Carrier
HEATING & COOLING

48/50DK084-104
Single-Package Heating/Cooling Units

Installation, Operation,Start-Up and Service Instructions Supplement

This literature is to be used in conjunction with the 48/50DJ,DK084-104 Installation, Start-Up and Service Instructions for units containing product integrated controls (PIC) as a factory-installed option. Before attempting to run the 48/50DJ,DK units with PIC, prepare the unit for operation according to the base unit installation instructions supplied with the unit. Then review the Control System and Operation sections and unit Installation, Start-Up, Service and Troubleshooting sections contained in this Supplement.

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DESCRIPTION

Introduction — The control system consists of a local interface device (HSIO), a processor module (PSIO) and two relay modules (DSIO-HV and DSIO-LV). The software resides in the HSIO and PSIO, both of which are equipped with a 5-year lithium battery backup to prevent loss of memory in the event of a power failure.

Physical Characteristics — The control box includes electronic modules, transformers, fuses, and terminal blocks. Control box component locations are shown in Fig. 1A — 2B.

Control environmental limitations are as follows:

Operating temperature	— −20 to 160 F
Operating humidity	— 10 to 95%
Shipping temperature	— −40 to 185 F
Shipping humidity	— 10 to 98%

All electrical components are UL (Underwriters' Laboratories) recognized. The electronic modules are approved as part of the unit under UL Standard 465.

INSTALLATION

Follow all of the applicable installation procedures in the Installation, Start-Up and Service Instructions provided with the base unit.

Fan Activation — If operation of the supply or return fan is necessary during installation:

1. Close the control circuit breaker (CCB) to provide control circuit power.
2. Close the evaporator- and return-fan circuit breakers.
3. Set the RUN-STANDBY switch to STANDBY position.
4. At the keypad (see Fig. 3), press 2, then TEST. OUTPUTS will appear on the display panel. Press the down arrow on the keypad 3 times until IFC appears on the display panel.
5. Press ENTR and the supply/return fans will start.
6. To stop the fans, press 4, then TEST.

IMPORTANT: To stop the fans in an emergency, open the circuit breakers.

NOTE: If there has been no keypad activity for 9 minutes, the controls will automatically exit the test mode and the fans will stop. The 9-minute test period can be renewed at any time during the test by pressing ENTR.

Book 1 | 1 Tab 1a | 1b PC 111 Catalog No. 564-843 Printed in U S A. Form 48/50DK-1SIS Pg 1 9-91 Replaces: New

LEGEND FOR FIG. 1A – 2B

AFS	–	Airflow Switch
APS	–	Air-Pressure Switch
C	–	Compressor Contactor
CB	–	Circuit Breaker
CH	–	Crankcase Heater
CO	–	Convenience Outlet
COM	–	Common
COMP, COMPR	–	Compressor
CPCS	–	Compressor Protection
CS	–	Centrifugal Switch
DGT	–	Discharge-Gas Thermostat
DPS	–	Differential Pressure Switch
DSIO	–	Relay Module
EC	–	Enthalpy Control
ECON	–	Economizer
ECR	–	Economizer Closed Relay
EOR	–	Economizer Open Relay
EQUIP	–	Equipment
EXH	–	Exhaust
FLA	–	Full Load Amps
FU	–	Fuse
GND	–	Ground
HC	–	Heater Contactor
HCB	–	Heater Circuit Breaker
HIR	–	Heat Interlock Relay
HPS	–	High-Pressure Switch
HSIO	–	Keyboard and Display Module
HV	–	High Voltage
I	–	Ignitor
ICP	–	Ignitor Control Pack
IDC	–	Induced-Draft Contactor
IDM	–	Induced-Draft Motor
IFM	–	Indoor (Evaporator) Fan Motor
IFR	–	Indoor (Evaporator) Fan Relay
LPS	–	Low-Pressure Switch
LS	–	Limit Switch
LSR	–	Limit-Switch Relay
LV	–	Low Voltage
MFR	–	Master Fan Relay
MGV	–	Main Gas Valve
MTR	–	Motor
NC	–	Normally Closed
NO	–	Normally Open
OFCB	–	Outdoor (Condenser) Fan Circuit Breaker
OFM	–	Outdoor (Condenser) Fan Motor
OMR	–	Occupied Motor Relay
OPT	–	Optional
PL	–	Plug Assembly
POT	–	Potentiometer
PRI	–	Primary
PSIO	–	Processor Module
PWR	–	Power
RES	–	Resistor
RET	–	Return-Air
RFCB	–	Return-Air Fan Circuit Breaker
RFM	–	Return-Air Fan Motor
SN, SEN	–	Sensor
SP	–	Static Pressure
T	–	Thermostat
TB	–	Terminal Block
TRAN	–	Transformer
U	–	Compressor Unloader Solenoid


Terminal Marked


Terminal Block Connection


Spliced Unmarked

Factory Wire

Field Control Wiring

Option Wiring


To indicate common potential only. Not to represent wiring.

NOTES FOR FIG. 1A – 2B

1. Condenser-fan motors are thermally protected.
2. Three-phase motors are protected under primary single phasing conditions.
3. If any of the original wire furnished must be replaced, it should be replaced with 90 C wire or its equivalent.
4. All circuit breaker must trip amps are equal to or less than 1.40 FLA.
5. Field control wiring connections are at TB2 and TB3.
6. Convenience outlet power supply: 115-1-60, 3 amps maximum outlet to be used only when unit is not running.
7. Number(s) indicates the line location of contacts. A bracket over (2) numbers signifies single-pole, double-throw contacts. An underlined number signifies a normally-closed contact. A plain number (no lines) signifies a normally-opened contact.

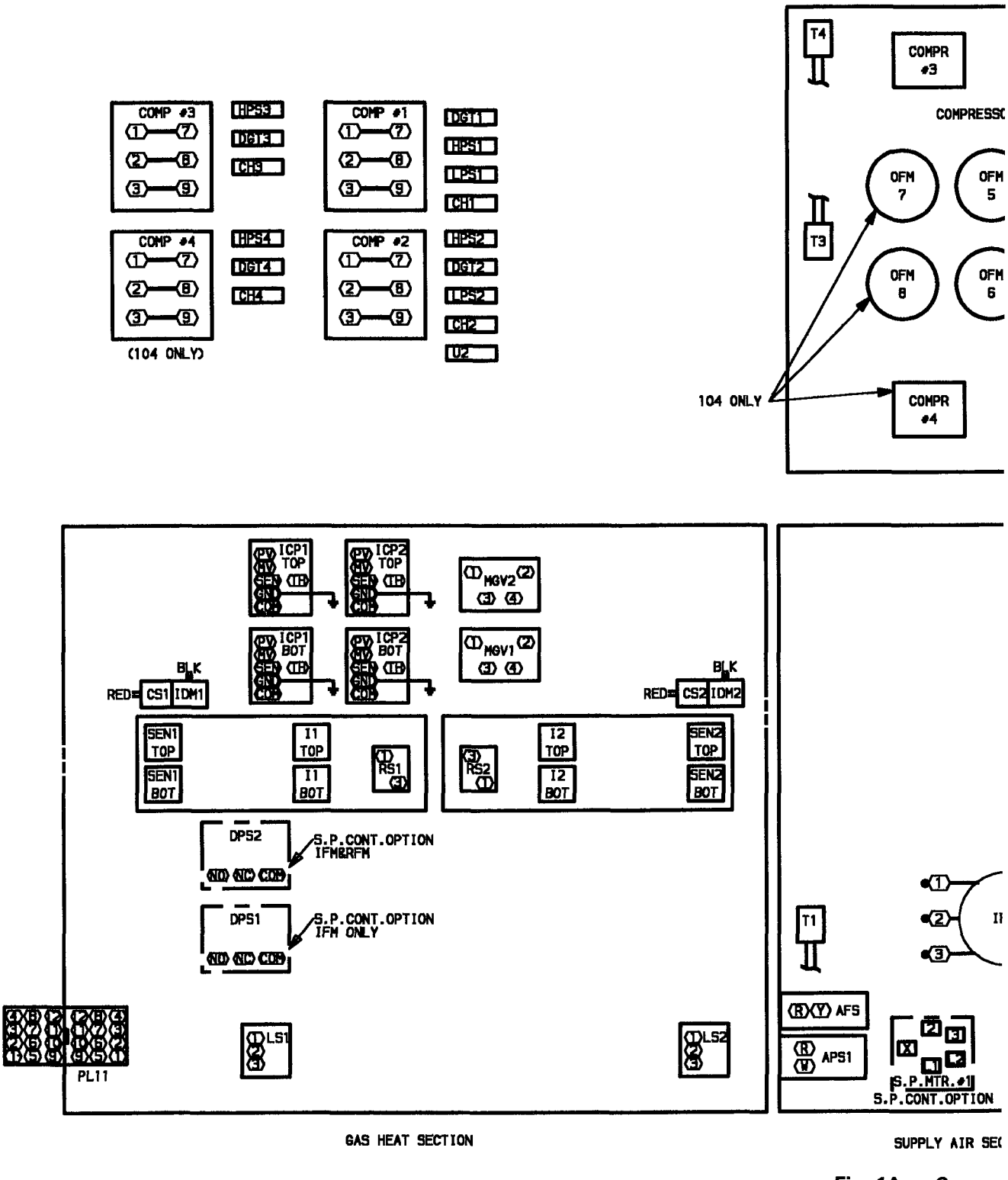
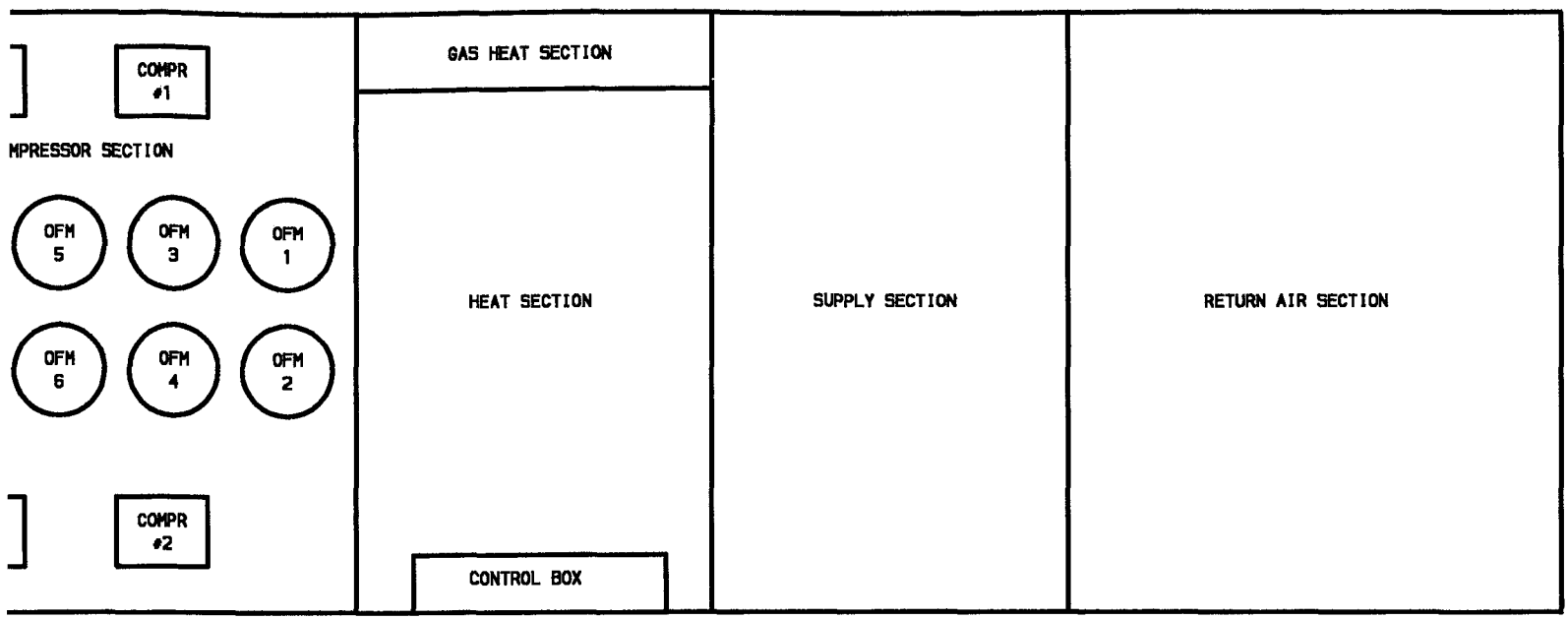
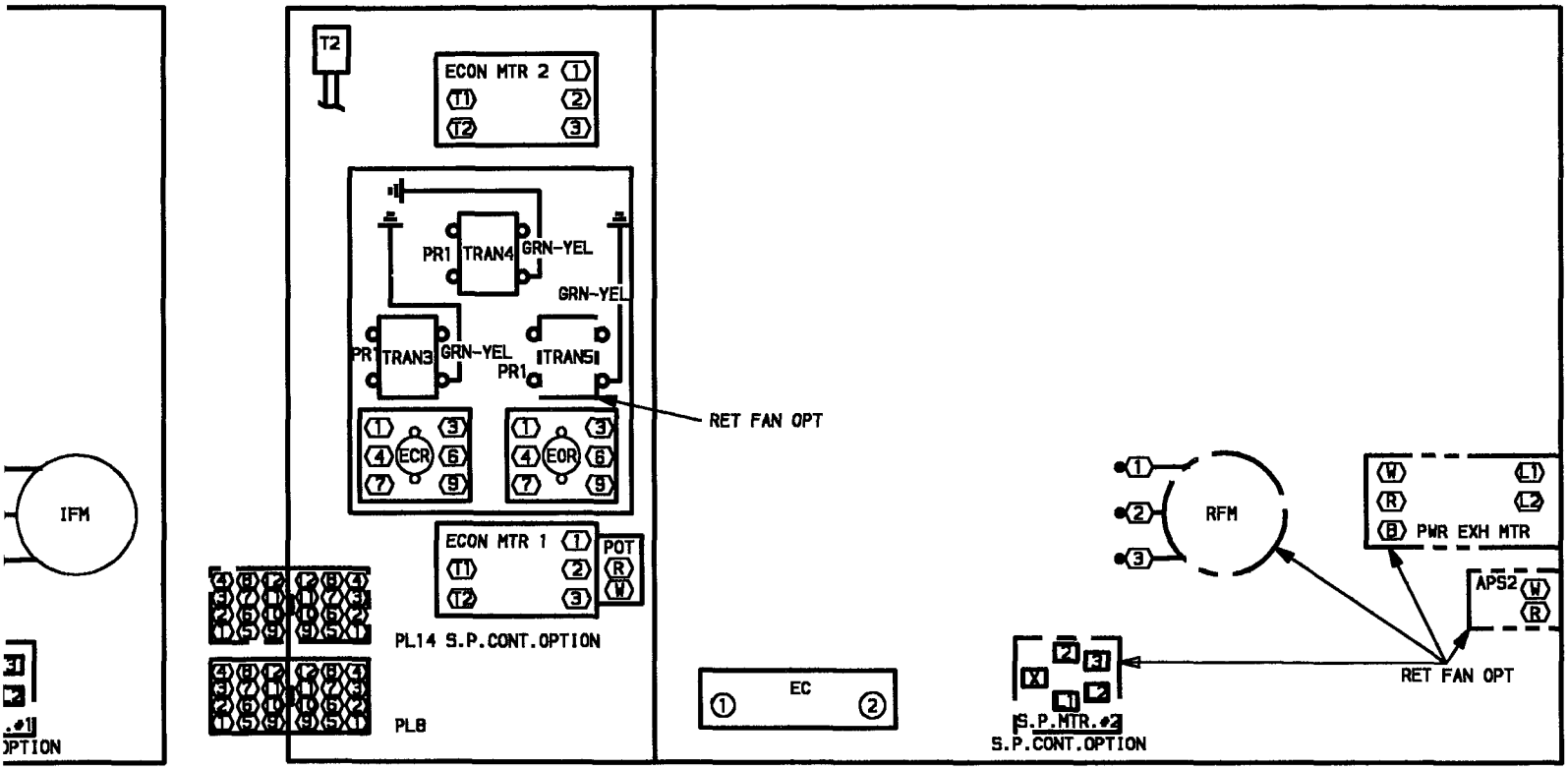

COMP #3
COMP #1
COMP #4
COMP #2
HPS3
DGT3
CH3
DGT1
HPS1
LPS1
CH1
HPS4
DGT4
CH4
HPS2
DGT2
LPS2
CH2
U2
(104 ONLY)
T4
COMPR #3
COMPRESSC
OFM 7
OFM 5
T3
OFM 8
OFM 6
104 ONLY
COMPR #4
ICP1 TOP
ICP2 TOP
ICP1 BOT
ICP2 BOT
MGV2
MGV1
BLK
RED
CS1
IDM1
CS2
IDM2
SEN1 TOP
SEN1 BOT
I1 TOP
I1 BOT
RS1
RS2
I2 TOP
I2 BOT
SEN2 TOP
SEN2 BOT
DPS2
S.P.CONT.OPTION IFM&RFM
DPS1
S.P.CONT.OPTION IFM ONLY
NO NC COM
PL11
LS1
LS2
T1
AFS
APS1
S.P.MTR.#1
S.P.CONT.OPTION
GAS HEAT SECTION
SUPPLY AIR SEC

Fig. 1A – Compo



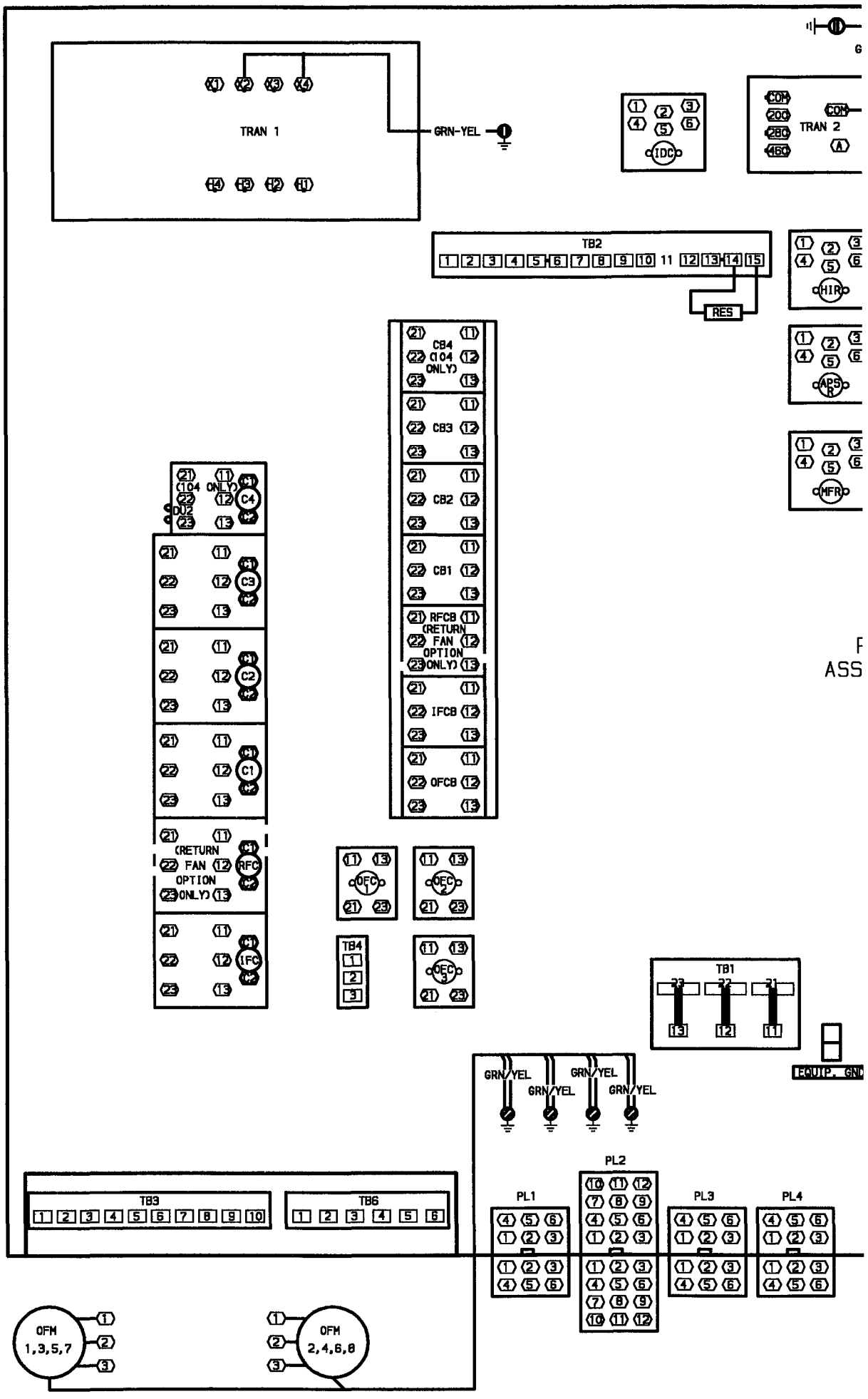
UNIT ARRANGEMENT



AIR SECTION

RETURN AIR SECTION

omponent Arrangement, 48DJ,DK


TRAN 1
GRN-YEL
TRAN 2
IDC
TB2
RES
HIR
APSR
MFR
CB4 (104 ONLY)
CB3
CB2
CB1
RFCB (RETURN FAN OPTION ONLY)
IFCB
OFCB
C4
C3
C2
C1
RFC
IFC
OFC 1
OFC 2
OFC 3
TB4
TB1
EQUIP. GND
GRN/YEL
TB3
TB6
PL1
PL2
PL3
PL4
OFM 1,3,5,7
OFM 2,4,6,8

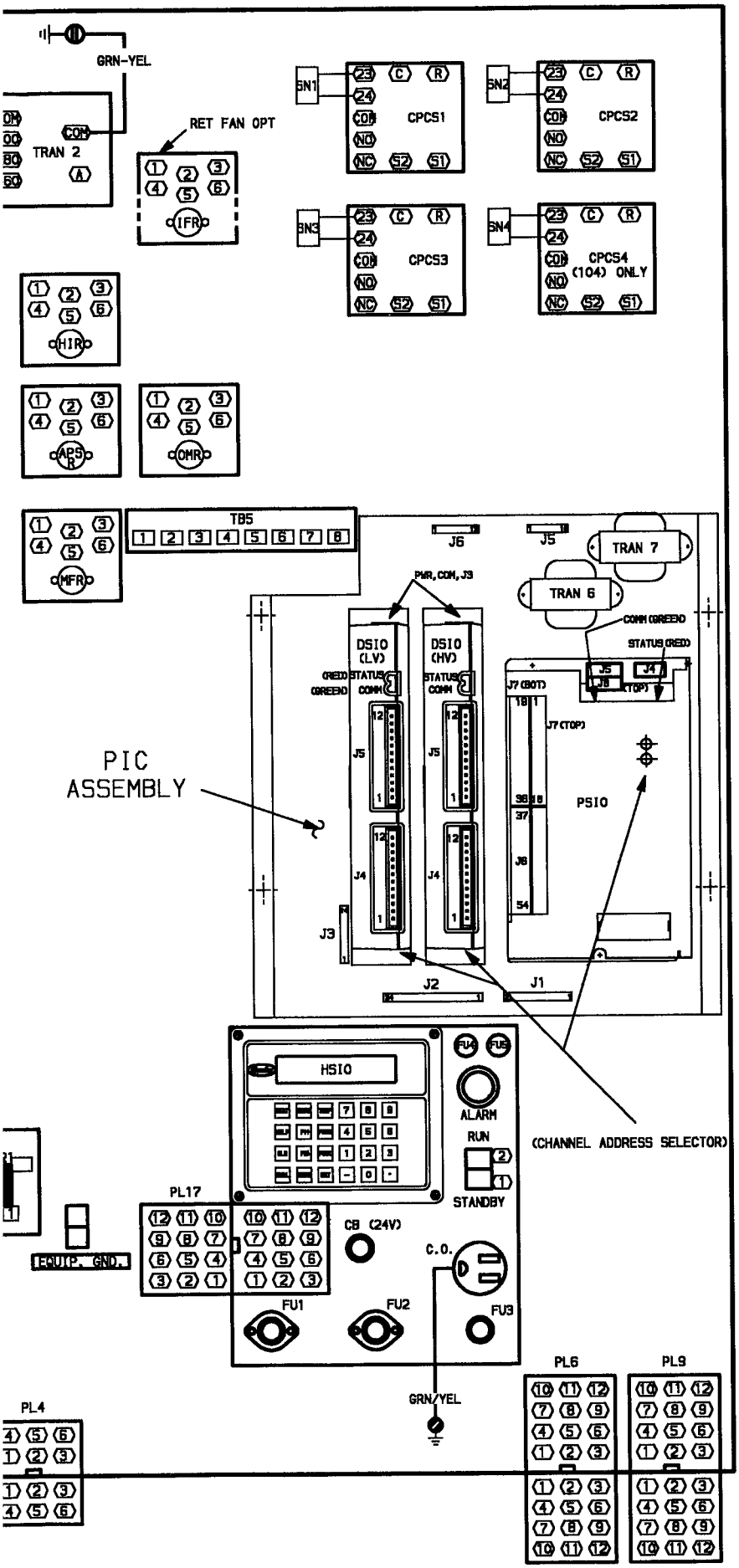


Fig. 1B — Component Arrangement, 48DJ,DK (cont)

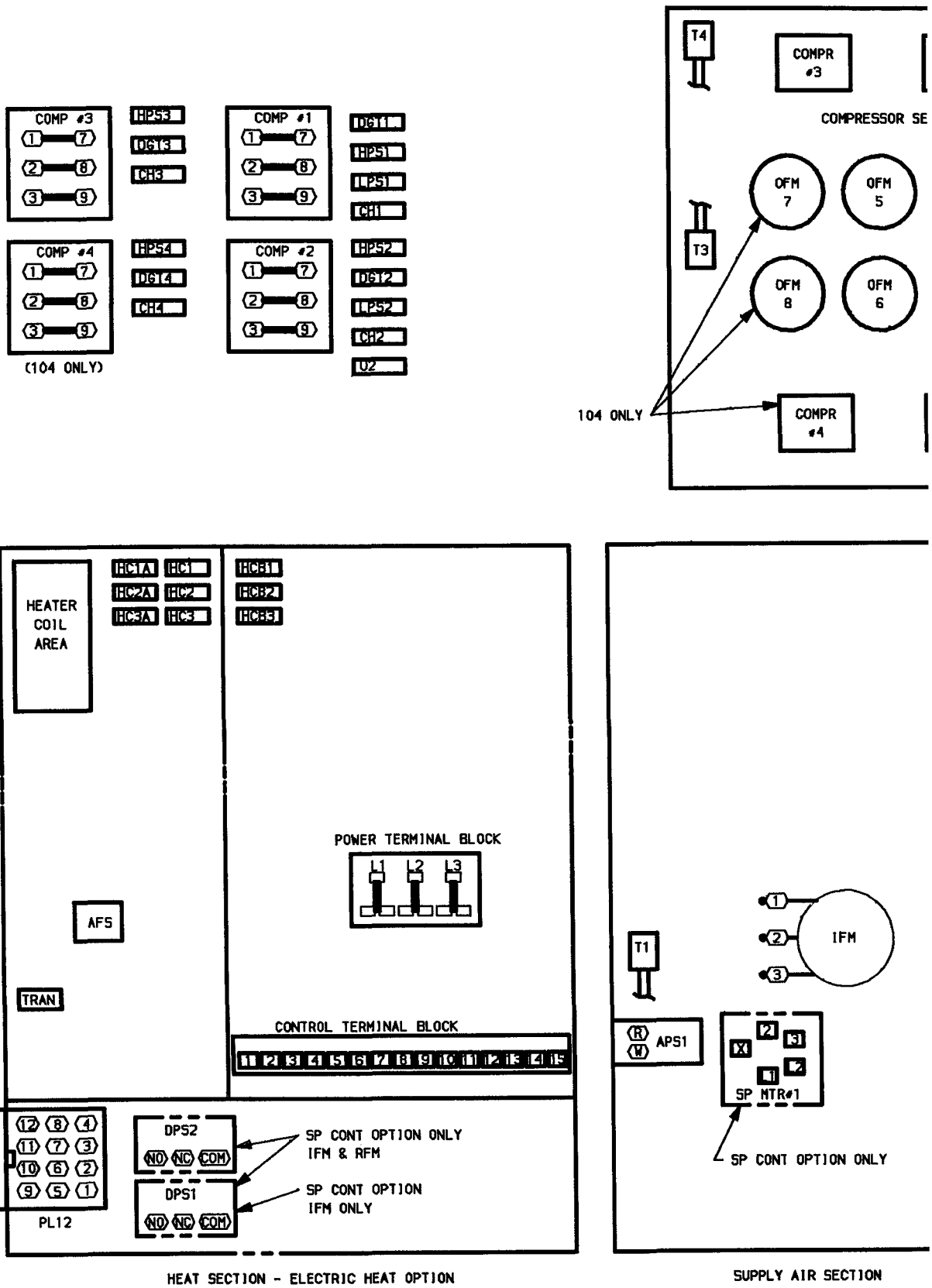
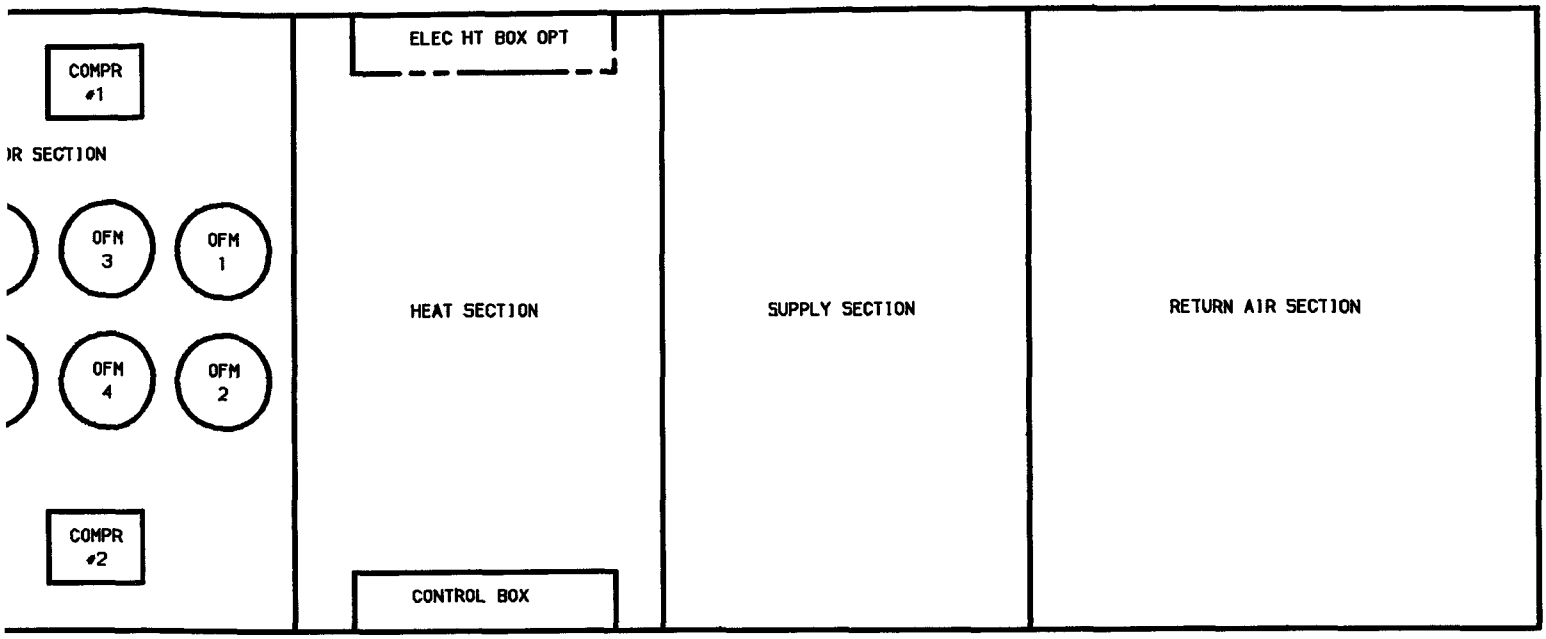
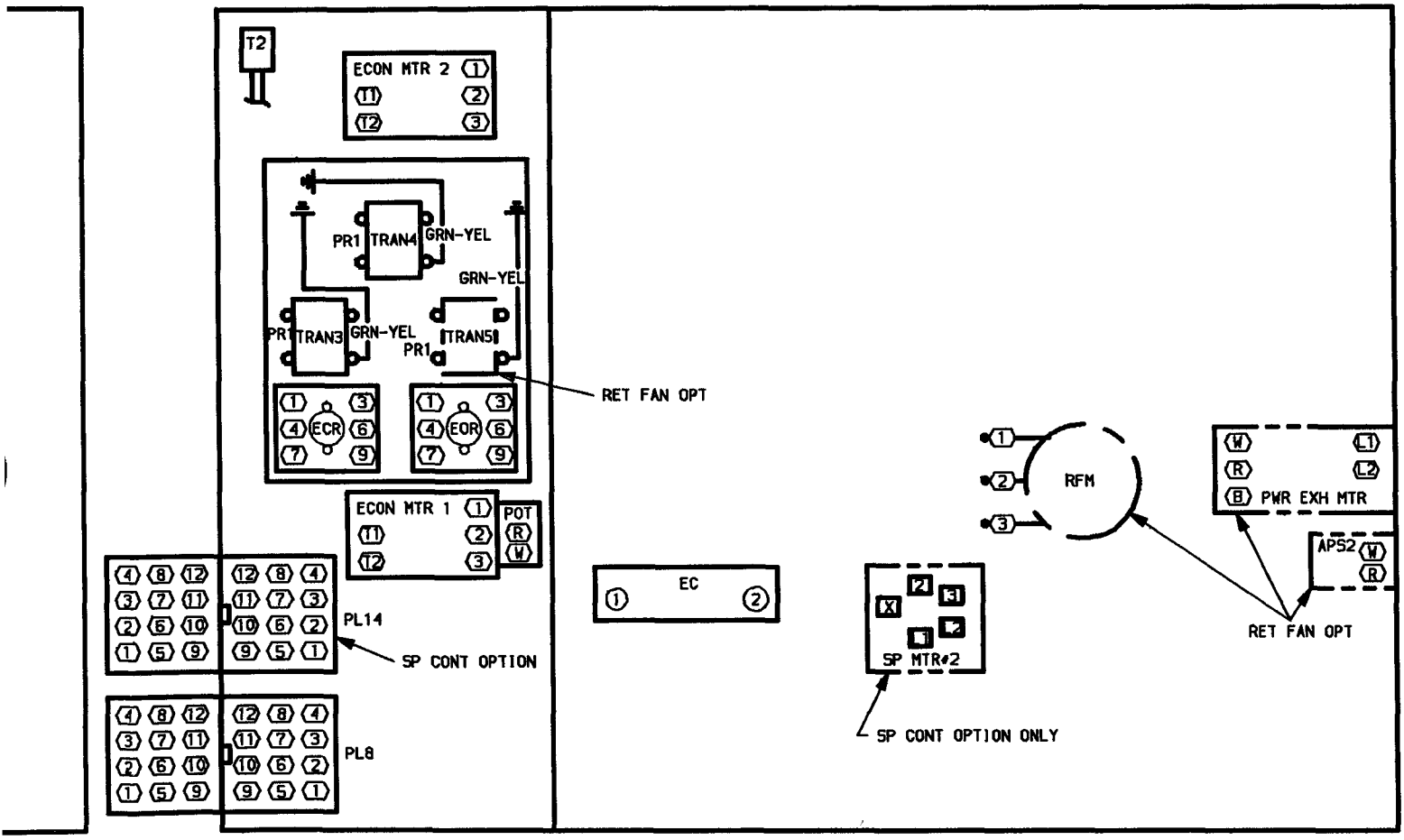

COMP #3
HPS3
DGT3
CH3
COMP #1
DGT1
HPS1
LPS1
CH1
COMP #4
HPS4
DGT4
CH4
(104 ONLY)
COMP #2
HPS2
DGT2
LPS2
CH2
O2
T4
COMPR #3
COMPRESSOR SE
OFM 7
OFM 5
T3
OFM 8
OFM 6
104 ONLY
COMPR #4
HEATER COIL AREA
HC1A
HC1
HC2A
HC2
HC3A
HC3
HCB1
HCB2
HCB3
POWER TERMINAL BLOCK
L1
L2
L3
AFS
TRAN
CONTROL TERMINAL BLOCK
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
PL12
DPS2
NO NC COM
SP CONT OPTION ONLY
IFM & RFM
DPS1
NO NC COM
SP CONT OPTION
IFM ONLY
HEAT SECTION - ELECTRIC HEAT OPTION
T1
IFM
R
W
APS1
X
SP MTR#1
SP CONT OPTION ONLY
SUPPLY AIR SECTION

Fig. 2A — Con



UNIT ARRANGEMENT



RETURN AIR SECTION

Component Arrangement, 50DJ,DK

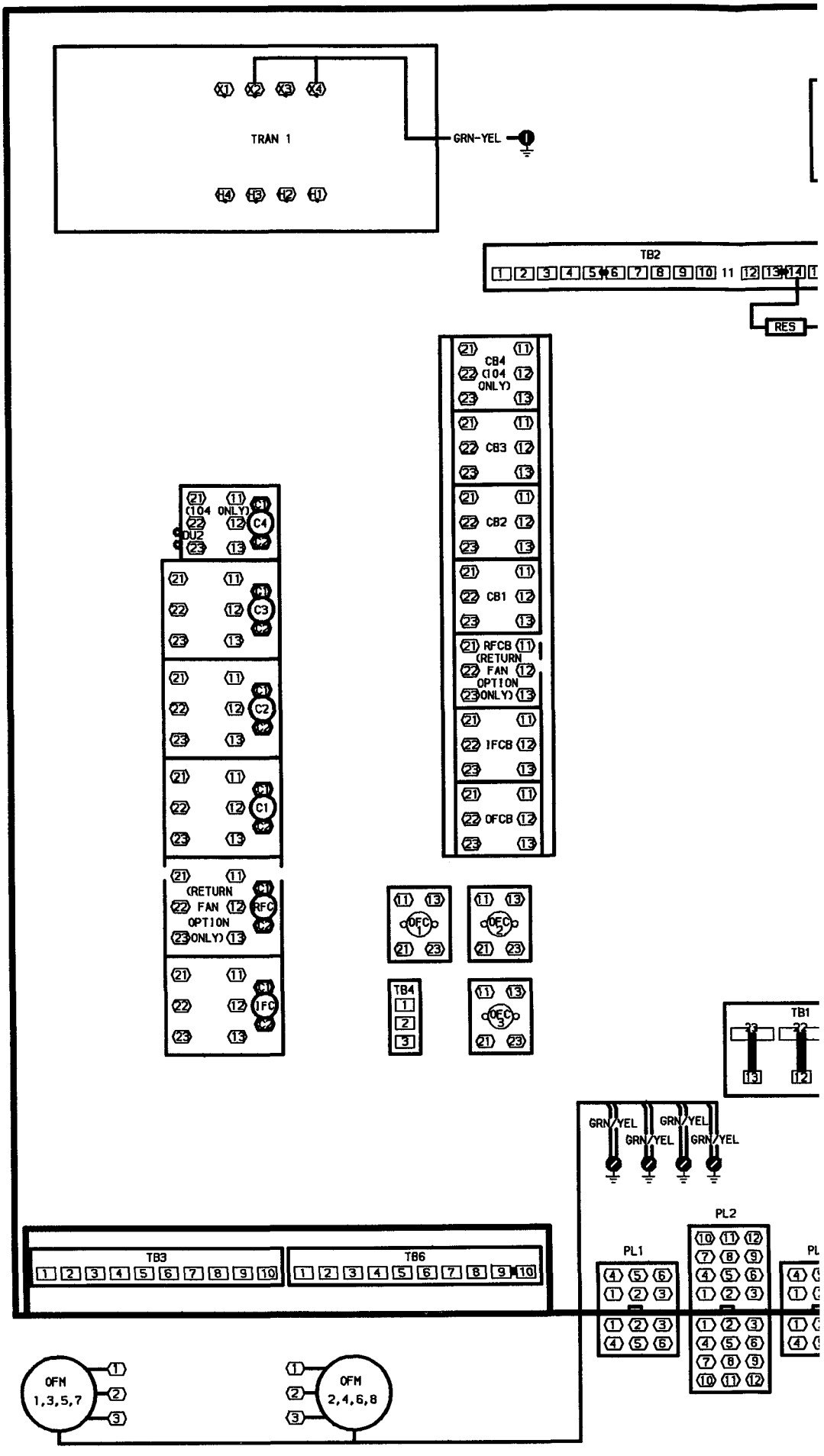
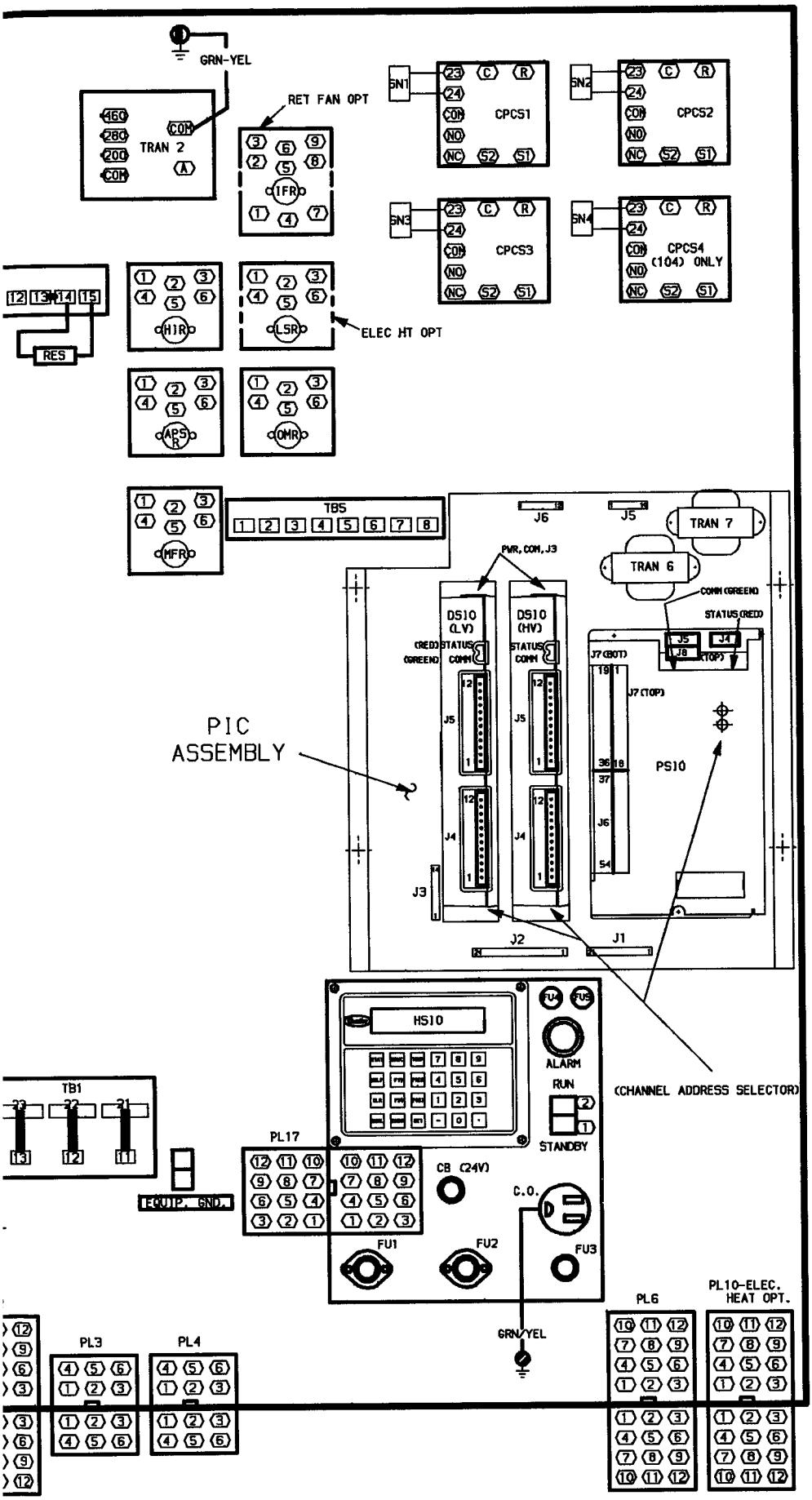
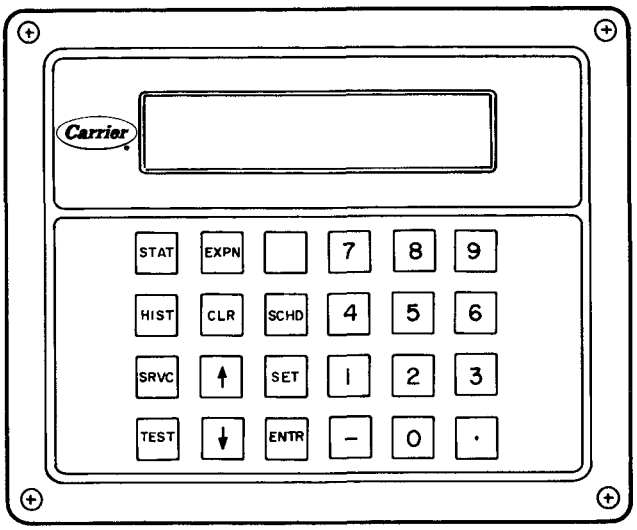


Fig. 2B — Component Arrangeme



rangement, 50DJ,DK (cont)



LEGEND

CLR	– Clear	**STAT**	– Status
ENTR	– Enter	**TEST**	– Test
EXPN	– Expansion		
HIST	– History	↑	Scroll Up
SCHD	– Schedule		
SET	– Setpoint	↓	Scroll Down
SRVC	– Service		

Fig. 3 – Local Interface Device

Remote Mounting of Keyboard and Display Module – The keyboard and display module (local interface device) is factory-installed in the unit control box, but may be removed and mounted in an indoor location if desired. The local interface device operating range is −20 F to 160 F (−30 C to 71 C). If the control box temperature could be outside this range, the local interface device should be removed and mounted in an indoor location as follows:

1. Remove the power and communication plugs at the top of the device.
2. Remove the 4 mounting screws.
3. Relocate the device to the desired indoor location.

The interconnecting wiring will consist of 5 field-supplied wires (two 21-v power wires and 3 communication wires) with a maximum length of 1000 ft each. The 21-v power wires must be at least 20-gage wire, and the 3 communication wires must be 20-gage Belden 8772 shielded cable or equivalent.

The 2 plugs have screw terminals for ease in removing and replacing wires. A pair of extra plugs is included with the unit so that the original plugs can be left in place and the module can be plugged in at the unit to facilitate set-up and servicing.

Building Pressurization and Smoke Purge – Refer to Start-Up, Building Pressurization Mode and Smoke Purge Mode sections in the base unit Installation Instructions included with the unit for more details. See Fig. 4 and unit wiring label for wiring details.

SWITCH NO. 1 — Switch to open 24-v circuit to PIC control to place PIC control in standby mode (field-supplied). Wire field-supplied, normally closed switch between ternals 9 and 10 on terminal board 6 (TB6). Remove factory-supplied jumper.

SWITCH NO. 2 — Switch to open 24-v circuit to de-energize economizer close relay (field-supplied). Wire field-supplied, normally closed switch between terminals 7 and 8 on TB6. Remove factory-supplied jumper.

SWITCH NO. 3 — Switch to close 24-v circuit to economizer motor to drive economizer dampers wide open (field-supplied). Wire field-supplied, normally open switch between terminals 1 and 2 on TB6.

SWITCH NO. 4 — Switch to open 115-v circuit to de-energize the supply and return fans (field-supplied). Wire field-supplied normally closed switch between terminals 7 and 9 on TB2. Remove factory-supplied jumper.

SWITCH NO. 5 — Switch to close 115-v circuit to energize the supply fan (field-supplied). Wire field-supplied, normallyopen switch between terminals 8 and 9 on TB2.

SWITCH NO. 6 — Switch to close 115-v circuit to energize the return fan in full exhaust mode (field-supplied). Wire field-supplied normally open switch between terminals 9 and 10 on TB2.

CONTROL SYSTEM

General – The control system consists of a processor module (PSIO), a high-voltage relay module (DSIO-HV), a low-voltage relay module (DSIO-LV), and a local interface device (HSIO).

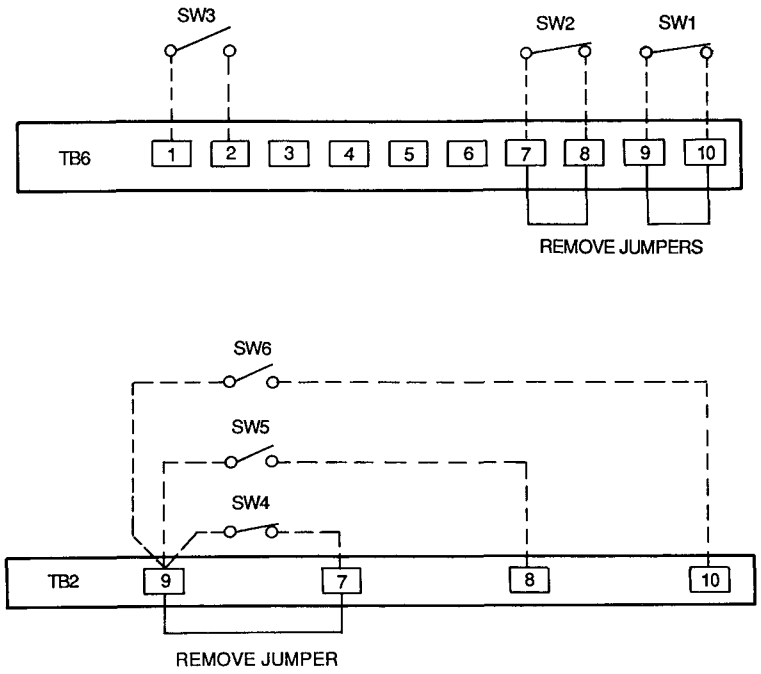
Features

PROCESSOR MODULE — This module contains the operating software and controls the operation of the unit. It continuously monitors information received from various thermistors.

HIGH-VOLTAGE RELAY MODULE — This module closes contacts to energize evaporator and condenser fans. It also controls heat and power exhaust operation.

LOW-VOLTAGE RELAY MODULE — This module closes contacts to energize the compressors. It also controls economizer operation.

LOCAL INTERFACE DEVICE (Fig. 3) — This device consists of a keyboard with 6 function keys, 5 operative keys, 10 numeric keys (0 through 9) and an alphanumeric 8 character Liquid Crystal Display (LCD). Key usage is explained in Table 1. Each function has one or more subfunctions as shown in Table 2. Those functions are described in greater detail in the Control Operation section on page 10.



LEGEND

SW — Switch
TB — Terminal Block
- - - - Field Wiring
——— Factory Wiring

NOTES:

1. Switches 1 through 6 are field supplied
2. For building pressurization, field-supplied source must drive room terminals wide open.
3. Switches 1 through 5 are for building pressurization. Switches 1 through 4 and 6 are for smoke purge
4. Switch 1 — Switch to open 24-v circuit to PIC control to place PIC control in standby mode — normally closed. (Remove factory-supplied jumper.)
5 Switch 2 — Switch to open 24-v circuit to deenergize economizer close relay — normally closed. Remove factory-supplied jumper
6. Switch 3 — Switch to close 24-v circuit to economizer motor to drive economizer dampers wide open — normally open
7 Switch 4 — Switch to open 115-v circuit to deenergize the supply and return fans — normally closed. Remove factory-supplied jumper.
8. Switch 5 — Switch to close 115-v circuit to energize the supply fan — normally open.
9. Switch 6 — Switch to close 115-v circuit to energize the return fan in full exhaust mode — normally open.

Fig. 4 — Field Wiring for Building Pressurization and Smoke Purge

Table 1 – Local Interface Device Key Usage

FUNCTION KEYS	USE
STAT	Status – To display diagnostic codes and current operating information about the unit.
TEST	Quick Test – To check inputs and outputs for proper operation.
HIST	History – To check most recent alarms.
SRVC	Service – To enter specific unit configuration information.
SET	Set Point – To enter operating set points and day/ time information
SCHD	Schedule – To enter occupied/unoccupied schedules for unit operation
OPERATIVE KEYS	**USE**
EXPN	Expand Display – To display a non-abbreviated expansion of the display
CLR	Clear – To clear the screen and return to previous display Also used to enter data value of zero.
↑	Up Arrow – To return to previous display position.
↓	Down Arrow – To advance to next display position
ENTR	To enter data.

Table 2 – Functions and Subfunctions

SUBFUNCTION NUMBER	FUNCTIONS					
	Status	History	Test	Service	Set Point	Schedule
1	Alarm Displays	Alarm History	Quick Test of Inputs	Log On and Log Off	System	Occupied Mode Override
2	Operating Mode Displays	–	Quick Test of Outputs	Software Version	Reset	Period 1
3	Capacity Stages	–	Quick Test of Compressors	Factory Configurations	Demand Limit	Period 2
4	Current Operating Set Points	–	Terminate Quick Test	Field Configurations	Time	Period 3
5	System Temperatures	–	–	Service Configurations	Unoccupied Cooling/Heating	Period 4
6	System Pressures	–	–	Service Variables	Economizer	Period 5
7	System Position	–	–	Network Address	Morning Warm-Up	Period 6
8	–	–	–	–	–	Period 7
9	–	–	–	–	–	Period 8

CONTROL OPERATION

Accessing Functions and Subfunctions — See Table 3. Refer also to Table 2, which shows the 6 functions (identified by name) and the subfunctions (identified by number). Table 4 shows the sequence of all of the elements in a subfunction.

Display Functions

SUMMARY DISPLAY — Whenever the keyboard has not been used for 9 minutes, the display will automatically switch to an alternating summary display. This display has 4 parts, shown below, which alternate in continuous rotating sequence.

Display	Expansion
TUE 12:45	TODAY IS TUE, TIME IS 12:45
MODE 23	UNOCCUPIED HEATING
1 STAGE	NUMBER OF STAGES IS 1
2 ALARMS	THERE ARE 2 ALARMS DETECTED

Table 3 — Accessing Functions and Subfunctions

OPERATION	KEYBOARD ENTRY	DISPLAY	DESCRIPTION
To access a function, press the subfunction number and the function name key The display will show the subfunction group. To move to the other elements, scroll up or down using the arrow keys.	2 SET	RESET	Reset Set Points
	↓	RTS X	Reset Temperature Set Point
	↓	RLS X	Reset Limit Set Point
When the last element in a subfunction has been displayed, the subfunction group name will be repeated	↓	RESET	Reset Set Points
To move to the next subfunction, it is not necessary to use the subfunction number; pressing the function name key will advance the display through all subfunctions within a function, and then back to the first.	SET	DEMAND	Demand Limit Set Points
	SET	TIME	Time of Day and Day of Week Display
	SET	UNOCCUPD	Unoccupied Set Points
	SET	VENT MIN	Ventilation Minimum Position Set Point
	SET	WARM-UP	Morning Warm-Up Temperature Set Point
	SET	PWR EXH	Power Exhaust Set Point
	SET	SET POINT	System Set Points
To move to another function, either press the function name key for the desired function (display will show the first subfunction), or access a particular subfunction by using the subfunction number and the function name key.	STAT	X ALARMS	X Alarms Detected
	3 STAT	STAGES	Capacity Stages

Table 4 — Keyboard Directory

STATUS		
KEYBOARD ENTRY	**DISPLAY**	**COMMENTS**
1 STAT	ALARMS	Current alarm displays
↓	ALARM X	Alarm 1
↓	ALARM X	Alarm 2
↓	ALARM X	Alarm 3
↓	ALARM X	Alarm 4
↓	ALARM X	Alarm 5
↓	ALARM X	Alarm 6
↓	ALARM X	Alarm 7
↓	ALARM X	Alarm 8
↓	ALARM X	Alarm 9
↓	ALARM X	Alarm 10
↓	ALARM X	Alarm 11
↓	ALARM X	Alarm 12
↓	ALARM X	Alarm 13
2 STAT	MODES	Current operating modes
↓	MODE X	Mode 1
↓	MODE X	Mode 2
↓	MODE X	Mode 3
3 STAT	STAGES	Capacity stages
↓	X STAGE	Stage number
4 STAT	SETPOINT	Current operating set point
↓	MLAS X	Control modified leaving-air temperature set point
↓	LAT X	Actual leaving-air temperature
5 STAT	TEMPS	System temperatures
↓	EAT X	Entering-air temperature (mixed air)
↓	LAT X	Leaving-air temperature
↓	SCT2 X	Saturated condensing temperature lead circuit
↓	SCT1 X	Saturated condensing temperature lag circuit
↓	CST X	Reset/Unoccupied Cooling space temperature
↓	HST X	Unoccupied Heating space temperature
6 STAT	PRESS	System pressures
↓	LCS1 X	Loss-of-charge switch, lead circuit
↓	LCS2 X	Loss-of-charge switch, lag circuit
7 STAT	POSITION	System position values
↓	ENTH X	Enthalpy switch (CLS is economizer active)
↓	VENT X	Ventilation damper percent full open

HISTORY		
KEYBOARD ENTRY	**DISPLAY**	**COMMENTS**
1 HIST	ALRMHIST	Alarm history
↓	ALARM X	Alarm X (Most recent alarm)
↓	ALARM X	Alarm X
↓	ALARM X	Alarm X
↓	ALARM X	Alarm X
↓	ALARM X	Alarm X

QUICK TEST		
KEYBOARD ENTRY	**DISPLAY**	**COMMENTS**
1 TEST	INPUTS	Factory/field test of inputs
↓	CHK STAT	Check 1 STAT for any input failures
2 TEST	OUTPUTS	Factory/field test of outputs
↓	VENT OPN	Ventilation damper open test
↓	VENT CLO	Ventilation damper close test
↓	IFC	Indoor (Evaporator) fan test
↓	OFC2	Outdoor (Condenser) fans 1, 3 and 5 (084, 094 units) or 3, 5 and 7 (104 unit) test
↓	OFC3	Outdoor (Condenser) fans 4 and 6 (084, 094 units) or 2, 4, 6, and 8 (104 unit) test
↓	ULD1	Unloader 1 test
↓	HEAT REL	Heat relay test
3 TEST	COMP	Factory/field test of compressors
↓	COMP1	Compressor 1 and either outdoor (condenser) fan 2 (084, 094 units) or outdoor (condenser) fan 1 (104 unit) test
↓	COMP2	Compressor 2 test
↓	COMP3	Compressor 3 test
↓	COMP4	Compressor 4 test (104 unit)

⚠ WARNING

During test of compressors, each compressor will start and run for 10 seconds Compressor service valves and the liquid line valve must be open Energize compressor crankcase heaters for 24 hours prior to performing compressor tests.

4 TEST	EXIT TEST	Leave quick test

Table 4 – Keyboard Directory (cont)

SERVICE		
KEYBOARD ENTRY	**DISPLAY**	**COMMENTS**
1 SRVC	LOGON	Now enter password
1 1 1 1 ENTR	LOGGEDON	
When finished with configurations, log out as follows:		
1 SRVC	LOGGEDON	Shows that configurations are available
↓	LOG OFF	
ENTR	LOGD OFF	Logged off successfully Configurations are again password protected.
2 SRVC	VERSION	Software version number
↓	XXX	Software version
3 SRVC	FACT CFG	*Factory configurations*
↓	COMP X	Number of compressors
↓	UNLS X	Number of unloaders (Requires password entry under 1 SRVC, or else displays DENIED)
4 SRVC	FLD CFG	Field configuration
↓	RST X	Reset enable (=disable, 1 =enable)
↓	DMLM X	Demand limit enable (. =disable, 1 =enable)
↓	VENT X	Ventilation/economizer enable (. =disable, 1 =enable)
↓	MWUP X	Morning warm-up enable (. =disable, 1 =enable)
↓	UCLG X	Unoccupied Cooling enable (. =disable, 1 =enable)
↓	UHTG X	Unoccupied Heating enable (. =disable, 1 =enable)
↓	ECLK X	Electronic time clock enable (=disable, 1 =enable)
5 SRVC	SRV CFG	Service configuration
↓	NONE	This device contains no service configuration parameters.
6 SRVC	VARIABLE	Service variables
↓	NONE	This device contains no service variables
7 SRVC	ADDRESS	Network address
↓	ADDR X	Element address
↓	BUS X	Bus number

SET POINT		
KEYBOARD ENTRY	**DISPLAY**	**COMMENTS**
1 SET	SETPOINT	System set points
↓	LAS X	Leaving-air temperature set point
2 SET	RESET	Reset set points
↓	RTS X	Reset temperature set point
↓	RLS X	Reset limit set point
3 SET	DEMAND	Demand limit set points
↓	DL1 X	Demand limit set point 1
↓	DL2 X	Demand limit set point 2
4 SET	TIME	Current time
↓	DAY.HH.MM	Current setting
5 SET	UNOCCUPD	*Unoccupied set points*
↓	COOL X	Unoccupied Cooling set point
↓	HEAT X	Unoccupied Heating set point
6 SET	VENT MIN	Ventilation minimum position set point
↓	MVS X	*Minimum ventilation set point*
7 SET	WARM-UP	Morning warm-up temperature set point
↓	MWS X	Morning warm-up set point

SCHEDULE		
KEYBOARD ENTRY	**DISPLAY**	**COMMENTS**
1 SCHD	OVRD	Number of hours to extend occupied period
2 SCHD	PERIOD 1	Define time schedule period 1
↓	OCC X	Start of occupied time
↓	UNO X	Start of unoccupied time
↓	MON X	Monday flag (X = entry codes) (1 = yes, . = no)
↓	TUE X	
↓	WED X	
↓	THU X	
↓	FRI X	
↓	SAT X	
↓	SUN X	
↓	HOL X	Holiday flag
3 SCHD		
↓		
↓	Time periods 2-8 (same elements as period 1)	
↓		
9 SCHD		

STATUS FUNCTION — The Status function shows the current status of alarm (diagnostic) codes, capacity stages, operating modes, set points, all measured system temperatures, pressure switch positions, and economizer damper position. These subfunctions are defined below and on pages 14 and 15. Refer to Table 3 for additional information.

[1] [STAT] (Alarms) Alarms are messages that one or more faults have been detected. Each fault is assigned a code number which is reported with the alarm. (See Table 5 for code definitions.) The codes indicate failures that cause the unit to shut down, terminate an option (such as reset) or result in the use of a default value as set point.

Up to 13 alarm codes can be stored at once. To view them in sequence, press [1] [STAT] to enter the alarm displays and then press [↓] to move to the individual alarm displays. Press [EXPN] after a code has been displayed and the meaning of the code will scroll across the screen. See Example 1.

Example 1 — Reading Alarm Codes

KEYBOARD ENTRY	DISPLAY RESPONSE	COMMENTS
	TUE 12:45 MODE 26 0 STAGES 3 ALARMS	Keyboard has not been used for at least 9 min. Alternating summary display appears on screen
[1] [STAT]	3 ALARMS	3 alarms detected
[↓]	ALARM 59	First alarm code
[EXPN]	LOSS-OF-CHARGE LEAD CIRCUIT	Explanation of alarm code
[↓]	ALARM 71	Second alarm code
[EXPN]	LEAVING-AIR THERMISTOR FAILURE	Explanation of alarm code
[↓]	ALARM 81	Third alarm code
[EXPN]	RESET THERMISTOR FAILURE	Explanation of alarm code

When a diagnostic (alarm) code is stored in the display and the machine automatically resets, the code will be deleted. Codes for safeties which do not automatically reset will not be deleted until the problem is corrected and the machine is switched to STANDBY, then back to RUN.

Table 5 — Display Codes

OPERATING MODES	
DISPLAY	DESCRIPTION
20	Initialization
21	Temperature reset in effect
22	Demand limit in effect
23	Unoccupied heating
24	Unoccupied cooling
25	Unit standby
26	Morning warm-up
27	Unoccupied mode
28	Run mode

ALARMS				
DISPLAY	DESCRIPTION	ACTION TAKEN BY CONTROL	RESET METHOD	PROBABLE CAUSE
51	Comp 2 failure	Comp lockout	Manual	High-pressure switch trip or high discharge gas temperature switch trips on when it is not supposed to be on Wiring error between electronic control and compressor relay
52	Comp 4 failure (100 ton)	Comp lockout	Manual	
55	Comp 1 failure	Comp lockout	Manual	
56	Comp 3 failure	Comp lockout	Manual	
59	Loss-of-charge — lead circuit	Lead circuit shut off	Manual	Low refrigerant charge or loss-of-charge pressure switch failure.
60	Loss-of-charge — lag circuit	Lag circuit shut off	Manual	
71	Leaving-air thermistor failure	Comp lockout, capacity stage = 0	Automatic	Thermistor failure, wiring error, or thermistor not connected to input terminals.
72	Entering-air thermistor failure	Compromised staging performance	Automatic	
75	Saturated Cond thermistor 1 failure	Comp lockout, capacity stage = 0	Automatic	
76	Saturated Cond thermistor 2 failure	Comp lockout, capacity stage = 0	Automatic	
77	Unoccupied heating thermistor failure	Unoccupied mode disabled	Automatic	
81	Reset/Unoccupied thermistor failure	Reset/Unoccupied mode disabled	Automatic	
83	Economizer potentiometer failure	Economizer dampers close	Manual	Potentiometer failure, wiring error, or potentiometer not connected to input terminals

LEGEND

Cond — Condensing
Comp — Compressor

NOTES:
1. All automatic reset failures that cause unit to stop will automatically restart the unit when the error has been corrected
2. All manual reset errors must be reset by moving the control switch to STANDBY and then to RUN

2 STAT (Modes) — The operating mode codes are displayed to indicate the operating status of the unit at a given time (see Table 5).

The modes are explained below:

Initialization (20) — In this mode, the unit drives the economizer dampers wide open and then fully closed to calibrate the economizer position.

Temperature Reset (21) — This mode indicates that the unit is using temperature reset to adjust the set point and to control to the modified set point. The set point is modified upwards based on space temperature.

Demand Limit (22) — This mode indicates the capacity of the unit is being limited by the demand limit control option. This mode is only available on units connected to the Carrier Comfort Network (CCN) or through the use of the external demand limit switches.

Unoccupied Heating (23) — This mode indicates that the space temperature is below the unoccupied heating set point and the unit is ON. When the space temperature rises above the set point, the unit is turned OFF.

Unoccupied Cooling (24) — This mode indicates that the space temperature is above the unoccupied cooling set point and the unit is ON. When the space temperature falls below the set point, the unit is turned OFF.

Standby (25) — The unit is being held in the standby mode either because the RUN/STANDBY switch is open or a set of relay contacts in series with the RUN/STANDBY switch is open.

Morning Warm-Up (26) — In this mode, the unit is controlling heating up to the morning warm-up set point. The heater is allowed to cycle until the entering-air temperature is greater than the morning warm-up set point, at which time normal unit operation begins and heating is locked out.

Unoccupied Mode (27) — Unit is not operating.

Run (28) — Unit is operating.

To enter the MODE subfunction, depress 2 STAT and use the ↓ key to determine if more than one mode applies. See Example 2 to read current mode with expansion.

Example 2 — Reading Current Operating Modes

KEYBOARD ENTRY	DISPLAY RESPONSE	COMMENTS
	TUES 12:45 MODE 25 0 STAGES	Keyboard has not been used for at least 9 minutes. Alternating summary display appears on screen.
2 STAT	MODE	Mode subfunction of status function
↓	MODE 25	Mode 25 is in effect
EXPN	UNIT STANDBY	Explanation of code 25

3 STAT (Stages) — This subfunction displays the capacity stage number (from 1 to 8) at which the unit is presently operating. See Tables 6 and 7 for compressor loading sequence.

To enter the STAGES subfunction, depress 3 STAT and use the ↓ key to display the stage number.

Table 6 — Loading Sequence, 084, 094 Units

STAGE	COMP 1	COMP 2	UNLOADER	COMP 3
0	OFF	OFF	OFF	OFF
1	OFF	ON	UNLOADED	OFF
2	OFF	ON	LOADED	OFF
3	ON	ON	UNLOADED	OFF
4	ON	ON	LOADED	OFF
5	ON	ON	UNLOADED	ON
6	ON	ON	LOADED	ON

Table 7 — Loading Sequence, 104 Units

STAGE	COMP 1	COMP 2	UNLOADER	COMP 3	COMP 4
0	OFF	OFF	OFF	OFF	OFF
1	OFF	ON	UNLOADED	OFF	OFF
2	OFF	ON	LOADED	OFF	OFF
3	ON	ON	UNLOADED	OFF	OFF
4	ON	ON	LOADED	OFF	OFF
5	ON	ON	UNLOADED	ON	OFF
6	ON	ON	LOADED	ON	OFF
7	ON	ON	UNLOADED	ON	ON
8	ON	ON	LOADED	ON	ON

4 STAT (Set point) This subfunction displays the modified leaving-air set points and actual leaving-air temperature. Modified leaving-air set point will be the set point programmed in the SET function unless a reset is in effect. If reset is in effect, the modified set point will be displayed.

To enter the set point subfunction, depress 4 STAT , then use the ↓ key to display the modified set point followed by the actual leaving-air temperature.

5 STAT (Temperature) The temperature subfunction displays the readings at temperature-sensing thermistors. To read a temperature, enter 5 STAT, then scroll to the desired temperature using the ↓ key. Table 4 shows the order of the readouts.

6 STAT (Pressure) This subfunction displays the status of the loss-of-charge switches. The display will show CLOSED or OPEN for the loss-of-charge switch. To enter Pressure subfunction, depress 6 STAT then use the ↓ key to display loss of charge switches.

[7] [STAT] (Position) The position subfunction displays the current position of the enthalpy control and economizer dampers. The enthalpy control will indicate:

ENTH OPN (switch open, temperature/humidity too high)
ENTH CLS (switch closed, outdoor air suitable for cooling, economizer active)

The damper position will be displayed in percent open. Use the [↓] key to display enthalpy control condition and damper position.

NOTE: The position subfunction will not display unless the economizer function is enabled.

HISTORY FUNCTION

[1] [HIST] Displays the 5 latest alarms generated by the unit in the order of their occurrence. If 5 alarms are displayed, the occurrence of a sixth alarm shifts the first alarm off the display.

TEST FUNCTION — The Test function operates the Quick Test diagnostic program. When the unit is in STANDBY mode, the Test subfunctions will energize the fans, unloaders, compressors and economizer actuator motor. The compressors will energize for 10 seconds. The subfunctions are explained below. Refer to Table 4 for all the elements in the subfunction.

---

[1] [TEST] — Displays the status of all inputs.

---

[2] [TEST] — Tests the outputs from the processor, except for compressors.

---

[3] [TEST] — Tests the compressors.

---

[4] [TEST] — Takes the unit out of Quick Test.

NOTE: The Quick Test energizes the alarm light and alarm relay. They will remain energized as long as the unit is in Quick Test.

To reach a particular test, enter its subfunction number and then scroll to the desired test with the [↓] key. A test can be terminated by pressing the [↓] key. Pressing the [↓] key after a test has started will advance the system to the next test, whether the current one is operating or has timed out. Once in the next step, you may start the test by pressing [ENTR] or advance past it by pressing [↓]. While the unit is in Quick Test, you may access another display or function by depressing the appropriate keys. However, the unit will remain in the Quick Test function until [4] [TEST] is entered, or, if the keyboard is not used for 9 minutes, the unit will automatically leave the Quick Test function. See Example 3.

Example 3 — Using Quick Test

KEYBOARD ENTRY	DISPLAY RESPONSE	COMMENTS
[3] [TEST]	COMP	Factory/field test of compressors; subfunction of test function.
[↓]	COMP 1	Compressor 1 test
[ENTR]	COMP 1	Pressing ENTR starts the test. When the compressor should be running, the display shows COMP 1.
	COMP 1	If the test is allowed to time out, the display will show COMP 1.
[↓]	COMP 2	Pressing the down arrow key advances the system to compressor 2 test
[ENTR]	COMP 2	Pressing ENTR starts the test. When the compressor should be running, the display shows COMP 2.
	COMP 2	If test is allowed to time out, the display will show COMP 2.
[↓]	COMP 3	Pressing the down arrow key advances the system to compressor 3 test
[ENTR]	COMP 3	Pressing ENTR starts the test. When the compressor should be running, the display shows COMP 3.
	COMP 3	If test is allowed to time out, the display will show COMP 3.
[↓]	COMP 4	Pressing the down arrow key advances the system to compressor 4 test (104 unit)
[ENTR]	COMP 4	Pressing ENTR starts the test. When the compressor should be running, the display shows COMP 4
	COMP 4	If the test is allowed to time out, the display will show COMP 4.
[4] [TEST]	EXIT TEST	If no other test is desired, exit quick test NOTE: This option may be exercised at any point during the test.

Programming Functions

SERVICE FUNCTION — The Service function allows the operator to verify factory configurations and read or change field configurations. The Service subfunctions are listed below. (See Table 4 for details.) Refer to Table 8 for configuration option default values.

[1] [SRVC] — The operator must use this subfunction to log on before accessing factory configurations ([3] [SRVC]) and to log off after completing factory configuration subfunctions. See Example 4.

[2] [SRVC] — Used to verify software version.

[3] [SRVC] — Used to verify factory configurations (number of compressors and unloaders). See Example 5.

[4] [SRVC] — Used to enable the unit for reset, demand limit, ventilation, morning warm-up, unoccupied cooling or heating, or electronic time clock. See Example 6.

NOTE: The [1] key is used to enable or turn on certain functions, and the [.] key is used to disable these functions. When the [.] key is pressed, the display will show 0.

Table 8 — Service Configuration Ranges and Defaults

SUBFUNCTION NUMBER	CONFIGURATION VALUE	RANGE	FACTORY DEFAULT
3	Number of Compressors	3-4	3
	Number of Unloaders	1	1
4	Space Temperature Reset	Enable/Disable	Disable
	Demand Limit	Enable/Disable	Disable
	Ventilation/Economizer	Enable/Disable	Enable
	Morning Warm-Up	Enable/Disable	Disable
	Unoccupied Cooling	Enable/Disable	Disable
	Unoccupied Heating	Enable/Disable	Disable
	Electronic Timeclock	Enable/Disable	Enable
	Power Exhaust	Enable/Disable	Disable
7	Element Address	0-239	0
	Bus Number	0-239	0

Example 4 — Logging On and Logging Off Service Function

KEYBOARD ENTRY	DISPLAY RESPONSE	COMMENTS
TO LOG ON:		
[1] [SRVC]	LOGON	Ready for password to be entered
[1] [1] [1] [1] [ENTR]	LOGGED ON	Operator can now use service functions.
TO LOG OFF:		
[1] [SRVC]	LOGGED ON	Configurations are available to operator.
[↓]	LOG OFF	Ready for operator to log off.
[ENTR]	LOGD OFF	Logged off — password protection enabled.

Example 5 — Reading Factory Setting

Log on as shown in Example 4 before performing the following functions

KEYBOARD ENTRY	DISPLAY RESPONSE	COMMENTS
[3] [SRVC]	FACT CFG	Factory configuration subfunction of service function
[↓]	COMP 3	Number of compressors is 3
[EXPN]	NUMBER OF COMPRESSORS IS 3	Explanation is scrolled across screen.

Example 6 — Reading and Changing Field Configurations

KEYBOARD ENTRY	DISPLAY RESPONSE	COMMENTS
[4] [SRVC]	FLD CFG	Field Configuration subfunction of service function
[↓]	RST NO	Temperature reset is disabled.
[1] [ENTR]	RST YES	Temperature reset is enabled.
[CLR]	RST NO	Temperature reset is disabled

[5] [SRVC] — Unit contains no service configuration parameters.

[6] [SRVC] — Unit contains no service variables.

[7] [SRVC] — Used to assign network addresses when unit is connected to CCN. See Example 7.

NOTE: Element address and bus number are determined by the building system designer.

Example 7 — Assigning Network Addresses

KEYBOARD ENTRY	DISPLAY RESPONSE	COMMENTS
7 SRVC	ADDRESS	Network address subfunction of service function
↓	ADDR 0	Element address = 0
1 ENTR	ADDR 1	Element address = 1
↓	BUS 0	Bus number = 0
2 ENTR	BUS 2	Bus number = 2

SET POINT FUNCTION — Set points are entered through the keyboard. Set points can be changed within the upper and lower limits, which are fixed. See Table 9.

1 SET — Displays leaving-air temperature set point.

2 SET — Displays temperature reset set point.

3 SET — Displays demand limit set point.

4 SET — Displays time of day and day of week.

5 SET — Displays unoccupied cooling and heating set points.

6 SET — Displays minimum ventilation set point.

7 SET — Displays morning warm-up set point.

Table 9 — Set Point Ranges and Defaults

SET POINT	RANGE	FACTORY DEFAULT
Leaving-Air Temperature Set Point (F)	45- 70	55
Minimum Ventilation Set Point (F)	0-100	20
Morning Warm-Up (F)	40- 80	60
Demand Limit Set Point No. 1 (%)	50-100	100
Demand Limit Set Point No. 2 (%)	0- 49	49
Reset Temperature Set Point (F)	40- 80	70
Reset Limit Set Point (F)	0- 20	10
Unoccupied Heating Set Point (F)	30- 70	50
Unoccupied Cooling Set Point (F)	70-100	85
Power Exhaust Set Point (%)	30-100	90

Reading and Changing Set Points — Example 8 shows how to read and change system set points. Other set points can be changed by following the same procedure. Refer to Table 4 for the display sequence of set points in each subfunction. To adjust any parameter after enabling a function, press the ↓ key until desired parameter is displayed. Key in new value and press ENTR. If input is within the allowable range, the display will show the parameter and new value. If the input is not within the allowable range, the old value will still be displayed.

NOTE: If the appropriate option is not enabled under the field configuration subfunction, its set point will not be displayed. The next applicable set point will be shown instead.

Example 8 — Reading and Changing System Set Points

KEYBOARD ENTRY	DISPLAY RESPONSE	COMMENTS
1 SET	SETPOINT	System set points
↓	LAS 55	Present leaving-air set point is 55 F.
5 0 ENTR	LAS 50	Type 50 and press ENTR Display shows new leaving-air set point is 50 F,which is within the allowable range.
4 0 ENTR	LAS 50	Type 40 and press ENTR. Display still shows leaving-air set point as 50 because 40 is not within the allowable range See Table 9 for allowable ranges.

NOTE: The subfunctions to change reset set points (2 SET), demand limit set points (3 SET), unoccupied set points (5 SET), ventilation set points (6 SET), and morning warm-up set point (7 SET), are performed in the same manner as Example 8.

Reading and Changing Time Display — Time is entered and displayed in 24-hour time. The day of the week is entered as a number: 1 = MON, 2 = TUE...7 = SUN. The . key is used as the colon when entering time. See Example 9.

Example 9 — Setting Time of Day and Day of Week

KEYBOARD ENTRY	DISPLAY RESPONSE	COMMENTS
4 SET	TIME	Time display subfunction of set point function
↓	MON 16.00	Current setting is Monday, 4:00 p.m.
2 . 1 3 . 0 5 ENTR	TUE 13.05	New setting of Tuesday, 1:05 p m is entered and displayed

SCHEDULE FUNCTION — The Schedule function provides a means to automatically switch the unit from an occupied mode to an unoccupied mode.

The schedule consists of from one to 8 occupied time periods, set by the operator. These time periods can be flagged to be in effect or not in effect on each day of the week. The day begins at 00:00 and ends at 24:00. The unit will be in unoccupied mode unless a scheduled time period is in effect. If an occupied period is to extend past midnight, it must be programmed as follows:

1. If the occupied period starts at 00:00 (midnight) it must be programmed to end at 24:00 (midnight). A new occupied period must be programmed to begin at 00:00 hours.
2. If the occupied period starts at any time other than midnight, the occupied period must end at 00:00 (midnight) in order for the unit to stay in occupied mode past midnight, but not remain locked in the occupied mode.

The time schedule can be overridden to keep the unit or optional discrete output in the occupied mode for one, 2, 3 or 4 hours on a one-time basis.

The rooftop unit may also be configured for an applicable holiday/shutdown schedule. This function can only be utilized if the unit is connected to the CCN. The network will send a holiday message (flag) to the unit on the appropriate holiday. The unit will then utilize the schedule that has been set up for the holiday period. The unit will automatically return to its normal schedule after the holiday period is complete.

Example 10 — Using the Schedule Function

KEYBOARD ENTRY	DISPLAY RESPONSE	COMMENTS
PROGRAMMING PERIOD 1:		
2 SCHD	PERIOD 1	Define schedule period 1
↓	OCC 00 00	Start of occupied time For this example, first period should start here (at midnight) so no entry is needed.
↓	UNO 00.00	Start of unoccupied time (end of period). For this example, period 1 should end at 3:00 a m
3 . 0 0 ENTR	UNO 3 00	Period 1 ends at 3:00 a.m
↓	MON NO	Monday is not flagged for period 1. To put period 1 into effect on Monday, Monday must be flagged yes
1 ENTR	MON YES	Monday is now flagged for period 1 to be in effect
↓	TUE YES	For this example, period 1 is to be in effect on Monday only All other days must be checked to be sure that they are flagged no If any day is flagged yes, change to no
1 ENTR	TUE NO	Tuesday is now flagged no for period 1

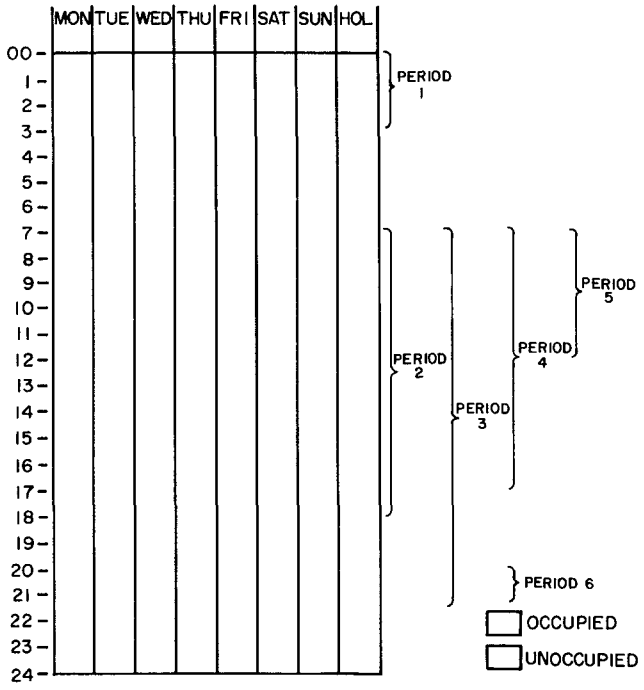


Fig. 5 — Sample Time Schedule

Figure 5 shows a schedule for an office building with the unit operating on a set point schedule. The schedule is based on building occupancy with 3-hour off peak cooldown period from midnight to 3 a.m. following weekend shutdown. To learn how this sample schedule would be programmed, see Example 10.

NOTE: This schedule was designed to illustrate the programming of the Schedule function and is not intended as a recommended schedule for unit operation.

Example 10 — Using the Schedule Function (cont)

KEYBOARD ENTRY	DISPLAY RESPONSE	COMMENTS
PROGRAMMING PERIOD 2:		
For this example, period 2 is used on Monday and Tuesday.		
3 SCHD	PERIOD 2	Define scheduling period 2
↓	OCC 00.00	Start of occupied time
7 . 0 0 ENTR	OCC 7.00	Occupied time will start at 7:00 a m.
↓	UNO 00 00	Start of unoccupied time (end of period) For this example, period 2 should end at 18:00 (6:00 p m).
1 8 . 0 0 ENTR	UNO 18.00	Period 2 ends at 18:00 (6:00 p.m)
↓	MON NO	Monday is not flagged for period 2 To put period 2 into effect on Monday, Monday must be flagged yes.
1 ENTR	MON YES	Monday is now flagged for period 2 to be in effect.
↓	TUE NO	Tuesday is not flagged for period 2 To put period 2 into effect on Tuesday, Tuesday must be flagged yes.
1 ENTR	TUE YES	Tuesday is now flagged for period 2 to be in effect.
↓	WED YES	For this example, period 2 is to be in effect only on Monday and Tuesday All other days must be checked to be sure that they are flagged no. If a day is flagged yes, change to no
. ENTR	WED NO	Wednesday is now flagged no for period 2

PRE-START-UP

Quick Test — The Test function provides a check on control inputs and outputs, and can only be conducted when the unit is in the standby mode. The alarm light will be on at all times when in the Test function, and will remain on even if another function (i.e. Status) is entered during the test. The alarm light will go off only when the test is terminated. Always terminate the test by the exit procedure (press 4 , then TEST).

The failure of any input will generate an alarm, so the input check simply directs the user to check for alarms in the Status function. Note that the Test function remains active even when searching the Status function.

The output check allows the user to confirm the operation of all fans, compressors, unloaders, and the economizer actuator motor. The test is performed in two steps for each component: the ↓ key will cause the component

name to be displayed, and pressing [ENTR] after 2 seconds will cause the component to activate. To terminate the test on a component and step to the next component, press the [↓] key. It is not necessary to activate a component in order to step to the next component. See Table 10.

To activate the compressor during Quick Test, verify that service valves are open, circuit breakers are closed, and that all the normal preparatory steps have been taken per the base unit installation instructions.

IMPORTANT: Energize crankcase heaters 24 hours prior to performing compressor tests.

Operating time for the compressors is limited to 10 seconds during Quick Test. To verify the operation of the compressor contactors without activating the compressors, the compressor circuit breakers can be opened, and operation of the compressor contactors can be verified when [ENTR] is pressed.

Table 10 – Quick Test of Outputs

KEYBOARD ENTRY	DISPLAY RESPONSE	COMMENTS
[2] [TEST]	OUTPUTS	Field test of outputs
[↓]	VENT OPN	Economizer damper open check
[ENTR]		This is the signal to the actuator motor to open the economizer dampers. This step will be ignored if the economizer is not enabled in [4] [SRVC].
[↓]	VENT CLO	Economizer close test
[ENTR]		Verify dampers close
[↓]	IFC	Supply fan test
[ENTR]		Verify supply fan is activated If unit is equipped with a return fan, verify that it is energized too.
		⚠ WARNING If the supply fan is not activated at this step, it will automatically activate at the first subsequent activated step of the Quick Test. It will remain ON for the duration of the test.
[↓]	OFC2	Outdoor (condenser) fan test for fans 1, 3, and 5 (084, 094 units) or fans 3, 5, and 7 (104 unit)
[ENTR]		Verify condenser fan nos. 1, 3, and 5 (084, 094 units) or 3, 5, and 7 (104 unit) start.
[↓]	OFC3	Outdoor (condenser) fan test for fans 4 and 6 (084, 094 units) or fans 2, 4, 6, and 8 (104 unit).
[ENTR]		Verfiy condenser fan nos. 4 and 6 (084, 094 units) or 2, 4, 6, and 8 (104 unit).
[↓]	ULD1	Unloader 1 test.
[ENTR]		Check valve stem with a knife blade or screwdriver to verify the existence of a magnetic field.
[↓]	HEAT REL	Heat relay test
[ENTR]		Verify that gas heat is energized
[3] [TEST]	COMP	Field test of compressors
[↓]	COMP1	Compressor no. 1 test
[ENTR]		Verify compressor contactors are operational Operating time for compressors is limited to 10 seconds during Quick Test.
[↓]	COMP2	Compressor 2 test
[ENTR]		Verify compressor contactors are operational. Operating time for compressors is limited to 10 seconds during Quick Test
[↓]	COMP3	Compressor no. 3 test
[ENTR]		Verify compressor contactors are operational. Operating time for compressors is limited to 10 seconds during Quick Test.
[↓]	COMP4	Compressor no 4 test (104 unit only)
[ENTR]		Verify compressor contactors are operational. Operating time for compressors is limited to 10 seconds during Quick Test.
[4] [TEST]	EXIT TEST	
[ENTR]		Terminate Quick Test

START-UP

1. Prepare the unit for operation per the Installation, Start-Up and Service Instructions included with the base unit.
2. Put the RUN/STANDBY switch in the STANDBY position. Close the control circuit breaker (CCB), which will energize the control circuit and the crankcase heaters. Crankcase heaters must operate for at least 24 hours before actually running either compressor.
3. Normal operation of the controls is indicated by blinking red and green lights on the processor and relay modules. Using the local interface device, verify that no alarms have been detected.
4. To allow easy checkout of initial operation, the controls are pre-set with a 55 F leaving-air set point. Put the unit temporarily in the occupied mode at the keypad by depressing [1], then [SCHD], then [1] then [ENTR] for one hour of operation. Up to 4 hours of occupied mode can be programmed in this manner.
5. To put the unit on line, close all circuit breakers. Put the RUN/STANDBY switch in the RUN position. The unit will then go through a 3-minute initialization process where the economizer actuator motor will drive full open and back to full closed. After the 3-minute period, the supply fan and return fan (if applicable) will start, and the unit will stage up to meet the 55 F leaving-air set point. If the outdoor air is suitable, the unit will try to satisfy the load using the economizer before bringing on any compressors. (Shut down the unit by putting the RUN/STANDBY switch in STANDBY position.)

Operating Sequences

COOLING — When the unit enters the occupied mode, it will go through a 3-minute initialization process, where the economizer dampers drive full open and then full closed. This allows the processor to program the end positions of the dampers so the processor can properly modulate the economizer during cooling.

If the unit does not have heating capability, it will go directly to the cooling mode at the conclusion of the initialization cycle. The supply and return fan will start, and the economizer will move to its minimum position. The controls will compare leaving-air temperature to the leaving-air set point, and if leaving air is above the set point, the unit will commence cooling.

If the outdoor-air enthalpy is suitable (enthalpy switch closed), the controls will drive the economizer open in a series of steps, attempting to meet the load first with outdoor air. The unit will then turn on capacity steps in 6 or 8 stages of compression (depending on unit size) if the outdoor air alone is not sufficient. The rate at which capacity stages are turned on and off depends on the differential between leaving-air actual temperature and set point and the rate of change of leaving-air and return-air temperatures. If the outdoor enthalpy is not suitable, the economizer will remain at minimum position during compressor operation.

HEATING — If the unit has heat, the controls determine if heating or cooling is required at the end of the initialization process. If the return air is warmer than the warmup set point, the unit will enter the cooling mode as described above. If the return air is cooler than the warmup set point, the unit will enter the heating mode and stay there until the set point is satisfied. The heat may cycle on and off during warmup, but once the unit enters the cooling mode it cannot return to heating until the beginning of the next occupied period. The economizer remains closed during heating.

When the first compressor in the lead circuit starts, one condenser fan will start with it. The balance of condenser fans will operate depending on the condenser thermistor temperature. If the temperature at either condenser reaches 113 F for one minute, all fans will cycle on. If the temperature at either condenser drops below 78 F for one minute, fans will start cycling off. This is the same fan control algorithm as with the Flotronic™ controls.

The low-pressure switches are bypassed during the first 2½ minutes of operation of each compressor to assist in low ambient starting situations. However, if a low-pressure switch is open prior to compressor start, the processor will recognize this as a loss-of-charge condition and will not allow the compressor to start. If a low pressure switch opens after the 2½ minute bypass period, it must remain open for 30 seconds in order to be recognized as a fault and cause compressor shutdown.

UNITS WITH POWER EXHAUST — The lead power exhaust motor (PEM1) will be energized when the economizer opens to the point of the power exhaust set point. The scroll modulation damper on the no. 2 power exhaust blower then modulates the exhaust airflow based on building pressure sensed by the differential pressure switch. When the scroll modulation damper is approximately 90% open, the switch on the power exhaust damper motor closes and the second power exhaust blower is energized. When the scroll modulation damper closes to approximately 15% open, the second power exhaust blower is deenergized.

TEMPERATURE RESET — Temperature reset is a useful means for preventing overcooling at light loads, while keeping air circulation at reasonable levels. As the conditioned space temperature drops below a predetermined temperature level, the leaving-air set point is reset upward. The amount of reset is a function of how far the space temperature has dropped below the desired level. The space temperature at which reset begins and the maximum allowed leaving-air reset are both programmed by the user.

Temperature reset requires installation of a field-supplied thermistor (part no. HH79NZ018) in the conditioned space; usually in a location where the thermistor will not trigger reset until the majority of the building is satisfactorily cool. The thermistor connects to terminals 4 and 5 of Terminal Block 3 (TB3) in the unit control box. This thermistor also provides the input for the unoccupied cooling function when that function is enabled.

EXTERNAL TIME CLOCK — When control of the unit occupied/unoccupied modes needs to be accomplished from an external clock, the clock must switch a 24-v signal from terminal 2 to terminal 7 of TB3. When a 24-v signal is sent to terminal 7 of TB3, the unit enters the occupied mode. When the signal is removed, the unit enters the unoccupied mode. This signal will override any unoccupied schedule programmed into the internal clock. However, it cannot override an occupied schedule. If the external clock is intended to be the permanent control, then the internal clock should be disabled. To disable the internal clock, enter the field configuration function and change the ECLK to the OFF setting.

UNOCCUPIED COOLING — Unoccupied cooling provides a means for cooling a space before it exceeds some pre-determined temperature during the unoccupied mode. The unit will enter the occupied mode at 1° F above the space temperature set point and will reenter the unoccupied mode at 1° F below the space temperature set point.

Unoccupied cooling requires installation of a field-supplied thermistor (part no. HH79NZ018) in the conditioned space. Connect the thermistor to terminals 4 and 5 of TB3 in the unit control box. (This same thermistor input is used for the temperature reset function.) The unoccupied

cooling function must be enabled and the set point programmed for any value between 70 F and 100 F. If morning warm-up is enabled, the unoccupied cooling set point should be higher than the morning warm-up set point.

UNOCCUPIED HEATING — Unoccupied heating provides a means for heating a space before it exceeds some pre-determined temperature during the unoccupied mode. The unit will enter the occupied mode at 1° F below space temperature set point and re-enter the unoccupied mode at 1° F above space temperature set point.

Unoccupied heating requires installation of a field-supplied thermistor (part no. HH79NZ018) in the conditioned space. Connect the thermistor to terminals 20 and 21 of J7 (BOT) on the PSIO in the unit control box. The morning warm-up and unoccupied heating functions must be enabled and their set points must be programmed. The set point for unoccupied heating can be any value between 30 F and 70 F, but not higher than 5° F less than the morning warmup set point.

MORNING WARM-UP — If the unit contains heat, a morning warm-up cycle can be programmed. When the morning warm-up is enabled, each time the unit enters the occupied mode, it will check return-air temperature against the warm-up set point. If the return air is cooler than the set point, the unit will go into the heating mode. It may cycle on and off in heating any number of times, but once it enters the cooling mode it cannot return to heating until the next occupied cycle.

DEMAND LIMIT — Two-step demand limit is available to limit the number of stages of cooling allowed at a particular time. This is typically used to reduce electrical utility demand charges at peak power consumption periods of the day.

To utilize demand limit:

1. Determine the maximum percent of cooling stages to be allowed for each step. The first step can be any value from 50 to 100%, and the second step can be any value from zero to 49%.
2. At the keypad, go to the Service, Field Configuration function (see Table 8) and enable the demand limit function.
3. Using the [↓] key, go to the Set, Demand Limit function and enter the 2 percentage limits from Step 1.

NOTE: Field-supplied external switching (demand limiter) is required to activate the demand limit. One switch will close a 24-v circuit between terminals 2 and 3 of TB3 to activate the first step, and another will close a 24-v circuit between terminals 2 and 1 of TB3 to activate the second step. If both circuits are closed at the same time, the second step will take priority.

When connected to the CCN, demand limiting may be accomplished through the loadshed option of the CCN instead of the demand limiter. When the loadshed option issues a redline alert to the controller, first stage demand limit will be used. When the loadshed option issues a shed command to the controller, second stage demand limit will be used.

SERVICE

Control Diagnostic Information — Alarms are a signal that a fault has been detected. The diagnostic routine checks all inputs every 3 seconds, and upon detecting a fault, activates the alarm message and the alarm light. Refer to Table 5 for alarm codes and a brief description of the possible causes.

Codes 51, 52, 55 and 56: Compressor Failure — If the controls are calling for a compressor to run, but the high-pressure switch (HPS) is open, then the compressor will be locked out and the appropriate alarm activated. When the fault has been corrected, the compressor circuit must be reset by putting the unit into STANDBY and then back into RUN.

Codes 59 and 60: Low-Pressure Switch — This fault indicates that the low-pressure switch (LPS) is open. When this happens, the compressors in that circuit are shut down and locked out. The LPS will automatically reset when the circuit pressure rises, but the controls must be reset by going to STANDBY and then back to RUN. When the controls are reset, the alarm message is cancelled and the alarm light deactivates.

To assist in winter start conditions, the LPSs are ignored by the controls during the first 2½ minutes of compressor operation. However, if an LPS is open prior to a compressor starting, this will be recognized as a loss-of-charge condition, and the compressor will be prevented from starting. Also, an LPS that opens after the 2½ minute delay must remain open for 30 seconds before the controls will recognize it as a fault.

Opening of the LPS is usually due to low refrigerant charge, but could be due to other reasons such as low airflow, faulty thermal expansion valve (TXV), or liquid line obstruction.

Codes 71 to 81: Thermistor Failure — All thermistors are routinely checked to verify that their resistance is within normal limits. Any thermistor reading low resistance (or shorted) will cause an alarm, and display 245.0 in the System Temperature portion of the Status function. Any thermistor reading high resistance (or open) will cause an alarm, and display −40.1 or −10.0 in the System Temperature portion of the Status function. All thermistor alarms will clear automatically when the fault is corrected. Refer to Tables 11 and 12 for thermistor resistance.

LEAVING-AIR THERMISTOR FAILURE (71) — When a fault is detected in the leaving-air thermistor, compressors are locked out and the unit capacity stage set to zero. The economizer dampers will go to minimum position and the supply fan (and return fan, if so equipped) will continue to run to provide ventilation.

ENTERING-AIR THERMISTOR FAILURE (72) — When a fault is detected in the entering-air thermistor, the unit will continue to run and attempt to meet the leaving-air set point. However, the ability to respond properly to changing load conditions will be compromised until the fault is corrected.

SATURATED CONDENSER THERMISTOR FAILURE (75 or 76) When a fault is detected in the condenser thermistor, compressors are locked out and the capacity stage is set to zero. The supply fan and return fan (if equipped) will continue to run and the economizer will continue to function.

UNOCCUPIED HEATING THERMISTOR FAILURE (77) — When a fault is detected in this thermistor, the unoccupied heating function will be disabled. The unit will function normally in all other respects.

RESET/UNOCCUPIED COOLING THERMISTOR FAILURE (81) — When a fault is detected in this thermistor, the reset and/or unoccupied cooling function will be disabled. The unit will function normally in all other respects.

Code 83: Economizer Potentiometer Failure — If a fault is detected in the economizer actuator motor potentiometer or associated wiring, the economizer dampers will

close and an alarm will be generated. After correction of the fault, reset the controls by moving the RUN/STANDBY switch to STANDBY and back to RUN.

Processor Module (PSIO), and Relay Modules (DSIO) — The PSIO and DSIO modules all perform continuous diagnostic evaluations of the condition of the hardware. Proper operation of these modules is indicated by LEDs (light emitting diodes) on the front surface of the DSIOs and on the top horizontal surface of the PSIO.

RED LED:

Blinking Continuously at a 3 to 5 second rate indicates proper operation.

Lit Continuously indicates a problem requiring replacement of the module.

Off Continuously indicates the power should be checked. If there is no input power, check fuses. If fuse is bad, check for shorted secondary circuit of transformer or for bad module.

GREEN LED: (On a PSIO, this is the green LED closest to the COMM connectors. The other green LED on the module could be used with external communications.) The green LED should always be blinking when power is on; it indicates that the modules are communicating properly. If a green LED is not blinking, check the red LED. If the red LED is normal, check the module address switches. Refer to Fig. 1A — 2B for location of address switches. The proper addresses are:

PSIO (Processor Module) — 00
DSIO-LV (Low-Voltage Relay Module) — 19
DSIO-HV (High-Voltage Relay Module) — 31

If all modules indicate a communication failure, check the COMM plug on the PSIO module for proper seating. If a good connection is assured and the condition persists, replace the PSIO module.

If only a DSIO module indicates a communication failure, check the COMM plug on that module for proper seating. If a good connection is assured and the condition persists, replace the DSIO module.

Table 11 — Thermistor Resistance vs Temperature Values for Space Temperature Sensor

RESISTANCE (Ohms)	TEMP (F)	RESISTANCE (Ohms)	TEMP (F)	RESISTANCE (Ohms)	TEMP (F)	RESISTANCE (Ohms)	TEMP (F)	RESISTANCE (Ohms)	TEMP (F)
173631	−30	38309	22	10698	74	3603	126	1410	178
168222	−29	37304	23	10459	75	3533	127	1386	179
162998	−28	36329	24	10227	76	3466	128	1363	180
157954	−27	35382	25	10000	77	3400	129	1341	181
153083	−26	34463	26	9779	78	3335	130	1319	182
148378	−25	33571	27	9563	79	3272	131	1297	183
143833	−24	32704	28	9353	80	3210	132	1276	184
139442	−23	31863	29	9148	81	3150	133	1255	185
135200	−22	31046	30	8948	82	3090	134	1234	186
131101	−21	30252	31	8754	83	3033	135	1214	187
127139	−20	29481	32	8563	84	2976	136	1195	188
123310	−19	28732	33	8378	85	2920	137	1175	189
119609	−18	28005	34	8197	86	2866	138	1156	190
116031	−17	27298	35	8021	87	2813	139	1138	191
112571	−16	26611	36	7849	88	2761	140	1119	192
109226	−15	25943	37	7681	89	2710	141	1101	193
105992	−14	25295	38	7517	90	2660	142	1084	194
108863	−13	24664	39	7357	91	2611	143	1066	195
99837	−12	24051	40	7201	92	2564	144	1049	196
96910	−11	23456	41	7049	93	2517	145	1033	197
94078	−10	22877	42	6900	94	2471	146	1017	198
91339	−9	22313	43	6755	95	2426	147	1000	199
88687	−8	21766	44	6613	96	2383	148	985	200
86122	−7	21234	45	6475	97	2340	149	969	201
83638	−6	20716	46	6340	98	2298	150	954	202
81235	−5	20212	47	6209	99	2256	151	939	203
78908	−4	19722	48	6080	100	2216	152	925	204
76655	−3	19246	49	5954	101	2176	153	910	205
74474	−2	18782	50	5832	102	2138	154	896	206
72362	−1	18332	51	5712	103	2100	155	882	207
70317	0	17893	52	5595	104	2063	156	869	208
68336	1	17466	53	5481	105	2026	157	855	209
66417	2	17050	54	5369	106	1991	158	842	210
64558	3	16646	55	5260	107	1956	159	829	211
62757	4	16253	56	5154	108	1922	160	817	212
61012	5	15870	57	5050	109	1888	161	804	213
59321	6	15497	58	4948	110	1855	162	792	214
57682	7	15134	59	4849	111	1823	163	780	215
56094	8	14780	60	4752	112	1791	164	768	216
54555	9	14436	61	4657	113	1760	165	757	217
53062	10	14101	62	4564	114	1730	166	745	218
51616	11	13775	63	4474	115	1700	167	734	219
50213	12	13457	64	4385	116	1671	168	723	220
48853	13	13148	65	4299	117	1643	169	712	221
47534	14	12846	66	4214	118	1615	170	702	222
46255	15	12553	67	4132	119	1587	171	691	223
45014	16	12267	68	4051	120	1560	172	681	224
43810	17	11988	69	3972	121	1534	173	671	225
42643	18	11717	70	3895	122	1508	174	661	226
41510	19	11452	71	3819	123	1483	175	651	227
40411	20	11194	72	3745	124	1458	176	642	228
39344	21	10943	73	3673	125	1434	177	632	229

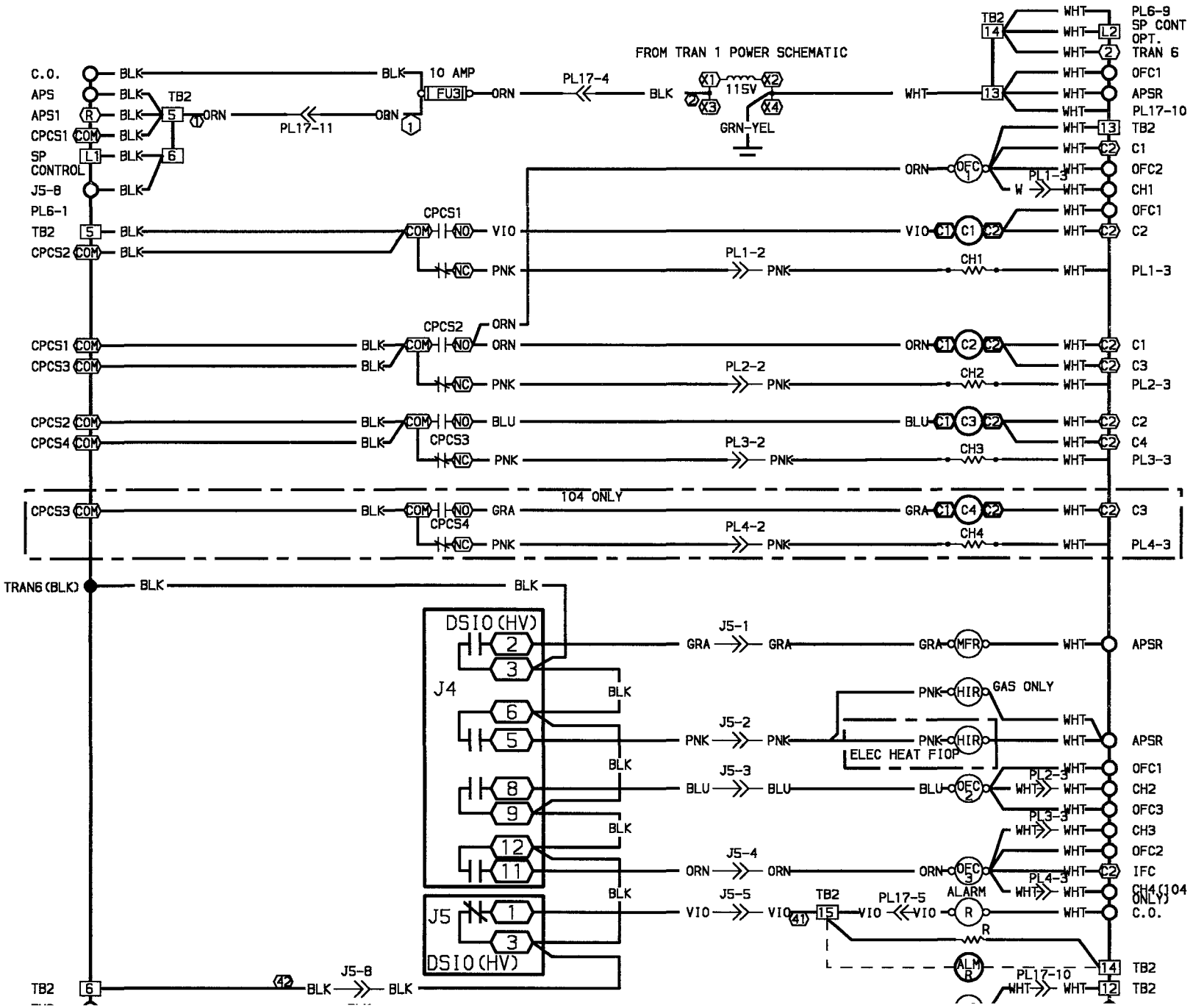
Table 12 — Thermistor Resistance vs Temperature Values All Other Thermistors

RESISTANCE (Ohms)	TEMP (F)	RESISTANCE (Ohms)	TEMP (F)	RESISTANCE (Ohms)	TEMP (F)	RESISTANCE (Ohms)	TEMP (F)	RESISTANCE (Ohms)	TEMP (F)
98010	−25	19392	26	4976	77	1614	128	570	179
94707	−24	18843	27	4855	78	1582	129	560	180
91522	−23	18311	28	4737	79	1550	130	551	181
88449	−22	17796	29	4622	80	1519	131	542	182
85485	−21	17297	30	4511	81	1489	132	533	183
82627	−20	16814	31	4403	82	1459	133	524	184
79871	−19	16346	32	4298	83	1430	134	516	185
77212	−18	15892	33	4195	84	1401	135	508	186
74648	−17	15453	34	4096	85	1373	136	501	187
72175	−16	15027	35	4000	86	1345	137	494	188
69790	−15	14614	36	3906	87	1318	138	487	189
67490	−14	14214	37	3814	88	1291	139	480	190
65272	−13	13833	38	3726	89	1265	140	473	191
63133	−12	13449	39	3640	90	1239	141	467	192
61070	−11	13084	40	3556	91	1214	142	461	193
59081	−10	12730	41	3474	92	1189	143	456	194
57162	−9	12387	42	3395	93	1165	144	450	195
55311	−8	12053	43	3318	94	1141	145	444	196
53526	−7	11730	44	3243	95	1118	146	439	197
51804	−6	11416	45	3170	96	1095	147	434	198
50143	−5	11111	46	3099	97	1072	148	429	199
48541	−4	10816	47	3031	98	1050	149	424	200
46996	−3	10529	48	2964	99	1028	150	419	201
45505	−2	10250	49	2898	100	1007	151	415	202
44066	−1	9979	50	2835	101	986	152	410	203
42678	0	9717	51	2774	102	965	153	405	204
41339	1	9461	52	2713	103	945	154	401	205
40047	2	9213	53	2655	104	925	155	396	206
38800	3	8973	54	2598	105	906	156	391	207
37596	4	8739	55	2542	106	887	157	386	208
36435	5	8511	56	2488	107	868	158	382	209
35313	6	8291	57	2436	108	850	159	377	210
34231	7	8076	58	2385	109	832	160	372	211
33185	8	7868	59	2335	110	815	161	366	212
32176	9	7665	60	2286	111	798	162	361	213
31201	10	7468	61	2238	112	782	163	356	214
30260	11	7277	62	2192	113	765	164	350	215
29351	12	7091	63	2147	114	749	165	344	216
28472	13	6911	64	2103	115	734	166	338	217
27624	14	6735	65	2060	116	719	167	332	218
26804	15	6564	66	2018	117	705	168	325	219
26011	16	6399	67	1977	118	690	169	318	220
25245	17	6237	68	1937	119	677	170	311	221
24505	18	6081	69	1898	120	663	171	304	222
23789	19	5929	70	1860	121	650	172	297	223
23096	20	5781	71	1822	122	638	173	289	224
22427	21	5637	72	1786	123	626	174	282	225
21779	22	5497	73	1750	124	614	175		
21153	23	5361	74	1715	125	602	176		
20547	24	5229	75	1680	126	591	177		
19960	25	5101	76	1647	127	581	178		

TROUBLESHOOTING

SYMPTOMS	CAUSE	REMEDY
Compressor does not run	Power line open	Reset circuit breaker.
	Control circuit breaker open	Check control circuit for ground or short. Reset breaker.
	Safety thermostat tripped	Move RUN/STANDBY switch to STANDBY, then back to RUN
	Tripped power breaker	Check the controls. Find cause of trip and reset breaker.
	Loose terminal connection	Check connections.
	Improperly wired controls	Check wiring and rewire.
	Low line voltage	Check line voltage — determine location of voltage drop and remedy deficiency
	Compressor motor defective	Check motor winding for open or short Replace compressor, if necessary.
	Seized compressor	Replace compressor.
Compressor shuts down on high-pressure control	High-pressure control erratic in action	Replace control switch.
	Compressor discharge valve partially closed	Open valve, or replace if defective.
	Air in system	Purge.
	Condenser fans not running	Check fans, motors and contactors.
	Blocked coil	Remove blockage.
Compressor shuts down on low-pressure control	Low refrigerant charge	Add refrigerant
	Low-pressure control erratic in action	Replace control switch.
	Low evaporator airflow	Clean filters. Check economizer/return damper operation. Check inlet guide vane operation. Check VAV terminals
	No evaporator airflow	Check for broken fan belt. Replace belts
		Check indoor (evaporator) fan circuit breaker (IFCB). If IFCB is tripped, reset.
Unit operates too long or continuously	Low refrigerant charge	Add refrigerant.
	Control contacts fused	Replace control.
	Air in system	Purge.
	Partially plugged or plugged expansion valve or filter drier	Clean or replace
	Defective insulation	Replace or repair.
	Service load	Keep doors and windows closed.
	Inefficient compressor	Check valves, replace if necessary.

SYMPTOMS	CAUSE	REMEDY
System Noises	Piping vibration	Support piping as required.
		Check for loose pipe connectors.
	Expansion valve hissing	Add refrigerant.
		Check for plugged liquid line filter drier.
	Compressor noisy	Check valve plates for valve noise.
		Replace compressor (worn bearings).
		Check for loose compressor hold-down bolts.
Compressor loses oil	Leak in system	Repair leak.
	Mechanical damage (blown piston or broken discharge valve)	Repair damage or replace compressor.
	Oil trapped in line	Check piping for oil traps.
	Crankcase heaters not energized during shutdown	Replace heaters, check wiring and crankcase heater relay contacts.
Hot liquid line	Shortage of refrigerant due to leak	Repair leak and recharge.
Frosted liquid line	Shutoff valve partially closed or restricted	Open valve or remove restriction.
	Restricted filter drier	Remove restriction or replace filter drier.
Compressor will not unload	Burned out coil	Replace coil.
	Defective capacity control valve	Replace valve.
	Miswired solenoid	Rewire correctly.
	Weak, broken or wrong valve body spring	Replace spring
Compressor will not load	Miswired solenoid	Rewire correctly.
	Defective capacity control valve	Replace valve.
	Plugged strainer (high side)	Clean or replace strainer.
	Stuck or damaged unloader piston or piston ring(s)	Clean or replace the necessary parts.


FROM TRAN 1 POWER SCHEMATIC
C.O.
APS
APS1
CPCS1
SP CONTROL
J5-8
PL6-1
TB2
CPCS2
10 AMP
FU3
PL17-4
PL17-11
115V
GRN-YEL
CPCS1
CPCS2
CPCS3
CPCS4
PL1-2
PL2-2
PL3-2
PL4-2
CH1
CH2
CH3
CH4
104 ONLY
TRAN6 (BLK)
DSIO (HV)
J4
J5
J5-1
J5-2
J5-3
J5-4
J5-5
J5-8
PL6-9
SP CONT OPT.
TRAN 6
OFC1
APSR
PL17-10
C1
C2
C3
C4
OFC2
CH1
PL1-3
PL2-3
PL3-3
IFC
CH4(104 ONLY)
C.O.
GAS ONLY
ELEC HEAT FIOP
ALARM
PL17-5
PL17-10
PL2-3
PL3-3
PL4-3

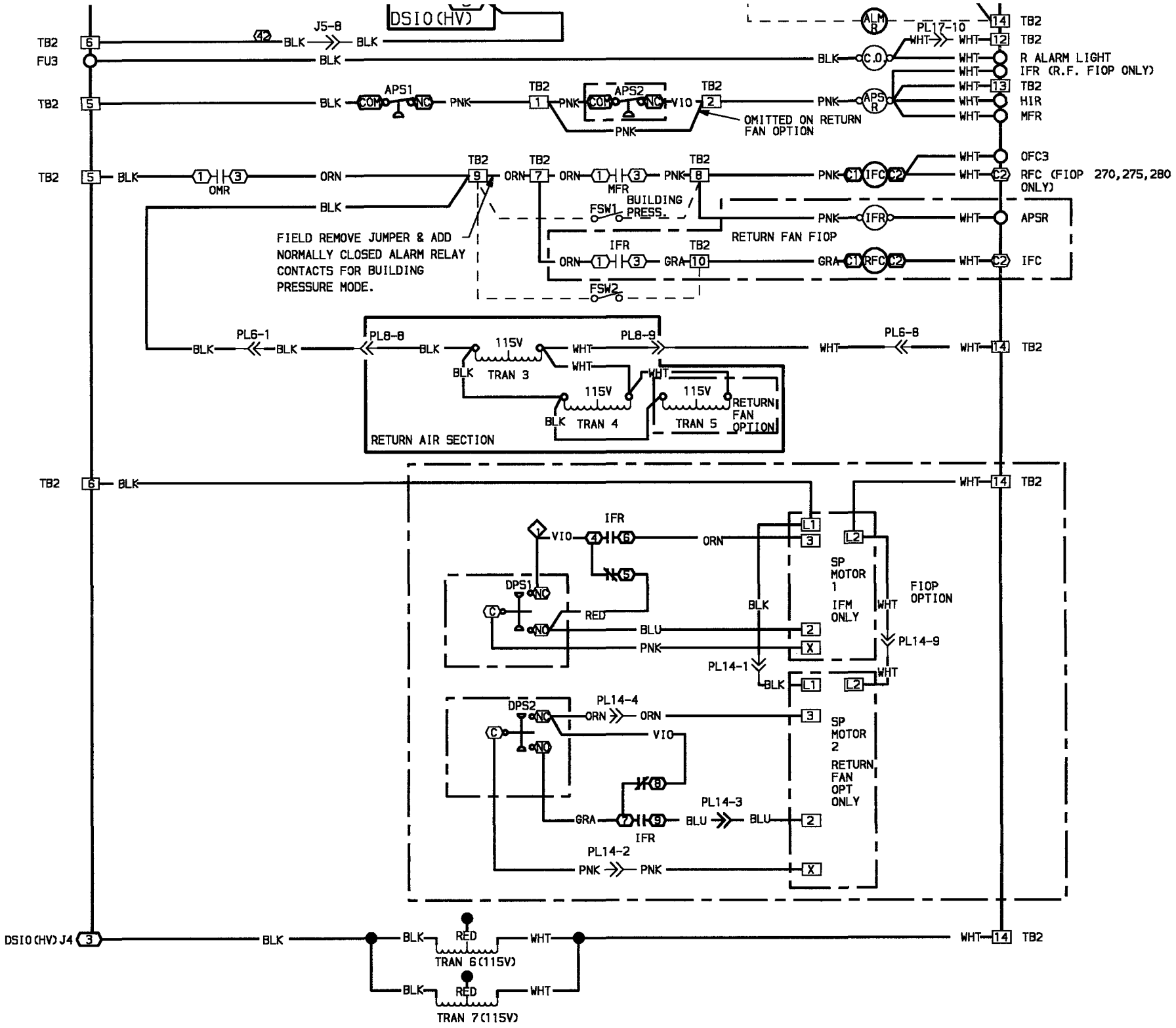
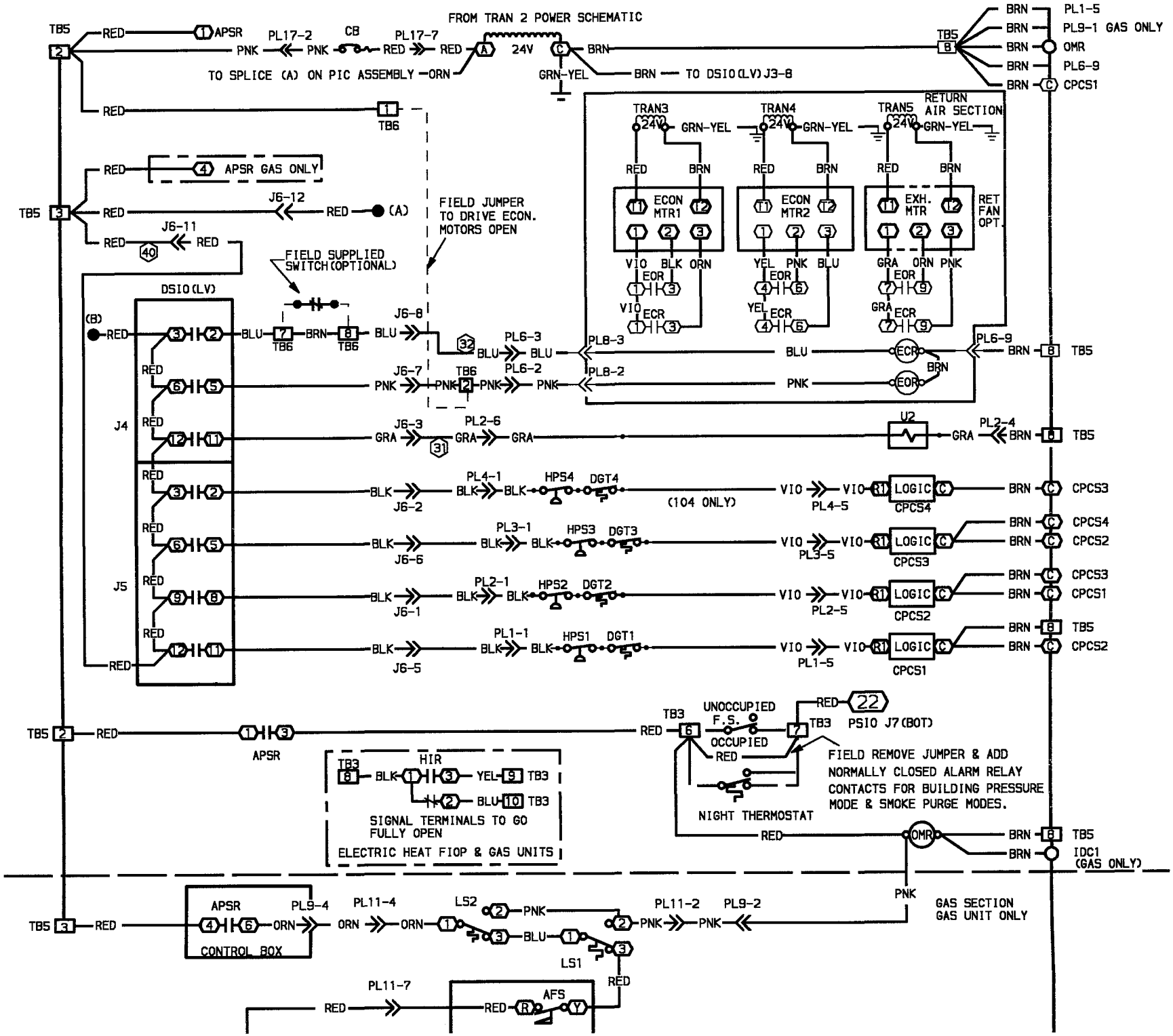


Fig. 6 — 115-v Control Circuit


FROM TRAN 2 POWER SCHEMATIC
TB5
APSR
PL17-2
CB
PL17-7
24V
TO SPLICE (A) ON PIC ASSEMBLY
TO DSIO(LV) J3-8
TB6
APSR GAS ONLY
J6-12
J6-11
FIELD JUMPER TO DRIVE ECON. MOTORS OPEN
FIELD SUPPLIED SWITCH(OPTIONAL)
DSIO(LV)
TRAN3
TRAN4
TRAN5
RETURN AIR SECTION
ECON MTR1
ECON MTR2
EXH. MTR
RET FAN OPT.
ECR
EOR
J6-8
J6-7
J6-3
PL6-3
PL6-2
PL2-6
PL8-3
PL8-2
PL6-9
U2
PL2-4
J4
J5
J6-2
J6-6
J6-1
J6-5
PL4-1
PL3-1
PL2-1
PL1-1
HPS4
HPS3
HPS2
HPS1
DGT4
DGT3
DGT2
DGT1
(104 ONLY)
LOGIC
CPCS4
CPCS3
CPCS2
CPCS1
PL4-5
PL3-5
PL2-5
PL1-5
PS1O J7(BOT)
UNOCCUPIED
OCCUPIED
F.S.
NIGHT THERMOSTAT
FIELD REMOVE JUMPER & ADD NORMALLY CLOSED ALARM RELAY CONTACTS FOR BUILDING PRESSURE MODE & SMOKE PURGE MODES.
HIR
SIGNAL TERMINALS TO GO FULLY OPEN
ELECTRIC HEAT FIOP & GAS UNITS
OMR
IDC1 (GAS ONLY)
PL1-5
PL9-1 GAS ONLY
PL6-9
CPCS1
CONTROL BOX
PL9-4
PL11-4
PL11-2
PL9-2
LS2
LS1
PL11-7
AFS
GAS SECTION GAS UNIT ONLY

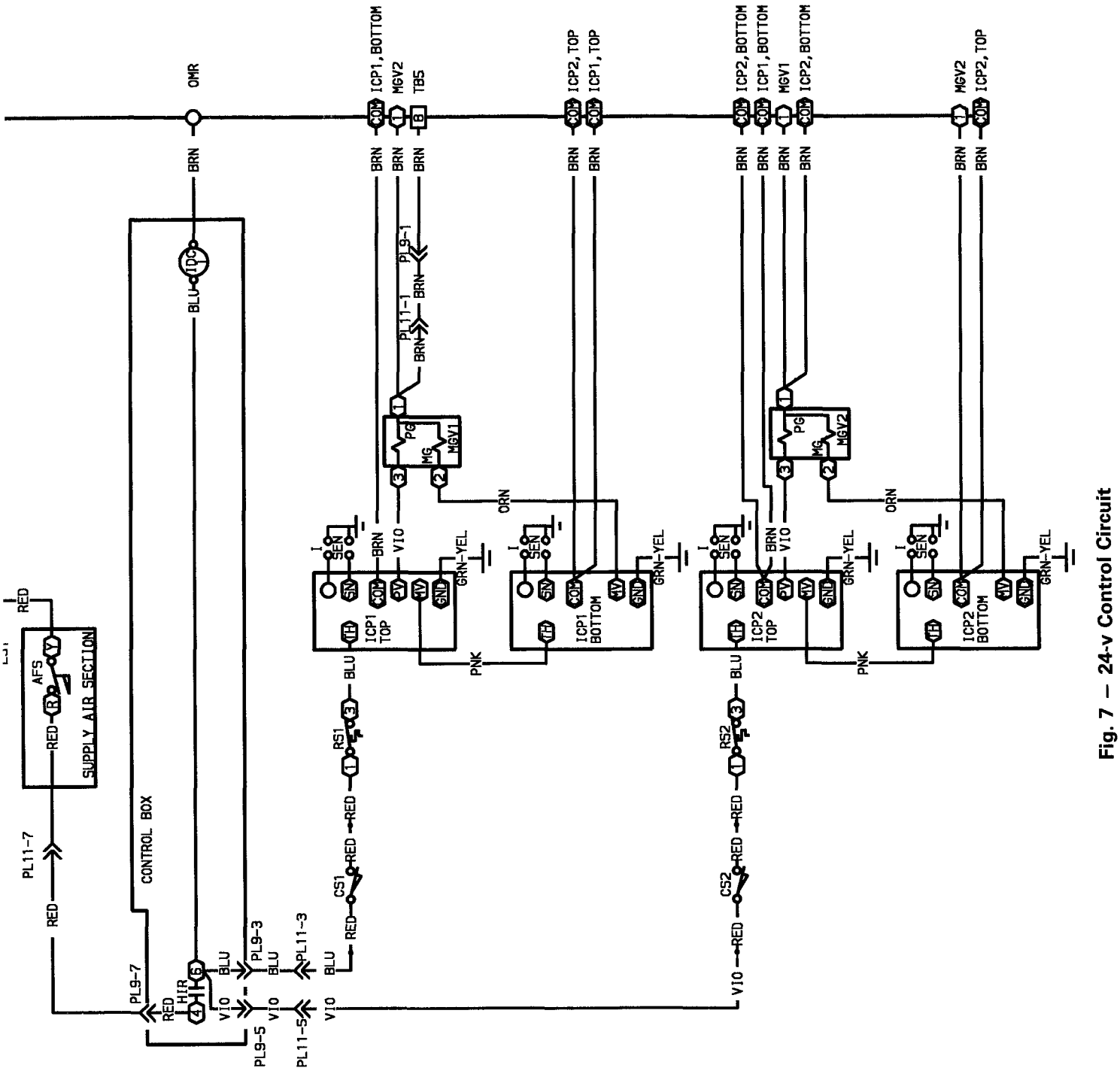
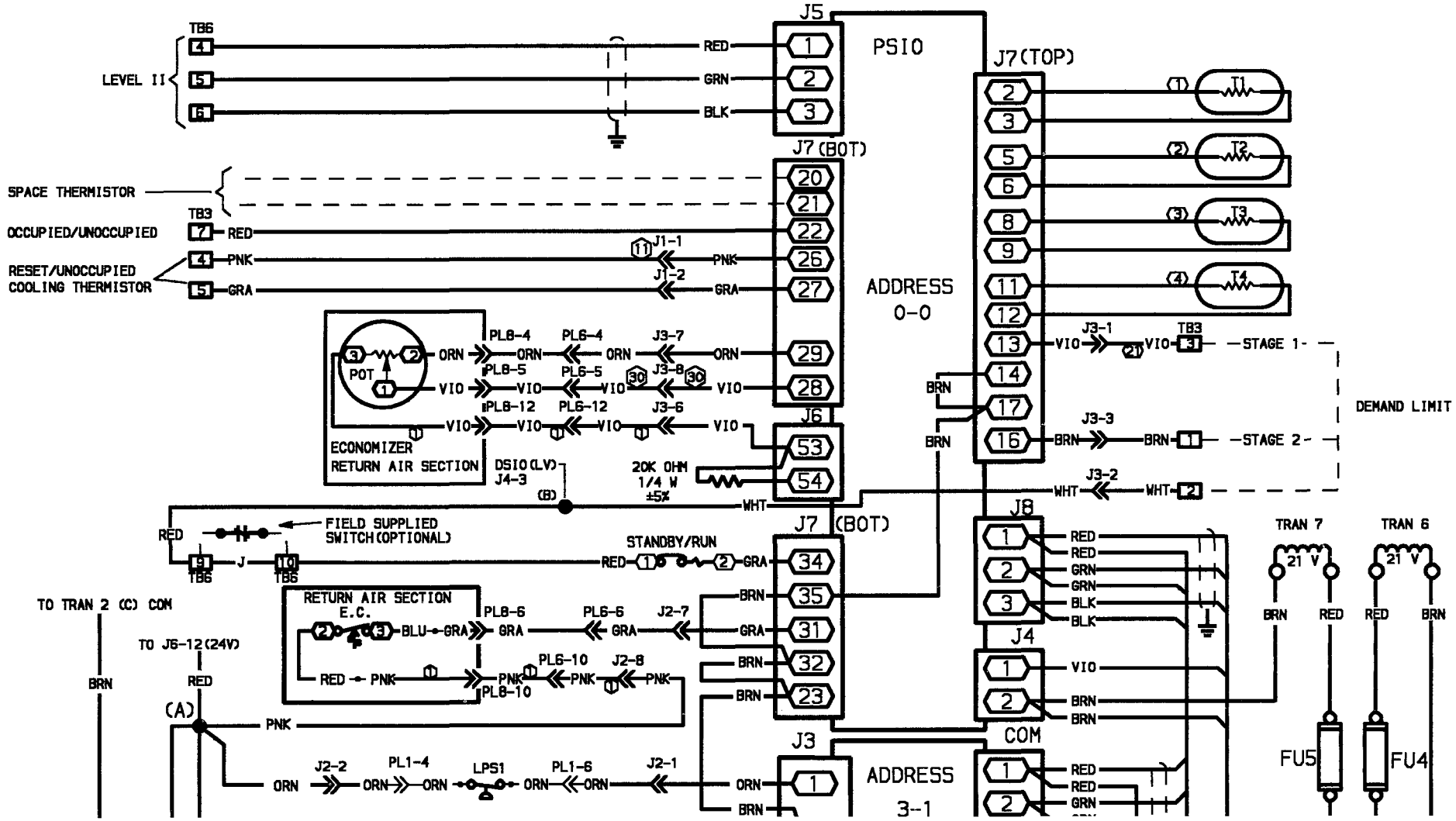


Fig. 7 – 24-v Control Circuit


TB6
LEVEL II
4
5
6
RED
GRN
BLK
J5
1
2
3
PSIO
J7 (TOP)
J7 (BOT)
SPACE THERMISTOR
OCCUPIED/UNOCCUPIED
TB3
7
RED
22
RESET/UNOCCUPIED
COOLING THERMISTOR
4
PNK
26
5
GRA
27
J1-1
J1-2
ADDRESS
0-0
POT
ECONOMIZER
RETURN AIR SECTION
PL8-4
PL6-4
J3-7
ORN
29
PL8-5
PL6-5
J3-8
VIO
28
PL8-12
PL6-12
J3-6
J6
53
54
DSIO (LV)
J4-3
20K OHM
1/4 W
±5%
WHT
J3-1
J3-2
J3-3
STAGE 1
STAGE 2
DEMAND LIMIT
BRN
FIELD SUPPLIED
SWITCH (OPTIONAL)
STANDBY/RUN
J8
J4
COM
TRAN 7
TRAN 6
21 V
FU5
FU4
TO TRAN 2 (C) COM
TO J6-12 (24V)
RETURN AIR SECTION
E.C.
BLU
GRA
PL8-6
PL6-6
J2-7
PL6-10
J2-8
PL8-10
PNK
(A)
(B)
J3
ADDRESS
3-1
J2-2
PL1-4
LPS1
PL1-6
J2-1
34
35
31
32
23

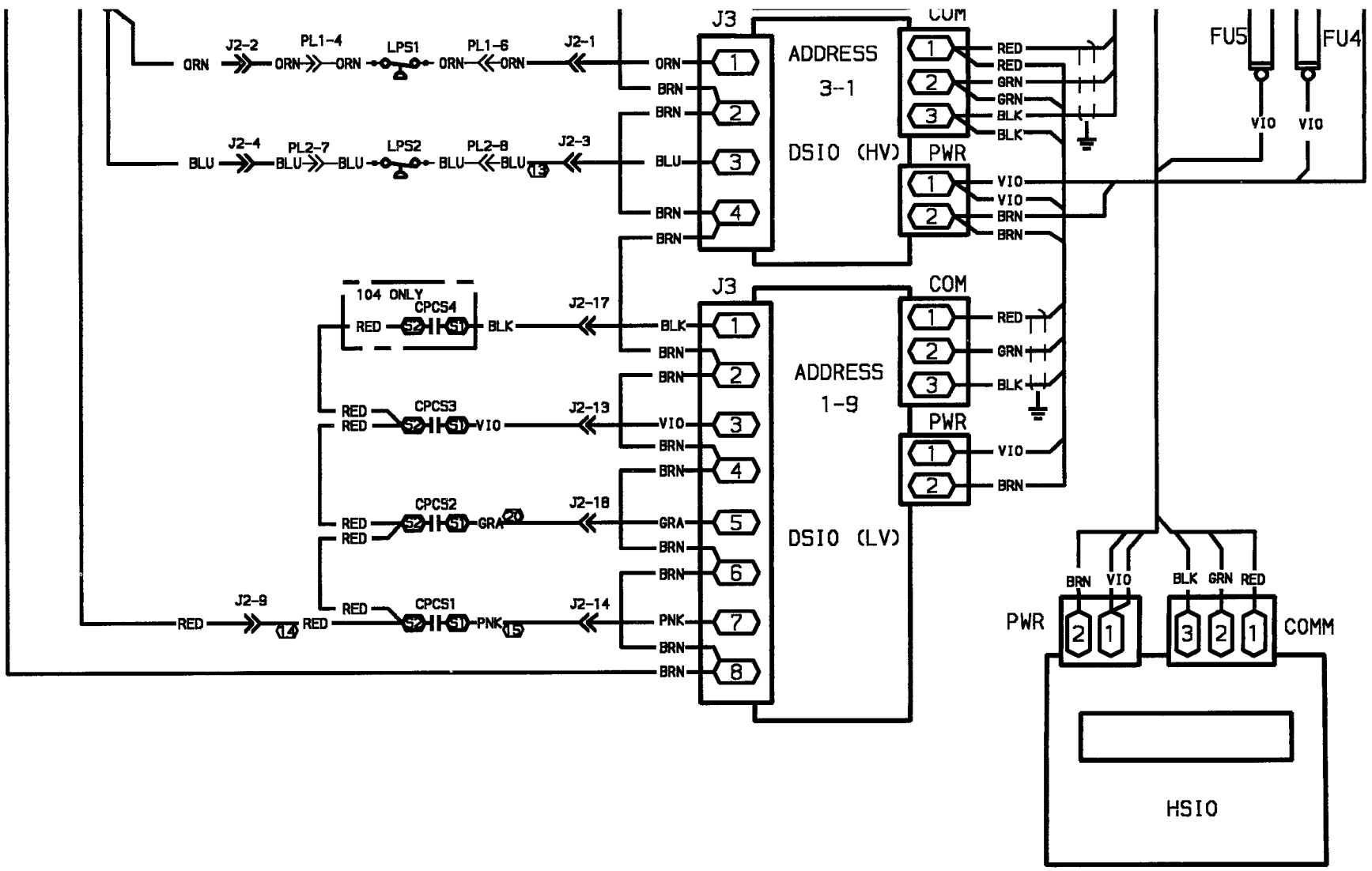


Fig. 8 — 21/24-v PIC Controls Inputs

LEGEND FOR FIG. 6 – 8

AFS	–	Airflow Switch
ALM	–	Alarm
APS	–	Air-Pressure Switch
APSR	–	Air-Pressure Switch Relay
C	–	Compressor Contactor
CB	–	Circuit Breaker
CH	–	Crankcase Heater
CO	–	Convenience Outlet
COM	–	Common
COMM	–	Communication
CPCS	–	Compressor Protection
CS	–	Centrifugal Switch
DGT	–	Discharge-Gas Thermostat
DPS	–	Differential Pressure Switch
DSIO	–	Relay Module
EC	–	Enthalpy Control
ECON	–	Economizer
ECR	–	Economizer Closed Relay
EOR	–	Economizer Open Relay
EXH	–	Exhaust
FIOP	–	Factory-Installed Option
FS	–	Fan Switch
FSW	–	Field-Supplied Switch
FU	–	Fuse
GND	–	Ground
HIR	–	Heat Interlock Relay
HPS	–	High-Pressure Switch
HSIO	–	Keyboard and Display Module
HV	–	High Voltage
I	–	Ignitor
ICP	–	Ignitor Control Pack
IDC	–	Induced-Draft Contactor
IFC	–	Indoor (Evaporator) Fan Contactor
IFM	–	Indoor (Evaporator) Fan Motor
IFR	–	Indoor (Evaporator) Fan Relay
LPS	–	Low-Pressure Switch
LS	–	Limit Switch
LV	–	Low Voltage
MFR	–	Master Fan Relay
MG	–	Main Gas
MGV	–	Main Gas Valve
MTR	–	Motor
MV	–	Main Valve
NC	–	Normally Closed
NO	–	Normally Open
OFC	–	Outdoor (Condenser) Fan Circuit
OMR	–	Occupied Motor Relay
OPT	–	Optional
PG	–	Pilot Gas
PL	–	Plug Assembly
POT	–	Potentiometer
PSIO	–	Processor Module
PV	–	Pilot Valve
PWR	–	Power
R	–	Relay
RET	–	Return-Air
RFC	–	Return-Air Fan Circuit
RS	–	Rollout Switch
SN, SEN	–	Sensor
SP	–	Static Pressure
TB	–	Terminal Block
TH	–	Thermostat
TRAN	–	Transformer
U	–	Compressor Unloader Solenoid


Terminal Marked


Terminal Block Connection

Spliced Unmarked

Factory Wire

Field Control Wiring

Option Wiring

Field Power Wire


To indicate common potential only.
Not to represent wiring