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For Direct Expansion Systems Using:

**SMX II**

**SMX Online<sup>NET</sup>**



**DIRECT EXPANSION SYSTEMS**

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**For LP-25**

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# SMX II/SMX Online Net Controls • User Operation

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## **Warning**

This manual contains essential information concerning the operation and maintenance of your SMX Series Control. It is very important that you read and understand the contents of this manual thoroughly before using the equipment, and you should keep it on your boat for future reference. If there are any statements in this manual that you do not understand, contact the Taylor Made Environmental, Inc. Service Department or your local dealer for assistance.

## **Introduction**

This manual covers SMX II and SMX Online Net SMX Series computerized air conditioning controls.

**SMX II.** SMX Series switch assembly with soft-touch membrane keys. Includes all programmable functions. It may be used with the optional SMX Modem.

**SMX Online Net.** Multiple SMX Online Net units may be linked together in a local area network. Each unit has all of the programmable functions as the SMX II. In addition, it has "click-type" keys, two-speed blower control and optional outside temperature sensing. Additional programmable features available with optional convenience panel. It may also be used with the optional SMX Modem.

**(OPTIONAL) SMX Modem.** The SMX Telephone Data Modem is sold as a separate unit and **IS NOT** included in a standard SMX II or SMX Online Net System. If you have purchased an SMX Modem, installation and operation of this product is described in the SMX Modem Control System Operation Manual (L-0896).

Most of the basic operating principles are the same for all SMX Series systems, but there are some differences. For instance, the SMX II only displays inside temperature, while the SMX Online Net has an optional outside thermistor and can therefore also display outside temperature. We have identified those paragraphs applying only to specific systems.

If you need additional help, after reading these instructions, please contact the Taylor Made Environmental service department at 804-746-1313.

# The SMX Keypad

## **SMX II and SMX Online Net**

The SMX keypad is arranged for logical operation. The SMX II and SMX Online Net keypads are very similar, with minor differences as noted below.

### **1. Data Display**

Provides indication of current setpoint, temperatures, programmed values and error messages.

### **SMX Online Net Only**

Provides scrolling readout of IDs for all units. Provides data readouts for remote units.

### **2. Cooling Indicator**

LED to left of data display. Lights when compressor is running in cooling mode.

### **3. Heating Indicator**

LED to right of data display. Lights when compressor is running in heating mode.

### **4. Setpoint Indicator**

LED below data display. Lights when setpoint is displayed. Off when inside or outside temperature is displayed. (SMX Online Net only)

### **5. SET Key**

Press the SET key to display the selected setpoint (the temperature you wish to maintain in the cabin ).

### **SMX II Only**

The SET key also is used to dim the data display readout. Press once to display setpoint. Press again one or two times to dim the display.

### **6. UP-DOWN Keys**

Press UP or DOWN to raise or lower the setpoint.

### **SMX Online Net Only**

UP and DOWN keys are used to scroll through ID numbers of all units in the network.

### **7. TEMP Key**

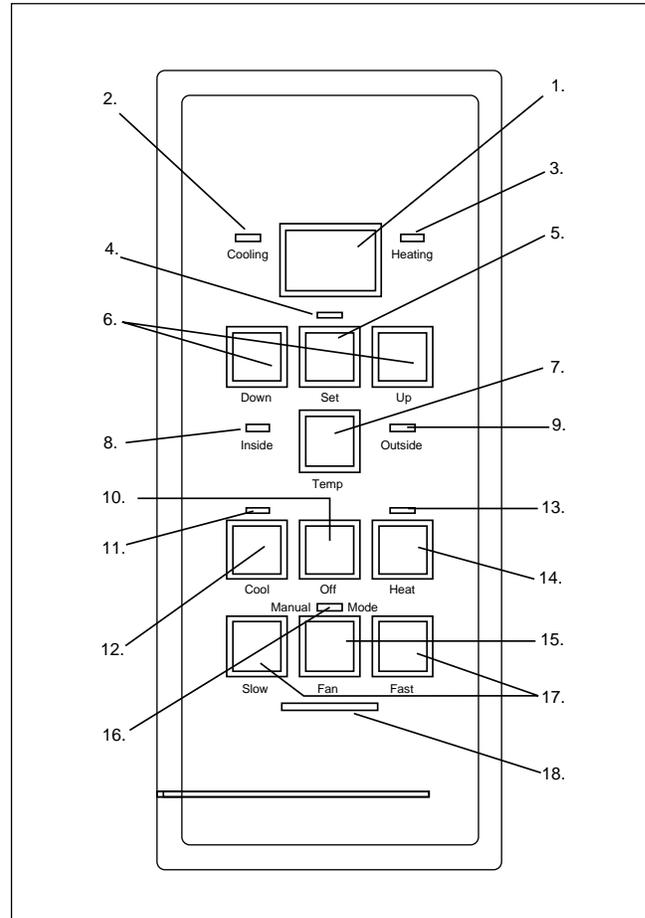
Press once to display inside temperature.

### **SMX II Only**

Press TEMP a second time, and the display will alternate between inside temperature and setpoint. Press it a third time to return to inside temperature only.

### **SMX Online Net Only**

Press TEMP a second time to display outside temperature, if the optional outside thermistor is installed with your system. Press a third time for a rotating display of inside temperature, outside temperature and setpoint. Press a fourth time to return to inside temperature only.



### **8. Inside Temperature Indicator**

#### **SMX Online Net Only**

Small LED to left of TEMP key. Lights when data display is showing inside temperature. This LED is not available on SMX II.

### **9. Outside Temperature Indicator**

#### **SMX Online Net Only**

Small LED to right of TEMP key. Lights when data display is showing outside temperature. This LED is not available on SMX II.

### **Note**

Fahrenheit or Celsius may be chosen.

### **10. OFF Key**

Halts operation of the system. Data display remains on. You can adjust setpoint and activate the manual fan (to circulate air) while the system is in the OFF mode.

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**11. COOL Indicator**

LED above COOL key. Lights when you press the COOL key.

**12. COOL Key**

Turns the system on in the cooling only mode.

**13. HEAT Indicator**

LED above HEAT key. Lights when you press the HEAT key to select the heating mode. For boats equipped with aux heat, the Heat Indicator will flash slowly when the system is operating in the aux heat mode.

**Note**

Press both HEAT and COOL at the same time, and the system will automatically choose between cooling and heating mode. When in the automatic switchover mode, both the COOL and HEAT indicators are lit.

**14. Heat Key**

Turns the system on in heating only mode.

**SMX Online Net Only**

If your boat has auxiliary heating, the HEAT key is also used to select the aux heat mode.

**15. FAN Key**

Controls fan operation. Selects manual or automatic fan speed control. Press once to select manual control. The LED above the key lights. Press FAN again to select automatic fan speed control.

**16. Manual Fan Indicator**

LED above the FAN key. Lights when fan is running in manual mode.

**17. SLOW-FAST Keys**

Control fan speed when the fan is in the manual mode.

**18. Fan Speed Indicators**

Row of five LEDs below FAN key. Indicate the current fan speed.



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# Basic Operation

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## **SMX II and SMX Online Net**

### **Power On**

When AC power is applied to the system at the circuit breaker, the SMX microprocessor retrieves from permanent memory the operating system and the last operating configuration. This process takes about four seconds, after which the system will begin operating just as it had been when power was last turned off.

### **System Off**

Press the OFF key to turn the system off. Note that the data display remains energized even when the system is off. Also, you can turn the fan on and off manually when the system is in the off mode.

### **Note**

The SMX has built-in protection against sudden power interruptions. The system automatically stores the current operating configuration in permanent memory every time you make changes. When AC power is lost, the SMX system retains these settings, and when AC power is restored it resumes operation using the same settings as before.

### **Selecting Setpoint**

Press the SET key. The indicator above the key will light, and the current setpoint will be displayed. Press the UP or DOWN key to change the setpoint.

### **Displaying Temperature**

To display cabin temperature, press the TEMP key.

### **SMX II Only**

Press TEMP a second time for an alternating display of inside temperature and setpoint. Press a third time to return to inside temperature only.

### **SMX Online Net Only**

If your boat is equipped with the optional outside thermistor, press TEMP a second time to display outside temperature. Press a third time for an alternating display of setpoint, inside temperature and outside temperature. Note that the inside and outside indicators show you which temperature is being displayed.

### **Selecting The Cooling Mode**

Press the COOL key. The Cool Indicator above the COOL key will light to show that you have selected the cooling mode.

The Cooling Indicator to the left of the data display will be lit whenever the system is in the cooling mode and the compressor is actually running. When the compressor cycles off, the Cooling Indicator goes off, but the Cool Indicator above the COOL key stays on.

### **Selecting The Heating Mode**

Press the HEAT key. The Heat Indicator above the HEAT key will light to show that you have selected the heating mode.

The Heating Indicator to the right of the data display will be lit whenever the system is in the heating mode and the compressor is actually running. When the compressor cycles off, the Heating Indicator goes off, but the Heat Indicator stays on.

### **Selecting Automatic Changeover**

Press the COOL and HEAT keys simultaneously. The indicators above both buttons will light, to show that the system is in the automatic changeover mode.

Note that the Cooling or Heating Indicator will come on to show whether the system is running in the cooling or heating mode.

### **Operating The Auxiliary Heat Mode**

#### **SMX Online Net Only**

If your boat is equipped with an auxiliary heating system, the aux heat function is normally disabled. This means if you press the HEAT key the system will run in the reverse cycle heating mode without auxiliary heat (aux heat).

*To enable the aux heat function see page 12.*

When aux heat is enabled, press the HEAT key **once** to run Reverse-Cycle heating only. Press the HEAT key **twice quickly** to run aux heat. The Heat Indicator will flash slowly. For automatic changeover, press HEAT and COOL simultaneously.

### **Adjusting Fan Speed Manually**

Press the FAN key to select manual fan control. The Fan Indicator will light to show that it is in the manual mode. Then use the SLOW and FAST keys to select the desired fan speed.

Note that you can use the manual fan control to circulate air even when the system is in the OFF mode.

### **Adjusting Fan Speed Automatically**

Press FAN a second time to select automatic fan control. The Fan Indicator goes off. Now the system will automatically

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adjust fan speed as the actual cabin temperature deviates from the setpoint. As setpoint is approached, the fan speed automatically slows. Once setpoint is reached, the compressor cycles off and the fan keeps running on low speed.

### ***Adjusting Brightness Control***

With the SMX Online Net, the display brightness is adjusted automatically according to cabin lighting conditions.

#### **SMX II Only**

Press the SET key once to display setpoint. Press SET a second time to dim the data display. Press it a third time to dim the display further. Press it again, and it returns to full brightness.

### ***Using The Humidity Control Routine***

When engaged, the SMX humidity control routine automatically turns the air conditioning system on at preselected intervals to remove moisture from the air. The system is programmed at the factory for average values. To change the factory settings, see page 17.

#### **To start the dehumidification program:**

- Press OFF.
- Press COOL, HEAT and FAN keys simultaneously.
- The data display will flash HU, indicating that the program is active.
- To halt the dehumidification program, press any key. The HU message will stop flashing.

### ***Safety Note***

Whenever the SMX system is in the dehumidification mode, all of the system safeguard controls remain active. If the seawater flow fails or if line voltage falls below preset limits, the system will automatically shut down. If AC power is interrupted, the system will automatically resume operation in the dehumidification mode when power is restored.

# Network Operation

## SMX Online Net Only

A network consists of several SMX Online Net units connected in a serial chain as shown below. Each SMX Online Net unit is assigned a controller ID code, which serves as its unique "address" on the network.

You can perform network functions from any SMX Online Net control panel on the network, or from the convenience panel.

A convenience panel is not necessary for network operation. However, the convenience panel offers single-key control over certain functions and allows operation of multiple units with a single keystroke.

## Controller ID Numbers

Normally, ID numbers are assigned when the system is installed, and you will not need to change them. To make it easier, you can use one of the two-letter codes for spaces such as the Main Salon (SL) or Forward Stateroom (FS), or you can use numbers.

### To view or change the controller ID for a specific station:

- Enter the programming mode:  
Press OFF  
Press SET.
- Press DOWN and OFF simultaneously. The null sign (--) will appear in the data display if no ID has been assigned. If an ID has already been assigned to that unit, the current ID selection will be shown.
- Use the UP or DOWN key to scroll through the possible

selections until you see the one that you wish to assign to that station. Note that if you scroll to the end of the list, you will have to reverse direction to get back to the starting point.

- Press OFF to select the controller ID and exit the programming mode.
- Repeat the above steps at each SMX Online unit in the network.

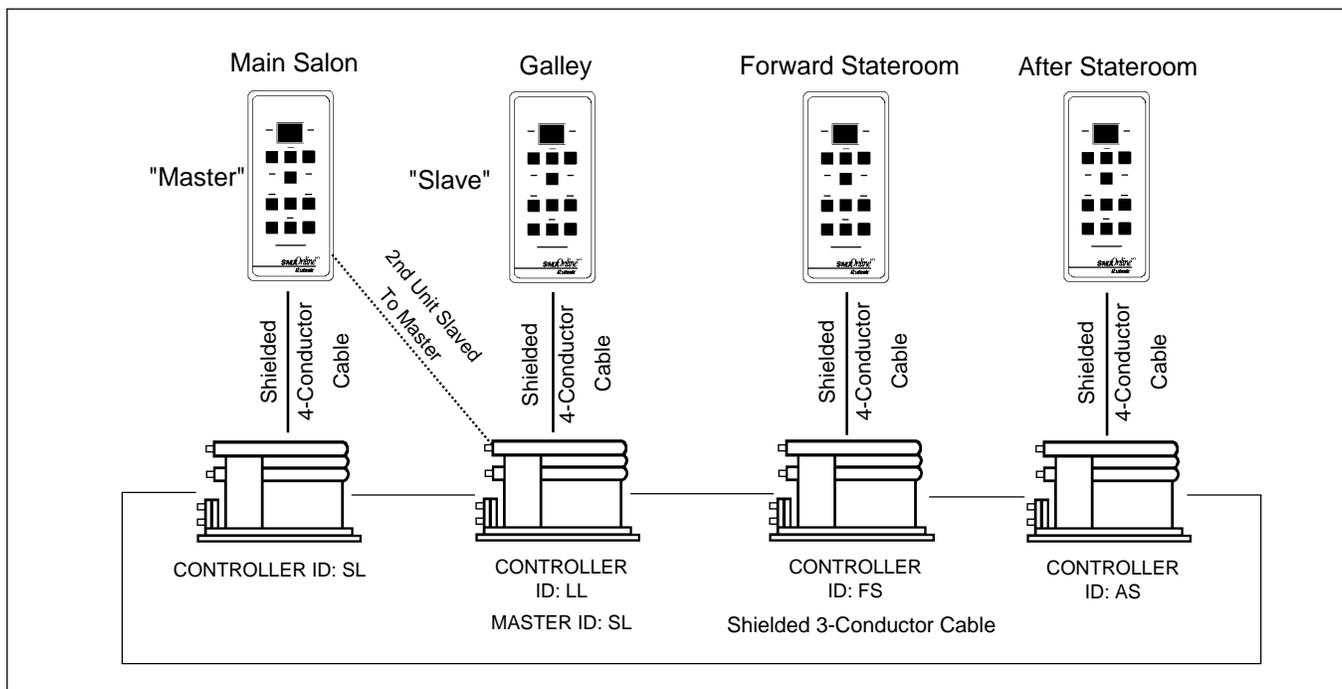
CONTROLLER ID CODES:			
--	Null (no ID assigned)	PS	Port Stateroom
SL	Salon	SS	Starboard Stateroom
LL	Galley	S1	Stateroom #1
Fb	Flying Bridge	S2	Stateroom #2
PH	Pilot House	S3	Stateroom #3
FS	Forward Stateroom	12-28	Additional cabins
AS	After Stateroom		

### Note

Make sure you keep a written record of all ID numbers. A convenient form is provided in the back of this manual. We suggest that you make a copy of this list and store it separately in case the manual is misplaced.

### Note

In order for the network to function properly, every unit must have a unique ID. If two of the units are programmed with the same controller ID, you will have to change one of them.



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## **Remote Control**

The SMX Online Network permits you to take control over remote SMX Online Net units from any SMX Online Net unit or from the Convenience Panel. In the remote control mode, you can perform the following functions for the remote unit:

- change setpoint
- view cabin or outside temperature
- turn the unit off
- select cool or heat mode or automatic changeover
- control fan speed
- enter or exit the auto dehumidification mode
- enter and change program settings

## **Remote Control From Convenience Panel**

To take control of a remote system from the convenience panel:

- Press the SCROLL ▲ or SCROLL ▼ key to display the Controller ID of the unit you wish to control.
- Press REMOTE. A flashing decimal will appear in the center of the data display of the SMX Online keypad to indicate that you are in the remote control mode.

Change the settings for the remote unit as desired, using the SMX Online control panel

- Press LOCAL to exit the remote control mode.

## **Remote Control From SMX Online Net Control Panel**

To take control of a remote system from the SMX Online Net control panel:

- Press SLOW, FAST and FAN simultaneously.
- Press the UP or DOWN key to scroll through controller IDs until the one you want appears in the data display. Press SLOW, FAST and FAN again simultaneously. A flashing decimal will appear in the center of the data display to indicate that you are in the remote control mode.
- Change the settings for the remote unit as desired. (see Basic SMX Operation).
- Press COOL, OFF and HEAT simultaneously to exit the remote control mode.

## **Locking And Unlocking**

Using the Convenience Panel, you can lock out all SMX Online Net systems that are currently in the OFF mode. When a unit is locked out, its keypad is disabled. Pressing any key will cause the data display to show the code LC. Turn the desired system(s) off by going to each location and pressing the OFF key, or by turning them off remotely.

Press LOCK. The indicator above the LOCK key will light. Press OFF and RESUME to unlock the systems. The LOCK indicator will go out.

## **Note**

Whenever you select the Day, Night, Resume or Absent mode, the data display will go through a brief program loading sequence, and the system will begin operating in the selected mode.

## **Selecting The Daytime Configuration**

Using the Convenience Panel, press DAY to instruct all systems in the network to operate in the preprogrammed daytime mode. The day indicator will light.

## **Selecting The Nighttime Configuration**

Using the Convenience Panel, press NIGHT to instruct all systems in the network to operate in the preprogrammed nighttime mode. The night indicator will light.

## **Selecting The Absent Configuration**

Press ABSENT on the Convenience Panel.

All systems in the network will revert to the preprogrammed absent mode. When you return, press RESUME, and the system will start operating in the configuration it was in when you pressed ABSENT. The RESUME Indicator will light. Alternatively, press DAY or NIGHT to operate in the daytime or nighttime mode.

## **Turning All Systems Off**

Press OFF on the Convenience Panel to turn all systems in the network off. The indicator above the OFF key will light. Press RESUME, DAY, NIGHT or ABSENT to resume operation.

## **Note**

When you have multiple air conditioning systems on board, it's a good idea to program them with different compressor restart delays. This will avoid overloading your electrical system by preventing the compressors from cycling on simultaneously at power-up.

With SMX Online Net systems, the compressor restart delays are automatically set at 4 second intervals, and it is not normally necessary for you to program this function.

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# Programming The SMX II and SMX Online Net

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SMX control systems are programmed at the factory for average values. For optimum performance, you may wish to change these settings to suit your individual preferences.

## **Factory Memory Reset**

You can use the memory reset sequence to restore all programmed functions to the factory settings. To do this:

### **To restore programmed functions to factory setting:**

- Press OFF, SET and FAN simultaneously.
- Press SET.
- After a delay, the memory will be reset from stored values. After another delay, the display will come back on normally.

## **Fahrenheit/Celsius Display**

(Factory Set: Degrees Fahrenheit)

You can choose to view temperature in degrees Fahrenheit or Celsius.

### **To select Fahrenheit or Celsius:**

- Enter the programming mode:  
Press OFF.  
Press SET.
- Press DOWN, TEMP and UP simultaneously.
- Use the UP or DOWN key to select F for Fahrenheit or C for Celsius.
- Press OFF to exit programming mode.

Note that changing from Fahrenheit to Celsius will affect the compressor control differential and fan response differential, since these settings will now be expressed in degrees Celsius. You should reprogram these values.

## **Compressor Restart Time Delay**

(Factory Set: 0)

This function is used when you have more than one air conditioning compressor on board. You can program your SMX with different restart time delays for each compressor to avoid electrical overloads by restarting them one at a time at startup.

### **SMX II**

(Before 8-1-98)

You can select eight time delay values, from 0 to 70 seconds, in 10 second increments. Thus, if you have three systems, set one for 0, the second for 10 and the third for 20 seconds.

### **All SMX Models**

(After 8-1-98)

You can select time delays in increments of 1 second.

**To program time delay, go to each SMX switch, and**

### **follow these steps:**

- Enter the programming mode:  
Press OFF.  
Press SET.
- Press DOWN, SET and UP simultaneously. The delay in seconds will be displayed.
- Use the UP or DOWN keys to change the time to the desired setting.
- Press OFF to exit the programming mode.

At initial power-up, you will see the countdown for each compressor on the data display, if you are in the TEMP mode. The countdown will not appear in the SET mode.

### **SMX Online Net only.**

Compressor restart delays are automatically set with 4 second intervals when a cabin is given an ID number, You can reset restart delays in increments of 1 second.

## **Compressor Restart Differential**

(Factory set: 1.5 degrees Fahrenheit)

The compressor response differential is the amount of temperature change in the room needed for the compressor to cycle on and off. The factory setting is 1.5 degrees Fahrenheit, which should be adequate for most applications. Differential selections are available in increments of 1/8 degrees. Thus, to select one degree, you should choose 8 (for 8 eighths).

### **To program the restart differential:**

- Enter the programming mode:  
Press OFF.  
Press SET.
- Press SLOW and FAN simultaneously. The restart differential will be displayed.
- Use the UP or DOWN key to change the setting.
- Press OFF to exit the programming mode.

## **Note**

If you switch from Fahrenheit to Celsius for temperature displays, the compressor restart differential will also operate on degrees Celsius. Thus, the factory-set compressor restart differential will be 1.5 degrees Celsius, which is quite wide. To correct this, reset the differential value from 12 to 6. This will provide a differential of about 0.75 degrees Celsius, roughly corresponding to 1.5 degrees Fahrenheit. This will also affect the Fan Response Differential, which is factory set at a value of 4 for one-half degree Fahrenheit. When shifting from Fahrenheit to Celsius, you should reset the Fan Response Differential from 4 to 2. This will provide a value that is roughly equivalent to one-half degree Fahrenheit.

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## Note

Be careful not to set your compressor restart differential too low, since it will cause the compressor to start and stop quite often. This will place an undue load on your electrical system and also wear out your compressor faster.

## Continuous Or Intermittent Fan

(Factory set: Continuous)

You can select continuous fan operation or instruct the fan to cycle on and off with the system compressor.

### To select continuous or intermittent fan:

- Enter the programming mode:  
Press OFF.  
Press SET.
- Press DOWN, FAN and UP simultaneously.
- Use the UP or DOWN key to select C (continuous) or I (intermittent).
- Press OFF to exit the programming mode.

## Note

If you select intermittent fan operation, you may have to relocate the thermistor from the return air duct to an inside wall for best results. Check with your dealer or call the Cruisair Applications Department for more information.

## Low Fan Speed Adjustment

Factory set: 32)

You can adjust the lowest fan speed to suit individual preferences. For instance, you may wish to decrease the low fan speed setting in your stateroom to minimize fan noise.

### To adjust low fan speed:

- Enter the programming mode:  
Press OFF.  
Press SET.
- Press DOWN and SET simultaneously. The current low speed reference number will be displayed (factory set at 32).
- Press UP or DOWN to raise or lower speed reference number.
- Press OFF to exit the programming mode.

## Note

You should normally keep the low fan speed at the highest possible setting, consistent with a comfortable noise level, for most efficient operation of your Cruisair system. Running the fan speed too slow can damage the compressor.

## High Fan Speed Adjustment

(Factory set: 60)

The high fan speed should be set at the fastest possible speed level the fan or blower can attain. This will give you the most efficient cooling or heating capacity. To maximize performance, you should set the high fan speed value at the lowest number beyond which the fan speed does not increase.

### To adjust high fan speed:

- Enter the programming mode:  
Press OFF.  
Press SET.
- Press SET and SLOW simultaneously. The current high speed reference number will be displayed (factory set at 60).
- Use the UP key to raise the displayed value to 80. Listen to the fan until you have its sound well in mind.
- Press and hold the DOWN key until you hear a drop in the fan noise level. As soon as the drop occurs, release the DOWN key. Observe the displayed number, and use the UP key to raise this number 3 units. Write down this number.
- Press and hold the UP key. As the displayed value increases up to 99, there should be no change in the fan speed level. If there is, add 3 more units to the recorded number and repeat the process, listening for fan speed changes.
- Once you have determined the lowest number beyond which the fan noise level does not increase, reset the display at that number. This will be your new high fan speed.
- Press OFF to exit the programming mode.

## Fan Response Differential

(Factory set: 1/2 degree Fahrenheit)

SMX II (Before 8-1-98)

All SMX Models (After 8-1-98)

When the fan is in the automatic mode, its speed is governed by how far the room temperature differs from the setpoint. The fan runs faster when the difference is great. As the room cools or warms, the temperature approaches setpoint, and the fan slows down automatically. The amount of temperature rise in the room above setpoint needed to cause the fan to increase in speed one step is called "fan speed differential." It can be adjusted from 1/4 to 4 degrees Fahrenheit in 1/8 degree increments.

The fan speed range is divided by the SMX microprocessor in five 20% increments. If the fan response differential is set at 1/2 degree, the fan speed will change 20% for each 1/2 degree of temperature deviation from setpoint. Lowering the fan speed differential will cause the fan to increase speed quickly as temperature changes. Raising the fan speed differential will result in slower fan speed changes for a given temperature change. The factory setting of 1/2 degree Fahrenheit is about right for most applications, but you may wish to try a slightly higher setting in your salon and a lower setting in your stateroom. See the note concerning Fan Response Differential in degrees Celsius.

### To adjust fan response differential:

#### SMX II (Before 8-1-98)

- Press SLOW, FAN and FAST simultaneously.

#### All SMX Models

(After 8-1-98)

- Press COOL and SLOW. The differential will be displayed in increments of 1/8 degrees Fahrenheit (factory set at 4, for 1/2 degree).
- Use the UP or DOWN key to raise or lower this value.
- Press OFF to exit the programming mode.

### Auxiliary Heat

(Factory set: disabled)

Normally, the aux heat function is disabled, so that the compressor runs in reverse cycle heating mode without aux heat. When aux heat is enabled (see below), press the HEAT key **once** to run Reverse-Cycle heating only. Press the HEAT key **twice quickly** to run aux heat.

### To enable or disable aux heat:

- Enter the programming mode:  
Press OFF.  
Press SET.
- Press HEAT and SET simultaneously.
- Use the UP or DOWN key to toggle the aux heat on or off. When aux heat is enabled the letters AH will be displayed. When aux heat is disabled, the Null sign (--) will appear.
- Press OFF to exit the programming mode.

### AC Line Voltage Calibration

(Factory set: +/- 1%)

The SMX control assembly has a built-in voltmeter which senses AC line voltage. The microprocessor automatically responds to sustained low-voltage conditions by shutting down the air conditioning system to prevent compressor damage.

At installation, the SMX voltmeter is calibrated to line voltage within +/- 1%.

### To check or recalibrate AC line voltage:

- Enter the programming mode.  
Press OFF.  
Press SET.
- Press DOWN and UP simultaneously. Line voltage will be displayed in two digits. For 115V systems, 70-99 appears as 70-99, and 100-160 appears as 00-60. For 230V systems, the display shows one-half the line voltage.
- To check accuracy or to calibrate, turn off all on-board AC loads and measure the line voltage with an accurate voltmeter.
- If the SMX displayed voltage is not correct, press the UP or DOWN key to enter the correct value.
- Press OFF to exit the programming mode.

### Temperature Calibration

(Factory set: +/- 1 deg. Fahrenheit)

The SMX II has one thermistor for cabin temperature. The SMX Online Net has both inside and outside thermistors. These sensors are calibrated at installation.

### To check or recalibrate the thermistors:

- Use the TEMP key to select inside temperature (SMX Online Net only).
- Enter the programming mode:  
Press OFF.  
Press SET.
- Press SET and UP simultaneously. The temperature will be displayed in degrees Fahrenheit or Celsius, depending on which you have selected.
- Place an accurate thermometer beside the thermistor you are using and compare the temperatures.
- Use the UP or DOWN key to adjust the displayed temperature to the correct value.
- Press OFF to exit the programming mode.

### Two-Speed Or Variable Blower Control

(Factory set: Variable)

#### SMX Online Net Only

The SMX Online Net control can be programmed for use with variable-speed or two-speed blowers. The SMX II can only be used with variable-speed blowers.

### To program for variable or two-speed blower control:

- Enter the programming mode.  
Press OFF.  
Press SET.
- Press SET and FAST simultaneously.
- Use the UP or DOWN key to toggle the display for F1 for variable-speed or F2 for 2-speed.
- Press OFF to exit the programming mode.

### Two-Speed blower, high-to-low speed coast adjustment.

- Enter the programming mode.  
Press OFF.  
Press SET.
- Press SET and FAST simultaneously.
- Use the UP or DOWN key to increase the number for longer coast time or decrease the number for shorter coast time.
- Press OFF to exit the programming mode.

### **Programming Summary Table**

All programming steps are entered by touching the OFF key, followed by touching the SET key, followed by simultaneously depressing the two or three keys noted in the code table below. Successful entry into a programming mode is indicated by the presence of a decimal point to the right of the two displayed characters. To raise or lower a value, touch the UP or DOWN keys. To exit the programming mode, touch the OFF key.

<b>FUNCTION</b>	<b>CODE</b>	<b>FACTORY SETTING</b>	<b>RECOMMENDED VALUE</b>
AC Line Voltage	DOWN & UP	+ 5%	1%
Temperature	SET & UP	± 1%	± 1%
Compressor Restart Delay	DOWN & SET & UP	0	0 to 70 sec.
Cont. (C) or Int. (I) Fan	DOWN & FAN & UP	C	C or I
Low Fan Speed	DOWN & SET	32	30 to 56
High Fan Speed	SET & SLOW	60	41 to 90
Fan Differential	SLOW & FAN & FAST (SMX II Before 8-1-98) COOL & SLOW (All SMX Models After 8-1-98)	4	2 to 8
Compressor Differential	SLOW & FAN	12	4 to 24
Fahrenheit/Celsius	DOWN & TEMP & UP	F	F or C
HU Precirculation	TEMP & DOWN	10 Min.	See Humidity Control
HU Dehumidification	TEMP & SET	30 Min.	See Humidity Control
HU Time Period	TEMP & UP	12 Hrs.	See Humidity Control
Variable/2-Speed Blower	SET & FAST	Variable (F1)	F1 or F2
High to Low Speed Adjustment (2-Speed Blower Only.)	SET & FAN	38	
Factory Reset	OFF & SET & FAN & then SET		

# Humidity Control Program

## SMX II and SMX Online Net

<b>DEHUMIDIFICATION PROGRAMMING SUMMARY</b>				
	Climate	Time Period	Precirculation Time	Dehumidification Time
Summer	Cool	6 Hrs.	10 Min.	30 Min.
	Moderate	8 Hrs.	10 Min.	30 Min.
	Tropical	6 Hrs.	20 Min.	60 Min.
Fall	Cool	12 Hrs.	10 Min.	10 Min.
	Moderate	8 Hrs.	10 Min.	20 Min.
	Tropical	6 Hrs.	20 Min.	30 Min.
Winter	Cool	----	-----	-----
	Moderate	12 Hrs.	10 Min.	10 Min.
	Tropical	8 Hrs.	20 Min.	30 Min.
Spring	Cool	12 Hrs.	10 Min.	10 Min.
	Moderate	8 Hrs.	10 Min.	20 Min.
	Tropical	6 Hrs.	20 Min.	30 Min.

### Humidity Control Program

The SMX dehumidification program automatically cycles the air conditioning system on at preselected intervals to control humidity in the boat. The dehumidification process works like this. First, the fan comes on at high speed to circulate the air. After a preprogrammed period of time, the fan drops to low speed and the compressor cycles on in the cooling mode. After another preprogrammed interval, the system cycles off. The process repeats according to the programmed time period.

#### The factory set sequence is:

Overall time period	12 hours
Precirculation cycle	10 min.
Dehumidification cycle	30 min.

These settings should be adequate for most moderate climates. For very humid climates, you may wish to shorten the overall period and extend the dehumidification cycle. In dryer climates, you can select longer intervals between cycles and a shorter dehumidification time. The above table provides guidelines for programming these settings.

### Programming The Time Period

(Factory set: 12 hours)

The time period determines how often the system performs the dehumidification process. You can select intervals of 2, 4, 5, 8, 10, 12, 14 or 16 hours.

#### To select time period:

- Enter the programming mode:  
Press OFF.  
Press SET.
- Press TEMP and UP simultaneously. The display will show the overall time period in hours.
- Use the UP or DOWN key to select the desired time period.
- Press OFF to exit the programming mode.

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### ***Programming The Precirculation Time***

(Factory set: 10 minutes)

The precirculation time governs how long the fan runs before the compressor cycles on during the dehumidification process. You can select 0, 10, 20 or 30 minutes.

#### **To select precirculation time:**

- Enter the programming mode:  
Press OFF.  
Press SET.
- Press TEMP and DOWN simultaneously. The display will show the time period in minutes.
- Use the UP or DOWN key to select the desired time period.
- Press OFF to exit the programming mode.

### ***Programming The Dehumidification Time***

(Factory set: 30 minutes)

The dehumidification time determines how long the compressor runs in the dehumidification mode. You can select 10, 20, 30, 40, 50 or 60 minutes.

#### **To select dehumidification time:**

- Enter the programming mode:  
Press OFF.  
Press SET.
- Press TEMP and SET simultaneously. The display will show the time period in minutes.
- Use the UP or DOWN key to select the desired time period.
- Press OFF to exit the programming mode.

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# Programming The Network

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## ***SMX Online Net Only***

You can program the DAY, NIGHT and ABSENT modes to suit your individual preferences. We suggest that you write down these configurations and keep them in a convenient location for ready reference.

### ***Programming The Daytime Configuration***

**To program your daytime operating mode:**

- At the Convenience Panel, press DAY.
- Go to each SMX Online Net control panel in the network, and set it for the desired daytime mode, or set each system remotely from the Convenience Panel. (See "Reminder" on this page.)
- Press DAY and OFF simultaneously to save the daytime settings and exit the programming mode.

### ***Programming The Nighttime Configuration***

**To program your nighttime operating mode:**

- At the Convenience Panel, press NIGHT.
- Go to each SMX Online Net control panel in the network, and set it for the desired nighttime mode, or set each system remotely from the Convenience Panel. (See "Reminder" on this page.)
- Press NIGHT and OFF simultaneously to save the nighttime settings and exit the programming mode.

### ***Programming The Absent Configuration***

When you leave the boat, you may wish to have one or more of the air conditioning systems in the automatic dehumidification mode.

**To program your absent configuration:**

- At the Convenience Panel, press ABSENT.
- Go to each SMX Online Net control panel in the network, and set it for the desired absent mode, or set each system remotely from the Convenience Panel. (See "Reminder" on this page.)
- Press ABSENT and OFF simultaneously to save the absent settings and exit the programming mode.

### ***Reminder . . .***

#### ***Remote Control From The Convenience Panel***

1. Press the SCROLL ▲ or SCROLL ▼ key to display the Controller ID of the unit you wish to control.
2. Press REMOTE. A flashing decimal will appear in the center of the data display of the SMX Online Net keypad to indicate that you are in the remote control mode.
3. Change the settings for the remote unit as desired using the SMX Online Net keypad (see Basic SMX Operation).
4. Press LOCAL to exit the remote control mode.
5. Repeat Steps 1-4 for all systems on the network.

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# Slaving Systems

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## SMX Online Net Only

The SMX Online Net permits multiple air conditioning systems to be “slaved” together, so that all of them are operated from a single master control. This is often desirable when more than one air conditioning unit is installed in a single spacious cabin, such as a main salon.

It is not necessary for the “slave” unit to have a separate control panel. In that case, there will be only one control panel in the cabin. The installer will have programmed the system so that the slave unit is controlled by the master control panel. If a separate “slave” control panel is installed, it will work just like the “master” control panel.

The slave receives operating commands from the master control unit and cycles on and off according to master’s setpoint and inside temperature sensor. Fan speeds also operate in tandem, although you can operate the manual fan speed of the slave when the master is off.

### ***Slaving From The Slave Control Panel***

**To slave one unit to another, using the slave’s control panel:**

- Enter the programming mode:  
Press OFF.  
Press SET.
- Press OFF and SET simultaneously.
- Use the UP or DOWN key to scroll to the ID of the unit that will be the master.
- Press OFF to save the master ID selection and exit the programming mode.

### ***Slaving From The Master Control Panel***

**To slave one unit to another, using the master’s control panel:**

- Press SLOW, FAST and FAN simultaneously.
- Use the UP and DOWN key to scroll the ID number of the unit to be slaved to the master.
- Press SLOW, FAST and FAN again simultaneously. A flashing decimal will appear in the center of the display to indicate you are in the remote control mode.

- Enter the programming mode:  
Press OFF and SET simultaneously
- Use the UP or DOWN key to scroll to the ID number of the master.
- Press OFF to save the master ID selection and exit the programming mode.
- Press COOL, OFF, and HEAT simultaneously to return to local control mode.

### ***Unslaving Systems From The Master Control Panel***

**To unslave systems from master control panel:**

- Press SLOW, FAST and FAN simultaneously.
- Use the UP or DOWN key to scroll to the ID number of the slaved unit.
- Press SLOW, FAST and FAN again simultaneously. A flashing decimal will appear in the center of the display to indicate you are in the remote control mode.
- Enter the programming mode.  
Press OFF.  
Press SET.
- Press OFF and SET simultaneously.
- Use the UP or DOWN key to scroll to the null sign (--).
- Press OFF to exit the programming mode.
- Press COOL, OFF and HEAT simultaneously to return to local control mode.

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# Fault Shutdowns and Error Messages

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## **SMX II and SMX Online Net**

The SMX control contains built-in safeguards designed to protect your air conditioning system from damaging conditions. These are described below.

### **Note**

Your system must be equipped with a high-pressure switch and low-pressure switch for the high- and low-pressure shutdown to operate. You should check with your dealer to make sure these important protective devices are installed properly.

### **High Pressure Shutdown**

In the cooling mode, if head pressure rises above 400-425 PSI (usually caused by loss of cooling water flow, refrigerant gas overcharge or dirty condenser) the SMX will attempt three restarts, then shuts down the entire system. The display will flash the legend HI-PS (for high pressure). This is a sustained shutdown, and even when the pressure falls after shutdown, the system will remain off until reset by pressing the OFF key.

In the heating mode, a rise in head pressure above the set limit (usually caused by poor air flow or incorrect charge) will cause the compressor to cycle off for two minutes, allowing the heat in the coil to dissipate. This readies the system for recycling in the heating mode. The compressor will then continue to cycle, based on input from the high-pressure switch, until the cabin temperature reaches setpoint, after which compressor cycling is automatically restored to normal thermostatic control.

### **Lowpressure Shutdown**

In the event system suction pressure drops and remains below 35 PSI for more than two minutes, the SMX will attempt five restarts, then shuts down the entire system. The display will flash LO-PS (for low pressure). This is a sustained shutdown, and even when the pressure rises after shutdown, the system will remain off until reset by pressing the OFF key.

In the cooling mode the low-pressure condition is usually caused by substantial loss of refrigerant gas or poor air flow. In the heating mode, it may be caused by loss of refrigerant or extremely low seawater temperatures.

### **Low Voltage Shutdown**

The low-voltage protection feature is always active. If AC line voltage drops and remains below 100 volts (200 volts for a 230V system) for more than three minutes, the SMX shuts down the entire system. The display will flash LO-AC (for low AC). This is a sustained shutdown, and the system will not resume operation even if the line voltage rises to normal levels. To reset, press the OFF key.

### **Note**

For the low voltage shutdown function to work properly, the SMX internal voltmeter must be properly calibrated. This is normally accomplished at installation. To check or recalibrate line voltage, see the AC Line Voltage Calibration section.

### **Software Error**

Whenever power is applied to the SMX, the microprocessor goes through an automatic self check and software loading process. If all is well, the SMX loads the most recent operating configuration from its internal memory, and turns on normally. If a program fault is found during the self check, the error message PE will be displayed.

Likewise, the self-diagnostic routine runs continuously whenever the SMX system is on. If a system fault is detected, the system shuts down, and the PE error message appears.

If this message occurs, contact your nearest Cruisair dealer, or call the Factory Service Department in Richmond, Virginia (804-746-1313) for assistance.

### **Determining Your Software Version Number**

When you call your dealer or the factory for service assistance, it's helpful to know the Software Version Number for your SMX system.

#### **SMX II (Before 8-1-98)**

To display your software number:

- Press OFF.
- Press OFF, SET and FAN simultaneously.
- Press COOL twice until display reads 68.
- Press UP once. The display should read Version Number.
- Press SLOW until display reads F2.
- Press UP once. The display should read Revision Level.

All SMX Models (After 8-1-98)

To display your software number:

- Press OFF.
- Press OFF, SET and FAN simultaneously.
- Press COOL and DOWN simultaneously. The display will read Version Number.
- Press UP once. The display should read Revision Number.
- Press UP once. The display should read Revision Level.

### ***Fault Code Displays***

If an operational failure occurs, such as low voltage or high/low pressure, the display will show one of the following flashing code messages. Fault code displays are cancelled by pressing OFF.

<b>Fault Code</b>	<b>Meaning</b>	<b>Result</b>
LO/AC	Operating voltage remained below 100V for 3 min. or more (or 200V for 230V system)	Shutdown
HI / PS*	Head pressure above 400 to 425 PSI	Shutdown
LO/PS**	Suction Pressure below 30 PSI	Shutdown
PE	Program error in software	Shutdown

\*Indicates pump failure or loss of water flow.

\*\*Indicates loss of gas; or on heat cycle, water too cold for heating.

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# ID Programmed Settings Form

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Use this table to record your programmed settings.

<b>ID</b>	<b>Location</b>	<b>Day</b>	<b>Night</b>	<b>Absent</b>
SL	Salon			
LL	Galley			
Fb	Flying Bridge			
PH	Pilot House			
FS	Forward Stateroom			
AS	Aft Stateroom			
PS	Port Stateroom			
SS	Starboard Stateroom			
S1	Stateroom 1			
S2	Stateroom 2			
S3	Stateroom 3			
12				
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# Notes

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# Notes

# WARNING

Taylor Made Environmental, Inc. (TME) manufacturers of Cruisair, Grunert, Marine Air and Sentry Products, makes the following safety warnings concerning the application, installation, use and care of its products. Although these warnings are extensive, there may be specific hazards which may arise out of circumstances which we have not outlined herein. Use this as a guide for developing an awareness of potential hazards of all kinds. Such an awareness will be a key factor in assuring your SAFETY and comfort.

**ELECTRICITY** - Many TME products operate on 115, 230 or 440 volt AC power. Such voltages can be LETHAL; therefore, the chassis, cabinets, bases, etc., on all components must be grounded together and connected to the vessel's grounding system. Sparks can occur as switches, thermostats and relays open and close in the normal operation of the equipment. Since this is the case, ventilating blowers for the removal of hazardous fumes or vapors should be operated at least 5 minutes before and during operation of any TME product or group of TME products. All electrical connections must be covered and protected so accidental contact cannot be made by persons using the equipment, as such contact could be LETHAL.

**ELECTROLYSIS** - Electrical leakage of any component can cause electrolytic deterioration (electrolysis) of thru-hull components which could result in leakage serious enough to sink a vessel which could result in loss of life. All TME components must be kept clean and dry and checked periodically for electrical leakage. If any electrical leakage is detected, the component should be replaced or the fault causing the leakage corrected before the component is put back into service.

**GAS - CRUISAIR, MARINE AIR and GRUNERT** components utilize R134a refrigerant, tetrafluoro-ethane or R404A, R125/R143a/R134 (44%/52%/47%) which are non-toxic, non-flammable gases; however, these gases contain no oxygen and will not support life. Refrigerant gas tends to settle in the lowest areas of the compartment. If you experience a leak, evacuate all personnel, and ventilate area. Do not allow open flames in the area of leaks because refrigerant gas, when burned, decomposes into other potentially LETHAL gases. Refrigerant components operate at high pressure and no servicing should be attempted without gloves, long-sleeved clothing and eye protection. Liquid refrigerant gas can cause severe frost burns to the skin and eyes.

**VENTILATION** - To cool or heat air, CRUISAIR, MARINE AIR and GRUNERT components are designed to move air through a heat exchanger by a blower or propeller fan. This design necessarily produces a suction on one side of the air handling component and a pressure on the other side. Air handling components must be installed so that the suction-pressure action does not: (1) pressurize an area to the extent that structural failure occurs which could cause harm to occupants or bystanders, or (2) cause a suction or low pressure in an area where hydrogen gas from batteries, raw fuel vapor from fuel tanks, carbon monoxide from operating propulsion engines, power generators or heaters, methane gas from sewage holding tanks, or any other dangerous gas or vapor could exist. If an air handling unit is installed in such a manner that allows potentially lethal gases or vapors to be discharged by the air handling unit into the living space, this could result in loss of life.

Maximum protection against the introduction of dangerous gases or vapors into living spaces can be obtained by providing living spaces which are sealed from all other spaces by use of airtight bulkheads and decks, etc., and through the introduction of clean air into the living space. Bear in mind that the advent of air conditioning, whether it be for cooling or for heating, naturally leads to the practice of closing a living space tightly. Never close all windows and doors unless auxiliary ventilating systems, which introduce clean outside air into the living space, are used. Always leave enough window and door openings to provide adequate ventilation in the event potentially lethal gases or fumes should escape from any source.

**CONDENSATE** - All cooling units produce water condensate when operating on the cooling cycle. This water must be drained from the cooling unit overboard. If condensate is allowed to drip on a wooden structure, rotting or decay and structural failure may occur which could result in loss of life. If condensate is allowed to drip on electrical components, deterioration of the electrical components could result in hazardous conditions. When an air conditioning system is in operation, condensate drains may be subjected to negative pressure. Always locate condensate drains as far as possible from points where engine waste and other dangerous gases are exhausted so no such dangerous gases can be drawn into the condensate drains.

## **Warning**

Never sleep in a closed area on a boat when any equipment, which functions as a result of the combustion of a volatile fuel, is in operation (such as engines, generators, power plants, or oil-fired heaters, etc.) At any time, the exhaust system of such devices could fail, resulting in a build-up of LETHAL gases within the closed area.

Warning Revised: 7-6-99

## Notes



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