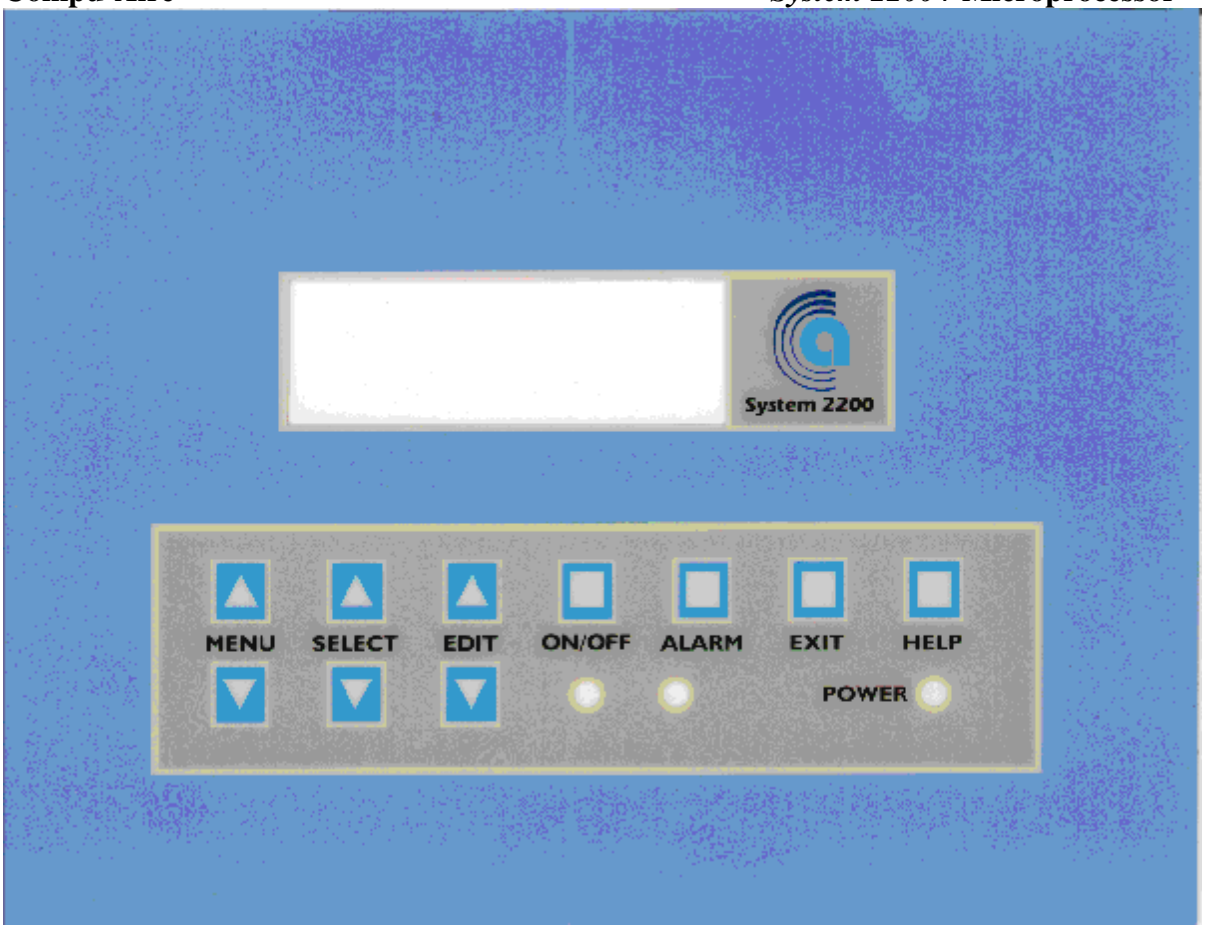


Compu-Aire
System 2200+
Programmable Controller

COMPU-AIRE, Inc. 8167 Byron Road Whittier, CA 90606
Ph: (562) 945-8971 FAX: (562) 696-0724

ABOUT THE SYSTEM 2200+

The ***System 2200+*** is a new programmable controller based on a double microprocessor designed for precise "smart" control of an air handling system. The ***System 2200+*** is made up of a microprocessor-based MAIN BOARD equipped with a set of terminals used to connect the board to the controlled devices (ie: valves, compressors, fans). The program is contained in an Eprom and parameters are permanently stored (even in case of power failure) in a special electronic component called Eprom. The Main Board can be linked to a supervisory/telemaintenance system via serial line through the RS422 standard and communication protocol.

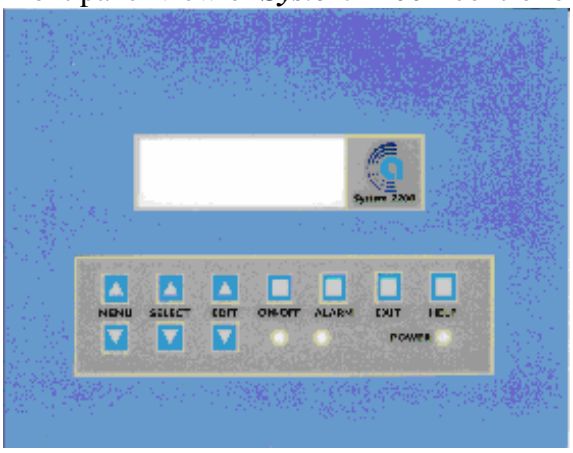
System 2200+ also includes a microprocessor-based TERMINAL unit complete with display, keypad and led indicators allowing you to easily set the main control parameters (set-points, bands, alarm thresholds) and carry out the main working operations (on/off, displaying controlled variables, printouts). Connection between the terminal unit and main board is necessary only when programming ***System 2200+*** basic parameters.

The basic sequence of operation is:
· start the fan on demand for cooling, heating, humidifying or dehumidifying or operate continuously
· sequence the compressors on in stages with programmed delays, to meet demand for cooling
· sequence the heaters on in stages with programmed delays, to meet demand for heating
· activate the humidifier as needed when the humidity falls below the setpoint
· activate dehumidification by means of cooling to reduce the humidity level when it rises above the setpoint. If the temperature falls below the temperature setpoint, heating is brought on at the same time to maintain temperature.
· monitor the sensors, compressors and heaters for failure. On a sensor failure, the applicable systems are disabled. On a compressor failure by low or high pressure, the compressor is locked out and other compressors substituted. On a heater failure the heaters are locked out, but automatically reset.

In addition to the basic sequence of operation, optional features are available:
· a discharge air temperature sensor to prevent overheating or cooling of the air stream
· an outside air temperature sensor for automatic temperature adjustment or economizer action
· a freecooling temperature sensor for water cooled systems
· hot gas bypass either by solenoid or by modulating electronic valve
· redundant system operation of two or more units with automatic crossover and compensation
· networking to a central command computer, or to an existing building automation system

The ***System 2200+*** is truly one of the most powerful and flexible controllers available on HVAC units today.

Front panel view of ***System 2200+*** controller:



The ***System 2200+*** consists of a microprocessor controller board located in the electrical panel of the Compu-aire unit, and the front panel mounted keypad/display microprocessor unit shown at left. In this manual, "controller" means the microprocessor board, "keypad" or "display" refers to the panel mounted unit shown at left.

The keypad/display provides a backlit, supertwist LCD screen having 4 rows of 20 characters. There are also three LEDs to indicate Power, On/Off status, and Alarms (red).

To enter setpoints and other parameters, the ***System 2200+*** has 10 buttons arranged on a touchpad. Six of the buttons are arranged in pairs to permit easy access to the menus or specifric items.

In this manual, individual displays will be referred to as "screens", areas on each screen where you may change values will be referred to as "fields".

Functions of the buttons in COMPU-AIRE standard application programs:

The first set of buttons, labeled MENU, control access to the screens. Pressing the down button takes you to the next screen in the loop. Pressing the up button takes you to the previous screen in the loop. On reaching the last screen in the loop, you will roll over to the beginning of the loop again.

The next set of buttons to the right, labeled SELECT, control access to each line or item of a screen. Pressing the down button takes you to the next line or field in the currently displayed screen. Pressing the up button takes you to the previous line or field in the currently displayed screen. On reaching the last field in the screen, you will roll over to the first field again.

The next set of buttons to the right, labeled EDIT allow you to modify the value of a field on the currently displayed screen. Press the up button to increase the value or to toggle it if it is an on/off type. Press the down button to decrease the value or to toggle it if it is an on/off type. To lock in a value, press any button EXCEPT the EXIT button. Pressing the EXIT button returns the value of the field to the starting point, and takes you to the opening screen in the program.

The ON/OFF button controls unit operation. Pressing this button toggle the unit operation on or off. The LED immediately below the button is lit only when the unit is on.

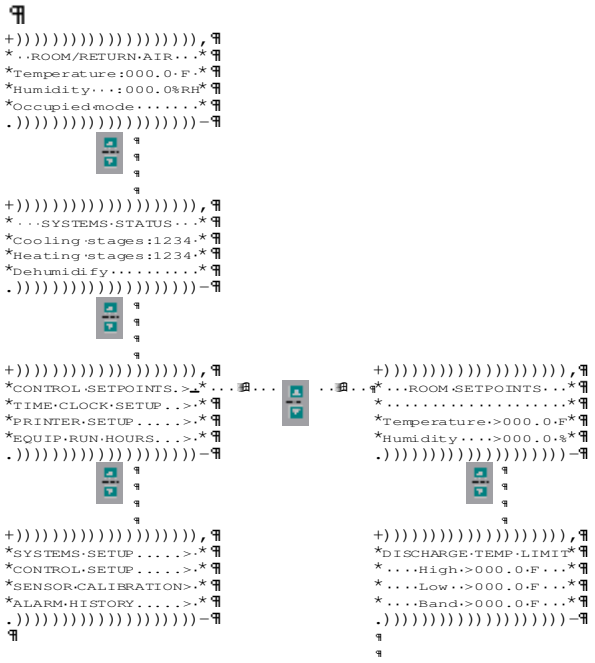
The ALARM button is used to silence the alarm horn and view the alarm screens. When an alarm sounds, the LED directly under the ALARM button will glow red, and an audible horn will sound. The first press of the ALARM button silences the alarm. Each press of the ALARM button then brings up each alarm screen in turn.

The EXIT button is used to exit from a loop of screens and return to the main display screen of the program. Pressing this button also reverses any change to the current field you are in.

The HELP button takes you to helpful screens that instruct you on how to operate this program or on any special features.

The POWER LED will glow amber whenever there is power to the keypad/display unit. This does not necessarily indicate power to the unit or the controller board.

All Compu-Aire programs are arranged in a “tree” format, using loops of screens and menus to access all parts of the program. Example:



OPERATING THE SYSTEM 2200+

Whenever power is first turned on to the ***System 2200+***, the version screen is the first displayed:

```
  U00  COMPU AIRE
    HVAC CONTROLLER

V1.0    DATE:00/00/00
```

This screen shows the version number of the software, and the date it was created. This is the first screen in the first loop of screens.

Pressing MENU down will take you to the next screen in the loop which is the main screen. This is where the EXIT button will always take you as well.

```
U00  ROOM/RETURN AIR
TEMPERATURE: 000.0°F
 HUMIDITY    : 000.0%
   U            MODE
```

This screen displays the current temperature and humidity. The bottom line shows the mode of operation whether “Occupied” or “Standby”.

The following screens will be in the main display loop if the sensors that they display are activated at the factory.

```
U00 OPTIONAL SENSORS
DISCHARGE   : 000.0°F
COIL TEMP   : 000.0°F
```

```
U00 OPTIONAL SENSORS
OUTSIDE TMP: 000.0°F
OUTSIDE HUM: 000.0
```

```
U00 OPTIONAL SENSORS
WATER IN :   000.0
WATER OUT:   000.0
```

Pressing the ON/OFF button toggles the mode status and turns the unit on or off.

VIEWING SYSTEM STATUS

In the main screen loop, there are the following two screens. A quick way to get here is to press EXIT and then MENU down until these screens display.

U00 SYSTEMS STATUS Cooling stages:1234 Heating stages:1234 Dehumidify	 Shows how many stages of cooling are on if any. Shows how many stages of heating are on if any. Indicates humidify or dehumidify modes.

U00 7/01/96 12:30 Mode: MON UNOCC Override mode> OFF Override time>060min	Shows actual day, date and time per the internl clock. Shows clock mode. Toggling this field to ON overrides any night setback. Enter override time in minutes.

SYSTEM CONTROL MENUS

In the main screen loop, as you continue to press MENU down, you will arrive at three menus giving you a variety of choices. To select any choice, press SELECT up or down. When the cursor is at the end of the line showing the area you want, press EDIT up or down and you will then move to that area in the program.

U00 SETPOINTS.....> TIME CLOCK SETUP..> PRINTER SETUP.....> EQUIP RUN HOURS...>	Goes to setpoint screens, and alarm setpoint screens. Goes to time clock setup, night/day setback control. Goes to printer setup, if your ***System 2200*** has this. Goes to screens showing equipment run time hours.

U00 SYSTEMS SETUP.> CONTROL SETUP.....> SENSOR CALIBRATION> ALARM HISTORY.....>	Goes to On/Off and manual control of systems. Goes to Goes to sensor calibration screens. Goes to screens showing the history of the alarms.

U00 ALARM RELAY.....> SUPERVISOR SETUP..> FACTORY SETUP.....>	 Goes to screens to setup alarm 2 relay. Goes to the supervisor program set up. Goes to factory setup, control of all functions, delays, and configurations.

PASSWORDS

Many areas of the program are protected by password. There are three levels of password. Level 1 is for the operator who needs to change setpoints. Level 2 is for maintenance personnel who need access to other areas. Level 3 is reserved for factory personnel and controls all configuration setups.

When you try to enter an area protected by password, you see the following screen:

```
U00
  ENTER
  PASSWORD> 0000
PRESS MENU DOWN
```

Use the EDIT up and down buttons to enter the proper password. The wrong password will show the response at left. The proper password takes you to the screens you want.

ENTERING CONTROL SETPOINTS

From the first menu, select CONTROL SETPOINTS and press the EDIT up or down button. You will then see these screens in order (after the password):

```
U00  ROOM SETPOINTS

Temperature >068.0 F
Humidity    >045.0 %
```

These are the system control setpoints.

```
U00 DISCHARGE LIMIT
    High >120.0 F
    Low  >045.0 F
    Band >005.0 F
```

These are the discharge temperature limit setpoints. These are only used when there is a discharge air temperature sensor installed in you unit. These set-points prevent overheating or cooling of the air.

```
U00   COIL SETPOINTS
 Freeze protection
Setpoint    >034.0 F
Band        >001.0 F
```

If your system has a coil temperature sensor, you may enter the freeze protection setpoints in this screen.

```
U00  ECONOMIZER
  Water temperature
Setpoint    >050.0 F
Hysteresis  >005.0 F
```

If your system has freecooling, enter those setpoints in this screen.

```
U00  ECONOMIZER
  DISCHARGE TEMP
SETPOINT    >000.0¯F
HYSTERESIS  >000.0¯F
```

```
U00 OA SETPOINTS
   AIR ECONOMIZER
 Setpoint    >055.0 F
 Hysteresis  >004.0 F
```

If your system is operating with economizer control, enter the economizer setpoints and hysteresis here.

```
U00   ROOM ALARMS
      TEMP    HUM
HIGH> 000.0¯F 000.0%
LOW > 000.0¯F 000.0%
```

In this screen enter the room temperature and humidity alarm setpoints. If room temperature goes above or below either setpoint, an alarm sounds and the appropriate system (cooling or heating) is shut down.

SETTING THE REAL TIME CLOCK

From the first menu, select TIME CLOCK SETUP and press the EDIT up or down button. If your ***System 2200+*** has a real time clock board installed, you may enter night/day setback modes, and the alarms will also be date/time stamped as to when they occur.

```
U00 REAL TIME CLOCK

SET> 00:00  00/00/00
```

The first screen in the loop allows you to set the real time clock, which is battery backed for 10 years.

```
U00
  ENABLE NIGHT
  SETBACK>OFF
NIGHT MIN ON >000S
```

Set to ON if you wish to use night setback mode. Enter the minimum on time for night setback mode. If OFF, the system will run continuously.

```
U00 NIGHT SETBACK
TEMP>OFF     HUM>OFF
HIGH>000.0¯F >000.0%
LOW >000.0¯F >000.0%
```

Set to ON if you wish night setback to operate Enter the high and low activation points. When the room is within these setpoints, the unit is off.

NOTE: always set your alarm setpoints wider than your night setback setpoints or you will have alarms to deal with every morning.

```
U00 SETBACK  MON>NO
TUE>NO       WED>NO
THU>NO       FRI>NO
SAT>YES      SUN>YES
```

In this screen you select the days of the week when night setback is to be in effect. Any day with NO selected will run continuously for the full 24 hours until the next night setback selected day.

```
U00 OCC    MON>01:30
TUE>13:00  WED>00:00
THU>00:00  FRI>00:00
SAT>00:00  SUN>00:00
```

Enter occupied mode start times for each day of the week (international time). Example, mode starts on Monday at 1:30 a.m. On Tuesday it starts at 1:00 p.m. and on Wednsday through Sunday it starts at midnight.

```
U00 UNOCC  MON>14:00
TUE>00:00  WED>00:00
THU>00:00  FRI>00:00
SAT>00:00  SUN>00:00
```

Enter the unoccupied mode start times.

Example: Monday occupied mode starts at 1:30 a.m. and the unoccupied mode starts at 2:00 p.m.

CONTROLLING THE PRINTER

If your ***System 2200+*** has the optional RS232 printer serial port, you may connect a standard serial printer to this port for data printouts. The printer must be configured for 1200 Baud, 8 bits, No parity, 2 stop bits. See the technical manual for more detail.

From the menus, select PRINTER SETUP and press the EDIT up or down button. You will then see the following screen:

```
 U00 PRINTER   >OFF     Set to ON to activate timed cycle printing.
PRINT CYCLE   >00MIN    Enter the minutes between each printout.
MANUAL PRINT  >OFF      Set to ON for force one manual printout.
PRINT ON ALARM>OFF      Set to ON if you want the printer to print all data
                        every time there is an alarm.
```

MONITORING EQUIPMENT RUN HOURS

From the menus, select EQUIP RUN HOURS and press the EDIT up or down button. You will then see the following screen:

```
U00 FAN       > 00000
RUN HUMIDIFY > 00000
HRS
```

In these screens are displayed the actual run hours for each item in the system.

```
U00 COMP 1    > 00000
RUN COMP 2    > 00000
HRS COMP 3    > 00000
    COMP 4    > 00000
```

```
U00 HEAT 1    > 00000
RUN HEAT 2    > 00000
HRS HEAT 3    > 00000
HEAT 4    >     00000
```

ENABLING SYSTEMS & MANUAL CONTROL

From the menus, select SYSTEMS SETUP and press the EDIT up or down button. You will then see the following screens:

```
U00    COMP 1> ON
       COMP 2> OFF
        UNL 1> AUTO
        UNL 2> AUTO
```

In these screens you may set any component of the ***System 2200+*** to manual ON or OFF or AUTO modes. When set to ON, the component runs continuously. OFF means the component is off permanently. AUTO allows the component to run as needed automatically.

WARNING: It is not wise to leave any component in the ON mode for longer than a manual test.

```
U00    HEAT 1> AUTO
       HEAT 2> AUTO
       HEAT 3> AUTO
       HEAT 4> AUTO
```

```
U00
HUMIDIFIER     > AUTO
DEHUMIDIFY     >OFF
```

If a modulating humidifier is present, you may enter a value for its output to force a manual test.

```
U00 ANALOG OUTPUTS
A1: OFF         >000%
A2: OFF         >000%
```

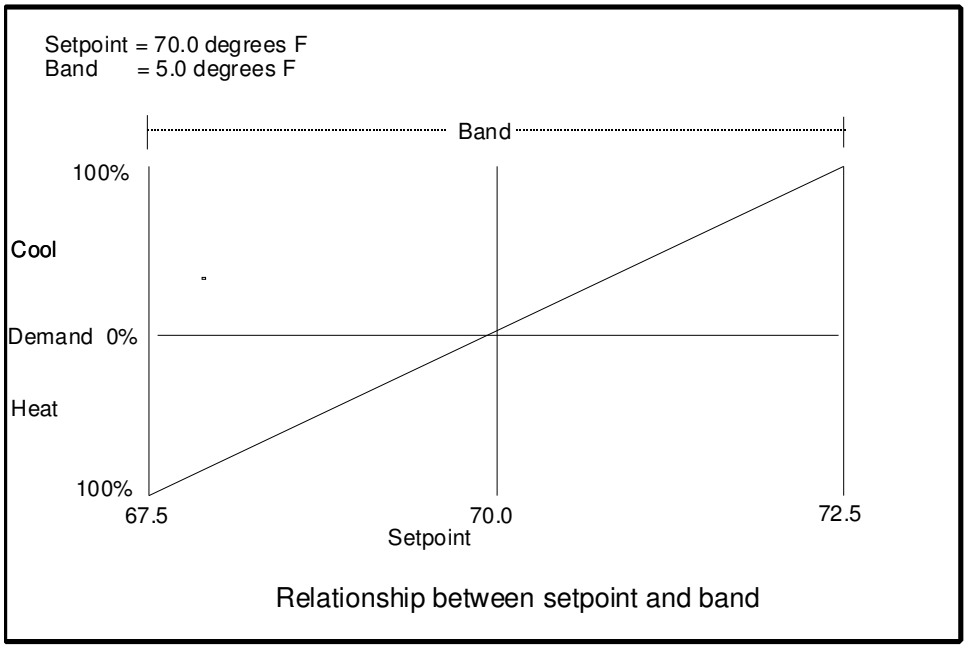
If an analog output is select in configuration, then manual control of the device will appear. Enter the % output desired for manual testing.

SETTING CONTROL BANDS & TYPE OF CONTROL

From the menus, select CONTROL SETUP and press the EDIT up or down button. You will then see the following screens:

```
U00 ROOM  CONTROL
     TYPE INT BAND
TEMP>P    000 00.0°F
HUM >P    000 00.0%
```

Enter control type. When P+I is chosen, you are also asked for the integration time in seconds. Enter the bandwidths for control. The band is split in half so that for example, at 70F, with a band of 5,control is within the range of 67.5 and 72.5. The humidity band should always be twice the band set for temperature.



Relationship between setpoint and band

CALIBRATING SENSORS

From the menus, select SENSOR CALIBRATION and press the EDIT up or down button. You will then see the following screens:

```
U00    SENSOR CAL
ROOM TEMP > 000.0 F
ROOM HUMID> 000.0 %
DISCH TEMP>-002.0 F
```

These screens allow you to enter an offset to any sensor reading, allowing you to calibrate the sensors from the controller.
For example, the discharge air temperature sensor has an offset of -2F. If the incoming reading is 60, it will display and control as 58.

```
U00  SENSOR CAL

OA TEMPERA> 000.0 F
OA HUMIDIT> 000.0 %
```

```
U00  SENSOR CAL
COIL TEMP > 000.0 F
WATER IN  > 000.0 F
WATER OUT > 000.0 F
```

```
U00     X1> 0.0 Vdc
B7 CAL  X2> 0.0 Vdc
        Y1> 000.0
        Y2> 000.0
```

In the user sensors, calibration is more involved. You must range the sensor by selecting its input voltage range x1 to x2 (0-1Vdc or .2-1Vdc for 4-20mA) and then selecting the display range y1 to y2. Usually the factory will enter these values.

```
U00     X1> 0.0 Vdc
B8 CAL  X2> 0.0 Vdc
        Y1> 000.0
        Y2> 000.0
```

VIEWING THE ALARM HISTORY

From the menus, select ALARM HISTORY and press the EDIT up or down button. You will then see the following screens:

```
U00 24 HOUR MIN/MAX
       MIN     MAX
TEMP: 000.0°F 000.0
HUM : 000.0%  000.0%
```

This screen displays the minimum and maximum temperature and humidity of the system.
The values will be reset to actual room values at 1:01 am everyday, if a clock board is installed.

```
U00  ALARM LIST 00

 DATE: 00/00
 TIME: 00:00
```

The alarm list holds the last ten alarms. The time and date is recorded each time an alarm sounds. Use the DOWN menu key to display the active alarms. Use the UP/DOWN edit key to view the ten alarms.

```
U00  ALARM LIST 00
```

One or more of the following screens will be visiable

```
 HIGH TEMP
 HIGH HUM
 AIRFLOW LOSS
```

for each of the ten alarm occurances.

```
U00 ALARM LIST 00
 CONDENSATE AL
 SMOKE AL
 FILTER AL
```

```
U00 ALARM LIST 00
 C1 LO PRES
 C2 LO PRES
```

```
U00 ALARM LIST 00
 HI-LIMIT HEAT
 WATER LOSS
 SENSOR FAILURE
```

```
U00 ALARM LIST 00
 STAND-BY PUMP ON
 DISCHARGE COOL AL
 DISCHARGE HEAT AL
```

```
U00 ALARM LIST 00
 FAN OVER LOAD
 C1 SHORT CYCLE
 C2 SHORT CYCLE
```

```
U00 ALARM LIST 00
 C1 PUMP DOWN FAILED
 C2 PUMP DOWN FAILED
```

SETTING THE REMOTE ALARM RELAYS

The ***System 2200+*** has two relays that may be assigned as remote alarm indicators. The first relay is activated on any alarm that also sounds the horn. To control the second alarm relay, from the menus, select REMOTE ALARM RELAY and press the EDIT up or down button. You will then see the following screens:

```
U00 ALARM RELAY 2
TEMP >OFF AIRFL>OFF
HUM  >OFF SMOKE>OFF
COMPS>OFF EPROM>OFF
```

To activate remote alarm relay #2, set to ON.

```
U00 ALARM RELAY 2
TEMP >OFF AIRFL>OFF
HUM  >OFF SMOKE>OFF
COMPS>OFF EPROM>OFF
```

Set each alarm to ON which you want to activate alarm relay #2 when this alarm occurs.

SETTING USER PASSWORDS

The ***System 2200+*** also allows you to enter two levels of passwords to prevent unauthorized tampering with setpoints and parameters. To reach this control screen, contract factory.

```
   CHANGE PASSWORD
   LEVEL 1>0000
   LEVEL 2>0000
```

Enter the various level passwords and don't forget them.

NOTE: Level 3 password is set at the factory and is generally not handed out.

SETTING UP THE SYSTEM FOR A SUPERVISOR COMPUTER OR MODEM

If your ***System 2200+*** is to be connected to a computer or modem for remote control and supervision, you need to identify each unit on the network by assigning a unit identification number. To reach this control screen, select SUPERVISOR SETUP and press the EDIT up or down button.

```
U00   COMMUNICATIONS

 UNIT IDENT> 01
 BAUD RATE > 1200
```

Enter this unit's identification number (1-32)
Enter the communications BAUD rate (1200 - 9600)
NOTE: All units on one network must have the same BAUD rates.

FACTORY SETUPS & SYSTEM CONFIGURATION

The following screens are reserved for factory personnel and are only accessible under the Level 3 password. They are accessed by selecting FACTORY SETUP from menus and pressing EDIT up or down to select.

The following screens tell ***System 2200+*** which sensors and devices are connected to the system.

```
U00 INSTALLED SENSOR
ROOM TEMPERATURE>NO
ROOM HUMIDITY   >NO
DISCHARGE TEMP  >NO
```

Activate which sensors are connected to the system. Turning off sensors deactivates their control loops and alarms.

```
U00 INSTALLED SENSOR
OUTSIDE AIR TEMP>NO
OUTSIDE AIR HUM >NO
```

```
U00 INSTALLED SENSOR
ANALOG B3 >NO
ANALOG B7 >NO
ANALOG B8 >NO
```

B3 can be selected as “coil” or “water in”.
B7 can be selected as “user 1” or “water in”.
B8 can be selected as “user 2” or “water out”.

```
U00 DIGITAL INPUTS
AIRFL>NO  FILTER>NO
SMOKE>NO  DRAIN >NO
HI HT>NO  WATER >NO
```

Set which digital input devices are connected to the system. Set to YES if the device is present.

```
U00 DIGITAL INPUTS
C1 LP>NO   C1 HP>NO
C2 LP>NO   C2 HP>NO
DI 11>OFF  DI 12>OFF
```

Digital input 11 can be selected as "PUMP" or "FAN".
Digital input 12 can be selected as "OVR" or "FAN"

```
U00 DIGITAL OUTPUTS
DO 5> HEATER 4
```

```
AIR FLOW>OPEN  CLOSE
SMOKE   >OPEN  CLOSE
HI HEAT >OPEN  CLOSE
FILTER  >OPEN  CLOSE
```

```
CONDENS >OPEN  CLOSE
WATER FL>OPEN  CLOSE
C1 LOW P>OPEN  CLOSE
C1 HI P >OPEN  CLOSE
```

```
C2 LOW P>OPEN  CLOSE
C2 HI P >OPEN  CLOSE
DIN 11  >OPEN  CLOSE
DIN 12  >OPEN  CLOSE
```

```
U00 AO1> OFF     DIR
Y1>00.0 Y2>00.0 Vdc
    AO2> OFF     DIR
Y1>00.0 Y2>00.0 Vdc
```

Output 1 can be "HEAT","COOL","ECON","HUM" or "ALARM 2"
The output can be direct or reverse acting and scaled.
Output 2 can be "HEAT","COOL","ECON","HUM" or "ALARM 2"

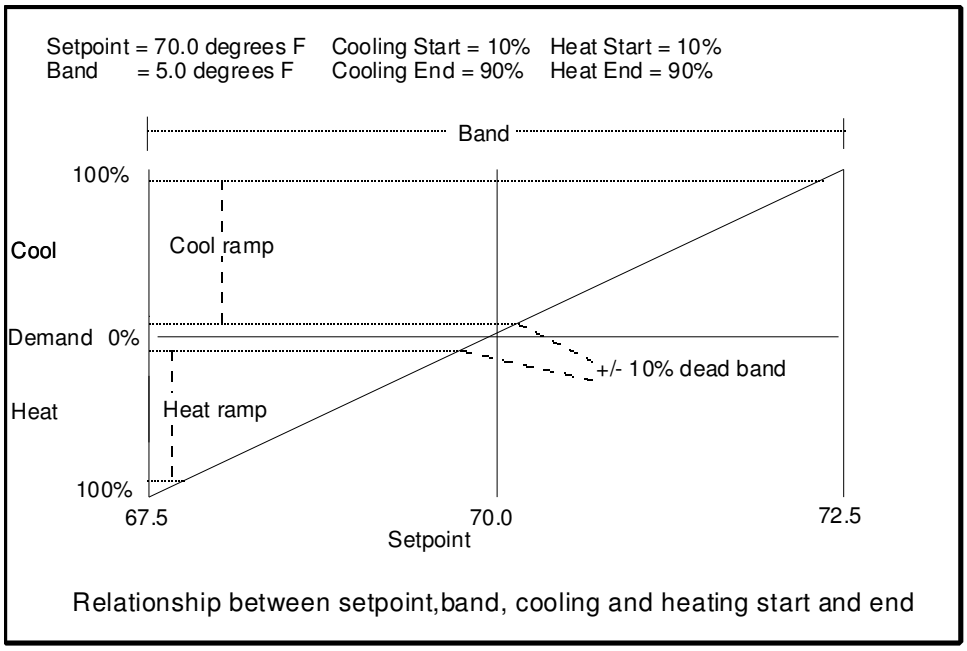
```
U00 START DELAY>000S
FAN OPERATION  >AUTO
FAN MINIMUM ON >030S
FAN MINIMUM OFF>030S
```

Enter the system delay on initial startup.
Set fan to AUTO (demand) or CONTinous operation.
Enter the minimum ON time for the fan.
Enter the minimum OFF time for the fan.

```
U00  CL RAMP ST> 010
COOL RAMP END  > 100
HEAT RAMP START> 010
HEAT RAMP END  > 100
```

Enter the start and end points for the control ramps.
The ramp operates within the band that has been set.
Negative numbers may be entered to skew the ramp in
one direction or another.

```
U00 HUM RAMP ST> 010
   HUMRAMP END > 100
DEHUM RAMP STRT> 010
DEHUM RAMP END > 100
```



Relationship between setpoint,band, cooling and heating start and end

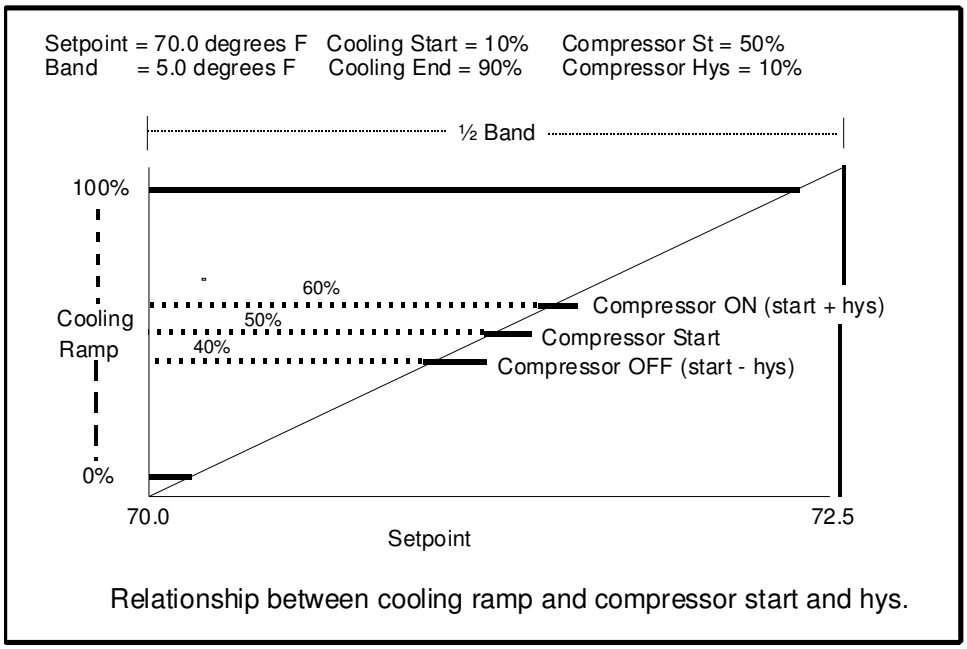
```
U00 DISCHARGE ALARMS
COOL> 00.0°F >000sec
HEAT> 00.0°F >000sec
```

```
U00 COOLING> COMPS
COMPS>0  UNLOADERS>0
VALVE TIME > 000
PUMP DOWN >  OFF
```

Select whether compressors or floating point valve.
Enter the number of compressors in the system.
Enter the number of unloaders per compressor.
Enter the floating point valve stroke time if selected.

```
U00  COOLING STAGES
COOLING HYSTER  >009
COOLING 1 START >010
COOLING 2 START >030
```

Enter the compressor start points and hysteresis.
For example: compressor 1 will start at 19% of the ramp
and shut off when the demand drops to 1% of the ramp.
Compressor 2 starts at 39% an shuts off at 21%



Relationship between cooling ramp and compressor start and hys.

```
U00  COOLING STAGES
C1 UNL STOP >000%
C2 UNL STOP >000%
SHORT CYCLE >000/HR
```

```
U00 COMPRESSOR SETUP
 LP DEL>000  TBC>000
 MIN ON>000  OFF>000
 ROTATE>NO  ECON>OFF
```

Enter the low pressure alarm delay on compressor start.
Enter the minimum ON time for any compressor.
Enter the minimum OFF time for any compressor.

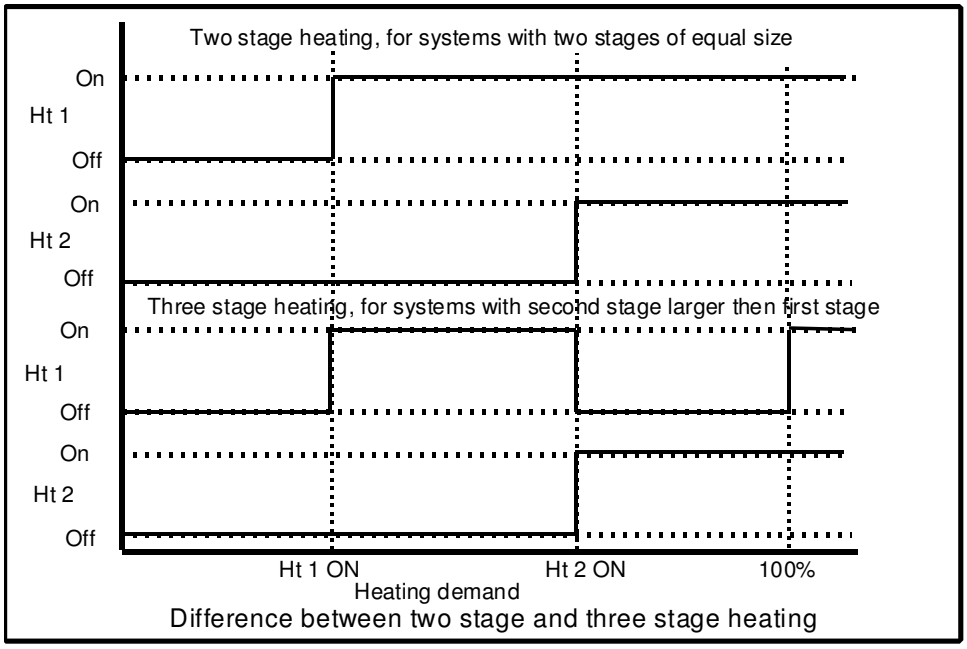
```
U00 HEATING >HEATERS
    NUMBER  >2
```

Select heaters or heating valve for heating method.
Enter the number of heaters in the system

VALVE TIME>120S Enter the heating valve stroke time if selected.

```
U00   HEATER SETUP
STAGE RP>OFF TYPE>2S
STAGE DELAY> 000 sec
MIN ON> 000  OFF>000
```

Set to ON if you have one heater with modulation and other heaters ON/OFF. Enter 2 stage or 3 stage if there are two unequal size heaters. Enter the delay between heater stages.



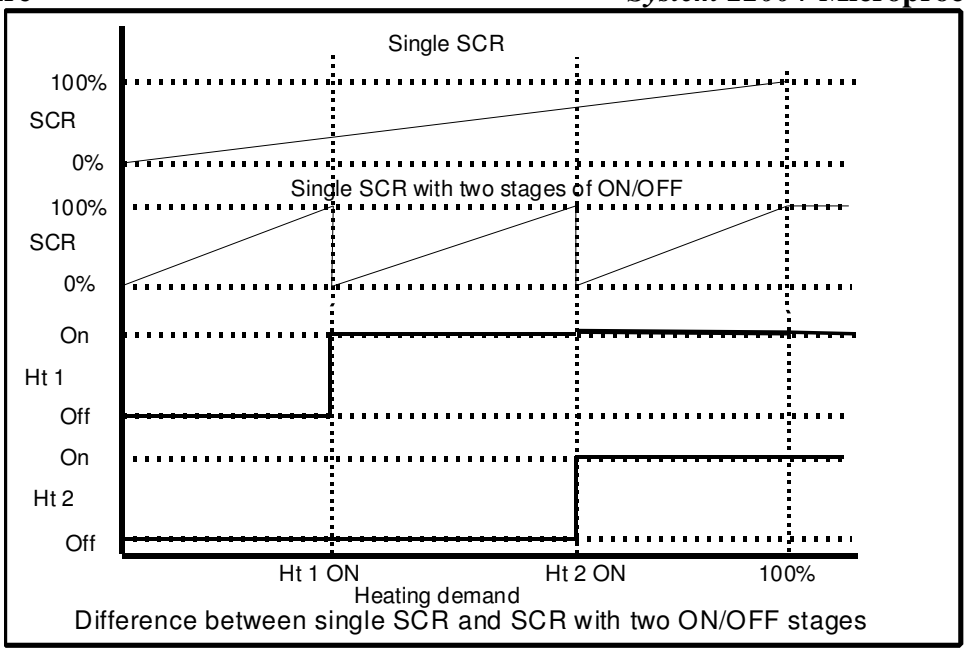
Difference between two stage and three stage heating

```
U00  HEATING STAGES
HEATING HYS    >000%
ST 1>000%  ST 2>000%
ST 3>000%  ST 4>000%
```

Enter the heater start points and hysteresis.

```
U00    HUMIDIFIER
HUMIDIFIER START>000
HUMIDIFIER HYS  >000
DEHUMIDIFY COMP2>OFF
```

Enter the heater start points and hysteresis.



Difference between single SCR and SCR with two ON/OFF stages

```
U00 HUMIDIFIER DRAIN
AUTO DRAIN >OFF
DRAIN CYCLE>0024 HRS
DRAIN TIME >0060 SEC
```

If your unit has an infra-red humidifier, you may set the unit to automatically drain the reservoir.
Set to ON for auto draining.
Enter drain cycle time.
Enter drain duration.

```
U00
DISPLAY>FAHRENHEIT
SHUT DOWN FAN ON
AIRFLOW LOSS> NO
```

Set to FAHRENHEIT or CELCIUS. If you change this setting, you must then reenter all setpoints and bands in the proper unit. Set to YES if you want the fan to shut down on an air flow loss alarm.

```
U00 ASSIST COOL >OFF
    ASSIST HEAT >OFF
    ASSIST HUM  >OFF
    ASSIST DEH  >OFF
```

```
UNIT  U1>OFF U9 >OFF
NET   U3>OFF U11>OFF
WORK  U5>OFF U13>OFF
ROT.  U7>OFF U15>OFF
```

```
  SYSTEM ROTATION
TIME         >000day
STEP ROTATION>OFF
INITIALIZER  >OFF
```

ALARMS

When an alarm occurs in the ***System 2200+,*** the Alarm LED will glow red, and a horn will sound. After a few seconds, the LCD display will begin scrolling through the alarms as well as the normal displays. Pressing the ALARM button will first silence the horn, and then take you to the alarm screens loop.

Pressing the ALARM button again will scroll you through the alarm screens that are active and, after leaving the alarm screens loop, will clear the alarm and reset it. If alarms still exist, the Alarm LED will relight and the horn will sound again.

```
U00   * ALARM *

   EEPROM FAILURE
```

Parameter memory has failed. Since your setpoints have been lost it is best to shut down the unit.

```
U00   * ALARM *
     00:00 00/00
    AIRFLOW LOSS
     SYSTEM OFF
```

Time and date alarm occurred.

System turns off only if selected to do so in the factory setup section.

```
U00   * ALARM *
     00:00 00/00
  HEATER OVERHEAT
     HEATER OFF
```

```
U00   * ALARM *
     00:00 00/00
     SMOKE ALARM
     SYSTEM OFF
```

Smoke alarm always shuts down the system.

```
U00   * ALARM *
     00:00 00/00
  C1 LOW  PRESSURE
  COMPRESSOR OFF
```

With compressor alarms, once they clear, the compressor will come back on line automatically.

```
 U00  * ALARM *
     00:00 00/00
  C1 HIGH  PRESSURE
  COMPRESSOR OFF
```

NOTE: There is a manual high pressure reset on the refrigerant lines.

```
U00   * ALARM *
     00:00 00/00
  C2 LOW   PRESSURE
  COMPRESSOR OFF
```

```
U00   * ALARM *
     00:00 00/00
  C2 HIGH  PRESSURE
  COMPRESSOR OFF
```

```
U00   * ALARM *
  00:00  00/00
  COMPRESSOR 1
  SHORT CYCLE
```

```
U00   * ALARM *
   00:00 00/00
   COMPRESSOR 2
   SHORT CYCLE
```

```
U00   * ALARM *
    00:00 00/00
CONDENSATE OVERFLOW
   CHECK DRAIN
```

```
U00   * ALARM *
    00:00 00/00
 HIGH TEMPERATURE
       ROOM
```

```
U00   * ALARM *
    00:00 00/00
 LOW TEMPERATURE
       ROOM
```

```
U00   * ALARM *
    00:00 00/00
  HIGH HUMIDITY
       ROOM
```

```
U00   * ALARM *
    00:00 00/00
   LOW HUMIDITY
       ROOM
```

```
U00   * ALARM *
ROOM TEMPERATUR:FAIL
ROOM HUMIDITY  :OK
OA TEMPERATURE :OK
```

If a sensor fails, it is indicated as FAIL, otherwise OK indicates the sensor is fine.

```
U00   * ALARM *
FREECOOL TEMPER:OK
DISCH TEMPERATU:OK
ROOM PRESSURE  :OK
```

```
U00   * ALARM *
    00:00  00/00
    FILTER DIRTY
```

```
U00   * ALARM *
   00:00  00/00
   DISCHARGE AIR
   HEATING ALARM
```

```
U00   * ALARM *
  00:00  00/00
  DISCHARGE AIR
  COOLING ALARM
```

```
U00   * ALARM *
    00:00  00/00
FAN MOTOR OVERLOAD
```

```
U00   * ALARM *
    00:00  00/00
 WATER FLOW LOSS
 COMPRESSORS OFF
```

This alarm only operates on water cooled units.

```
U00   * ALARM *
   00:00  00/00
   COMPRESSOR 1
 PUMP DOWN FAILED
```

```
U00   * ALARM *
    00:00  00/00
   COMPRESSOR 2
 PUMP DOWN FAILED
```

```
U00   * ALARM *
WARNING  SYSTEM WILL
SHUT DOWN IN 48HRS
 CONTACT FACTORY
```

```
U00   * ALARM *
WARNING  SYSTEM
HAS BEEN SHUT DOWN
 CONTACT FACTORY
```

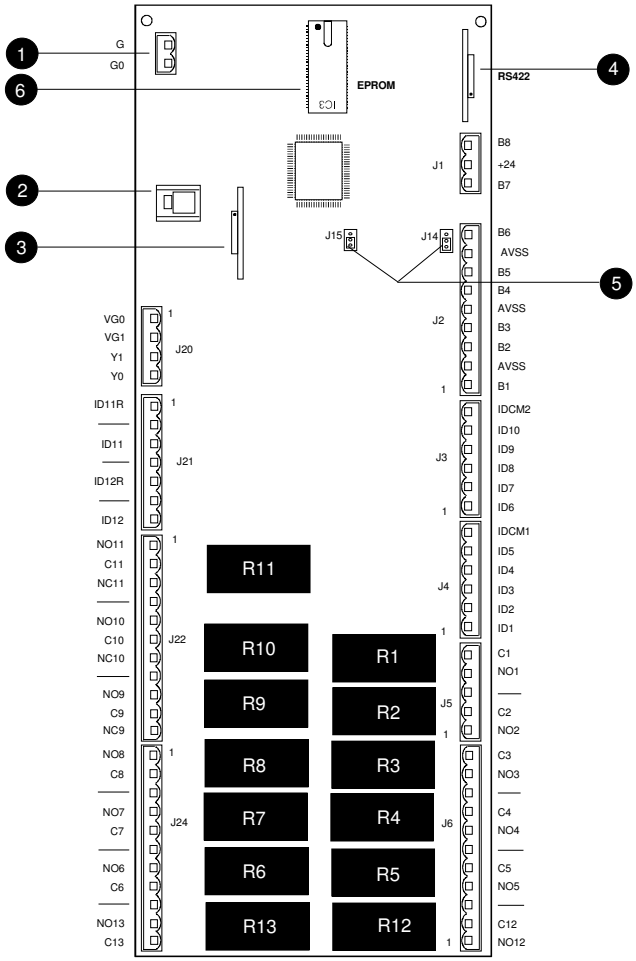
```
U00   * ALARM *
   00:00  00/00
MAIN PUMP FAILURE
STAND BY PUMP ON
```

```
U00   * ALARM *
  NO MORE ALARMS
```

Last alarm screen.

TECHNICAL INFORMATION

SYSTEM 2200+ MAIN BOARD



The ***System 2200*** main board is the core of the unit and will operate stand-alone without the need for the terminal unit. The main board is where all sensors and controlled devices are connected. The main parts are:

1. 24 Vac power input connection
2. RJ-11 phone cord (6 wire) connection to terminal unit and also to pLAN network
3. Optional real time clock plug-in board
4. Optional RS422/485 serial plug-in board for network communications.
5. Jumpers to select 0-1 Vdc or 0-20 mADC active sensor inputs for inputs 5 through 8.
6. Program and BIOS Eprom

Additionally there are 13 - 10 Amp relays to control on/off devices, and two analog outputs (0-10 Vdc). Relays R12 and R13 are strapped to analog outputs 1 & 2 respectively.

MAIN BOARD CONNECTIONS

Connector	Signals	Description	Software Use
J17 - 1	G	Power supply +24 Vac, 50/60 Hz, 15 VA	
J17 - 2	G0	Power supply reference 0Vac	
J19	Terminal	6-wire RJ11 telephone connection for terminal and PlAN network	
J20 - 1	VG0	Power supply to optoinsulated analog output 0 Vac	
J20 - 2	VG1	Power supply to optoinsulated analog output 24 Vac	
J20 - 3	Y0	Analog output 1 (0-10 Vdc)	Heat OR Cool OR humidfier OR Economizer OR remote alarm #2
J20 - 4	Y1	Analog output 2 (0-10 Vdc)	Heat OR Cool OR humidfier OR Economizer OR remote alarm #2
J21 -1	ID11R	Common digital input 11	
J21 - 2		No connection	
J21 - 3	ID11	Digital input 11 (12 to 250 Vac/dc)	Stand-by pump on alarm OR Fan overload
J21 - 4		No connection	
J21 - 5	ID12R	Common digital input 12	
J21 - 6		No connection	
J21 - 7	ID12	Digital input 12 (12 to 250 Vac/dc)	Manual override switch OR Fan overload
J22 - 1	NO-R11	Normally open contact relay no.11	Remote alarm 1
J22 - 2	C-R11	Common relay no.11	
J22 - 3	NC-R11	Normally closed contact relay no.11	
J22 - 4		No connection	
J22 - 5	NO-R10	Normally open contact relay no.10	Compressor 2 unloader
J22 - 6	C10	Common relay no.10	
J22 - 7	NC-R10	Normally closed contact relay no.10	
J22 - 8		No connection	
J22 - 9	NO-R9	Normally open contact relay no.9	Compressor 1 unloader
J22 - 10	C9	Common relay no.9	
J22 - 11	NC-R9	Normally closed contact relay no.9	
J24 - 1	NO-R8	Normally open contact relay no.8	Compressor 2
J24 - 2	C8	Common relay no.8	

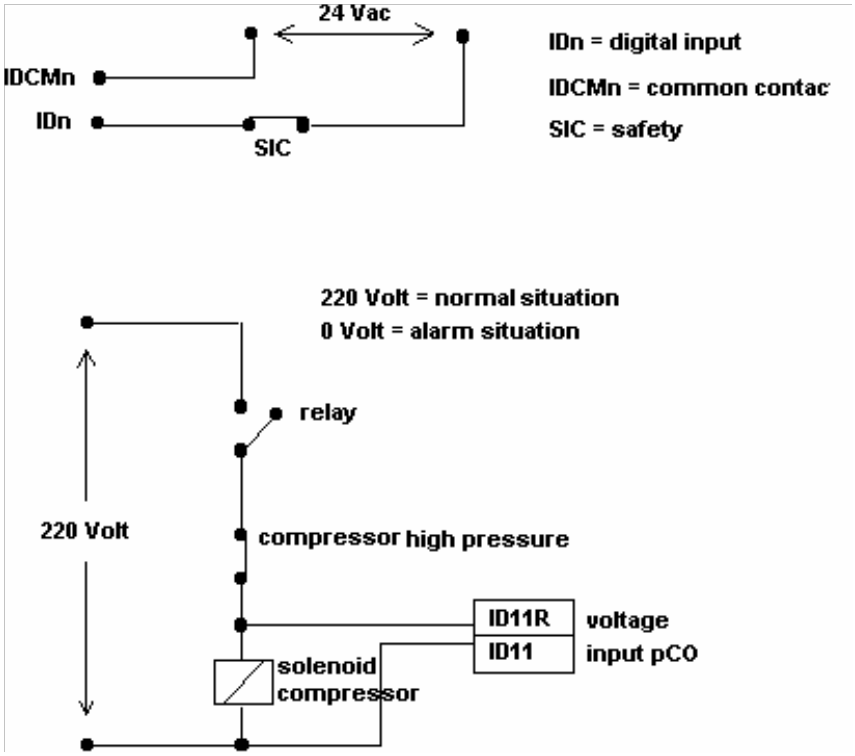
Connector	Signals	Description	Software Use
J24 - 3		No connection	
J24 - 4	NO-R7	Normally open contact relay no.7	Compressor 1
J24 - 5	C7	Common relay no.7	
J24 - 6		No connection	
J24 - 7	NO-R6	Normally open contact relay no.6	Humidifier
J24 - 8	C6	Common relay no.6	
J24 - 9		No connection	
J24 - 10	NO-R13	Normally open contact relay no.13	Same functions as analog output 2
J24 - 11	C13	Common relay no.13	
J6 - 1	NO-R12	Normally open contact relay no.12	Same functions as analog output 1
J6 - 2	C12	Common relay 12	
J6 - 3		No connection	
J6 - 4	NO-R5	Normally open contact relay no.5	Heater 4 or remote alarm relay 2
J6 - 5	C5	Common relay no.5	
J6 - 6		No connection	
J6 - 7	NO-R4	Normally open contact relay no.4	Heater 3
J6 - 8	C4	Common relay no.4	
J6 - 9		No connection	
J6 - 10	NO-R3	Normally open contact relay no.3	Heater 2
J6 - 11	C3	Common relay no.3	
J5 - 1	NO-R2	Normally open contact relay no.2	Heater 1
J5 - 2	C2	Common relay no.2	
J5 - 3		No connection	
J5 - 4	NO-R1	Normally open contact relay no.1	Fan
J5 - 5	C1	Common relay no.1	
J4 - 1	ID1	Digital Input no.1 (12 to 24 Vac/dc)	Airflow loss alarm
J4 - 2	ID2	Digital Input no.2 (12 to 24 Vac/dc)	Smoke detector alarm
J4 - 3	ID3	Digital Input no.3 (12 to 24 Vac/dc)	Heater overheat alarm
J4 - 4	ID4	Digital Input no.4 (12 to 24 Vac/dc)	Dirty filter alarm

Connector	Signals	Description	Software Use
J4 - 5	ID5	Digital Input no.5 (12 to 24 Vac/dc)	Condensate drain alarm
J4 - 6	IDCM1	Common digital inputs ID1-ID5	
J3 - 1	ID6	Digital input no.6 (12 to 24 Vac/dc)	Water flow alarm
J3 - 2	ID7	Digital input no.7 (12 to 24 Vac/dc)	Compressor 1 low pressure alarm
J3 - 3	ID8	Digital input no.8 (12 to 24 Vac/dc)	Compressor 1 high pressure alarm
J3 - 4	ID9	Digital input no.9 (12 to 24 Vac/dc)	Compressor 2 low pressure alarm
J3 - 5	ID10	Digital input no.10 (12 to 24 Vac/dc)	Compressor 2 high pressure alarm
J3 - 6	IDCM2	Common digital inputs ID6-ID10	
J2 - 1	B1	Analog input no.1 (NTC)	Room or return air temperature
J2 - 2	AVSS	Common analog inputs	
J2 - 3	B2	Analog input no.2 (NTC)	Discharge air temperature
J2 - 4	B3	Analog input no.3 (NTC)	Coil temperature OR Water In temperature
J2 - 5	AVSS	Common analog inputs	
J2 - 6	B4	Analog input no 4 (NTC)	Outside air temperature
J2 - 7	B5	Analog input no 5 (0-1 Vdc or 0-20 mADC)	Room or return air humidity
J2 - 8	AVSS	Common analog inputs	
J2 - 9	B6	Analog input no.6 (0-1 Vdc or 0-20 mADC)	Outside air humidity
J1 - 1	B7	Analog input no.7 (0-1 Vdc or 0-20 mADC)	Customer generic sensor input 1 OR Water In temperature
J1 - 2	+24	Power supply to external active sensors 24 Vdc (max. 80 mA)	
J1 - 3	B8	Analog input no.8 (0-1 Vdc or 0-20 mADC)	Customer generic sensor input 2 OR Water Out temperature

Connecting Inputs

DIGITAL INPUTS

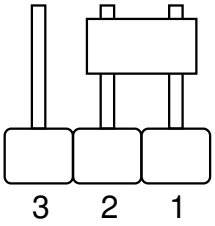
The digital inputs are designed to work with 24 Vac or 24 Vdc. However, when using dc voltage input, the common must come into the actual digital input port, and must also be the same as the connection to the G0 terminal.



ANALOG INPUTS

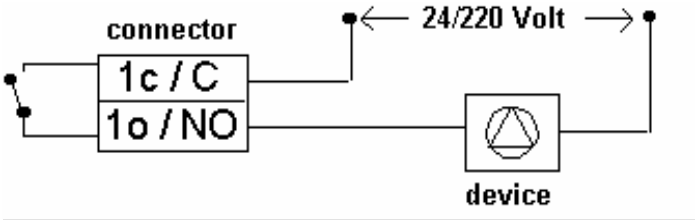
There are eight possible analog inputs. B1 through B4 are reserved as resistance type NTC temperature sensor inputs. The NTC temperature sensors are connected as follows. There is no polarity to the sensors.

B5 through B8 are for active sensor inputs and may be either 0-1 Vdc or 0-20 mADC, jumper selectable through jumpers J14 and J15. The figure to the right shows the jumper position for 4-20 mADC input.



Terminals B5 through B8 are the signal inputs (+), and terminal AVSS is the signal ground, which is also referenced to G0 or the grounded side of the power transformer.

Connecting Outputs

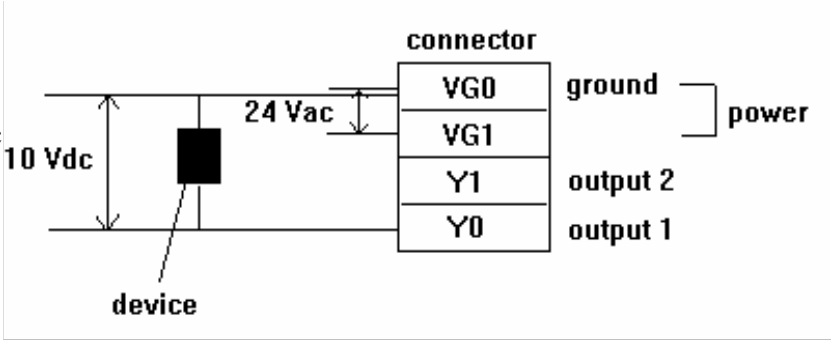


DIGITAL OUTPUTS

The 13 relay outputs are each capable of handling up to 10 Amps at 250 Vac. To power a device connect one side of the power supply to the device, and the other side must then be connected through the relay on the control board as shown.

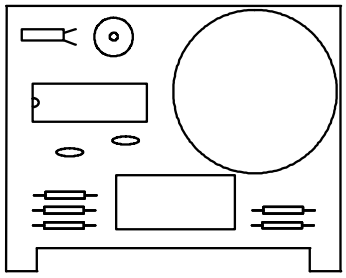
ANALOG OUTPUTS

The analog outputs are 0-10 Vdc modulating. The analog output circuit must be powered by 24 Vac, which may be the same power as for the control board itself.



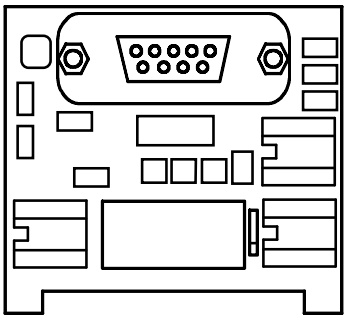
Mounting Optional Boards

REAL TIME CLOCK BOARD



The real time clock board is plugged into the #3 connector in the center of the control board. This board is necessary if date/time operations are to be performed. The clock board is powered by a 10 year Lithium battery. CAUTION: NEVER plug-in or remove the real time clock board when the control board is powered.

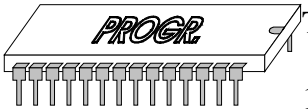
RS422/485 SERIAL NETWORK BOARD



The RS422/485 serial board is used to connect the Supervisor system to a modem or computer. This board is plugged into the #4 connector on the edge of the control board. CAUTION: NEVER plug-in or remove the RS422/485 serial board when the control board is powered.

INSTALLING A NEW PROGRAM EPROM

Installed on the control board is a plug-in EPROM chip that contains the program and BIOS operating system. If your system ever requires software upgrades or modifications, Compu-Aire will provide you with a new EPROM.



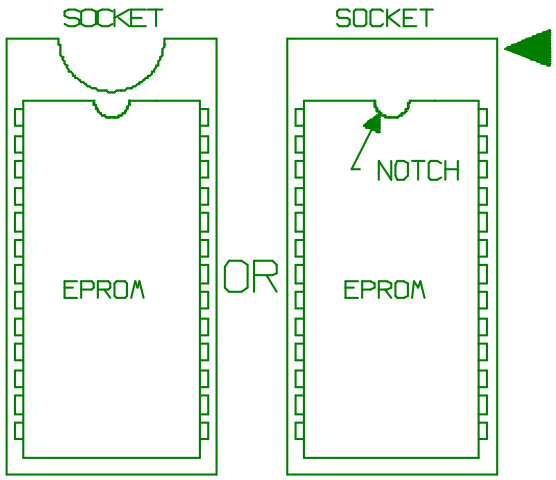
To replace the existing EPROM with the new one, follow these steps:

1. Go through the screens and copy down all the current field settings.

2. Turn off power to the control board (the red LED in the center of the board will go out).

3. Gently pry out the existing chip with a small screwdriver, being careful not to damage the control board or the chip.

4. Insert the new chip into the socket being careful not to bend any of the pins, and make sure you align the notch in the chip with either the notch in the socket, or the white arrow indicator as shown at left.



5. Power on the control board, and wait. The main display screen will appear and the words “WAIT - RESETTING” will appear on the top line. When the program has reset, another screen will appear instructing you to power off the unit again and then repower it. This resets and clears all memory and returns things to factory default settings.

6. Reenter your previously-recorded field settings.

LISTING OF PROGRAMMABLE PARAMETERS

Parameter/Description	Default Setting	Lower/Upper Limits	Unit of Measure
Room temperature set point	72	50/90	°F or °C selectable
Room temperature band	5	0/99	%
Room humidity set point	50	35/85	%RH
Room humidity band	10	0/99	%
Room hi/lo temperature alarm	80/60	50/120	°F or °C selectable
Room hi/lo humidity alarm	65/35	0/100	%RH
Enable night setback	OFF	On/Off	
Night minimum on	300	0-999	seconds
Night setback hi/lo temp	90/55	50/120	°F or °C selectable
Night setback hi/lo humidity	65/35	0/100	%RH
Occupied/unoccupied times	6/18:00	0/24:00/59	Hours/minutes
Temperature control type	Proportional	Prop/Prop + Integral	
Humidity control	Proportional	Prop/Prop + Integral	
Supervisor unit ident	1	1/32	
Supervisor baud rate	1200	300/9600	Baud