
Guidelines For Adding Computerized Controls To Your Boat's Air Conditioning System

If you have a Cruisair air conditioning system with a manual switch assembly, we have good news for you. Now you can replace your 3-knob switch with a state-of-the-art computerized control — quickly, easily and inexpensively. Your Cruisair dealer can upgrade your air conditioning system with the SMX II retrofit kit. In just a few hours, you can be exploring the powerful comfort-control possibilities available with an SMX series system. Although the SMX series was specifically designed for Cruisair air conditioning systems, in many cases you can retrofit it to systems other than Cruisair. You should consult with your dealer for guidance. In the following Application Note, we will describe the advanced features of the SMX II and offer guidance on how to upgrade your existing system. We invite you to review this information, then to call your Cruisair dealer to discuss how you can upgrade your air conditioning system.

ABOUT THE SMX II

The SMX II is a computerized control unit for Cruisair marine cooling and heating systems. It can be used with all Cruisair direct-expansion seawater-cooled systems with variable-speed blowers. It can be specified with new Cruisair systems, and can be retrofitted in the field to replace most Cruisair electro-mechanical switch assemblies.

Easy to Use

In spite of its sophistication (it has more than 20 different programmable functions) the SMX II is remarkably easy to use. The touchpad contains clearly marked buttons that are self-explanatory. A large easy-to-read digital display

gives instant reference to setpoint or cabin temperature. It also displays important operating parameters and fault code warnings. The small LED lights on the panel show the system's operating mode and status.

For normal operation, you simply select the desired temperature, set for automatic operation and relax. That's all.

If you want to fine-tune your settings or take advantage of the advanced programmable functions, you can enter the programming mode and make changes in the factory-set parameters. The system's non-volatile memory retains all your settings, even when power is interrupted.

Heating and Cooling

You can set the SMX II to provide cooling only, heating only or automatic changeover between heating and cooling. This means that in the Fall or Spring, when days are hot and nights are cool, the system will keep the inside of your boat at a constant comfortable temperature.

Non-Volatile Memory

Power interruptions are a common occurrence on most boats, and it's a nuisance to have to reset the air conditioning system every time power is lost momentarily. The SMX II is designed to bring the Cruisair system back on line automatically at user-programmed settings. To protect the compressor, the SMX II has a special software subroutine that automatically equalizes pressure before every compressor restart. If two or more Cruisair systems are on board, the SMX II can be programmed with time delays to restart the compressors sequentially, minimizing line and generator loads.

Automatic Monitoring

The SMX series monitors critical system functions, such as voltage and refrigerant pressures. Whenever it senses potentially damaging conditions, it reacts to protect the system from damage.

The SMX II constantly monitors line voltage with an internal voltmeter. Whenever it senses a brief dip in line voltage (three minutes or less) it lets the system continue running to

avoid nuisance shutdowns. If the low voltage persists, however, the SMX II issues a shutdown command to the system and displays a warning message on the LED.

Likewise, the SMX series automatically monitors pressures in the refrigerant lines. Any time the pressure exceeds a preprogrammed

limit, either too high or too low, the SMX II shuts the system down before it can be damaged. It then goes through a programmed subroutine of automatic restarts and system monitoring. If the out-of-tolerance condition persists after several restarts, the SMX series issues a sustained shutdown command. A warning display appears on the LED.

Dehumidification

When you leave your boat unattended for long periods of time, you can program the SMX II to switch the air conditioning system on at preselected intervals to circulate and remove moisture from the air. You can program the dehumidification software routine for your specific geographical region.

Legend

- A. Cooling Indicator.** Lit when compressor is running in cooling mode.
- B. Data Display Indicator.**
On: Setpoint is displayed.
Off: Cabin temperature is displayed.
- C. Down/Up Keys.** Used to adjust setpoint lower or higher.
- D. Off Key.** Halts operation of entire system but data display continues to operate.
- E. Cooling Mode Indicator.**
- F. Cool Key.** Used to select cooling mode.
- G. Slow/Fast Keys.** Used to increase or decrease fan speed when in manual fan control mode.
- H. Fan Speed Indicator.** Show relative fan speed.
- I. Data Display.** Displays setpoint when Set key is depressed. Displays cabin temperature when Temp key is depressed.
- J. Heating Indicator.** Lit when compressor is running in heating mode.
- K. Setpoint Key.** Used to enter the setpoint mode. Causes setpoint to be displayed.
- L. Temperature Key.** Used to change the display to cabin temperature.
- M. Heating Mode Indicator.**
- N. Heat Key.** Used to select heating mode.
- O. Manual Fan Control Indicator.** Lit when fan is in manual mode.
- P. Fan Key.** Used to select manual or automatic fan operation.

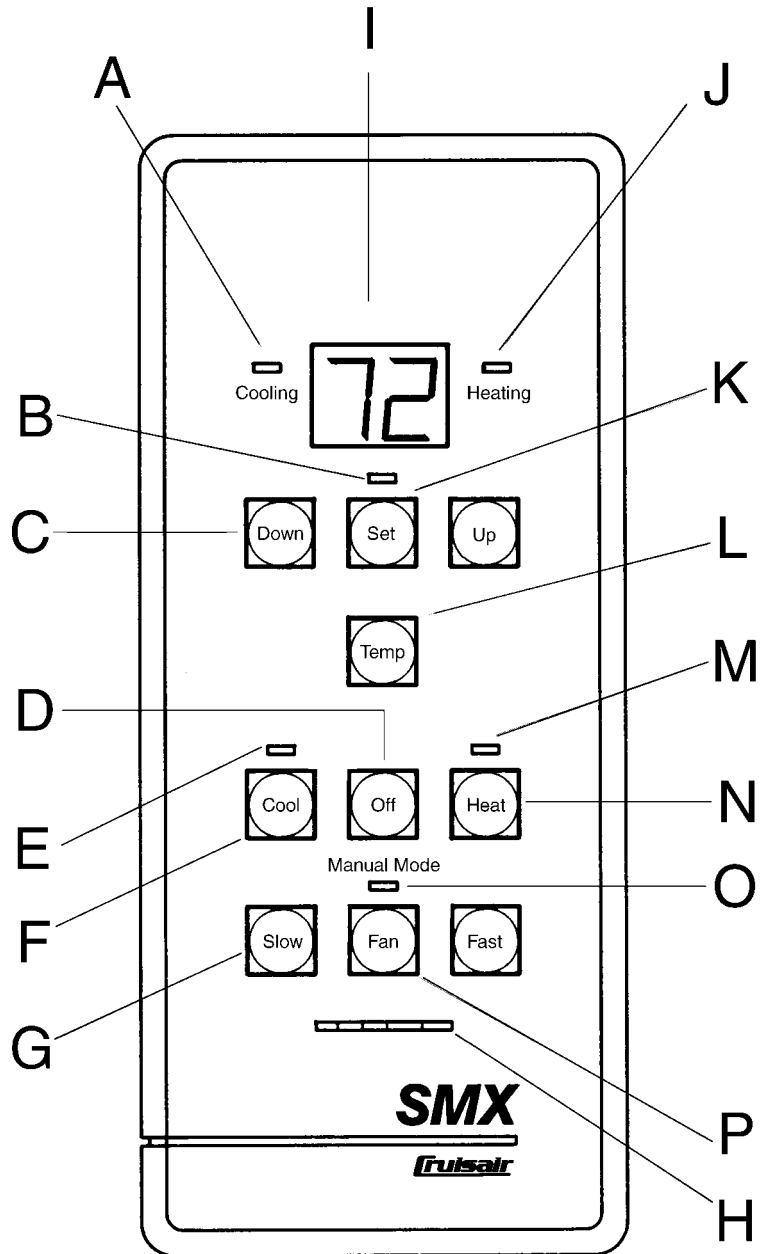


Figure 1. The SMX II Control Switch

Whenever the SMX II is in the dehumidification mode, all of the system safety controls are on guard. If the seawater flow fails, the high-pressure switch will shut the system down. Likewise, if line voltage drops below a certain limit, it will shut down to protect the compressor. If power is briefly interrupted, the SMX II will remember all of the settings currently in effect, and when power is restored it will automatically resume operation in the dehumidification mode.

Programmable

The SMX series is programmed at the factory for “average” conditions. For optimum performance, you can fine-tune many system parameters with touchpad programming procedures. For instance, you can calibrate the temperature, calibrate the internal line voltmeter, change the compressor restart time delay, set for continuous or intermittent fan operation, reset the high and low fan speeds, change the compressor response differential, optimize the automatic dehumidification cycle and change the display from Fahrenheit to Celsius.

Proven In The Field

Field experience has shown that SMX II equipped air conditioning systems work better and have fewer mechanical failures than systems with electromechanical controls. This is because electronic controls can monitor and react much more capably than mechanical systems, and also because of the built-in protective features and self-diagnostics made possible by the powerful microprocessor inside the SMX II.

Eprom Upgradable

Software upgrades for the SMX series are released periodically by Cruisair, containing new features and capabilities. New software can be installed in the field by plugging in a new EPROM chip.

Inexpensive Field Upgrade

The entire SMX II retrofit kit retails for about \$500. Cruisair has designed the SMX II Retrofit Kit for easy installation, minimizing labor costs.

Components included in SMX II Retrofit Kit

- power logic module
- SMX II switch assembly
- non-corrosive ABS cover, available in several colors
- temperature sensing element (thermistor)
- cable to connect the power logic module to the switch assembly
- low pressure switch and adaptor fitting

HOW TO SPECIFY AND ORDER YOUR SMX II UPGRADE



The Cruisair retrofit kit makes it easy to replace your old switch assembly with an SMX II. But before you call your Cruisair dealer, you will need to make a few decisions.

Your first step should be to determine the model numbers for the Cruisair units on your boat. This will help your dealer determine exactly which components will be needed to complete the retrofit.

Next, you'll have to answer the following questions. . .

1. What color switchplate do you want?

They are available in brown, black, white and beige.

2. How long is the cable run between the power logic module and the switch assembly?

Cables are available in standard lengths of 10, 15, 20, 30, 40 and 60 ft.

3. Where will the temperature sensor (thermistor) be placed?

Normally, it should be behind the return air grill, or in front of the evaporator coils. Thermistor units come with cable lengths of 10, 15, 20, 30, 40 and 60 ft.

WORKSHEET



For convenience, you can use the worksheet below. Fill in the blanks, and take it to your local Cruisair dealer. You'll find out how easy and inexpensive it is to join the SMX generation.

How many air conditioning systems do you have on board? _____

(Note: Each separate air conditioning system has its own switch assembly, and you'll need a separate worksheet for each.)

Model number of your air conditioning system: _____

Distance from power logic module location to switch assembly (approximate): _____ ft.

Distance from temperature sensing element (thermistor) to power logic module (approximate): _____ ft.

Color of switchplate cover (circle one):

- Black
- Brown
- White
- Beige

Color of keypad: (circle one)

- Black
- Brown

Notes. . .



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Revised: 12-15-99

L-0613