

English



DIRECT EXPANSION SYSTEMS

For Direct Expansion SMX II Control Systems using these displays:

SMX II
SMX^{ir}

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This manual replaces manuals L-0634 and L-0503.

SMX II Control Systems • Introduction

Warning

This manual contains essential information concerning the installation and operation of your SMX II control system. It is very important that you read and understand the contents of this manual before using the equipment, and it should be kept on the boat for future reference. If you have any questions about the contents of this manual, contact your local Cruisair dealer or the Taylor Made Environmental Service Department for assistance.

Introduction

This manual covers the installation and operation of Cruisair SMX II computerized controls for direct expansion (DX) marine air conditioning systems. There are many different parts required for a complete installation, so make sure that you have all the necessary items when installing the system.

Two different keypad/displays are available for use with SMX II control systems. The original SMX II keypad/display is rectangular and requires a large cutout in the mounting surface. The SMXir keypad/display has a compact housing with a decorative hinged cover, and is surface-mounted. An optional remote control can be used with the SMXir keypad/display. Hereinafter, this manual will refer to the original SMX II keypad/display as **SMX II**. The terms keypad and display are interchangeable.

Before installing the system, please read the warnings in this manual.

If you have an SMX Net control system, refer to manual(s) LP-25, *SMX Net Control Systems (DX) Installation and Operation*.

SMX II Control Systems • Installation

Warning

Make sure all power is off before opening any electrical box.

Installing the SMX Keypad/Display

To be operated satisfactorily, the SMX keypad/display should be installed so it is both visible and accessible. It should be placed in plain view and within easy reach of the operator. Overhead locations are discouraged since they make it very difficult to use the SMX control.

Select a spot on an interior, vertical surface. This can be an inside or outside wall, partition or other permanent structure with rear access for wiring. The SMX control operates on low voltage DC and is certified ignition-protected. The space behind the SMX control does not have to be ventilated since the control components do not produce heat.

SMX II Only

The SMX II keypad/display requires a cutout of 2⁹/₁₆" x 7¹/₈" (65mm X 181 mm). (For SMXir keypad installation, refer to drawing #086800 in the back of this manual.)

After cutting the hole for the keypad control, make sure it fits and the printed circuit board is clear of the bulkhead and that no objects of any kind are in a position to contact the SMX circuitry. Plug the interconnect cable in and route it to the Power/Logic (P/L) box. Refit the control in the hole and secure it with four No. 6 x ³/₈ inch screws. Hook the decorative plastic cover at the top, press it flat from the top down, and snap it in place at the bottom.

Retrofitting SMXir Keypad/Display to Original SMX II or 3-knob

Adapter plates are available to cover the old vertical or horizontal rectangular cutout and mount the SMXir keypad/display. Part #5103612 is a black plate, and #5103612W is white. Use adapter #4163805 to connect an existing CX cable to the SMXir display. (Refer to the SMXCABLE drawing, Figure 9, at the back of this manual.)

Installing the Power/Logic Box (retrofit only)

All SX and FX systems with integrated SMX II controls have the P/L box already installed on the unit.

In selecting a location for the Power/Logic box, bear in mind that several sets of wires will be connected to it. Refer to installation diagrams in this packet.

- The SMX P/L board is ignition protected, enclosed, and operates in ambient temperatures up to 130°F (54°C).
- The P/L box may be installed in any position.
- The P/L board dissipates heat when operating, and must be installed in a ventilated location.
- The P/L box is NOT waterproof and must be placed where it will NOT get wet.

The power input to the board can be 115V or 230V. The board automatically adjusts to either voltage.

Installing the Temperature Sensor (remote systems and retrofit only)

The TSEP temperature sensor measures the cabin air temperature and relays the information to the power/logic board. The sensor is 1" long by ¹/₄" diameter (25mm x 7mm diameter) and is attached to a length of flat, 4-conductor cable with a RJ-11 phone type plug at the end. Different lengths of TSEP cables are available, from 2 feet to 80 feet (.6m to 24m).

For best results, the sensor should be placed in the return air path, away from the system evaporator coil. Directly behind the return air grill is often a good location. The sensor must not touch the evaporator coil, or be placed in the discharge air.

With the TSEP in the return air path, use the default mode of continuous fan operation for the most accurate temperature control. If intermittent fan operation is desired (fan on and off with the compressor), the sensor must be wall mounted on an INSIDE surface not subject to any influence from heat outside of the area (including direct sunlight). Thermistor covers are available from Taylor Made Environmental, Inc. for wall mounting.

SX self-contained units with integrated SMX II P/L box will have the TSEP already installed. On FX remote units, the TSEP must be run from the P/L box on the FX unit to the return air path of the cooling unit.

The TSEP cable plugs into the RJ-11 jack on the P/L board marked "INSIDE TSE". Coil up any excess cable, and tie out of the way.

If you have a P/L board manufactured before 2000, you might have a 3-pin TSE plug. Adapters are available to connect the new TSEP cables to the old P/L boards. Refer to the SMXCABLE diagram at the back of this manual.

SMX Interconnect Cable - Connecting Keypad/Display To Power/Logic Board

Connection between the SMX II keypad and the Power/Logic board should be made with a CX## cable. This is a shielded, 3-conductor cable with 4-pin plugs on each end. The plugs on each end of the cable are identical, and are polarized. Make sure all 4 pins are engaged in the plug.

Systems with the SMXir keypad should use a CXP## cable. These are flat cables with RJ-12 phone jack plugs on each end.

Both CX and CXP cables are available in different lengths, from 2 feet (.6m) to 80 feet (24m). Route the cable from the power/logic board to the keypad. Plug the cable in at both ends, and secure per low DC voltage standards.

Warning

The SMX interconnect (CX or CXP) and temperature sensor cables (TSEP) transmit low voltage DC signals, and outside interference can affect their operation. Do not route these cables beside A/C power cables, high voltage wiring, or antenna wires. Keep the cable runs as short as possible to reduce the chance of interference.

Note

Standard phone cable will not work with SMX controls.

Pressure Switches (retrofit only)

Standard SX and FX units that have an integrated SMX II P/L box include both the high and low pressure switches, already connected. The SMX P/L board to pressure switch signals are low voltage DC, and connections can be made with 22 gauge or larger wire.

High-Pressure Switch: A high-pressure switch must be connected to the SMX P/L board. Most marine A/C units have a high-pressure switch that can be used for the SMX switch. It should be disconnected from its in-line application, and connected to the SMX P/L board at the push-on terminals labeled "HIGH PRESS".

The wires that were connected to the high-pressure switch should then be butt connected together, effectively bypassing the switch. The SMX II control will now monitor the switch and shut the unit down if a high-pressure fault is sensed.

Low-Pressure Switch: A low-pressure switch is recommended for SMX controlled systems, but is optional if the original unit did not have a low-pressure switch.

To add a low-pressure switch, use Cruisair model A-201, and either the A-204 sweat in TEE kit for remote condensing units or the #4024100 service port TEE kit for 1/4" flare ports, such as on SH self-contained units.

Connect the wires from the low-pressure switch to the SMX P/L board at the terminals labeled "LOW PRESS".

If an existing low-pressure switch is used, bypass the switch by butt connecting the old switch wires together.

SMX II Control Systems • Operation

The SMX Keypad/Display

The SMX II and SMXir keypad/displays are arranged for logical operation. The button layouts on the SMX II and the SMXir are similar, and the buttons perform the same respective functions. See next page for keypad/display diagrams.

1. Data Display

Large LED readout that provides indication of current setpoint, temperatures, programmed values and error messages.

2. Cooling Indicator

Lights when compressor is running in cooling mode.

3. Heating Indicator

Lights when compressor is running in heating mode.

4. Setpoint Indicator (SMX II Display Only)

Lights when setpoint is displayed. Off when inside temperature is displayed.

5. SET Key

Press the SET key to display your currently selected setpoint (the temperature you wish to maintain in the cabin). The SET key also is used to dim the data display readout.

6. UP-DOWN Keys

Press UP or DOWN to raise or lower the setpoint. Press and hold keys for large changes. Note: if inside temperature is displayed, touching the UP or DOWN key will cause the setpoint to be displayed.

7. TEMP Key

Press once to display inside temperature. Press TEMP twice, and the display will alternate between inside temperature and setpoint. Press again to return to inside temperature only.

Hint

You can display temperature in degrees Fahrenheit or Celsius.

8. OFF Key

Turns system off. Note that the data display remains on. You can continue to adjust setpoint, display temperature readings and activate the manual fan to circulate air while the system is in the OFF mode.

9. Cool Mode Indicator

Lights when you press the COOL key to select the cooling mode.

10. Heat Mode Indicator

Lights when you press the HEAT key to select the heating mode.

11. COOL Key

Turns the system on in the cooling mode.

12. HEAT Key

Turns the system on in the heating mode.

Hint

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

13. Manual Fan Indicator

Lights when fan is running in manual mode.

14. SLOW-FAST Keys

Control fan speed when the fan is in the manual mode. Pressing SLOW or FAST key when in automatic fan mode will change the system into manual mode.

15. FAN Key

Selects manual or automatic fan control mode. Press once to select manual control. Press FAN again to select automatic fan speed control. In this mode, the fan speed is controlled by the microprocessor as a function of the difference between setpoint and inside temperature.

16. Fan Speed Indicators

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

17. Inside Temperature Indicator (SMXir Display Only)

When illuminated, inside temperature is displayed. When light is off, setpoint is displayed.

18. IR Receiver (SMXir Display Only)

Infrared remote receiver

19. Dehumid Key (Remote Control Only)

Changes system into the Humidity Control program.

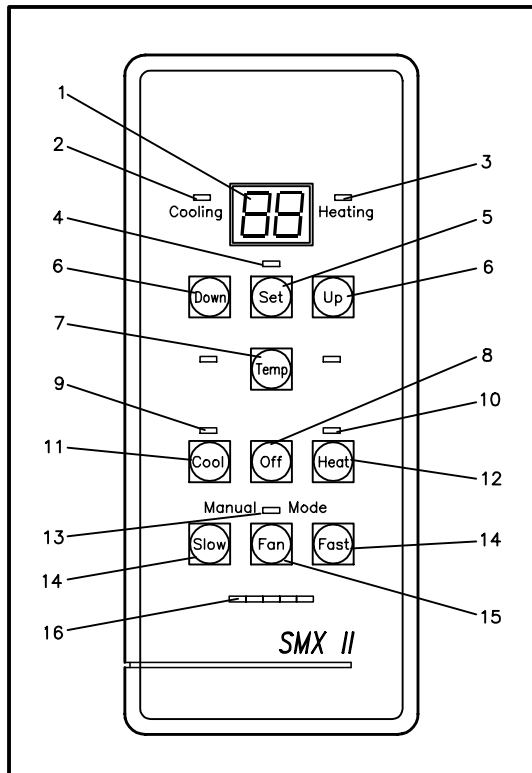
20. Auto Switchover Key (Remote Control Only)

Places the system into automatic changeover mode, so it will switch from cooling to heating as needed.

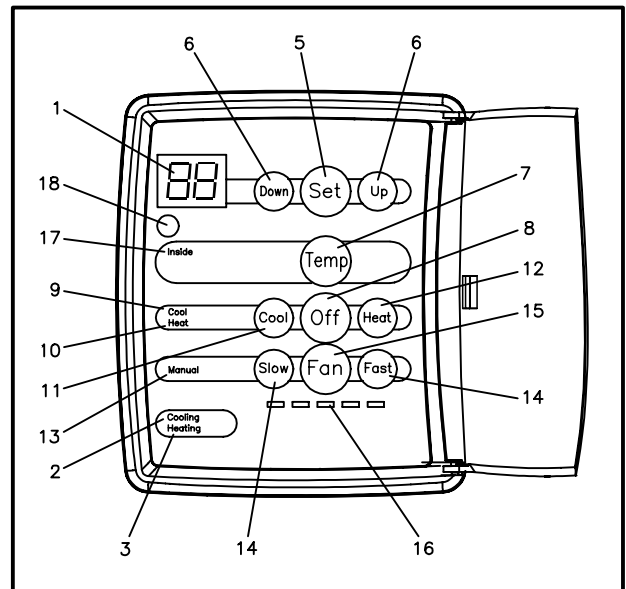
Definitions

LED - Light Emitting Diode. An indicator light is used to denote mode or operating status.

Setpoint - The selected temperature you want to maintain in the area being heated or cooled.



SMX II Keypad/Display



SMXir Keypad/Display

The SMXir Remote Control

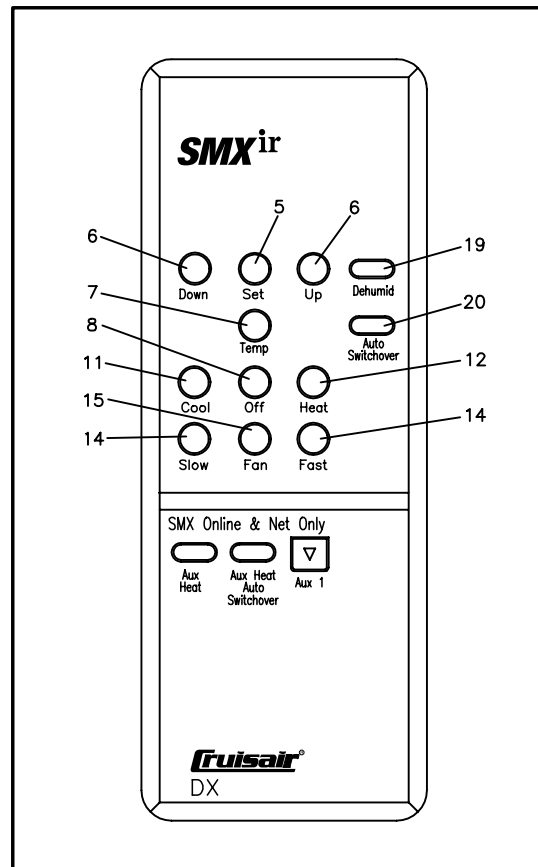
The SMXir remote control keypad has the familiar layout of the 10-button SMX keypad, and performs most of the same functions. The remote can not be used to program settings. Programming must be done at the keypad/display.

In addition to the standard keys, the SMXir remote also has two quick-hit buttons that allow easy access to the humidity control program and the automatic changeover mode.

The remote has three buttons that are not used on SMX II systems. The Aux Heat, Aux Heat Auto Switchover, and the Aux 1 buttons are for SMX Net systems only.

The SMXir remote control must be pointed at the SMXir keypad/display, which has the IR remote receiver. The remote will not work if the SMXir keypad/display has the optional full coverage door and the door is closed.

See Figure 12 for SMXir Remote control angle and distance range.



SMXir Remote Control

Basic Operation

Power On

When AC power is applied to the system at the circuit breaker, the SMX microprocessor performs a self-check and retrieves from permanent memory 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. The fan can be turned on 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. (The new operation mode must be in affect for 30 seconds before it is saved into permanent memory.) 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 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. Press TEMP twice for an alternating display of inside temperature and setpoint. Press again to return to inside temperature only.

Cool Mode

To enter the COOL mode, press the COOL key. The Cool Mode Indicator will light to show that you have selected the cooling mode.

The Cooling Indicator will be lit whenever the system is in the cooling mode and the compressor is running. When the compressor cycles off, the Cooling Indicator goes off, but the Cool Mode Indicator stays on.

Heat Mode

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

The Heating Indicator will be lit whenever the system is in the heating mode and the compressor is running. When the compressor cycles off, the Heating Indicator goes off, but the Heat Mode Indicator stays on.

Automatic Changeover

Press the COOL and HEAT keys simultaneously for AUTOMATIC CHANGEOVER between COOL and HEAT Modes. Both mode indicators will light, to show that the system is in the automatic changeover mode.

For the SMXir Remote Control only - Press the Auto Switchover key to enter automatic changeover mode.

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

Manual Fan Speed Control

Press the FAN key to select manual fan control. The Manual 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.

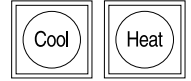
Note that you can use the manual fan control to circulate air even when the system is in the OFF mode.

Automatic Fan Speed Control

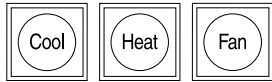
If in manual fan mode, press FAN key to select automatic fan control. The Manual Fan Indicator goes off, and the system will automatically adjust fan speed as the cabin temperature deviates from the setpoint. As setpoint is approached, the fan speed automatically slows. Once setpoint is reached, the compressor cycles off and the fan keeps running on low speed.

Adjusting Brightness

Pressing the SET key repetitively will dim the LED display. Keep pressing SET to return to full brightness.



Using The Humidity Control Routine



When engaged, the SMX humidity control routine automatically turns the air conditioning system on at timed intervals to remove moisture from the air. The system is programmed at the factory for average values. To change the factory settings, see “Humidity Control Program”.

To start the dehumidification program:

- Press OFF.
- Press COOL, HEAT and FAN keys simultaneously. **For the SMXir Remote Control only** - Press the Dehumid key to enter dehumidification mode.
- 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.

Anti-Ice Routine

The SMX control will occasionally shut down the compressor in the cooling mode to allow any ice that may have formed on the evaporator coil to melt. The anti-ice shutdown only occurs at inside temperatures lower than 70°F (21°C).

In a 10-minute cycle period, the compressor will shut off for 15 seconds per degree below 70°F. For example, if the inside temperature is 67°F, the compressor will shut off for 45 seconds every 10 minutes.

Seawater Temperature and Your Cruisair System

The basic principle behind an air conditioner or a heat pump is the movement of heat. In an air conditioner, heat is removed from the inside cabin and released to the seawater. In reverse-cycle heating, the refrigerant flow is reversed and heat is extracted from the seawater and discharged into the living space. The efficiency of the system operation depends on both the seawater and cabin temperatures.

In cooling, the air conditioner will work best in seawater temperatures below 90°F (32°C). At higher water temperatures, the unit may work, but at reduced capacity. A high-pressure shutdown can occur at higher water temperatures.

In heat mode, the opposite is true. As the water gets colder, there is less heat available, and the heating performance drops. Full heating capacity is obtained at about 55°F (13°C). Performance drops to about 50% of rated capacity in 40°F (4.4°C) water. Below this, the system pressure can be so low that the unit will shut down on low-pressure fault. This problem is compounded when the cabin is cold also. The low pressure shutdown routine is such that the unit will try many times to heat up the cabin enough to raise system pressure and continue running.

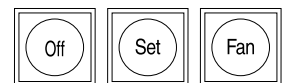
Warning

Do not operate your A/C unit in water that is colder than 38°F (3.3°C). Doing so could lead to water freezing in the condenser coil which can cause damage to the unit.

Programming the SMX II System

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.

All programming steps are entered by pressing the OFF key, followed by the SET key, then simultaneously depressing the two or three keys noted in the 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. (The SMXir Remote Control can not be used to program the system.)



Factory Memory Reset

You can use the memory-reset sequence to restore all programmed functions to the factory default settings.

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.

Programming Summary Table

Programmable Function	Keystroke Combination	Factory Setting	Range
Factory Memory Reset	OFF & SET & FAN, then SET	See table below before reset	
Compressor Time Delay	DOWN & SET & UP	0	0 to 70 sec.
Fahrenheit/Celsius	DOWN & TEMP & UP	F	F or C
Compressor Differential	SLOW & FAN	12	4 to 24
Fan Response Differential	COOL & SLOW (SLOW & FAN & FAST Before 8/98)	4	2 to 8
Low Fan Speed	DOWN & SET	32	30 to 56
High Fan Speed	SET & SLOW	60	41 to 90
Fan Mode (Cont. or Int.)	DOWN & FAN & UP	C	C or I
AC Line Voltage Calibration	DOWN & UP	-	± 1%
Temperature Calibration	SET & UP	-	± 1%
HU Precirculation	TEMP & DOWN	10 Min.	10 Min.
HU Dehumidification	TEMP & SET	30 Min.	See "Humidity Control Program"
HU Time Period	TEMP & UP	12 Hrs.	

Custom Programming Record

Use table below to keep track of any program changes. If a Factory Memory Reset is performed, then all parameters will revert back to factory default settings as outlined in the Programming Summary Table above.

Unit Location (Cabin #, Salon, etc.)							
Programmable Function	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6	Unit 7
Fahrenheit/Celsius							
Auxiliary (Electric) Heat							
Setpoint Differential							
Fan Mode (Cont. or Int.)							
Low Fan Speed							
High Fan Speed							
Fan Response Differential							
HU Dehumidification							
HU Time Period							

Compressor Time Delay

(Factory Default: 0 seconds)

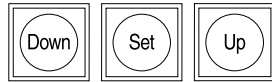
This function is used when you have more than one unit on board. To prevent electrical overload due to multiple compressors starting when turning on power to the system, or when power is interrupted, each SMX unit should be programmed with a different time delay.

Time delay can be set in increments of 1 second. On older systems (before 8/98) the time delay is set in 10-second increments, up to 70 seconds.

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.



Fahrenheit/Celsius Display

(Factory Default: Fahrenheit)

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

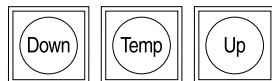
To select Fahrenheit or Celsius:

- 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

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° Celsius, which is too wide. To correct this, reset the differential value from 12 to 6. This will provide a differential of 0.75° C, or about 1.4° F.

This will also affect the Fan Response Differential, which is factory set at a value of 4, or 0.5° Fahrenheit. When changing from Fahrenheit to Celsius, you should reset the Fan Response Differential from 4 to 2. This will provide a fan differential of 0.25° C, or about 0.5° F.



Compressor Differential

(Factory Default: 12 = 1.5°)

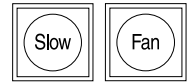
The compressor differential is the temperature change needed for the compressor to cycle on and off. The factory setting of 1.5° Fahrenheit should be adequate for most applications. Differential selections are available in increments of 1/8°. Thus, to select one degree, you should choose 8 (for 8-eighths).

To program the compressor 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.

Hint

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.



Fan Response Differential

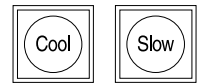
(Factory Default: 4 = 0.5°)

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°, in 1/8° increments.

The fan speed range is divided by the SMX microprocessor in five equal increments. If the fan response differential is set at 1/2°, the fan speed will change 20% for each 1/2° 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° Fahrenheit is good for most applications, but you may wish to try a slightly higher setting in your salon and a lower setting in your stateroom.

To adjust fan response differential:

- Enter the programming mode: Press OFF, Press SET
- Press COOL and SLOW. The differential will be displayed in increments of 1/8°.
- Use the UP or DOWN key to raise or lower this value.
- Press OFF to exit the programming mode.



Note

On SMX II systems built before 8/98, press SLOW, FAN and FAST simultaneously to adjust fan response differential.

Low Fan Speed Adjustment

(Factory Default: 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.

Hint

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

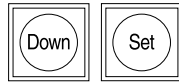
(Factory Default: 60)

A blower will often reach its highest speed at a voltage lower than full line voltage. For example, at a line voltage of 120V, the blower might reach its fastest speed at 110V. At higher voltages, the blower speed will not increase significantly.

The SMX High Fan Speed Adjustment allows you to set the maximum high-speed voltage to the threshold of the blower high-speed response. Because SMX breaks up the fan speed voltage steps into 5 equal parts (between the low-speed and high-speed adjustments), accurately setting the high-speed adjustment can help ensure that each fan speed step results in a noticeable change of fan speed.

To adjust the 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 default is 60).
- While listening to the fan noise level, use the UP key to raise the displayed value past the point that you can hear an increase in the fan noise level.



- Press the DOWN key to lower the voltage until you hear a drop in fan speed, then raise that number up by 2 or 3 to ensure that it is set at the highest speed.
- Press OFF to exit the programming mode.

Fan Mode

(Factory Default: 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.

Hint

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

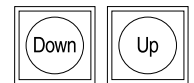
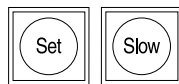
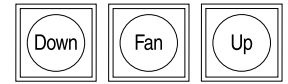
AC Line Voltage Calibration

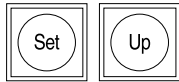
The SMX control assembly has a built-in voltmeter that senses AC line voltage. The microprocessor automatically responds to sustained low-voltage conditions by shutting down the air conditioning system to prevent compressor damage.

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 2 digits. On 115V systems, 95V appears as 95, 100V as 00, and 120V as 20. For 230V systems the reading shows 1/2 of line voltage, therefore, 190V will appear as 95, 200V as 00, and 230V as 15.
- 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

Typically, the temperature sensor is within 1 or 2 degrees of actual room temperature. If off by more, it can be calibrated to read actual temperature.

To calibrate the thermistor:

- Enter the programming mode: Press OFF, Press SET
- Press SET and UP simultaneously. The sensed temperature will be displayed.
- 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.

Humidity Control Program

The SMX dehumidification program automatically runs the air conditioning system for a programmed time period to help control humidity in the boat. The dehumidification program works in 3 stages:

The fan comes on at high speed to circulate air for 10 minutes.

The fan then drops to low speed, and the compressor cycles on in the cooling mode to dehumidify.

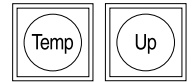
After the dehumidification cycle, the system turns off. The process repeats according to the programmed time period.

The compressor time delay setting will affect when the dehumidification cycle starts. Every 1-second of compressor delay equals a 6-minute advance into the dehumidification cycle. This can cause the dehumidification cycle to skip the first running and wait until the next time period.

The factory default settings are:

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

The factory settings are adequate for most moderate climates and boats. For humid climates, you may wish to shorten the overall time period and extend the dehumidification time. In dry climates, you can select longer intervals between cycles and a shorter dehumidification time.



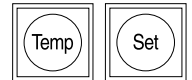
Programming The Time Period

(Factory Default: 12 hours)

The time period determines how often the system performs the dehumidification process. You can select intervals of 2, 4, 6, 8, 10, 12, 14 or 16 hours. Choose a shorter time period in climates with high humidity.

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.



Programming The Dehumidification Time

(Factory Default: 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. Select a longer dehumidification time in humid climates.

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.

Recommended Humidity Control Settings

Outside Temperature	Relative Humidity	Time Period	Dehumid. Time
Below 80° F (27°C)	75-85%	12 hrs	10 min
	Above 85%	8 hrs	20 min
80° - 90° F (27° - 32°C)	75-85%	10 hrs	30 min
	Above 85%	6 hrs	40 min
Above 90° F (32°C)	75-85%	8 hrs	40 min
	Above 85%	6 hrs	60 min

Fault Shutdowns and Error Messages

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

Hint

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

Fault Codes

If an operational failure occurs, the display will flash one of the following fault code messages. Fault code displays are cancelled by pressing OFF.

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 airflow 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.

Low Pressure Shutdown

When installed, the low-pressure switch is monitored by the SMX control. The low pressure switch opens when the suction pressure drops below 30 psi, and resets at 45 psi. The low-pressure fault routine operates differently in the cooling and heat modes.

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

* Note: The "PS" in the high pressure and low pressure fault warning can be confused as "P5" on the SMX LED display

Cooling Mode:

When the LP switch first opens, the unit will run for 2 minutes, then shut down for 50 seconds. It will do this 4 times. If the switch has not closed, the unit will shut down for 15 minutes, and flash "LO PS" on the display. After 15 minutes of shut down, the 2 minutes on, 50 seconds off cycle starts again.

If, after 18 attempted compressor starts, the low-pressure switch does not stay closed, the unit will go into a sustained shutdown and flash "LO PS".

If the LP switch closes at any time before the sustained shutdown, the unit will then operate normally.

Heating Mode:

If the LP switch opens, the fan will automatically change to low speed to try and raise system pressure. It will run for 11 minutes in this mode. Note that the fan speed can not be adjusted at this time. Any attempt to raise fan speed will result in "LO PS" being flashed, while the unit continues to run.

After 11 minutes, the unit will run for 2 minutes, then shut down for 50 seconds. It will do this 4 times. If the switch has not closed, the unit will shut down for 15 minutes, and flash "LO PS" on the display. After 15 minutes of shut down, the 2 minutes on, 50 seconds off cycle starts again.

If, after 18 attempted compressor starts, the low-pressure switch does not stay closed, the unit will go into a sustained shutdown and flash "LO PS".

If the LP switch closes at any time before the sustained shutdown, the unit will then operate normally.

Old Low Pressure Shut-Down (Models before March 1998)

The low-pressure shut down fault program was different on units built before March to May of 1998. On the early units, if the low-pressure switch opens (suction pressure drops below 35 psi) and stays open for 2 minutes, the unit will shut down. If the pressure rises and the switch closes, the unit will restart. It will attempt 5 restarts, and then go into a sustained shut down, flashing LO - PS. Press the OFF key to reset the system.

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.

Hint

For the low voltage shutdown function to work properly, the SMX internal voltmeter should be calibrated. This is normally accomplished at installation. To check or recalibrate line voltage, see "Programming Summary Table".

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 Systems (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 Systems (After 8/98)

To display your software number:

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

Quick SMX II Troubleshooting Guide

Problem: SMX Display Not On

Possible Solution:

1. Turn circuit breaker on
2. Check CX/CXP cable and connections
3. Replace keypad/display
4. Replace Power/Logic board

Problem: Erratic Temperature Display

Possible Solution:

1. Perform a Factory Memory Reset
2. Check temperature sensor, cable and connection
3. Ensure the temperature sensor is installed properly
4. Calibrate temperature
5. Replace Power/Logic board

Problem: Erratic system operation

Possible Solution:

1. Perform a Factory Memory Reset
2. Check CX/CXP cable and connections
3. Check temperature sensor, cable and connection
4. Replace keypad/display
5. Replace Power/Logic board

Warning

The Power/Logic board operates at 115VAC or 230VAC. Make sure the power is off before removing the cover of the Power/Logic box.

Contact an authorized Cruisair servicing dealer if the problem continues, or for replacement parts.

Owner's Limited WARRANTY



As hereinafter described, Taylor Made Environmental, Inc. limits the duration of any implied warranty to the duration of the underlying express warranty and also disclaims any liability for consequential or incidental damages arising from any application, installation, use or malfunction of any warranted product.

Section I

What does the Limited Warranty cover?

Products manufactured by Taylor Made Environmental, Inc. (TME) are under limited warranty to be free from defects in workmanship or materials under normal use and service with the obligation of TME under this limited warranty being limited to replacing or repairing any component(s) which shall disclose defects within the time limits defined in **Section III** and which, upon examination by TME, shall appear to the satisfaction of TME to be defective or not up to specifications.

This Limited Warranty is made in lieu of all other express warranties, obligations, or liabilities on the part of TME. In addition, TME shall not be responsible for any incidental or consequential damages. In those instances in which a cash refund is made, such refund shall effect the cancellation of the contract of sale without reservation of rights on the part of the purchaser. **Such refund shall constitute full and final satisfaction of all claims which purchaser has or may have against TME due to any actual or alleged breach of warranty, either express or implied, including, without limitation, any implied warranty of merchantability or fitness for a particular purpose.** Some states do not allow the exclusion or limitation of incidental or consequential damages so the above limitation may not apply to you. The terms and conditions of this warranty shall be governed by the laws of the Commonwealth of Virginia.

The Dealer is not an agent for TME except for the purpose of administering the above warranty to the extent herein provided, and TME does not authorize the dealer or any other person to assume for TME any liability in connection with such warranty, or any liability or expense incurred in the replacement or repair of its products other than those expressly authorized herein. TME shall not be responsible for any liability or expense except as is specifically authorized and provided in this section.

TME reserves the right to improve its products through changes in design or material without being obligated to incorporate such changes in products of prior manufacture, and to make changes at any time in design, materials, or part of units of any one year's model, without obligation or liability to owners of units of the same year's model of prior manufacture.

This warranty gives you, the purchaser, specific legal rights, and you may also have other rights which vary from state to

state. You also have implied warranty rights, including an implied warranty of merchantability, which means that your product must be fit for the ordinary purposes for which such goods are used. ***The duration of any implied warranty rights is limited to the duration of the express warranty as found in Section III.*** Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you.

Section II

What does this Limited Warranty not cover?

This Warranty Shall Not Apply to:

1. Failures resulting from improper installation or use contrary to instructions.
2. Failures resulting from abuse, misuse, accident, fire, or submergence.
3. Any part manufactured by TME which shall have been altered so as to impair its original characteristics.
4. Any parts which fail as a result of misuse, improper application or improper installation.
5. Items not manufactured by TME, i.e., items which are purchased from another manufacturer and supplied as received by TME without alteration or modification except as any part of an TME-manufactured unit or component.
6. Components or parts used by or applied by the purchaser as an integral part of products not manufactured by TME.

Installation and application of TME components is not warranted by TME because TME has no control or authority over the selection, location, application, or installation of these components.

Section III

What is the period of coverage?

See the previous section entitled Warranty Periods.

All TME components bear a data plate on which there are model and serial numbers. The serial number is date coded. To determine whether or not any TME component is in warranty, proceed as follows:

1. Determine the manufacture date of the component from the serial number on the data plate. If you are not familiar with the date code, write or call the TME Customer Service Department at (804)746-1313, to obtain the manufacture date. The hours of the Customer Service Department are 8:00 am - 5:00 pm USA, Eastern Time Zone) Monday through Friday excluding holidays.
2. It is possible that there might exist a considerable time lag between the date a component is manufactured and the date it is put in service. In such instances, the date of manufacture could indicate that the item is out of warranty. However, based on the date the equipment is first put in service, the item may still be covered by the TME warranty described in **Section I**. For proof of date put in service, TME will require a copy of the bill of sale of the TME equipment from the installer or new boat dealer to the original owner.

Section IV

How do you get service? Please Read the following Warranty Procedure.

WARRANTY PROCEDURE

If the failure of a TME component is determined to be covered under the TME warranty and the time in service is determined to be within the warranty time limit, the owner has the following three options:

1. Preferred option: Have an TME authorized Servicing Dealer perform the work needed. The customer should call TME's Service Department for a recommendation as to the closest dealer. If the customer already knows an authorized servicing dealer, the dealer should be contacted directly.
2. If the customer contacts TME's Service Department for a Servicing Dealer and TME has no one in that particular area, TME will authorize the use of a local service company and TME will work with the local company to assist in any way possible.
3. The customer may send his equipment back to the factory to have the repair work done. TME will make every effort to return the equipment to the customer within a three week time period. If the claim represents a legitimate warranty problem, TME will pay the freight both ways. TME prefers option one and two, if at all possible.

The customer may contact the TME Service Department at (804) 746-1313.

WARNING

Taylor Made Environmental, Inc. (TME) manufacturers of Cruisair, Grunert, Marine Air, Sentry and Tundra 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, GRUNERT and TUNDRA components utilize R-22 (Chlorodifluoromethane), R134a refrigerant (Tetrafluoroethane), R-407C (which contains Difluoromethane (HFC-32), Pentafluoroethane (HFC125), and 1.1.1.2 - Tetrafluoroethane (HFC134a)), or R404A (R125/R143a/R134 (44%/52%/4%)) 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: 7-19-01

Cruisair and Sentry Limited Warranty

WARRANTY PERIODS

Please read and keep this document with your important paperwork. Use it as a reference in the future. If you have any questions, please contact the Cruisair Service Department at (804)746-1313 for clarification.

Note: Any model or replacement part that has been installed due to a warranty failure will carry **only** the remainder of the original warranty. All warranties begin when the customer takes possession of the equipment. The warranty is extended to all owners of the equipment commencing the date the original owner takes possession of it. Proof of original purchase may be required. **Fuses** and **MOV's** are used as safety devices to protect Cruisair equipment against over-current conditions caused by lightning or inductive switching environments. **These are not covered under warranty.** We reserve the right to change our warranty policies and procedures as well as our warranty allowances without notice.

Cruisair Direct Expansion (DX) and Modulating Systems

- New, complete system installation using any member of the SMX family.

The warranty includes the pump.

2 year warranty including Parts and Labor

- New, complete system installation using an electro-mechanical control (3-knob).

The warranty includes the pump.

1 year warranty including Parts and Labor

- New, complete model sold as a partial system retrofit to an existing system.

Includes SMX family.

1 year warranty including Parts and Labor

Cruisair Tempered Water

- New, complete system installation using any member of the SMX family.

2 year warranty including Parts and Labor

NOTE: Excludes pump which has a 1 year warranty

- New, complete model sold as a partial system retrofit to an existing system.

Includes SMX family.

1 year warranty including Parts and Labor

Sentry Battery Chargers

- New SM or FR series installation.

2 year warranty including Parts and Labor

- New G-series installation.

1 year warranty including Parts and Labor

Cockpit Freezers/Refrigerators-Fish Boxes

- New installation of entire system including condensing unit, line sets, evaporator, etc.

1 year warranty including Parts and Labor

- New complete model sold as a partial system retrofit to an existing Cruisair system.

1 year warranty including Parts and Labor

- New installation of condensing unit only, with line sets, evaporators, etc. done by others i.e. not Cruisair pre-charged line sets and evaporators.

1 year warranty including parts and labor on mechanical and electrical parts of condensing unit only.

Replacement Parts

- Replacement parts and components - example: A-509, 40401-30.

90 day warranty, Parts only

- Replacement Compressors for other than Tempered Water Systems - example: R3101-16T, DX equipment - installed in an existing Cruisair system or a competitor's system.

1 year warranty including Parts and Labor

- Replacement compressors for Tempered Water - example: 30130-36 installed in an existing Cruisair system.

1 year warranty including Parts and Labor

- A Tempered Water compressor - example: 30130-36 installed with competitor's equipment.

90 day warranty, Parts only

Description of Figures

- Fig. 1 SXR7-16CK; 115/230V, 50-60Hz**
Dwg No. 82570, P-967
- Fig. 2 SX7-24CK; 115/230V, 50-60Hz**
Dwg No. 082577, P-1023
- Fig. 3 FX5-36CK; 115/230V, 50-60Hz**
Dwg No. 083703, P-1048
- Fig. 4 FX48RC; 230V, 50-60 Hz**
Dwg No. 083704, P-1049
- Fig. 5 FX20DC-FX48EC; 230V-460V, 3Ph, 50-60 Hz**
Dwg No. 084901, P1050
- Fig. 6 SMX II Retrofit, Typ. 3-knob**
Dwg. No. 084001, P-1063, A-284
- Fig. 7 SMX II Retrofit, F20C-48RC, to 3-knob term. strip**
Dwg No. 082605, P-1065,A-279
- Fig. 8 SMX II Retrofit, F20C-48RC, to cond. unit**
Dwg No. 082606, P-106, A-279
- Fig. 9 SMXCABLE; Cable Diagrams; Old and New P/L Boards**
- Fig. 10 SMXir Mounting Template and Instructions**
Dwg No. 086800, P-1077
- Fig. 11 Replacement DX SMX II Parts**
- Fig. 12 SMXir Remote Control Operation Range**
Dwg No. SKA-1247-rev1

Fig.1 - SXR7-16CK - 115/230V, 50-60Hz

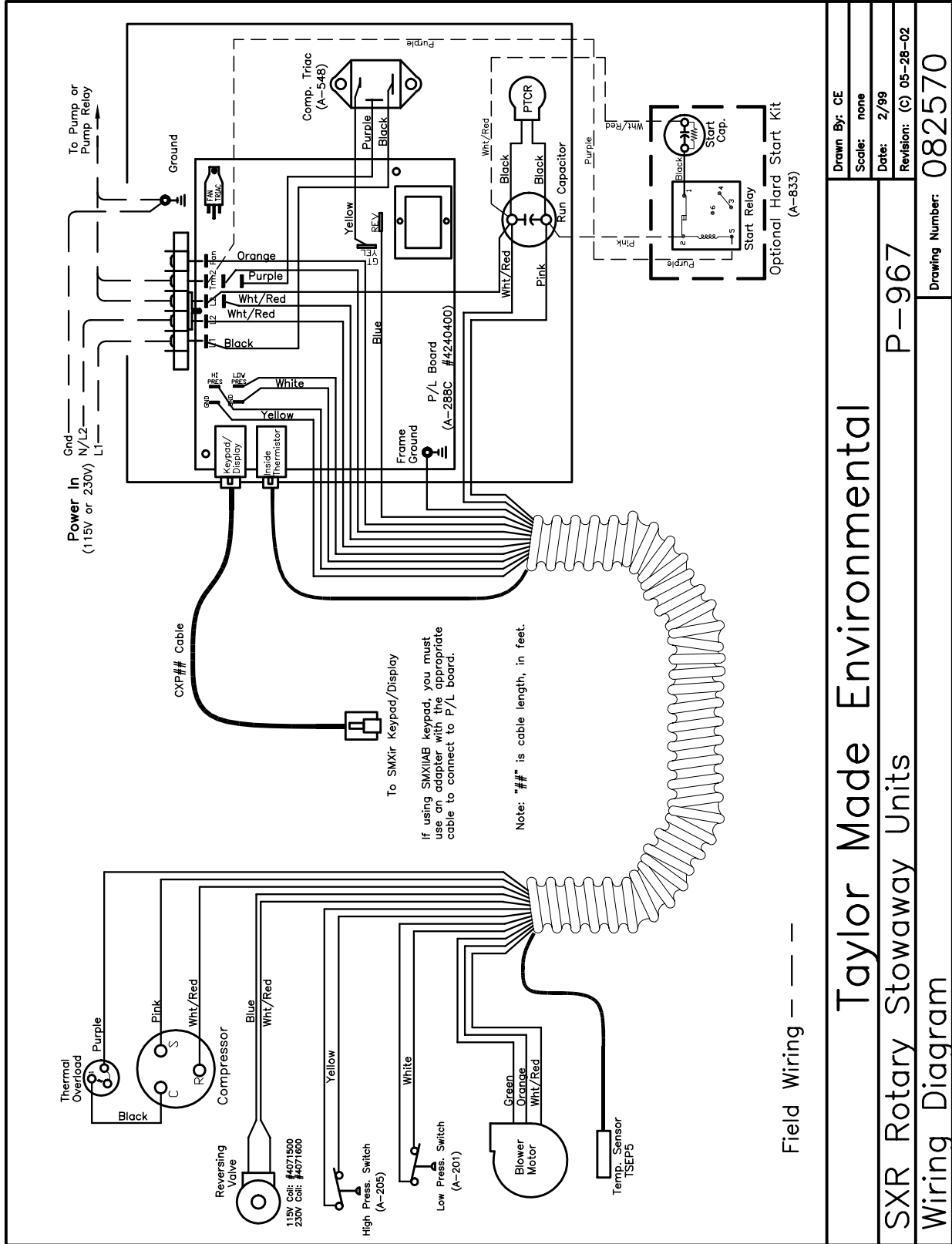


Fig. 2 - SX7-24CK - 115/230V, 50-60Hz

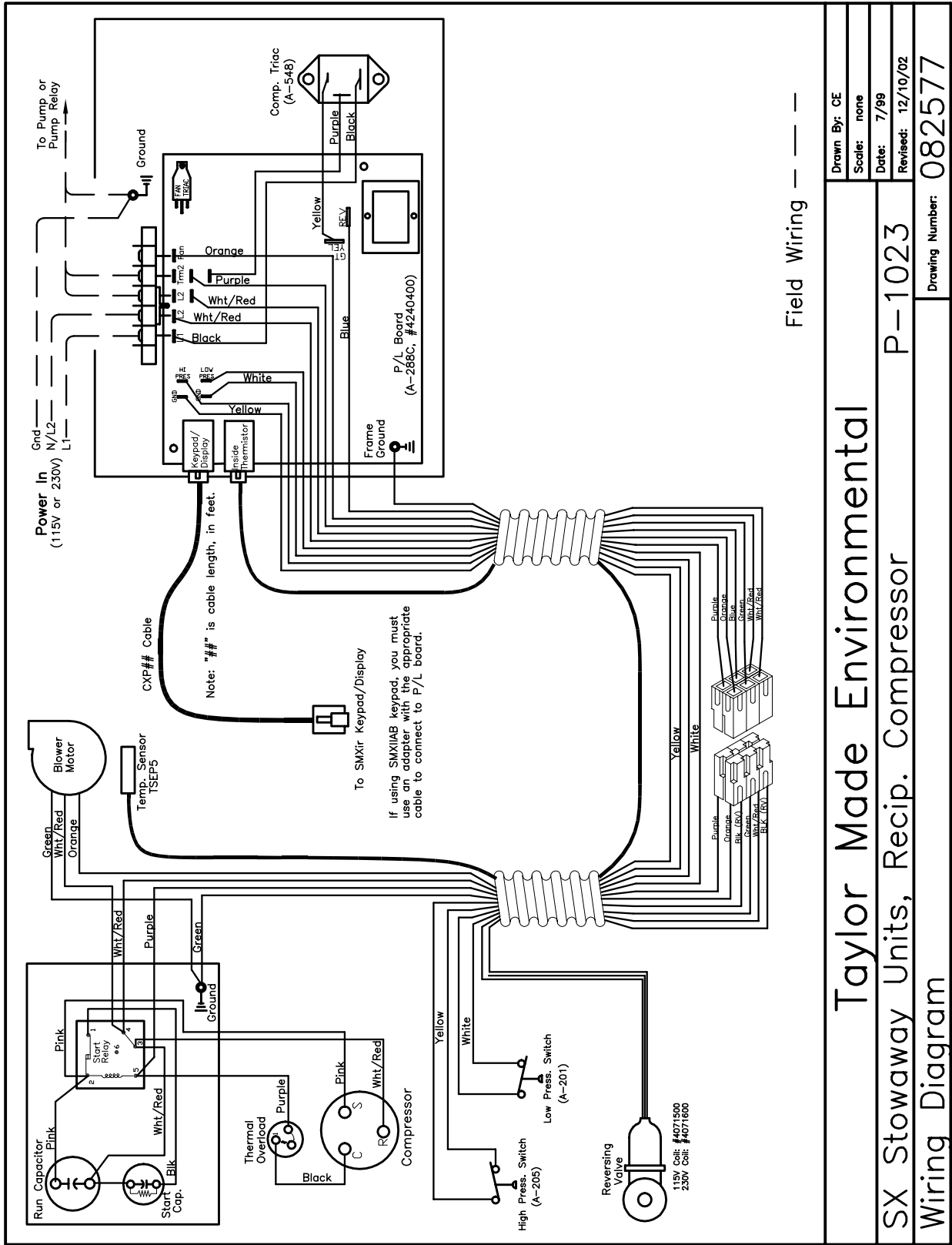
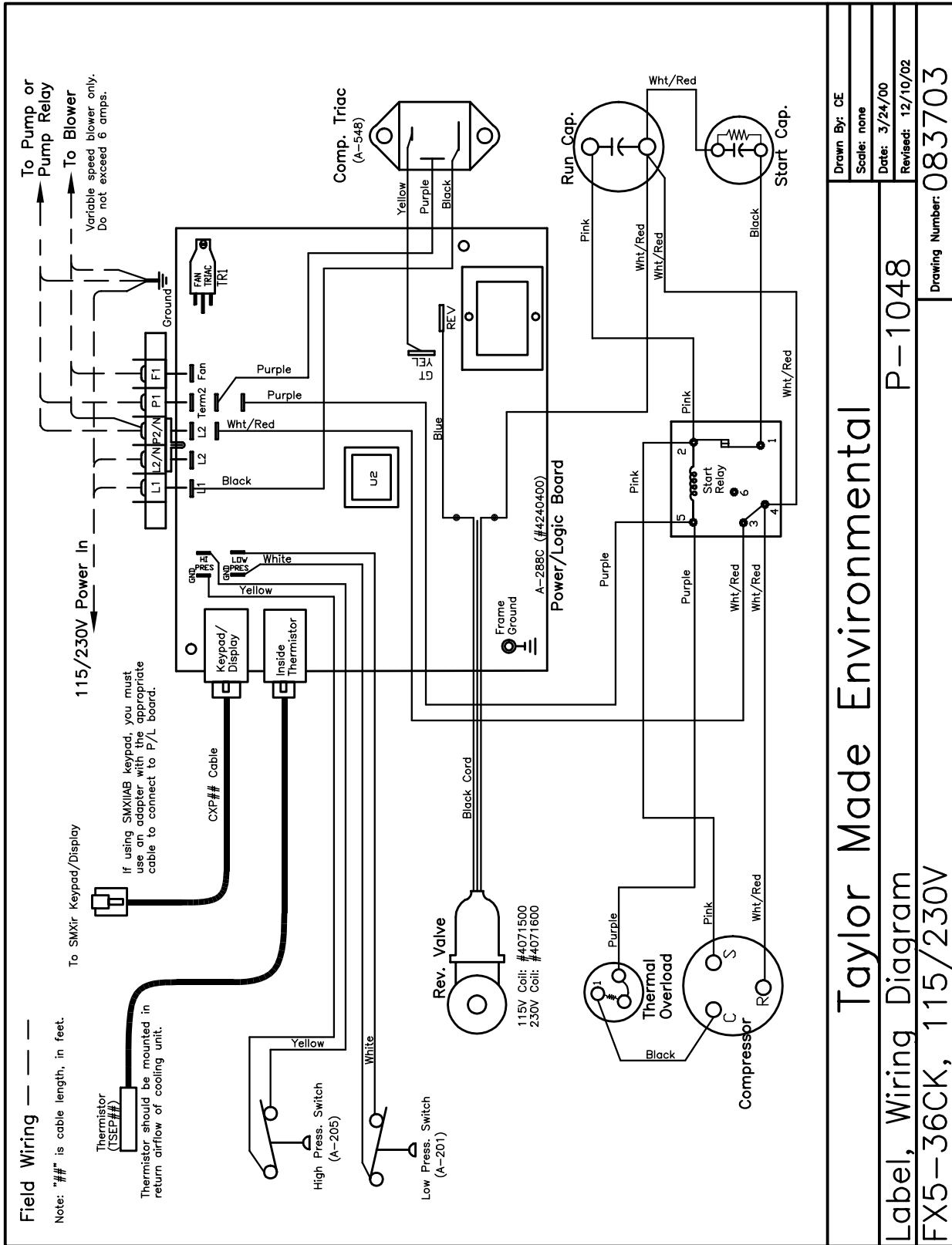


Fig. 3 - FX5-36CK - 115/230V, 50-60Hz



Taylor Made Environmental		Drawn By: CE
		Scaler: none
P-1048		Date: 3/24/00
		Revised: 12/10/02
Label, Wiring Diagram		Drawing Number: 083703
FX5-36CK, 115/230V		

Fig. 4 - FX48RC - 230V, 50-60 Hz

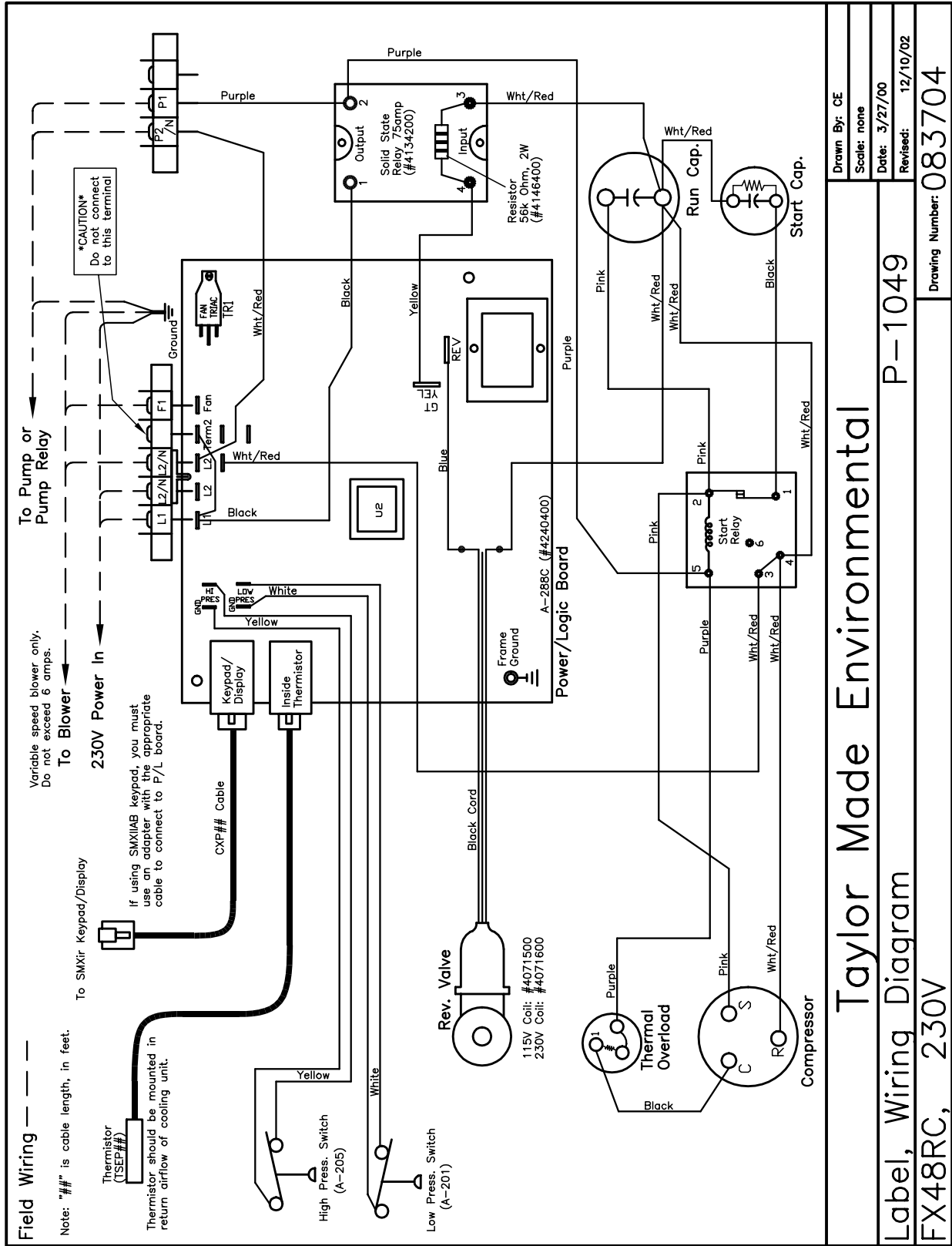
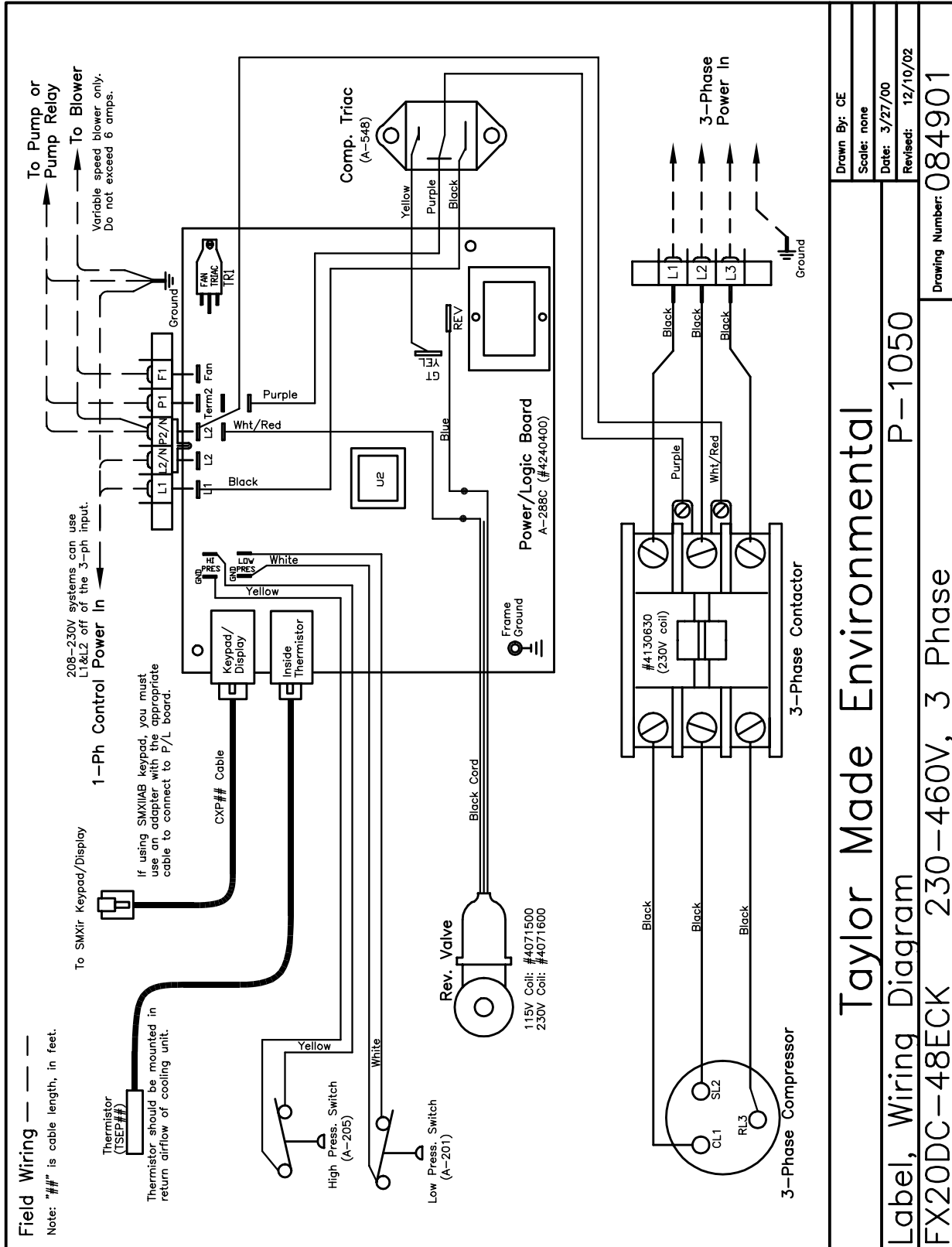
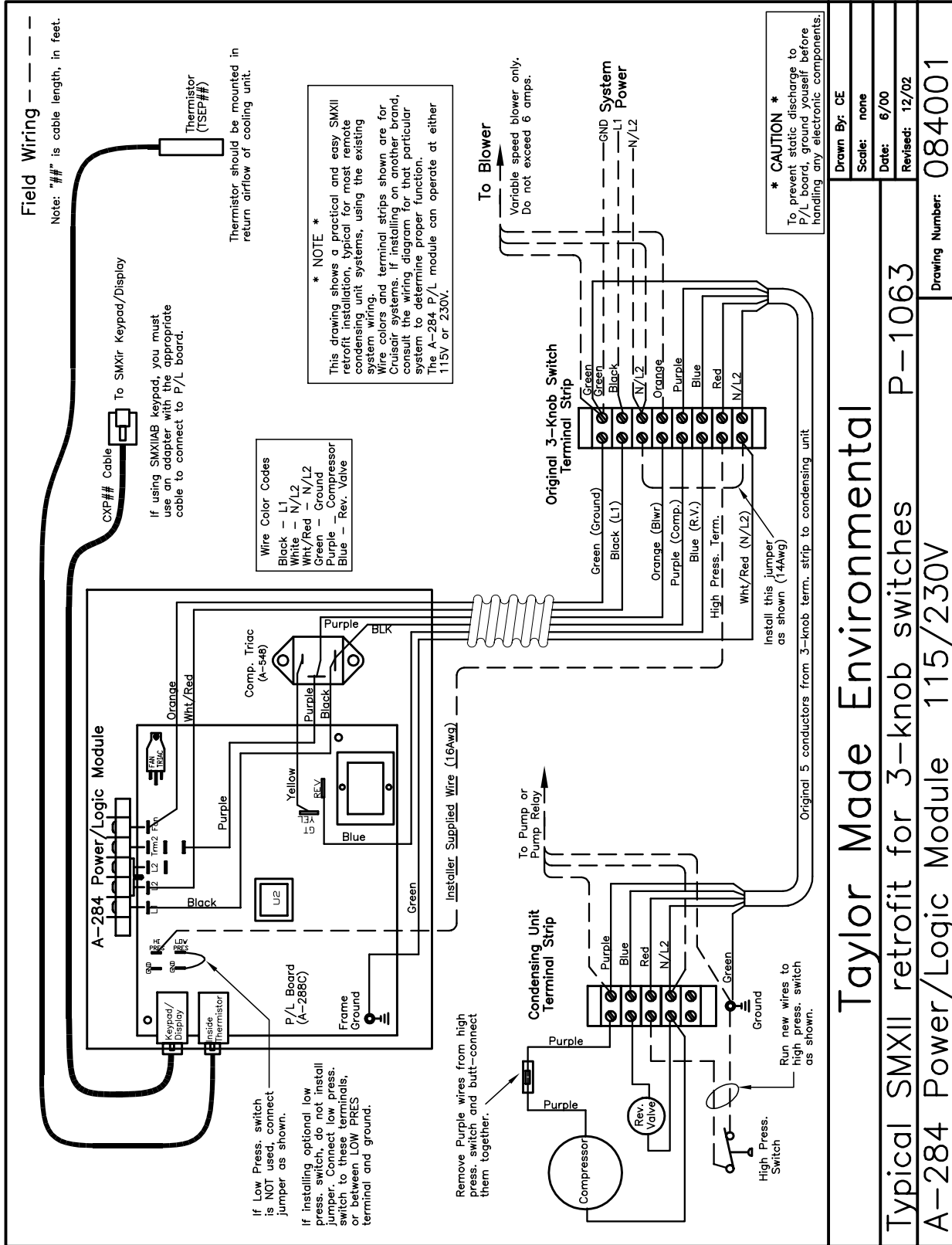


Fig. 5 - FX20DC-FX48EC - 230V-460V, 3Ph, 50-60Hz



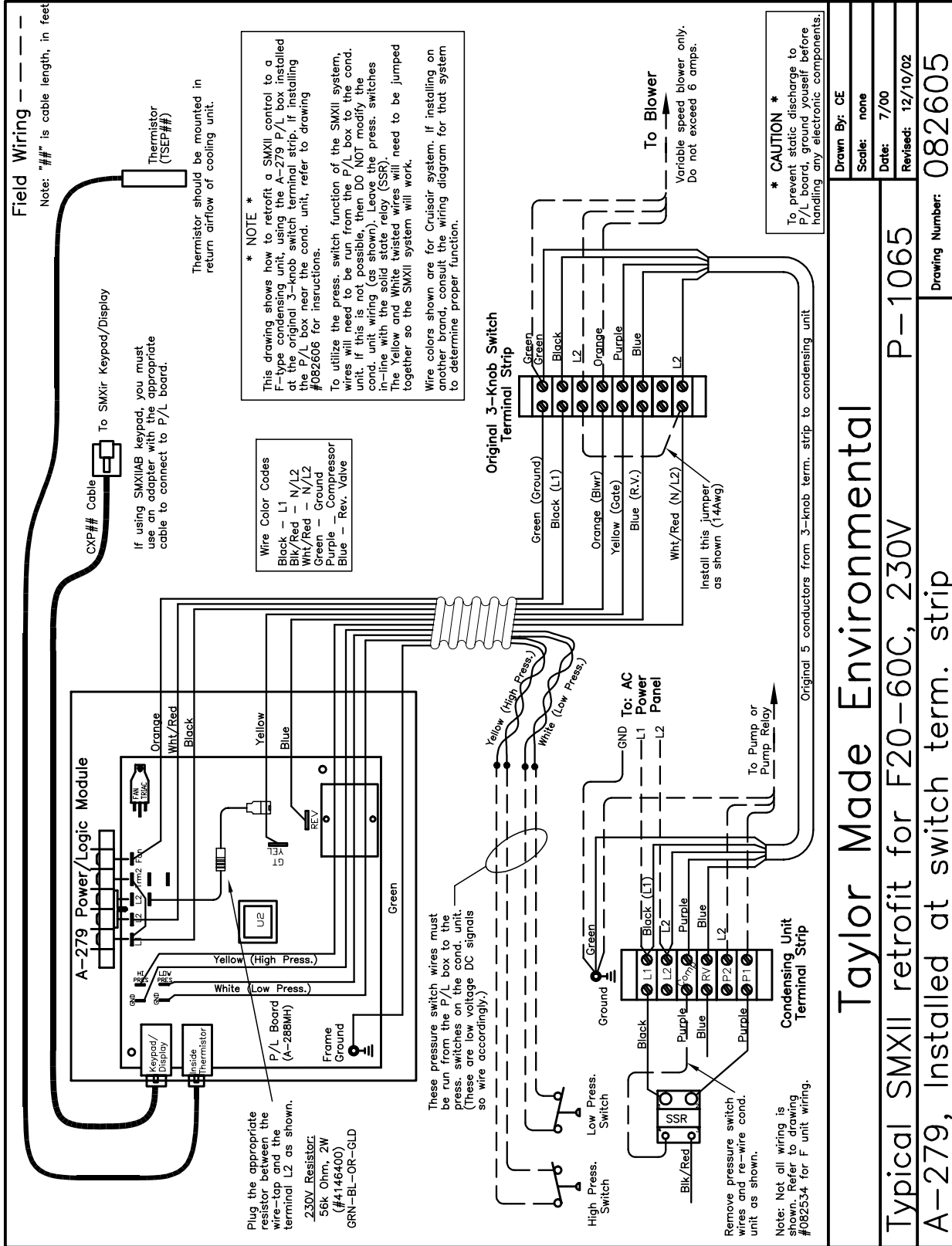
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<h2>Label, Wiring Diagram</h2>		P-1050
<h3>FX20DC-48ECK 230-460V, 3 Phase</h3>		Drawing Number: 084901

Fig. 6 - SMXII Retrofit, Typical 3-knob



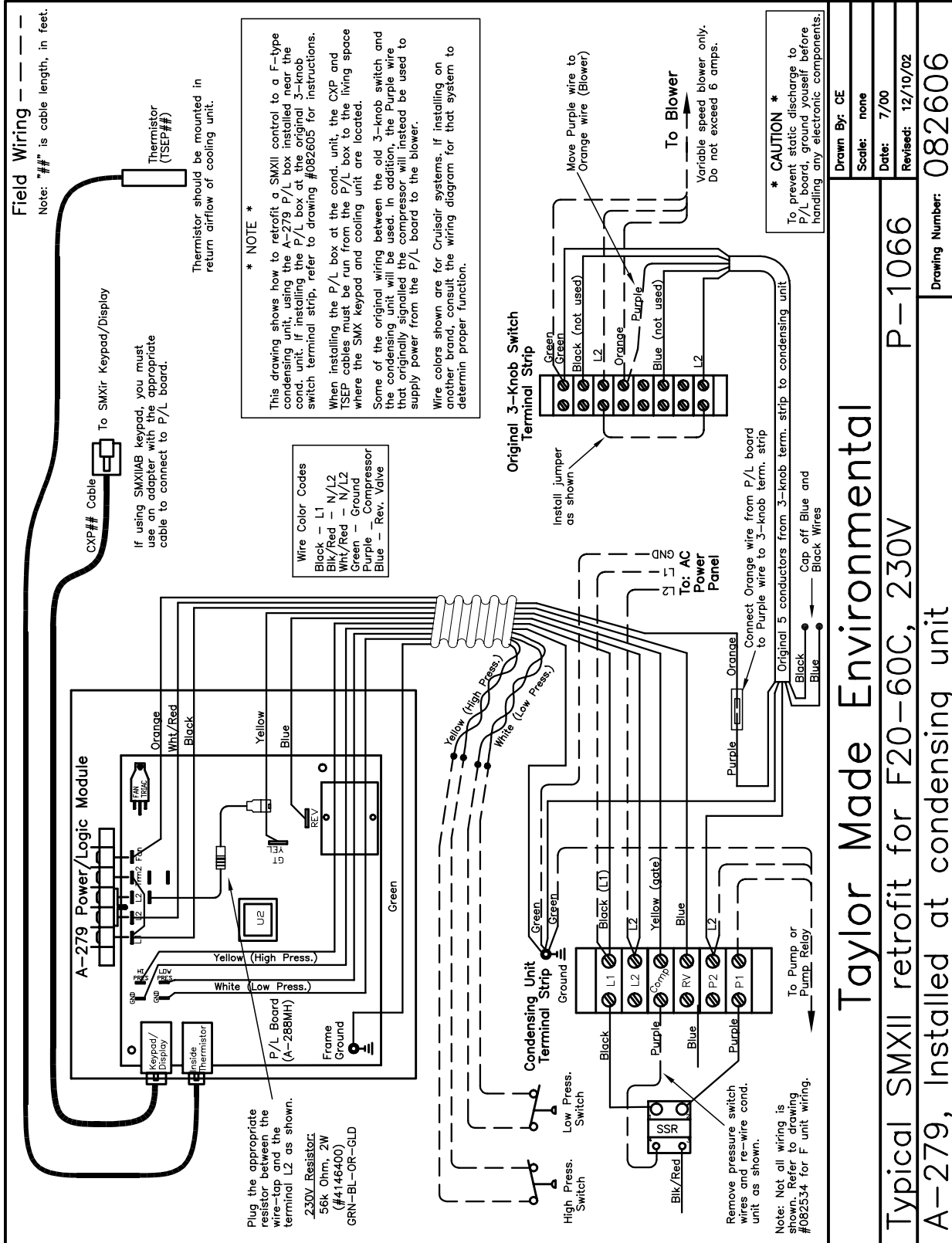
Taylor Made Environmental	
Typical SMXII retrofit for 3-knob switches P-1063	
A-284 Power/Logic Module 115/230V	
Drawing Number:	084001
Drawn By:	CE
Scale:	none
Date:	6/00
Revised:	12/02

Fig. 7 - SMXII Retrofit, F20C-48RC, to 3-knob term. strip



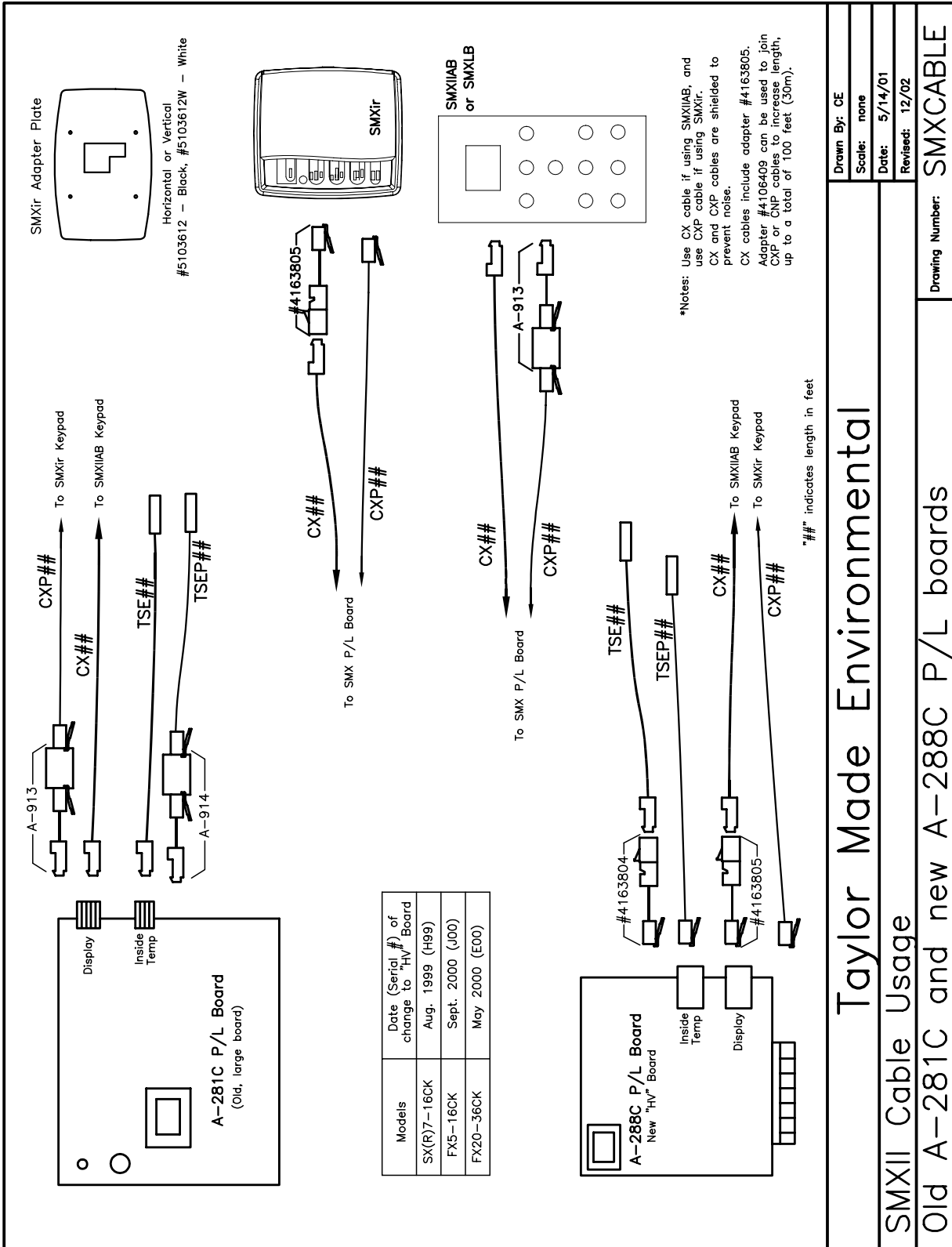
Taylor Made Environmental
 Typical SMXII retrofit for F20-60C, 230V
 A-279, Installed at switch term. strip

Fig. 8 - SMXII Retrofit, F20C-48RC, to condensing unit



Taylor Made Environmental
 Typical SMXII retrofit for F20-60C, 230V
 A-279, Installed at condensing unit

Fig. 9 - Cable Diagrams, Old and New P/L Boards



Taylor Made Environmental

SMXII Cable Usage

Old A-281C and new A-288C P/L boards

Drawing Number: **SMXCABLE**

Drawn By: CE
 Scale: none
 Date: 5/14/01
 Revised: 12/02

Fig. 10 - SMXir Mounting Template and Instructions

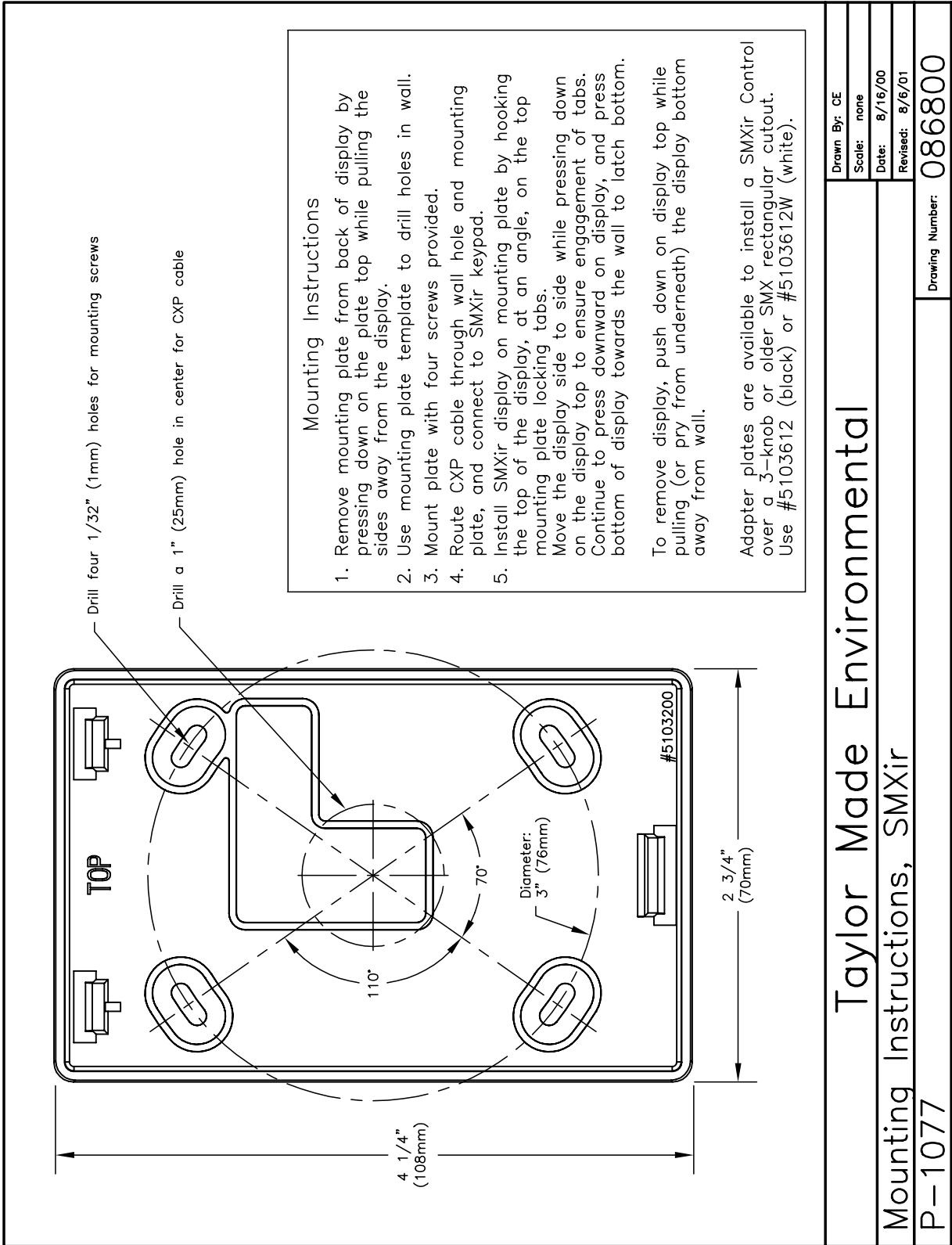
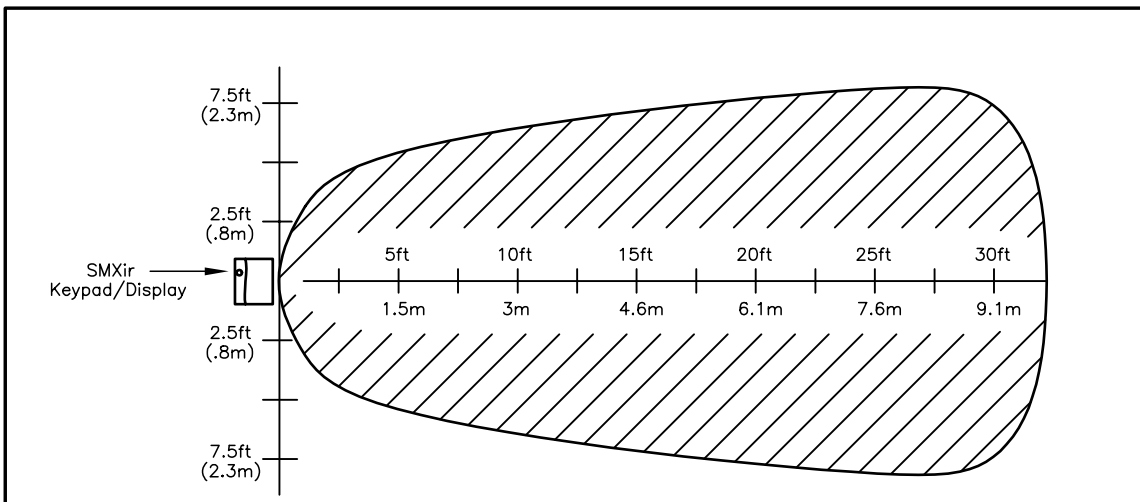


Fig. 11 - Replacement DX SMX II Parts

Model	Description
SMXIIAB	SMXII Keypad/Display, Black
SMXIIAN	SMXII Keypad/Display, Brown
PXB	Snap-on cover for SMXII, Black
PXN	Snap-on cover for SMXII, Brown
PXW	Snap-on cover for SMXII, White
PXG	Snap-on cover for SMXII, Beige
SMXIRB	SMXIR Keypad/Display, Black, 3/4 Door
SMXIRW	SMXIR Keypad/Display, White, 3/4 Door
SMXIRB-F	SMXIR Keypad/Display, Black, Full Door
SMXIRW-F	SMXIR Keypad/Display, White, Full Door
SMXIR-REM	SMXIR Remote Control
5103400	Replacement Full Door for SMXIRB, Black
5103400W	Replacement Full Door for SMXIRW, White
CX##	Cable for SMXII keypad (## is length in feet)
CXP##	Cable for SMXir keypad (## is length in feet)
TSE##	Temperature Sensor, 3-pin connector (old style)
TSEP##	Temperature Sensor, RJ-11 connector
A-288C	Replacement P/L board, 115/230V, HV
A-281C	Replacement P/L board, 115/230V, large board

Note: Cables are available in lengths from 5 feet to 60 feet.
See SMXCABLE drawing for different connectors.

Fig. 12 - SMXir Remote Control Operation Range



Cruisair Worldwide Service Dealer Locator

The service listings displayed for the United States are key members of the national Cruisair network. If you need service, please contact the closest company shown. In most cases they will direct you to a service port. We have over 500 Cruisair dealers in the national Cruisair network, and one should be convenient to you.

The international companies listed are capable of managing the majority of service requests for the countries listed. In some cases they will refer you to a local service port.

You may also contact us directly via the web site or call us in the US at (804) 746-1313.

Taylor Made Environmental – Europe is the Distribution Point for Europe and the Middle East. A large inventory is maintained at this location. This office can assist with quoting, service issues and sales issues. Look for more information under "England".

For a complete and up-to-date Dealer locator list, please visit our website at <http://www.cruisair.com/cruisair/dealer.html>

Domestic

USA

AAP Inc.

Location: Ladysmith, VA, USA
Territory: National Coach & Mobile Products Only
Phone: 804-633-9454
Fax: 804-633-5499
Web: www.aap.com

Alabama

Thom Chase Heating and A/C

Location: Chattanooga, TN, USA
Territory: Tennessee, Northern Alabama, Western Kentucky, Northern Mississippi
Phone: 423-344-6356
Fax: 423-344-6356
Email: thomchase@aol.com

California

Romaine Marine

Location: Richmond, CA, USA
Territory: Northern California
Phone: 510-232-1996

A to Z Marine Services

Location: San Diego, CA, USA
Territory: California
Phone: 619-224-1606
Fax: 619-226-0496
Email: info@atozmarine.net
Web: www.atozmarine.net

Connecticut

Nautical Air Conditioning, Inc.

Location: Copiague, NY, USA
Territory: NJ (North of Normandy), NY, CT, RI
Phone: 631-956-3456
Fax: 631-956-3479
Email: sales@nauticalair.com
Web: www.nauticalair.com

Charles S. Miller Yacht Engine Service

Location: Old Saybrook, CT, USA
Territory: Connecticut River Area
Phone: 860-388-9183
Fax: 860-388-2223

Delaware

Hoss Marine Service

Location: Havre-de-Grace, MD, USA
Territory: MD (N. of Baltimore), NJ (S. of Normandy), DE, PA, OH
Phone: 410-939-0631
Fax: 410-939-7546
Email: hossair@aol.com

Florida

Cruisair Southeast, A Division of T.K. Alley, Inc.

Location: Dania, FL, USA
Territory: Southeast Florida
Phone: 954-920-0300
Fax: 954-920-0301
Email: tkalley@aol.com
Web: www.cruisair-southeast.com

Ward's Marine Electric, Inc.

Location: Ft. Lauderdale, FL, USA
Territory: Battery Chargers Only
Phone: 954-523-2815
Fax: 954-523-1967
Email: info@wardsmarine.com

Cruisair Suncoast, Inc.

Location: St. Petersburg, FL, USA
Territory: Tampa, St. Petersburg and surrounding areas
Phone: 727-526-7875
Fax: 727-528-9519
Email: cruisairsuncoast@aol.com

Kansas

A.E.R. Supply, Inc.

Location: Seabrook, TX, USA
Territory: TX, MO, KS, OK
Phone: 281-474-3276
Fax: 281-474-2714
Email: rsmiller@aersupply.com

Kentucky

Thom Chase Heating and A/C

Location: Chattanooga, TN, USA
Territory: Tennessee, Northern Alabama, Western Kentucky, Northern Mississippi
Phone: 423-344-6356
Fax: 423-344-6356
Email: thomchase@aol.com

Louisiana

Sea Chest Marine Distr.

Location: New Orleans, LA, USA
Territory: Gulf Coast (LA & MS)
Phone: 800-535-8630
Fax: 504-288-1758

Maryland

Annapolis Cruisair

Location: Annapolis, MD, USA
Territory: Baltimore & Areas South
Phone: 410-224-0970
Fax: 410-224-0050

Hoss Marine Service

Location: Havre-de-Grace, MD, USA
Territory: MD (N. of Baltimore), NJ (S. of Normandy), DE, PA, OH
Phone: 410-939-0631
Fax: 410-939-7546
Email: hossair@aol.com

Massachusetts

World Wide Enterprises

Location: Cape Cod, MA, USA
Phone: 508-540-0963

Michigan

J & S Marine Sales & Service

Location: Detroit, MI, USA
Territory: Michigan, Canada (Windsor to Toronto)
Phone: 586-463-3400
Email: jandsmarine@earthlink.net

Minnesota

Marine Specialties

Location: Red Wing, MN, USA
Territory: Minnesota and Western Wisconsin
Phone: 651-388-4991
Fax: 651-388-3592

Mississippi

Thom Chase Heating and A/C

Location: Chattanooga, TN, USA
Territory: Tennessee, Northern Alabama, Western Kentucky, Northern Mississippi
Phone: 423-344-6356
Fax: 423-344-6356
Email: thomchase@aol.com

Sea Chest Marine Distr.

Location: New Orleans, LA, USA
Territory: Gulf Coast (LA & MS)
Phone: 800-535-8630
Fax: 504-288-1758

Missouri

A.E.R. Supply, Inc.

Location: Seabrook, TX, USA
Territory: TX, MO, KS, OK
Phone: 281-474-3276
Fax: 281-474-2714
Email: rsmiller@aersupply.com

New Jersey

Nautical Air Conditioning, Inc.

Location: Copiague, NY, USA
Territory: NJ (North of Normandy), NY, CT, RI
Phone: 631-956-3456
Fax: 631-956-3479
Email: sales@nauticalair.com
Web: www.nauticalair.com

Hoss Marine Service

Location: Havre-de-Grace, MD, USA
Territory: MD (N. of Baltimore), NJ (S. of Normandy), DE, PA, OH
Phone: 410-939-0631
Fax: 410-939-7546
Email: hossair@aol.com

New York

Nautical Air Conditioning, Inc.

Location: Copiague, NY, USA
Territory: NJ (North of Normandy), NY, CT, RI
Phone: 631-956-3456
Fax: 631-956-3479
Email: sales@nauticalair.com
Web: www.nauticalair.com

North Carolina

Martin's Marine

Location: Wilmington, NC, USA
Territory: North Carolina and Myrtle Beach, SC
Phone: 910-799-9362
Fax: 910-793-4267

Ohio

Hoss Marine Service

Location: Havre-de-Grace, MD, USA
Territory: MD (N. of Baltimore), NJ (S. of Normandy), DE, PA, OH
Phone: 410-939-0631
Fax: 410-939-7546
Email: hossair@aol.com

Oklahoma

A.E.R. Supply, Inc.

Location: Seabrook, TX, USA
Territory: TX, MO, KS, OK
Phone: 281-474-3276
Fax: 281-474-2714
Email: rsmiller@aersupply.com

Pennsylvania

Hoss Marine Service

Location: Havre-de-Grace, MD, USA
Territory: MD (N. of Baltimore), NJ (S. of Normandy),
DE, PA, OH
Phone: 410-939-0631
Fax: 410-939-7546
Email: hossair@aol.com

Rhode Island

Nautical Air Conditioning, Inc.

Location: Copiague, NY, USA
Territory: NJ (North of Normandy), NY, CT, RI
Phone: 631-956-3456
Fax: 631-956-3479
Email: sales@nauticalair.com
Web: www.nauticalair.com

Cay Electronics

Location: Portsmouth, Rhode Island, USA
Territory: Rhode Island
Phone: 401-683-3520
Fax: 401-683-3633
Web: www.cayelectronics.com

South Carolina

Martin's Marine

Location: Wilmington, NC, USA
Territory: North Carolina and Myrtle Beach, SC
Phone: 910-799-9362
Fax: 910-793-4267

Tennessee

Thom Chase Heating and A/C

Location: Chattanooga, TN, USA
Territory: Tennessee, Northern Alabama, Western
Kentucky, Northern Mississippi
Phone: 423-344-6356
Fax: 423-344-6356
Email: thomchase@aol.com

Texas

A.E.R. Supply, Inc.

Location: Seabrook, TX, USA
Territory: TX, MO, KS, OK
Phone: 281-474-3276
Fax: 281-474-2714
Email: rsmiller@aersupply.com

Washington

Sure Marine Services Inc.

Location: Seattle, WA, USA
Territory: Northwest
Phone: 206-784-9903
Fax: 206-784-0506
Email: suremarine@aol.com

International

Angola

Southern Power Products

Location: Cape Town, South Africa
Territory: Angola, Botswana, Mozambique, Namibia,
S. Africa, Zambia, Zimbabwe
Phone: 27-21-511-0653
Fax: 27-21-510-3049
Email: sales@southernpower.co.za

Antigua

The Signal Locker

Location: English Harbour, Antigua
Phone: 268-460-1528
Fax: 268-460-1148
Email: lockers@candw.ag

Aboard Refrigeration

Location: English Harbour, Antigua
Phone: 268-460-1690
Fax: 268-460-1690
Email: aboardrf@candw.ag

Argentina

Trimer S.A.

Location: Buenos Aires, Argentina
Phone: 5411-4580-0444
Fax: 5411-4580-0440
Email: trimer@trimer.com.ar
Web: www.trimer.ar

Australia

Seabreeze Industries

Location: Wongawallan, QLD, (Gold Coast),
Australia
Phone: 61-7-55299808
Fax: 61-7-55454426
Email: seabreeze@bigpond.net.au
Web: www.seabreeze-industries.com.au

Austria

Nautica Centis di Nespolo Cinzia & C. Sne

Location: Bevazzana de Latisana (UD), Italy
Territory: Northeast Italy, Austria, Croatia, Slovenia
Phone: 390-431-53-644
Fax: 390-431-53-460
Email: nautica.centis@nauticacentis.it
Web: www.nauticacentis.it

Bahamas

Nixon's Refrigeration

Location: Abaco, Bahamas
Territory: Abaco Island only
Phone: 242-367-5219
Fax: 242-367-5219
Email: seannixon@email.com

Freezing Point, Ltd.

Location: Nassau, Bahamas
Phone: 242-325-3589
Fax: 242-356-5271
Email: rolandknowles@bahamas.net.bs

Bahrain

International Agencies

Location: Manama, Bahrain
Phone: 973-728691
Fax: 973-728412
Email: service@intercol.com

Benelux

ASA Boot Electro BV

Location: Watergang, Netherlands
Phone: 31 204 369 100
Fax: 31 204 369 109
Email: asaboot@worldonline.nl

Bermuda

Flatt's Marine

Location: St. Georges, Bermuda
Phone: 441-293-5740
Fax: 441-293-5740
Email: bermudabanger@ibl.bm

Botswana

Southern Power Products

Location: Cape Town, South Africa
Territory: Angola, Botswana, Mozambique, Namibia,
S. Africa, Zambia, Zimbabwe
Phone: 27-21-511-0653
Fax: 27-21-510-3049
Email: sales@southernpower.co.za

Brazil

Sailing Products

Location: Rio de Janeiro, Brazil
Phone: 55 (0) 21 3154-9990
Fax: 55 (0) 21 2494-7223
Email: sailing@sailing.com.br

Sailing Products

Location: Sao Paulo, Brazil
Phone: 55 (0) 11 81 1985
Fax: 55 (0) 11 81 1936

British Virgin Islands

Cay Electronics Ltd.

Location: Tortola, British Virgin Islands
Phone: 284-494-2400
Fax: 284-494-5389
Email: caybvi@candwbvi.net
Web: www.cayelectronics.com

Parts And Power

Location: Tortola, British Virgin Islands
Phone: 284-494-2830
Fax: 284-494-1584
Email: partspwr@surfbvi.com

British West Indies

Marine Power

Location: Grand Cayman Island, British West Indies
Phone: 345-947-1945
Fax: 345-947-1909
Email: mpower@candw.ky

Caribbean Marine & Diesel

Location: Turks and Caicos Islands, British West
Indies
Phone: 649-941-5903
Fax: 649-941-5902
Email: caribmarinediesel@tcway.tc

Canada

British Columbia

Airon Heating And Air Conditioning

Location: Vancouver, BC, Canada
Phone: 604-270-2040
Fax: 604-270-3888
Email: dmairon@telus.net
Web: www.aironhvac.com

Accutemps Refrigeration and Air Conditioning

Location: Victoria, BC, Canada
Phone: 250-475-2665
Fax: 250-475-1957

Ontario

J & S Marine Sales & Service

Location: Detroit, MI, USA
Territory: Michigan, Canada (Windsor to Toronto)
Phone: 586-463-3400
Email: jandsmarine@earthlink.net

Northland Supply Company

Location: Queensville, ON, Canada
Phone: 905-478-2244
Fax: 905-478-2295
Email: norsupco@aol.com
Web: www.norsupco.com

Costa Rica

Metro Marine

Location: Herradura, Costa Rica
Phone: 506-643-3942
Fax: 506-643-2426

Croatia

Nautica Centis di Nespolo Cinzia & C. Sne

Location: Bevazzana de Latisana (UD), Italy
Territory: Northeast Italy, Austria, Croatia, Slovenia
Phone: 390-431-53-644
Fax: 390-431-53-460
Email: nautica.centis@nauticacentis.it
Web: www.nauticacentis.it

Cyprus

Tuti Mare Trading Ltd

Location: Limassol, Cyprus
Phone: 35 725 431313
Fax: 35 725 431300

Dominican Republic

May Day Marine

Location: San Juan, Puerto Rico
Territory: Puerto Rico, Dominican Republic
Phone: 787-720-9628
Fax: 787-790-2551

Inversiones Bastilla Internacional, S.A.

Location: Santiago, Dominican Republic
Phone: 809-299-2848
Fax: 809-226-0459
Email: ibinter@hotmail.com

Agencias Navieras B&R S.A.

Location: Santo Domingo, Dominican Republic
Territory: Dominican Republic
Phone: 809-562-3353
Fax: 809-562-3383
Email: hsosa@navierasbr.com

Egypt**Climate Company**

Location: Cairo, Egypt
Phone: 20-2-2598092
Fax: 20-2-4523028
Email: climate@tedata.net.eg

England**Taylor Made Environmental, Ltd./Europe,
European Office & Distribution Point**

Location: Poole, Dorset, United Kingdom
Territory: Europe, Gulf States
Phone: 44 (0) 870 3306101
Fax: 44 (0) 870 3306102
Email: sales@tmenviro-eu.com
Web: www.tmenviro-eu.com

Equador**Navas-Bustos Representaciones**

Location: Guayaquil, Equador
Phone: 593-2-252542
Fax: 593-2-251-421

Eritrea**DM Electrical Engineering**

Location: Asmara, Eritrea
Phone: 291-1-126737
Fax: 291-1-127650

France**Reya Electricite Marine**

Location: Cannes, La Bocca, France
Territory: Monaco
Phone: 33-493.90.47.00
Fax: 33-493.47.42.57
Email: ventes@reya.com
Web: www.reya.com

French West Indies**Iceberg Refrigeration**

Location: Guadeloupe, French West Indies
Phone: 590-24 35 35
Fax: 590-24 35 35
Email: iceberg.refrigeration@wanadoo.fr

C.S. Services

Location: Martinique, French West Indies
Phone: 596-749113
Fax: 596-749174

Germany**GEMO GmbH**

Location: Travemunde, Germany
Phone: 49-4502-2466
Fax: 49-4502-2425
Email: gemo_gmbh@t-online.de
Web: www.gemo_online.de

Greece**Polifrost Technical Ltd.**

Location: Piraeus, Greece
Phone: 30-1-461-3370
Fax: 30-1-461-4376

Grenada**Outfitters International**

Location: St. Georges, Genada
Phone: 473-440-7949
Fax: 473-440-6680
Email: footloos@caribsurf.com

Guam**Fentress Refrigeration Service Co.**

Location: Tamuning, Guam
Phone: 671-565-4038
Fax: 671-565-3315

Guatemala**Automotores y Marina, S.A.**

Location: Villa Nueva, Guatemala
Phone: 502-631-2033
Fax: 502-631-2034
Email: automotores@guate.net

Hong Kong**Tritex Equipment (H.K.) Ltd.**

Location: Kowloon, Hong Kong
Phone: 852-2341-3329
Fax: 852-2343-1830
Email: tx1607@netvigator.com

Astral Marine, Ltd.

Location: Sai Kung, NT, Hong Kong
Phone: 852-2719-5982
Fax: 852-2335-0580
Email: funcle@netvigator.com
Web: www.astral.com.hk

Indonesia**Tritex Equipment Pte. Ltd.**

Location: Singapore
Territory: Indonesia, Malaysia, Maldives, Myanmar, Philippines, Singapore
Phone: (65) 6861 1188
Fax: (65) 6861 4263
Email: tritex@pacific.net.sg
Web: www.tritex.com.sg

Israel**Yamit Mil Ltd.**

Location: Tel-Aviv, Israel
Phone: 972-3-5271778
Fax: 972-3-5271772
Email: mil@yamitysb.co.il

Italy**Nautica Centis di Nespolo Cinzia & C. Sne**

Location: Bevazzana de Latisana (UD), Italy
Territory: Northeast Italy, Austria, Croatia, Slovenia
Phone: 390-431-53-644
Fax: 390-431-53-460
Email: nautica.centis@nauticacentis.it
Web: www.nauticacentis.it

E.T.N. S.A.S.

Location: Milan, Italy
Territory: Northwest Italy
Phone: 390-2-253-6115
Fax: 390-2-253-6115
Email: 0022536115@iol.it

Cummins Diesel Italia S.P.A.

Location: Rome, Italy
Territory: Central & Southern Italy
Phone: 390-2-6-650-7746
Fax: 390-2-6-650-6524
Email: luigi.casaburi@cummins.com

Japan**Gunji Corporation**

Location: Osaka, Japan
Phone: 81-6-6451-5615
Fax: 81-6-6454-0056
Email: gunji@gunji.com
Web: www.gunji.com

Kuwait**Seas & Deserts**

Location: Safat, Kuwait
Phone: 965-4849212
Fax: 965-4845346

Malaysia**Tritex Equipment Pte. Ltd.**

Location: Singapore
Territory: Indonesia, Malaysia, Maldives, Myanmar, Philippines, Singapore
Phone: (65) 6861 1188
Fax: (65) 6861 4263
Email: tritex@pacific.net.sg
Web: www.tritex.com.sg

Maldives**Tritex Equipment Pte. Ltd.**

Location: Singapore
Territory: Indonesia, Malaysia, Maldives, Myanmar, Philippines, Singapore
Phone: (65) 6861 1188
Fax: (65) 6861 4263
Email: tritex@pacific.net.sg
Web: www.tritex.com.sg

Wheel Engineering Services

Location: Malé, Maldives
Territory: Maldives
Phone: 960-327806
Fax: 960-324145
Email: wes@avasmil.com.mv

Malta**Inmartech Ltd**

Location: St Maida, Malta
Territory: Malta
Phone: 356-21-9949-8502
Email: inmartech@waldonet.net.mt

Mexico**Servicios Técnicos Marinos**

Location: Mexico City, Mexico
Phone: 525-294-0562
Fax: 525-294-9688
Email: rpdal@performance.com.mx

Performance Yachts

Location: San Diego, CA, USA
Territory: Mexico
Phone: 619-222-2400
Fax: 619-223-6484

Monaco**Reya Electricite Marine**

Location: Cannes, La Bocca, France
Territory: Monaco
Phone: 33-493.90.47.00
Fax: 33-493.47.42.57
Email: ventes@reya.com
Web: www.reya.com

Mozambique**Southern Power Products**

Location: Cape Town, South Africa
Territory: Angola, Botswana, Mozambique, Namibia, S. Africa, Zambia, Zimbabwe
Phone: 27-21-511-0653
Fax: 27-21-510-3049
Email: sales@southernpower.co.za

Myanmar**Tritex Equipment Pte. Ltd.**

Location: Singapore
Territory: Indonesia, Malaysia, Maldives, Myanmar, Philippines, Singapore
Phone: (65) 6861 1188
Fax: (65) 6861 4263
Email: tritex@pacific.net.sg
Web: www.tritex.com.sg

Nambia**Southern Power Products**

Location: Cape Town, South Africa
Territory: Angola, Botswana, Mozambique, Namibia, S. Africa, Zambia, Zimbabwe
Phone: 27-21-511-0653
Fax: 27-21-510-3049
Email: sales@southernpower.co.za

Netherlands**ASA Boot Electro BV**

Location: Watergang, Netherlands
Phone: 31 204 369 100
Fax: 31 204 369 109
Email: asaboot@worldonline.nl

Netherlands Antilles

First Needs Co.

Location: Curacao, Netherlands Antilles
Phone: 599 966 69139
Fax: 599 976 79003
Email: hcrafft@attglobal.net
Web: www.firstneedscuracao.com

Necol N.V.

Location: St. Maarten, Netherlands Antilles
Phone: 599 545 2230, 599 545 2363
Fax: 599 545 2349
Email: necol@sintmaarten.net

New Caledonia

Altomarine

Location: Noumea, New Caledonia
Phone: 687 25 96 12
Fax: 687 25 43 30
Email: altomar@altomarine.com

New Zealand

Whiting Power Systems

Location: Auckland, New Zealand
Phone: 64-9-358-2050
Fax: 64-9-358-0285
Email: sales@whiting.co.nz
Web: www.whitingpower.com

Norway

Refnor A.S.

Location: Østerås, Norway
Phone: 47-67 14 07 50
Fax: 47-67 14 70 88
Email: refnor.as@c2i.net

Oman

Hi-Tech Projects LLC

Location: Muscat, Oman
Phone: 968-595056/57/58
Fax: 968-595054
Email: hitech1@omantel.net.om

Pakistan

Communications & Machinery Corp.

Location: Karachi, Pakistan
Phone: 92-21-5678252
Fax: 92-21-5683283
Email: cmcorp@cyber.net.pk

Papau New Guinea

Lohberger Engineering Pty

Location: Pors Moresby, Papua New Guinea
Phone: 675-321-2122
Fax: 675-321-2704
Email: loheng@online.net.pg

Philippines

Tritex Equipment Pte. Ltd.

Location: Singapore
Territory: Indonesia, Malaysia, Maldives, Myanmar, Philippines, Singapore
Phone: (65) 6861 1188
Fax: (65) 6861 4263
Email: tritex@pacific.net.sg
Web: www.tritex.com.sg

Portugal

Nauticool

Location: Ferragudo, Portugal
Phone: 351 934 080 354
Fax: 351 282 461 818

Puerto Rico

Suncool Air Conditioning

Location: Carolina, Puerto Rico
Phone: 787-791-6971
Fax: 787-791-3885
Email: suncool1@coqui.net

Cool-Tech Air Condition

Location: Fajardo, Puerto Rico
Phone: (787) 860-2615
Fax: (787) 801-2050
Email: cooltech@isppr.com

Technical House (E.T.S. Inc.)

Location: San Juan, Puerto Rico
Territory: Sentry Battery Chargers Only
Phone: 787-781-1313
Fax: 787-781-2020
Email: jdonato@technicalhouse.co
Web: www.technicalhouse.com

May Day Marine

Location: San Juan, Puerto Rico
Territory: Puerto Rico, Dominican Republic
Phone: 787-720-9628
Fax: 787-790-2551

Centro Cruisair de Puerto Rico

Location: Santurce, Puerto Rico
Phone: 787-727-3637
Fax: 787-727-3637
Email: fernan_moreno@hotmail.com

Qatar

Laffan Marine

Location: Doha, Qatar
Phone: 974-4326893/4328021
Fax: 974-4327452

Saudi Arabia

Samaco Marine

Location: Jeddah, Saudi Arabia
Phone: 966-2-6990064
Fax: 966-2-6991024

Scandinavia

Refnor A.S.

Location: Østerås, Norway
Phone: 47-67 14 07 50
Fax: 47-67 14 70 88
Email: refnor.as@c2i.net

Singapore

Tritex Equipment Pte. Ltd.

Location: Singapore
Territory: Indonesia, Malaysia, Maldives, Myanmar, Philippines, Singapore
Phone: (65) 6861 1188
Fax: (65) 6861 4263
Email: tritex@pacific.net.sg
Web: www.tritex.com.sg

Slovenia

Nautica Centis di Nespolo Cinzia & C. Sne

Location: Bevazzana de Latisana (UD), Italy
Territory: Northeast Italy, Austria, Croatia, Slovenia
Phone: 390-431-53-644
Fax: 390-431-53-460
Email: nautica.centis@nauticacentis.it
Web: www.nauticacentis.it

South Africa

Southern Power Products

Location: Cape Town, South Africa
Territory: Angola, Botswana, Mozambique, Namibia, S. Africa, Zambia, Zimbabwe
Phone: 27-21-511-0653
Fax: 27-21-510-3049
Email: sales@southernpower.co.za

Spain

Acastimar

Location: Tarragona, Spain
Phone: 349-77-362118
Fax: 349-77-362687
Email: acastimar@acastimar.com

Sri Lanka

G&M Enterprises

Location: Colombo, Sri Lanka
Phone: 94-1-691966
Fax: 94-1-691751
Email: gandm@sri.lanka.net

Sweden

S.A.L.T.

Location: Alvesta, Sweden
Phone: 46 472 106 10
Fax: 46 472 166 77
Email: salt@hall-miba.se

Switzerland

Marine Parts Heimgartner

Location: Volketswil, Switzerland
Phone: 41-1-997 40 90
Fax: 41-1-997 40 94
Email: info@marineparts.ch
Web: www.marineparts.ch

Taiwan

Ing Hai Company, Ltd.

Location: Kaohsiung, Taiwan
Phone: 886-7-802-1809
Fax: 886-7-802-1809

Ing Hai Company, Ltd.

Location: Taipei, Taiwan
Phone: 886-2-2531-2088
Fax: 886-2-2523-6531
Email: inghai@tpts6.seed.net.tw

Thailand

Thai Kolon Co. Ltd.

Location: Bangkok, Thailand
Phone: 66-2-745-6468-77 (10 lines)
Fax: 66-2-745-6152
Email: thkolon@infonews.co.th

Trinidad & Tobago

Nau-T-Kol Marine Refrigeration

Location: Chaguaramas, Trinidad
Phone: 868-634-2174
Fax: 868-634-2174
Email: nautkol@cablet.net
Web: www.nautkol.com
Turkey

Egemar Muhendislik Dan. San. Ve Tic. Ltd. Sti.

Location: Istanbul, Turkey
Phone: 90 (0) 216 494 21 68
Fax: 90 (0) 216 494 22 18
Email: sales@egemar.com.tr
Web: www.egemar.com.tr

U.S. Virgin Islands

St. Croix Marine Corp.

Location: St. Croix, U.S. Virgin Islands
Phone: 340-773-0289
Fax: 340-778-8974
Email: stxmarine@vipowernet.net

Coral Bay Marine Service

Location: St. John, U.S. Virgin Islands
Phone: 340-776-6859
Fax: 340-776-6859

Reefco

Location: St. Thomas, U.S. Virgin Islands
Phone: 340-776-0038
Fax: 340-776-0038
Email: dennedy@viaccess.net

United Arab Emirates

Technical Supplies & Services Co.

Location: Abu Dhabi, United Arab Emirates
Phone: 971-26-44-7912
Fax: 971-26-44-0175

HFL Mantech

Location: Dubai, United Arab Emirates
Phone: 971 4 333 25 42
Fax: 971 4 333 06 49
Email: mge@emirates.net.ae

Exalto Emirates Ltd

Location: Sharjah, United Arab Emirates
Phone: 971 6 5325597
Fax: 971 6 5325723
Email: exalto@emirates.net.ae

United Kingdom

Taylor Made Environmental, Ltd./Europe, European Office & Distribution Point

Location: Poole, Dorset, United Kingdom
Territory: Europe, Gulf States
Phone: 44 (0) 870 3306101
Fax: 44 (0) 870 3306102
Email: sales@tmenviro-eu.com
Web: www.tmenviro-eu.com

Venezuela

Rich Marine Center, C.A.

Location: Puerto La Cruz,, Estado Anzoategui,
Venezuela
Phone: 58 281 41 8 0324, 25, or 26
Fax: 58 281 2811630
Email: rich@tuyate.net
Web: www.tuyate.net

West Indies

Regis Electronics (St Lucia) LTD.

Location: St. Lucia, West Indies
Phone: 758-452-0205
Fax: 758-452-0206
Email: stlucia@regiselectronics.com

Zambia

Southern Power Products

Location: Cape Town, South Africa
Territory: Angola, Botswana, Mozambique, Namibia,
S. Africa, Zambia, Zimbabwe
Phone: 27-21-511-0653
Fax: 27-21-510-3049
Email: sales@southernpower.co.za

Zimbabwe

Southern Power Products

Location: Cape Town, South Africa
Territory: Angola, Botswana, Mozambique, Namibia,
S. Africa, Zambia, Zimbabwe
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Fax: 27-21-510-3049
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