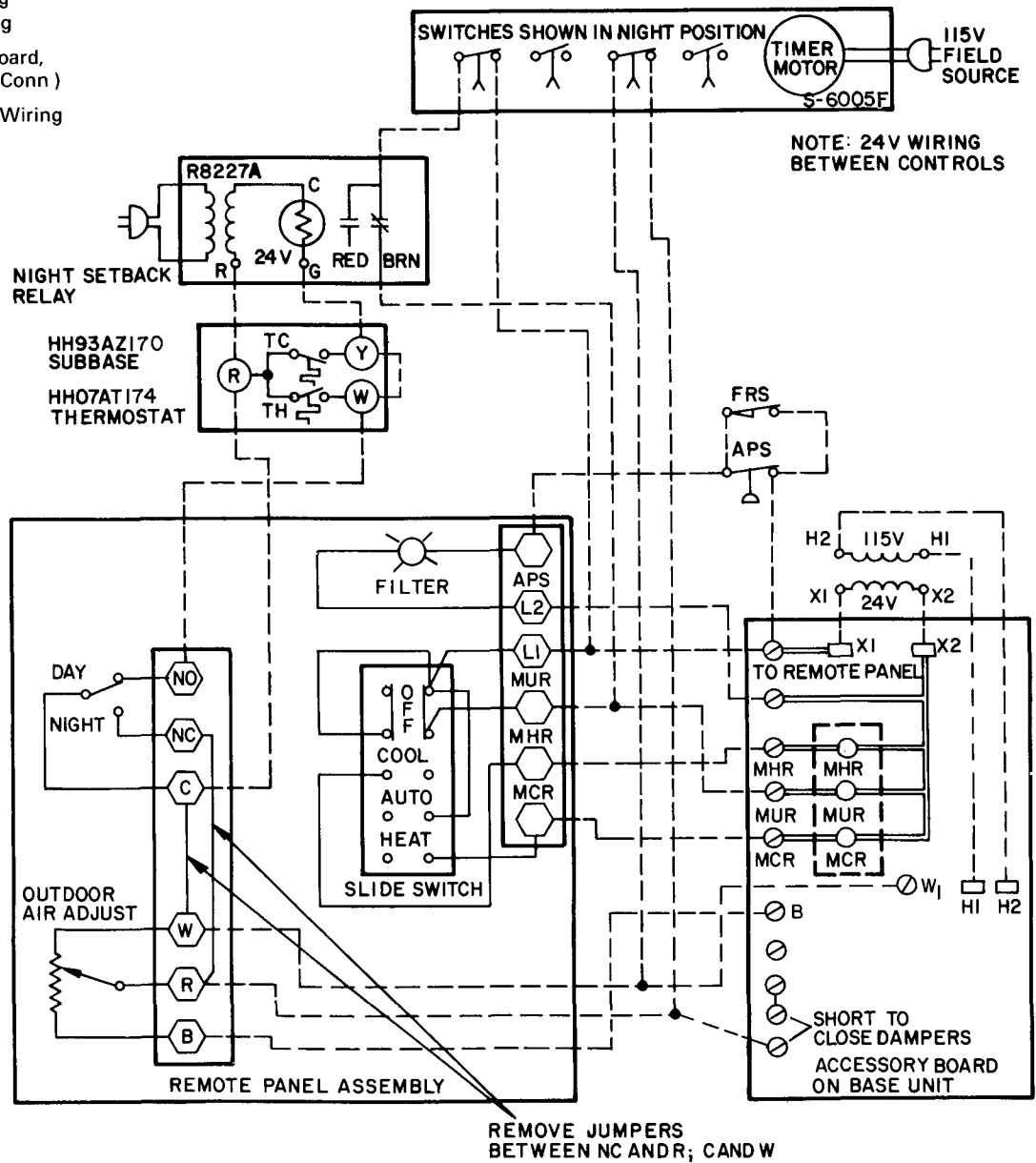
However, if a "wild" zone exists, it is allowed to cool on heating NS or vice versa. This may be an advantage on some applications between zones.

With the proposed wiring, the Day/Night switch on the remote panel assembly allows the night-setback thermostat to override the time clock when in the NIGHT position to prevent extreme conditions. When in the DAY position, the time clock is bypassed except for closing dampers at night.

Again, 2 jumper wires have to be removed from the back of the remote panel to isolate the Day/Night switch.

**LEGEND**

- APS** — Air Pressure Switch
- FRS** — Filter Media Runout Switch
- MCR** — Master Cooling Relay
- MHR** — Master Heating Relay
- MUR** — Master Unit Relay
- TC** — Thermostat, Cooling
- TH** — Thermostat, Heating
-  or  Terminal (Circuit Board, Field or Accessory Conn)
-  Accessory or Field Wiring
-  Factory Wiring
-  Circuit Board Run



**Fig. 19 — Night Setback, Method #3 — With Economizer**

**MORNING START-UP** — To conserve energy and lower total operating costs, the outdoor dampers may be closed when starting the system in the morning. During a warm-up period, when the system is operated for one or 2 hours before occupancy, only building return air should be heated. The extra load of cold outdoor air introduced uses extra heat energy. Ventilation is unnecessary until space is occupied, so the air introduced produces unnecessary heat waste.

The same principle holds true on a cooling day, when outside air transmits heat and moisture to the evaporator coil. This extra load above the return air only load is an unnecessary expense.

This can be offset by wiring a heating or cooling thermostat across the **SHORT TO CLOSE DAMPERS** terminals on the zone control board. The thermostat senses return air temperature and the outdoor air damper does not open until the building is at the required temperature.

A time clock can also be used and set as follows:

1. Occupied cycle: 8 a.m. to 6 p.m. Outdoor air damper is open and the system is controlled by individual zone thermostats.
2. Night setback cycle: 6 p.m. to 6 a.m. Individual zone thermostats are on night setback (NS) cycle. The outdoor air damper is closed, the unit is reset down and controlled by NS thermostat.
3. Warm-up (or cool-down) cycle: 6 a.m. to 8 a.m. Outside air damper is closed by time clock and the system is controlled by indoor zone thermostats.

Using any method, increased economy is achieved and building requirements are satisfied.

### **Thermostat Usage and Control**

**USAGE** — The thermostats used with the 48MA units are either a 2-step heat/1-step cool or 2-step heat/2-step cool. A single module can have only one step of cooling and one step of heating. When 2 or more modules are grouped together, the 2-step heat/2-step cool thermostat can be used. Modules are grouped together by the installation of factory-supplied jumpers on the unit zone control board.

The thermostats are automatic changeover with a 3 F dead spot between heating and cooling. There is a 1°F differential between the first and second steps of heating or cooling. Two subbases are available for use with the thermostats; one with Off-Heat-Auto.-Cool switch and one without switches for tamper-proof installation. The tamper-proof subbase has provisions for locking the thermostat cover and temperature selectors.

**CONTROL** — The thermostat field wiring connections are made at the screw-type terminals on the printed circuit board near the heating end of the unit. This is commonly called the zone control board. (See Fig. 1.)

Each module has the following thermostat terminals: R (24-v power supply), Y (for cooling), W1 and W2 (for heating). Pairs of modules are combined to form nests: 1 and 2; 3 and 4; 5 and 6; etc. Each nest forms a National Electrical code (NEC) Class II circuit, powered by its own 40-va transformer. Each transformer is basically limited in capacity to operate only the relays within its nest. Therefore, contacts are provided in the relays to transfer the signal to another module in an adjacent nest.

By correctly installing jumpers on zone control board terminals, the contacts from a relay in one nest power a relay in the adjacent nest using the transformer of the adjacent nest. This technique is known as multiplexing.

**Same Nest Ganging** — Figure 20 shows 2 modules (1 and 2) of the same nest ganged together to form a 2-module zone. Field jumpers are installed on same lettered terminals to energize both control relays simultaneously for cooling or heating relays or gas valves for heating.

Figure 21 is similar to Fig. 20 except a 2-step cooling thermostat independently powers the Y connections for 2-step cooling in one zone. These 2 examples have not left the particular nest, so no multiplexing has been done.

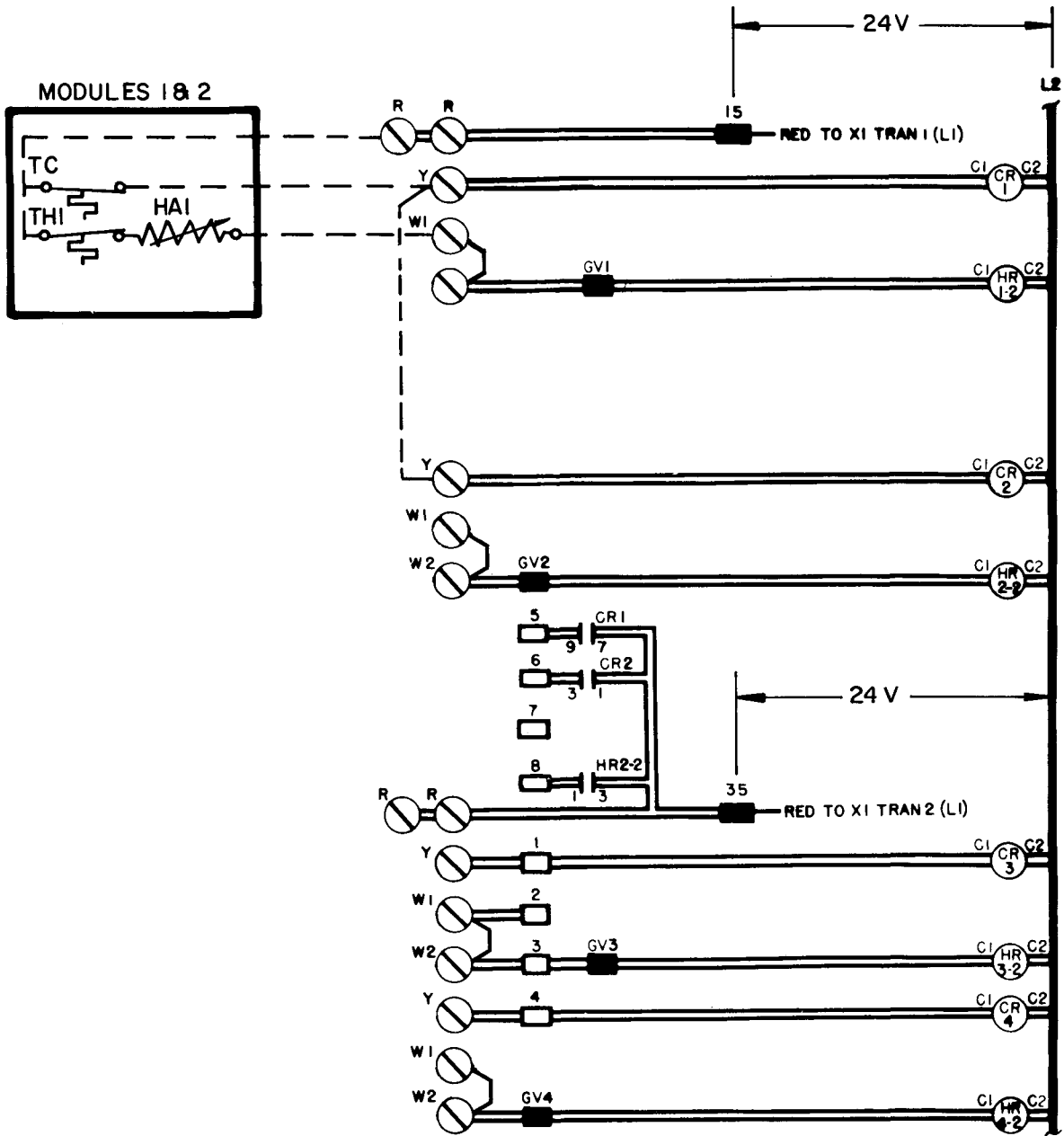
**Adjacent Nest Ganging** — Figure 22 and 23 show 2 modules (2 and 3) of adjacent nests ganged together in one zone so multiplexing is in effect. Module 1 is in a zone of its own. When CR2 is energized by the cooling thermostat, terminal 6 is powered through CR2 contacts 1 and 3 by the transformer of the second nest. Then terminal 6 is jumpered to 1 and CR3 is energized. Thus, on a call for cooling, modules 2 and 3 are energized simultaneously. The same principles and procedures are followed for heating.

**Multiple Ganging** — Figures 24 through 28 are further examples of ganging and multiplexing zones to provide 2, 3 or 4 modules per zone. These typical examples demonstrate the principles of multiplexing. The same procedures are followed for the remainder of the zones on the unit. Many more combinations are possible. Do not overload a transformer by powering more than one relay of a different nest in addition to the relays in its own nest.

Multiplexing is done from top to bottom of the zone control board . . . from module 2 to 3 and 4, from 4 to 5 and 6, and from 6 to 7 and 8. The contacts of one module are powered by the nest of the next higher numbered module (see Fig. 1).

ANTICIPATOR  
SETTING

HAI
.26



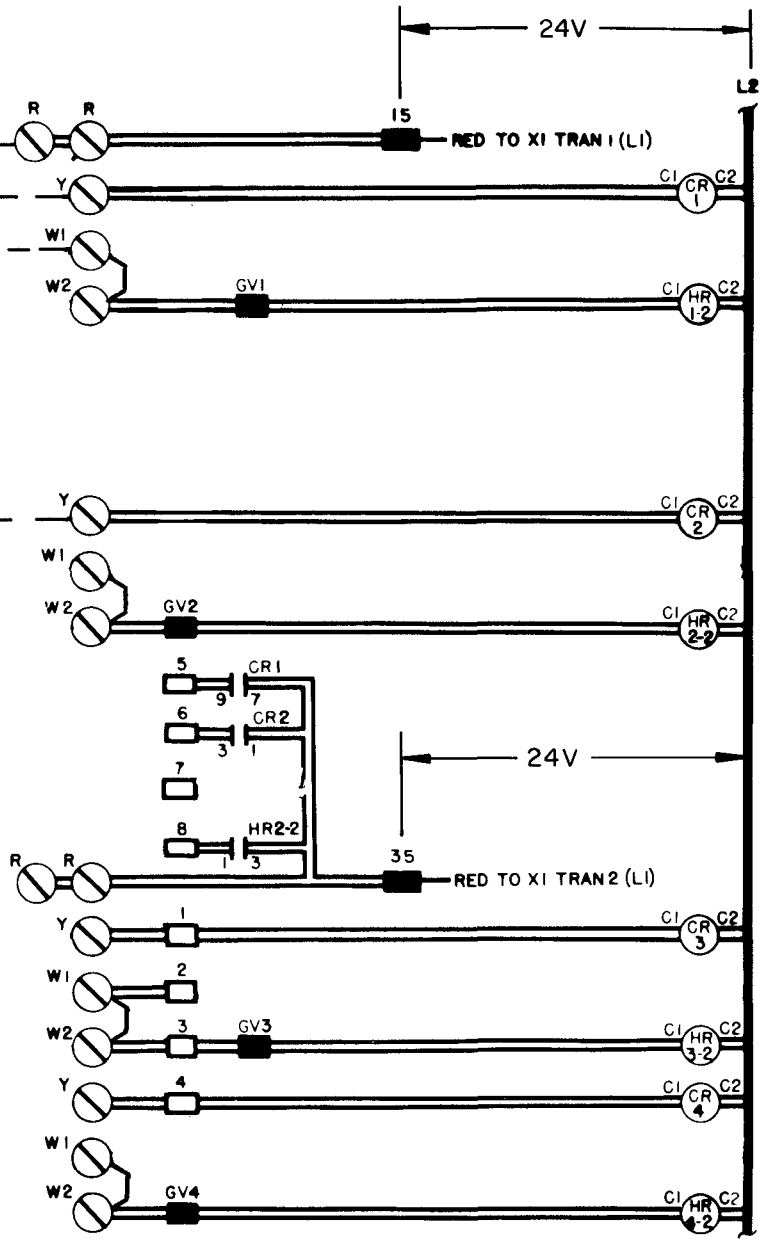
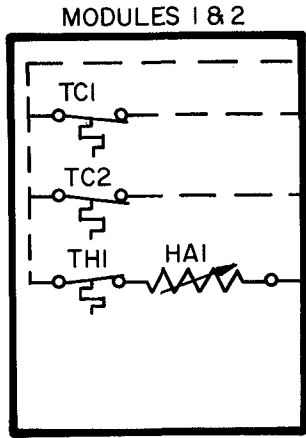
LEGEND

- CR — Control Relay
- GV — Gas Valve
- HA — Heat Anticipator
- HR — Heating Relay
- TC — Thermostat, Cooling
- TH — Thermostat, Heating
- Tran — Transformer
- Screw Terminal
- Quick-Connect Terminal
- Factory Control Wires
- Printed Circuit
- Field Wiring

Fig. 20 — Same Nest Ganging; One-Stage Heat, One-Stage Cool

ANTICIPATOR  
SETTING

HAI
.26



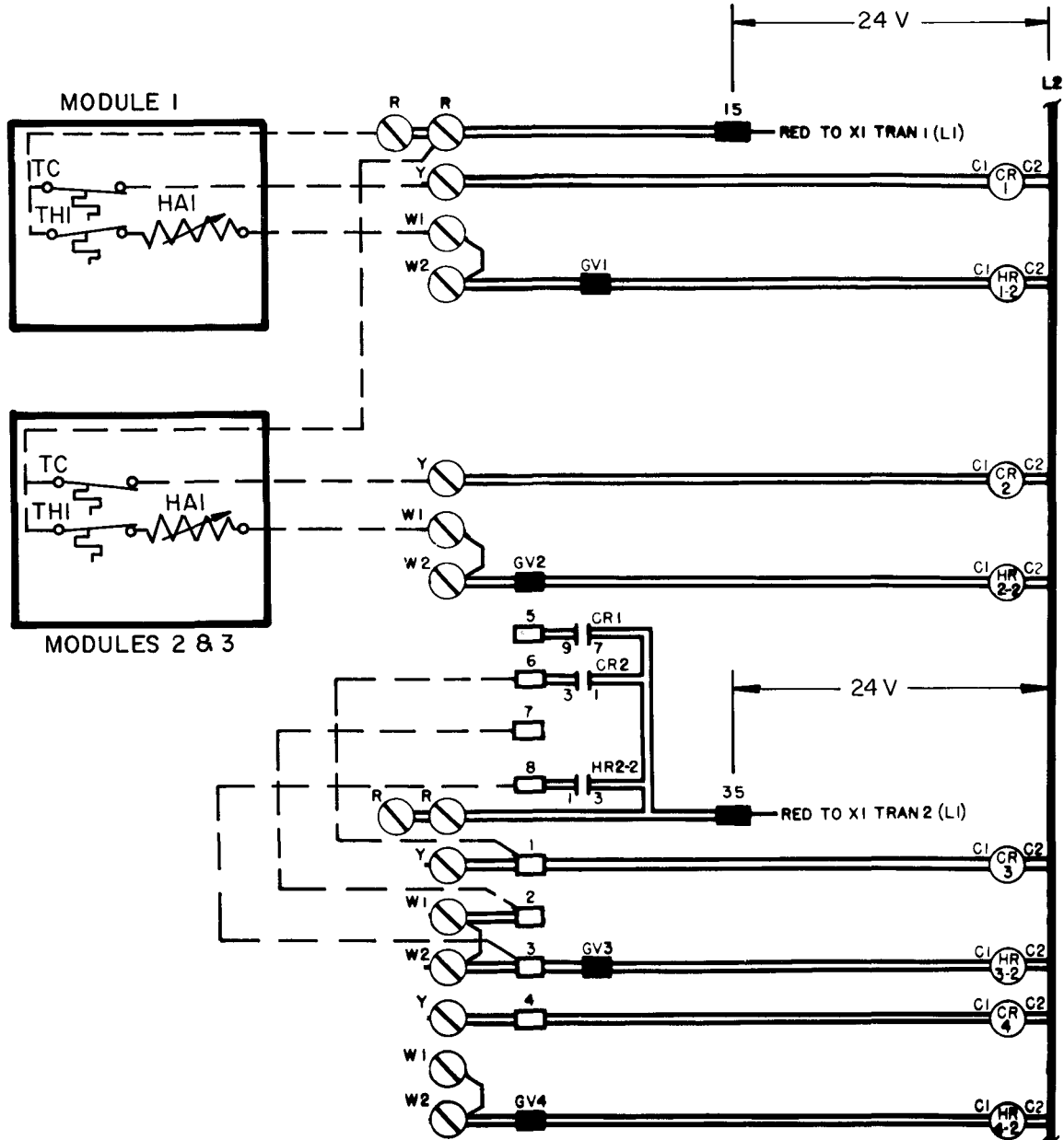
LEGEND

- CR — Control Relay
- GV — Gas Valve
- HA — Heat Anticipator
- HR — Heating Relay
- TC — Thermostat, Cooling
- TH — Thermostat, Heating
- Tran — Transformer
- Screw Terminal
- Quick-Connect Terminal
- Factory Control Wires
- Printed Circuit
- Field Wiring

Fig. 21 — Same Nest Ganging; One-Stage Heat, Two-Stage Cool

ANTICIPATOR  
SETTINGS

HAI
.13
.13



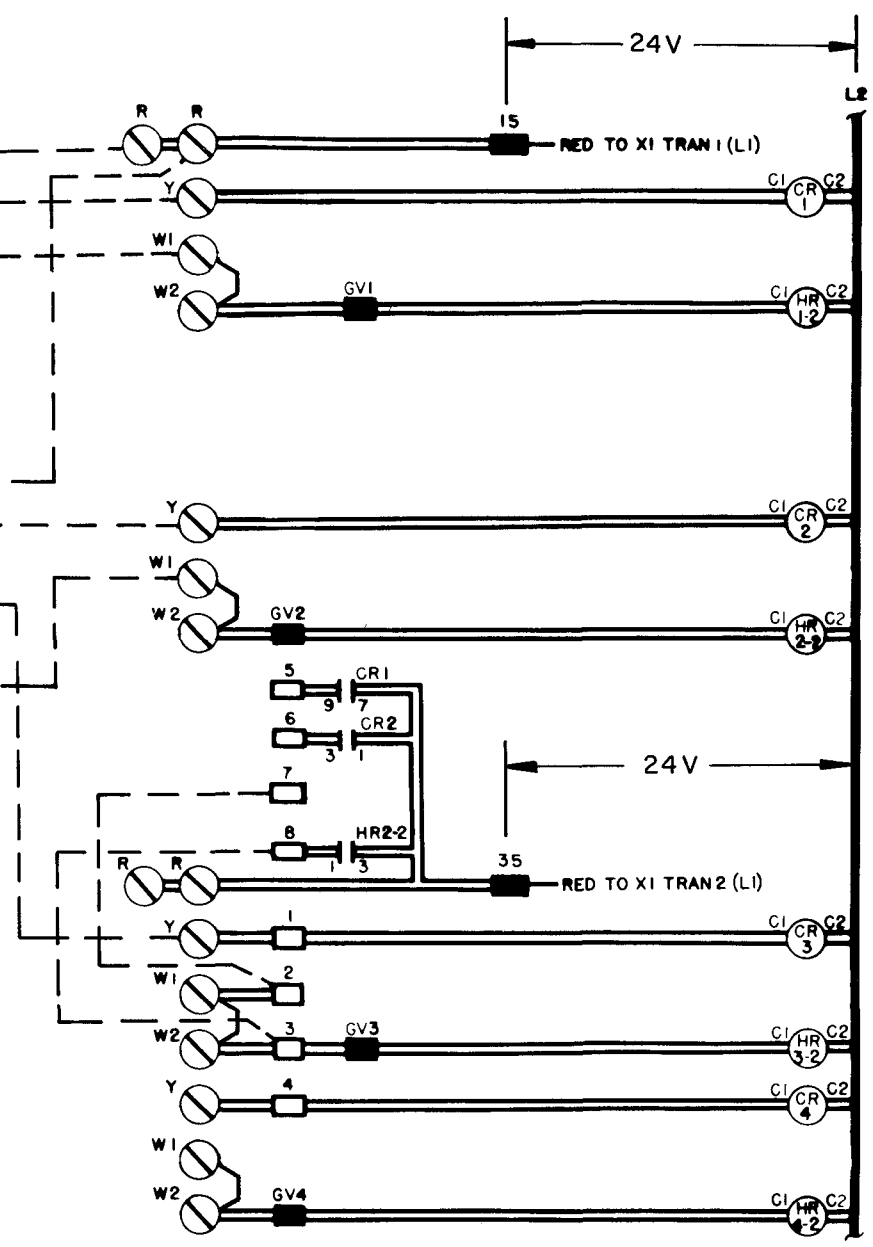
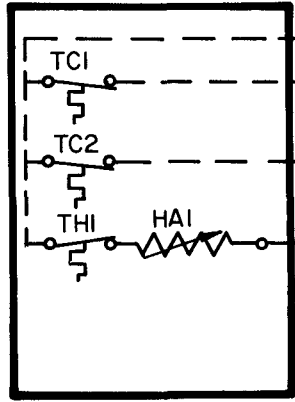
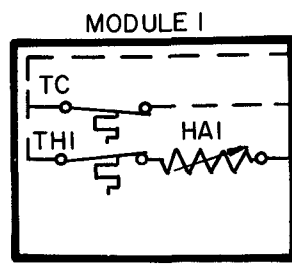
LEGEND

- CR — Control Relay
- GV — Gas Valve
- HA — Heat Anticipator
- HR — Heating Relay
- TC — Thermostat, Cooling
- TH — Thermostat, Heating
- Tran — Transformer
- ⊖ — Screw Terminal
- — Quick-Connect Terminal
- — — — — Field Wiring
- ==== Printed Circuit
- Factory Control Wires

Fig. 22 — Adjacent Nest Ganging; One-Stage Heat, One-Stage Cool

ANTICIPATOR  
SETTINGS

HAI
.13
.13



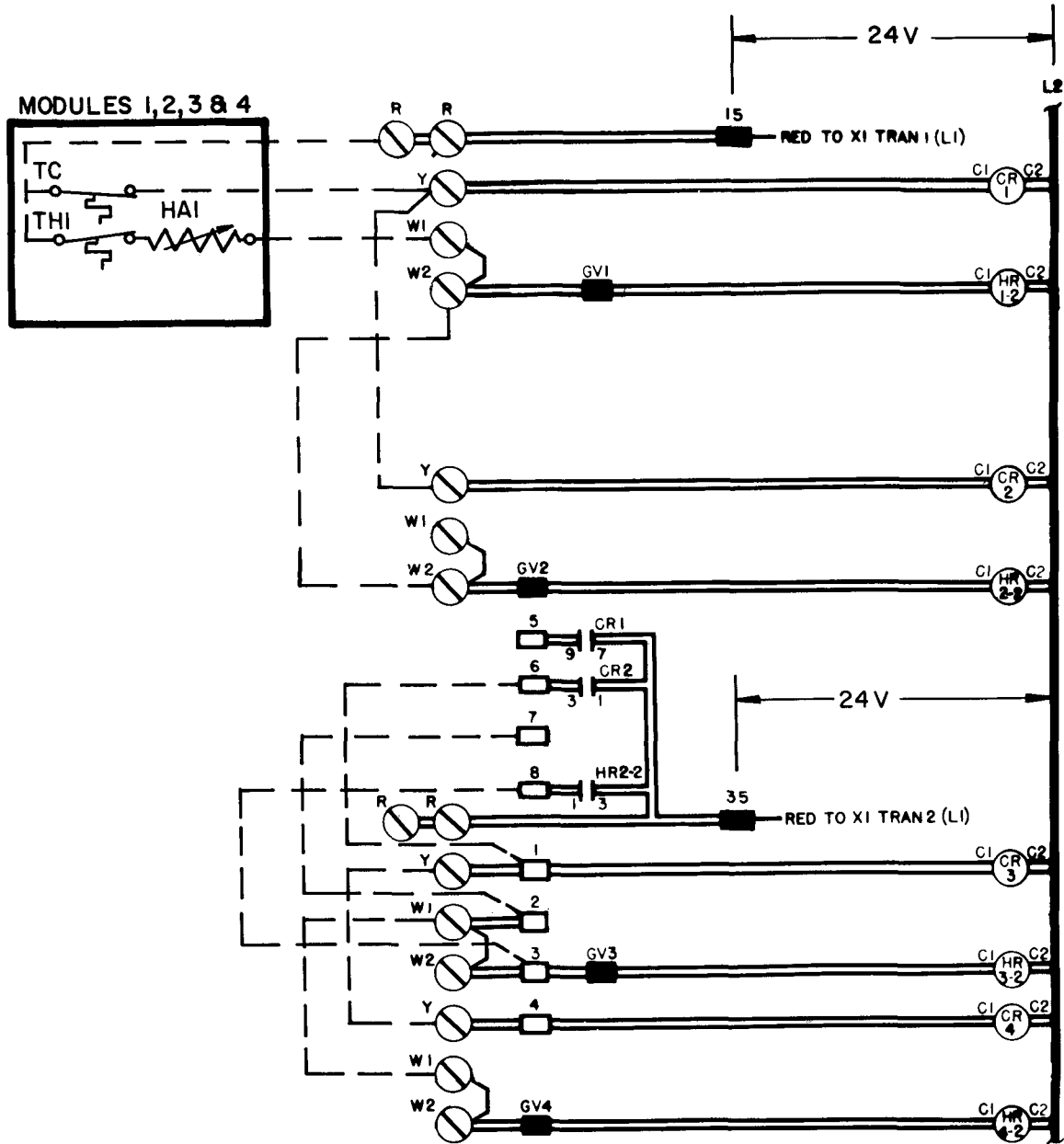
LEGEND

- CR — Control Relay
- GV — Gas Valve
- HA — Heat Anticipator
- HR — Heating Relay
- TC — Thermostat, Cooling
- TH — Thermostat, Heating
- Tran — Transformer
- Screw Terminal
- Quick-Connect Terminal
- Factory Control Wires
- Printed Circuit
- Field Wiring

Fig. 23 — Adjacent Nest Ganging; One-Stage Heat, One-Stage Cool; One-Stage Heat, Two-Stage Cool Combination

ANTICIPATOR  
SETTING

HAI
.26



LEGEND






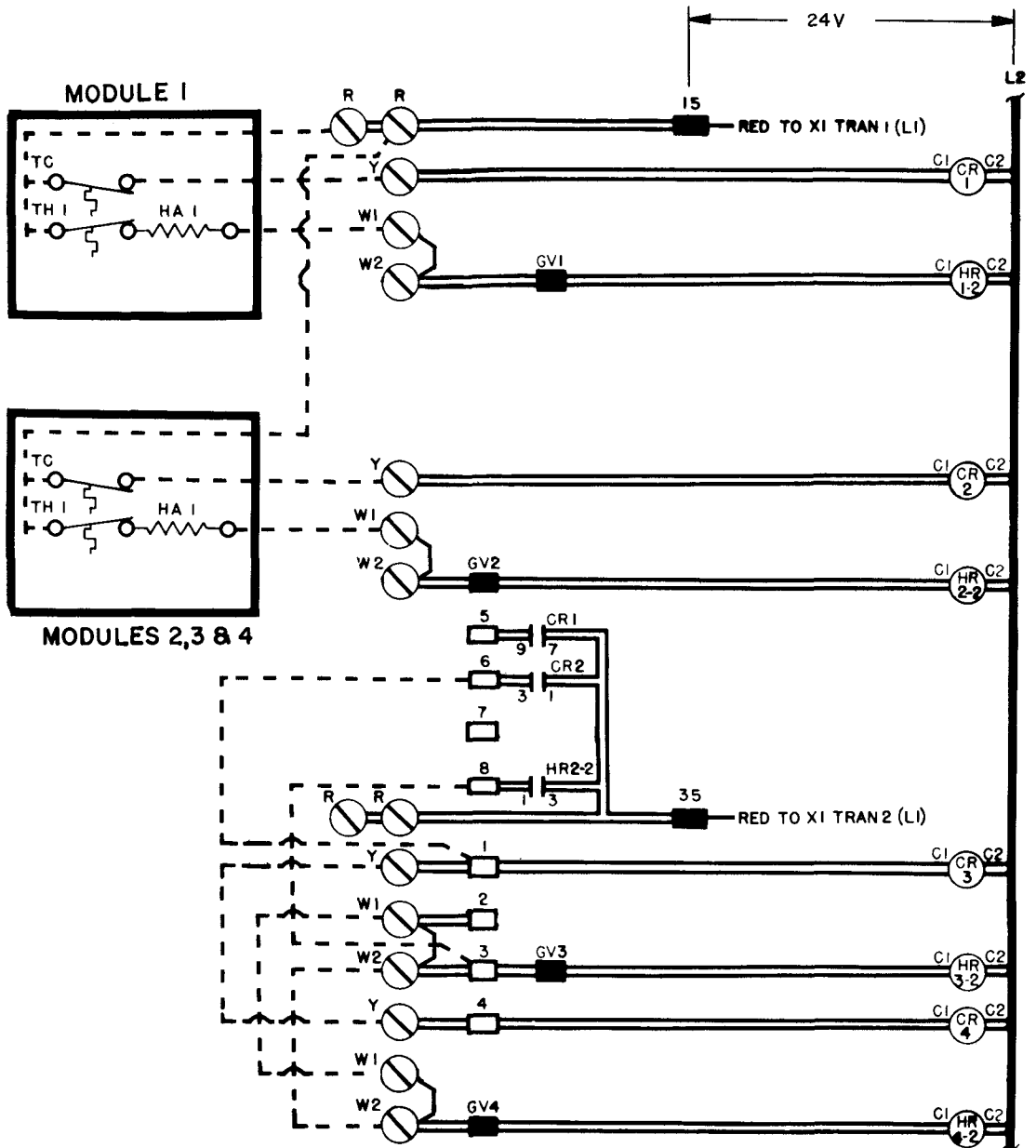
- CR — Control Relay
- GV — Gas Valve
- HA — Heat Anticipator
- HR — Heating Relay
- TC — Thermostat, Cooling
- TH — Thermostat, Heating
- Tran — Transformer
-  Screw Terminal
-  Quick-Connect Terminal
-  Factory Control Wires
-  Printed Circuit
-  Field Wiring

Fig. 24 — Multiple Ganging; One-Stage Heat, One-Stage Cool

ANTICIPATOR  
SETTINGS

HAI
.13
.13



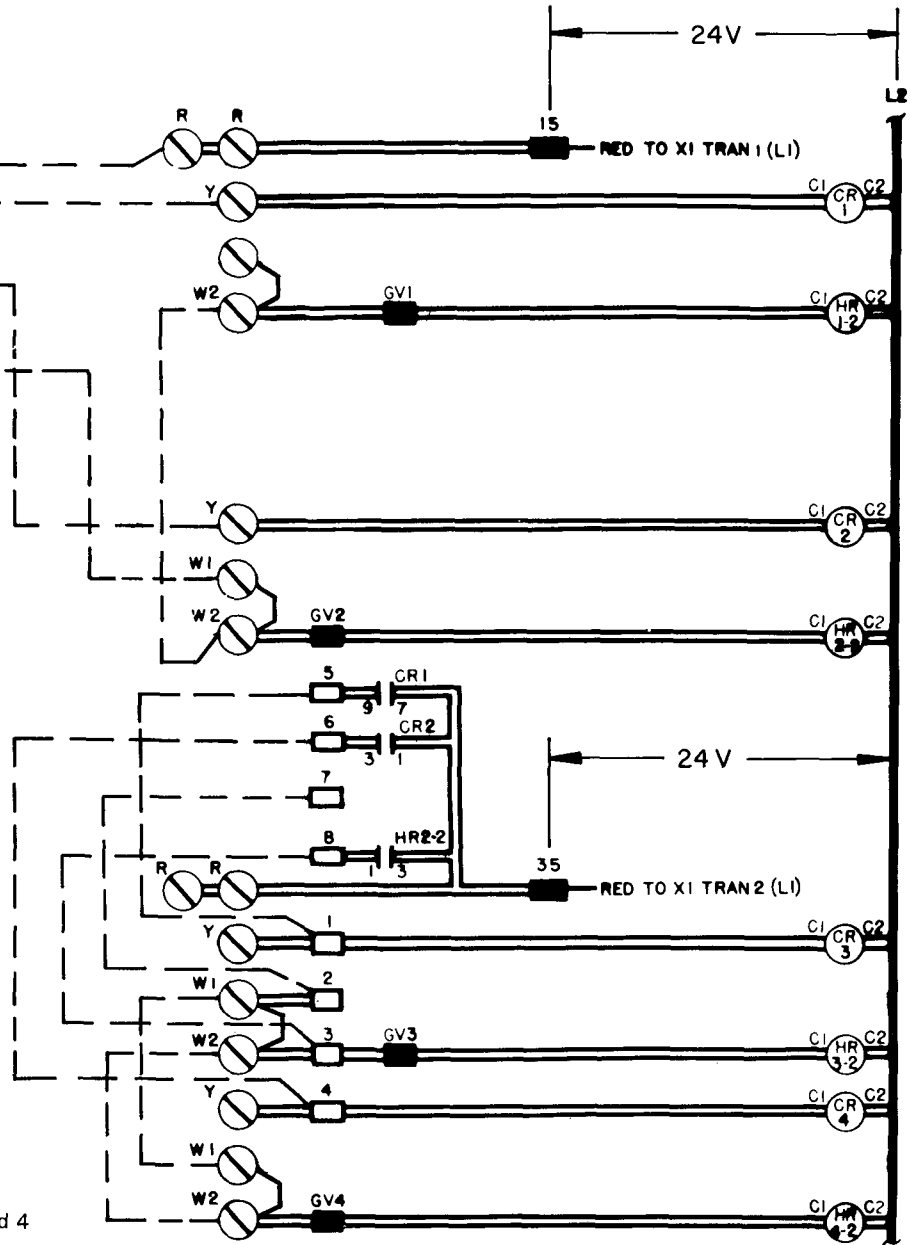
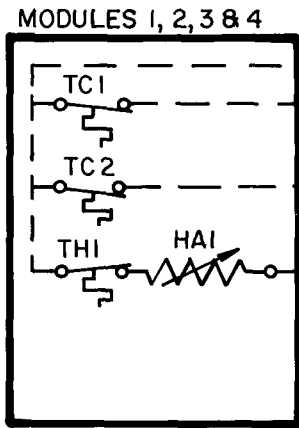
LEGEND

- CR — Control Relay
- GV — Gas Valve
- HA — Heat Anticipator
- HR — Heating Relay
- TC — Thermostat, Cooling
- TH — Thermostat, Heating
- Tran — Transformer
- ⊗ — Screw Terminal
- — Quick-Connect Terminal
- — — — — Factory Control Wires
- ==== Printed Circuit
- - - - - Field Wiring

Fig. 25 — Multiple Ganging; One-Stage Heat, One-Stage Cool

ANTICIPATOR  
SETTING

HAI
.26



NOTE:

**COOLING**

Stage 1 — Modules 1 and 3

Stage 2 — Modules 2 and 4

**HEATING**

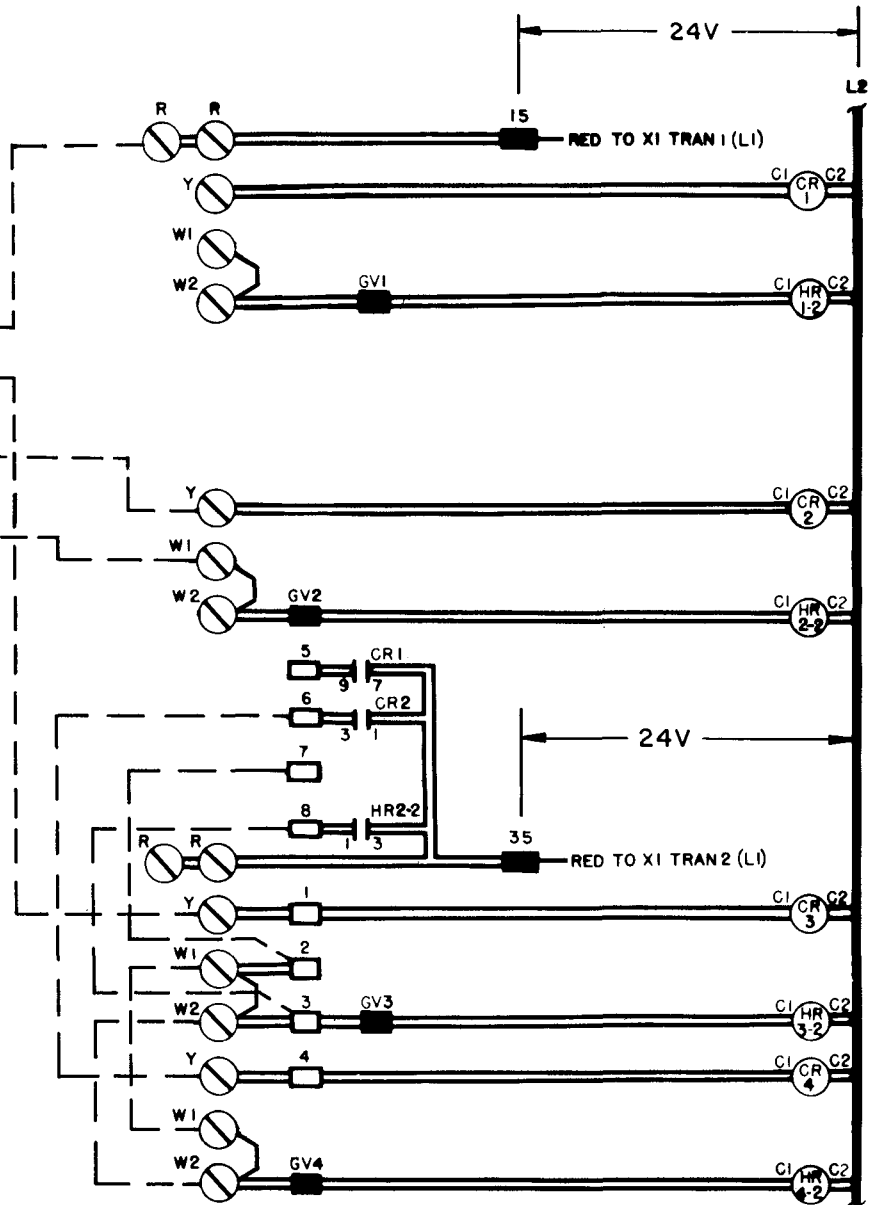
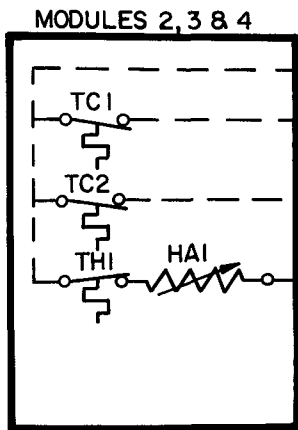
Stage 1 — First Stage of Modules 1, 2, 3 and 4

LEGEND

- CR — Control Relay
- GV — Gas Valve
- HA — Heat Anticipator
- HR — Heating Relay
- TC — Thermostat, Cooling
- TH — Thermostat, Heating
- Tran — Transformer
- Screw Terminal
- Quick-Connect Terminal
- Factory Control Wires
- Printed Circuit
- Field Wiring

Fig. 26 — Multiple Ganging; One-Stage Heat, Two-Stage Cool

ANTICIPATOR  
SETTING



**NOTE:**

**COOLING**

- Stage 1 — Module 3
- Stage 2 — Modules 2 and 4

If thermostat wires are interchanged,  
the reverse may be obtained

**HEATING**

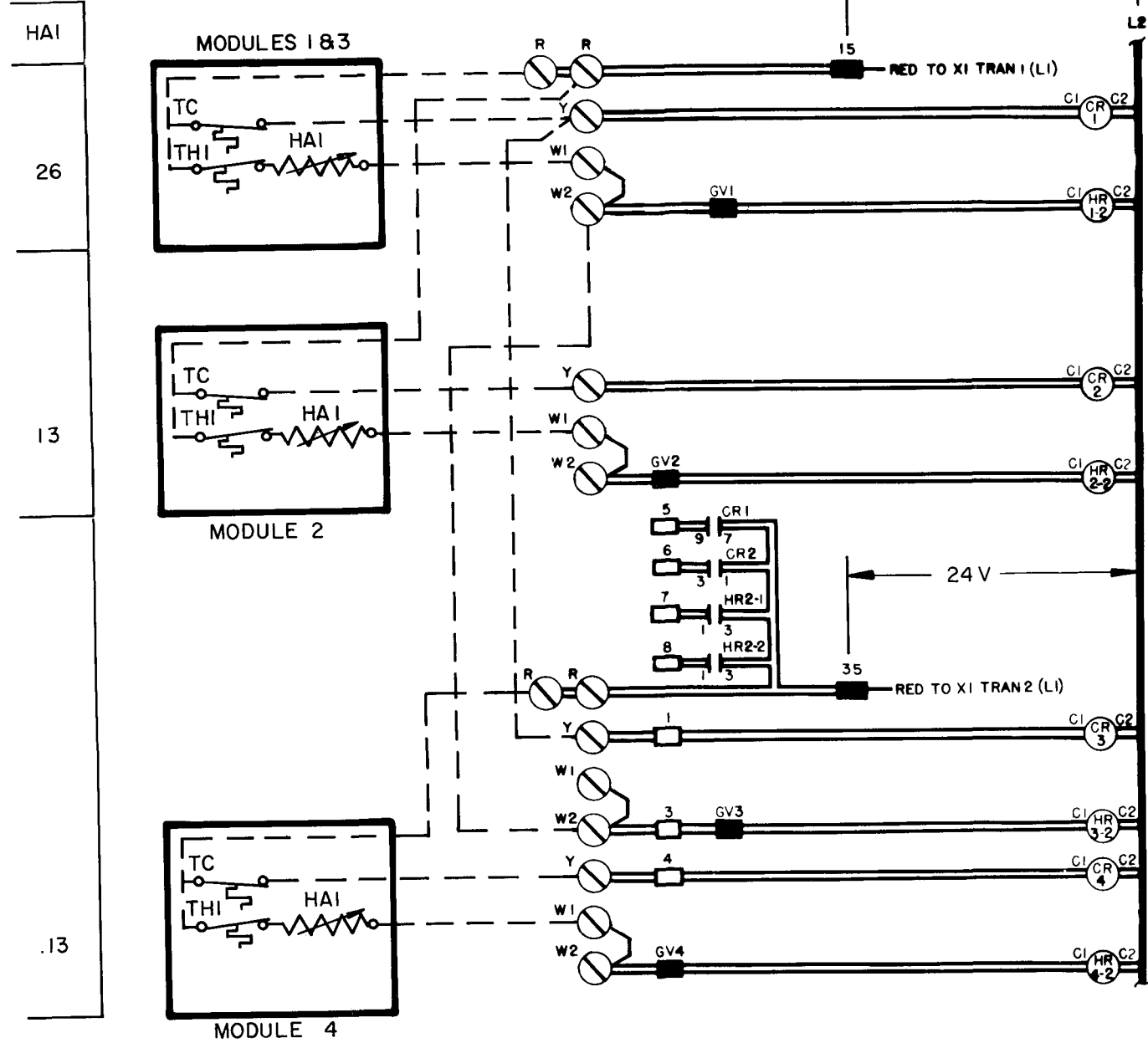
- Stage 1 — First stages of Modules 2, 3 and 4

**LEGEND**

- CR — Control Relay
- GV — Gas Valve
- HA — Heat Anticipator
- HR — Heating Relay
- TC — Thermostat, Cooling
- TH — Thermostat, Heating
- Tran — Transformer
- Ⓢ — Screw Terminal
- — Quick-Connect Terminal
- — — — — Factory Control Wires
- ===== Printed Circuit
- - - - - Field Wiring

Fig. 27 — Multiple Ganging; One-Stage Heat, Two-Stage Cool

ANTICIPATOR  
SETTINGS



LEGEND

- CR — Control Relay
- GV — Gas Valve
- HA — Heat Anticipator
- HR — Heating Relay
- TC — Thermostat, Cooling
- TH — Thermostat, Heating
- Tran — Transformer
- Ⓢ — Screw Terminal
- — Quick-Connect Terminal
- — — — — Field Wiring
- — — — — Printed Circuit
- — — — — Factory Control Wires

Fig. 28 — Multiple Ganging; One-Stage Heat, One-Stage Cool

Manufacturer reserves the right to discontinue, or change at any time, specifications or designs without notice and without incurring obligations.