

SMX II Control Systems (DX)

❖ INSTALLATION

Cruisair[®]

For Direct Expansion SMX II Control Systems using SMXIIAB,
SMXir or the new SMXht keypad/displays.

Direct Expansion Systems
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L-2382 ❖ English



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SMX II Control Systems • Introduction

Warning

This manual contains essential information concerning the installation 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 Dometic Service Department for assistance.

Introduction

The term "SMX II" refers to the overall product family of keypad/display controls and to the power/logic circuit board located in the a/c unit's electrical box. There are three different keypad/displays that can operate an SMX II control system.

The three different keypad/displays are:

- **SMXIIAB** (previously known as SMX II) - rectangular in shape and larger than the other two, this was the standard for many years.
- **SMXir** - newer and smaller than the SMXIIAB, this control has a hinged cover and an optional remote control.
- **SMXht** - the newest "High Technology" keypad/display, this European style control fits into a decorative bezel and has many new features.

If you have the **SMXIIAB**, **SMXir**, or **SMXht** keypad/display, refer to the SMX II Control Systems (DX) Owner/Operator manual (L-2362) before operating those controls.

If you have an SMX Net control system, refer to the SMX Net Control Systems (DX) Installation and Operation manual.

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.

For **SMXir** or **SMXht** keypad/display installations, refer to drawings #086800 or #086810 in the back of this manual.

SMX II Only

The SMX II keypad/display requires a cutout of $2\frac{9}{16}" \times 7\frac{1}{8}"$ (65mm X 181 mm). 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 $\frac{3}{8}$ 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 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 $\frac{1}{4}"$ 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 Dometic Corporation 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.

Owner's Limited Warranty

As hereinafter described, Dometic Corporation 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 Dometic Corporation (Dometic) are under limited warranty to be free from defects in workmanship or materials under normal use and service with the obligation of Dometic 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 Dometic, shall appear to the satisfaction of Dometic 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 Dometic. In addition, Dometic 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 Dometic 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 Dometic except for the purpose of administering the above warranty to the extent herein provided, and Dometic does not authorize the dealer or any other person to assume for Dometic 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. Dometic shall not be responsible for any liability or expense except as is specifically authorized and provided in this section.

Dometic 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 Dometic 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 Dometic, i.e., items which are purchased from another manufacturer and supplied as received by Dometic without alteration or modification except as any part of an Dometic-manufactured unit or component.
6. Components or parts used by or applied by the purchaser as an integral part of products not manufactured by Dometic.
7. Warranty does not cover damage to components that comprise a Custom Wrapped Box Evaporator refrigeration system (aka: catch boxes, fish boxes, etc.) when the box is installed in such a way that the customer can move it. These damages may include, but are not limited to: crimped refrigerant linesets (copper tubing or flexible linesets), refrigerant leaks, moisture ingress into the refrigeration system, subsequent damage to condensing unit from being operated with low refrigerant charge or moisture in the system, broken refrigerant connections, broken thermostat sensors, and/or broken constant pressure valves.

Installation and application of Dometic components is not warranted by Dometic because Dometic 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 Limited Warranty Periods, document # L-0894, for the period of coverage.

All Dometic 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 Dometic 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 Dometic 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 Dometic warranty described in **Section I**. For proof of date put in service, Dometic will require a copy of the bill of sale of the Dometic 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 Dometic component is determined to be covered under the Dometic 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 a Dometic authorized Servicing Dealer perform the work needed. The customer should call Dometic'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 Dometic's Service Department for a Servicing Dealer and Dometic has no one in that particular area, Dometic will authorize the use of a local service company and Dometic 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. Dometic 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, Dometic will pay the freight both ways. Dometic prefers option one and two, if at all possible.

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

WARNING

Dometic Corporation (Dometic) 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 Dometic 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 Dometic product or group of Dometic 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 Dometic 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)), R404A (R125/R143a/R134 (44%/52%/4%)), or R417a, 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.

Limited 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 Dometic Corporation 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 and FR series installation.

2 year warranty Including Parts and Labor

- New G-series installation.

1 year warranty Including Parts and Labor

Refrigerators/Freezers/Fish Boxes

The below warranty periods do not apply to systems that are installed as described in Section II, item #7, of the Owner's Limited Warranty, document # L-0123.

- 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** **SXF5-16(C/CK); 115/230V, 50-60Hz**
Dwg No. C0010001
- Fig. 2** **SXF24C; 230V, 50-60Hz**
Dwg No. C0010003
- Fig. 3** **SXUF5-16(C/CK)/1-HV; 115/230V, 50-60Hz**
Dwg No. C0010004A
- Fig. 4** **SXUF18(C/CK)/1-HV; 115/230V, 50-60Hz**
Dwg No. C0010006A
- Fig. 5** **SXR7-16CK; 115/230V, 50-60Hz**
Dwg No. 82570, P-967
- Fig. 6** **SX7-24CK; 115/230V, 50-60Hz**
Dwg No. 082577, P-1023
- Fig. 7** **FX5-36CK; 115/230V, 50-60Hz**
Dwg No. 083703, P-1048
- Fig. 8** **FX48RC; 230V, 50-60 Hz**
Dwg No. 083704, P-1049
- Fig. 9** **FX20DC-FX48EC; 230V-460V, 3Ph, 50-60 Hz**
Dwg No. 084901, P1050
- Fig. 10** **SMX II Retrofit, Typ. 3-knob**
Dwg. No. 084001, P-1063 , A-284
- Fig. 11** **SMX II Retrofit, F20C-48RC, to 3-knob term. strip**
Dwg No. 082605, P-1065,A-279
- Fig. 12** **SMX II Retrofit, F20C-48RC, to cond. unit**
Dwg No. 082606, P-106, A-279
- Fig. 13** **SMXCABLE; Cable Diagrams; Old and New P/L Boards**
- Fig. 14** **SMXir Mounting Template and Instructions**
Dwg No. 086800, P-1077
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Dwg No. 086810
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- Fig. 17** **SMXir Remote Control Operation Range**
Dwg No. SKA-1247-rev1

Fig. 1 SXF5-16(C/CK); 115/230V, 50-60Hz

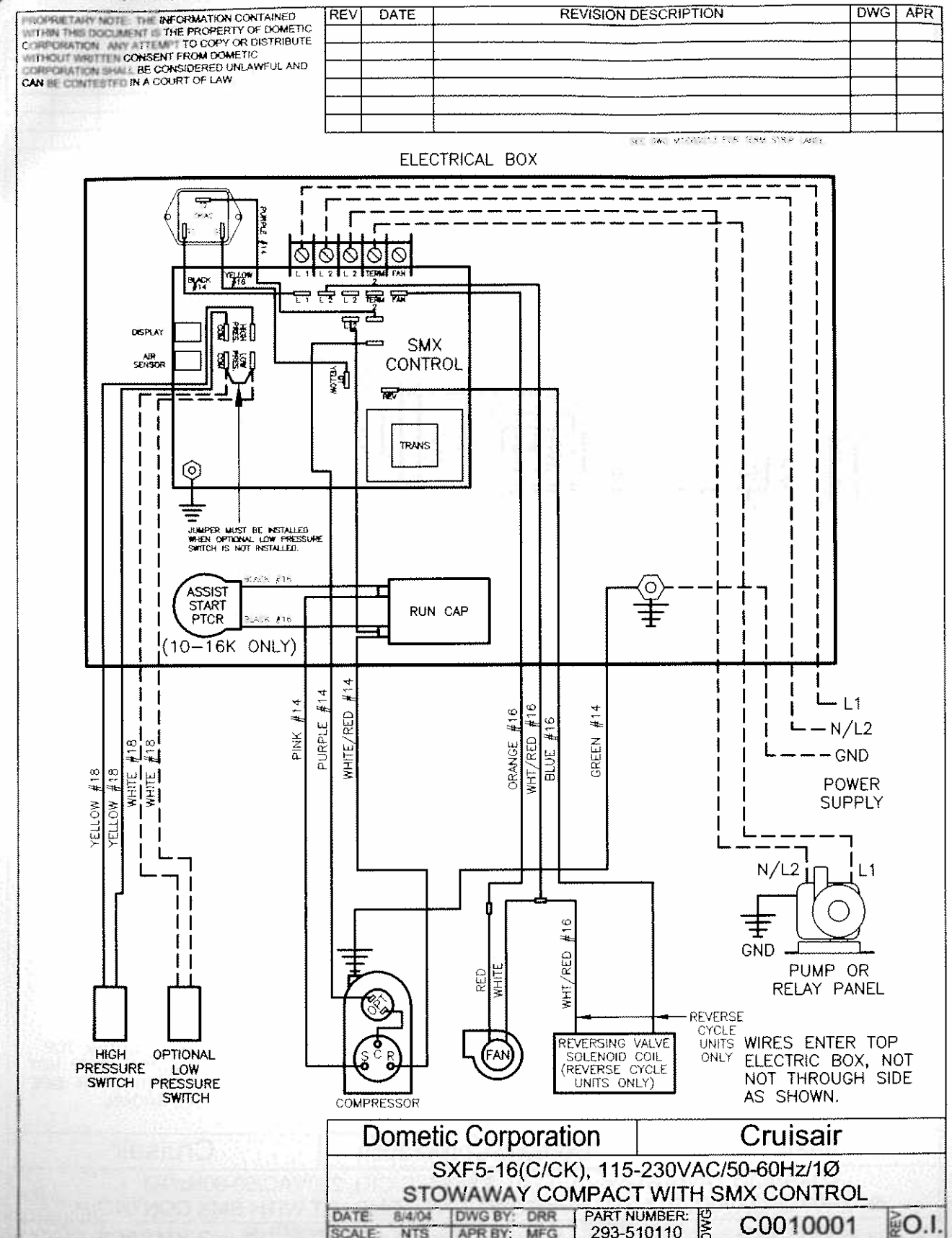


Fig. 2 SXF24C; 230V, 50-60Hz

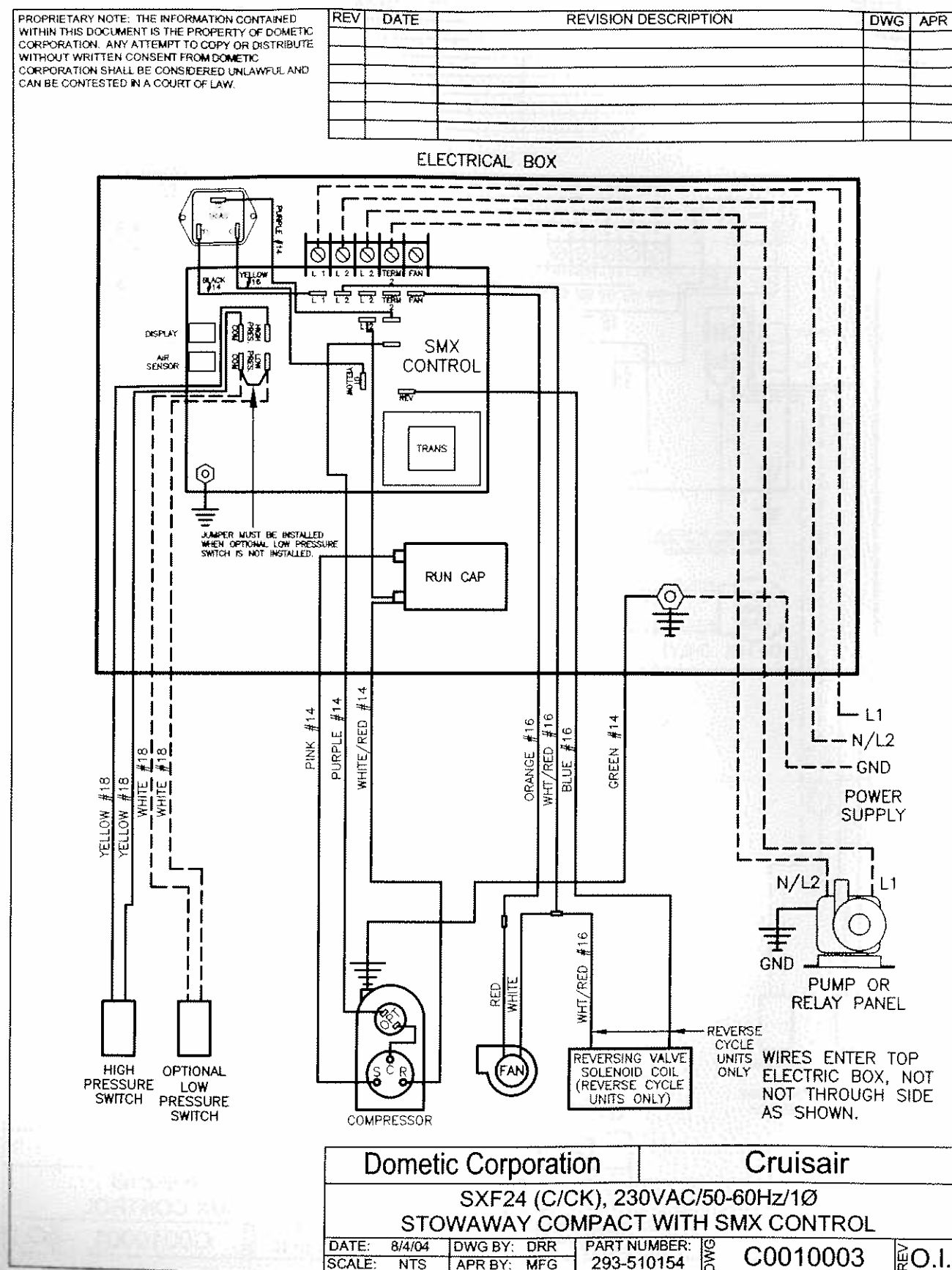


Fig. 3 SXUF5-16(C/CKY)-HV; 115/230V, 50-60Hz

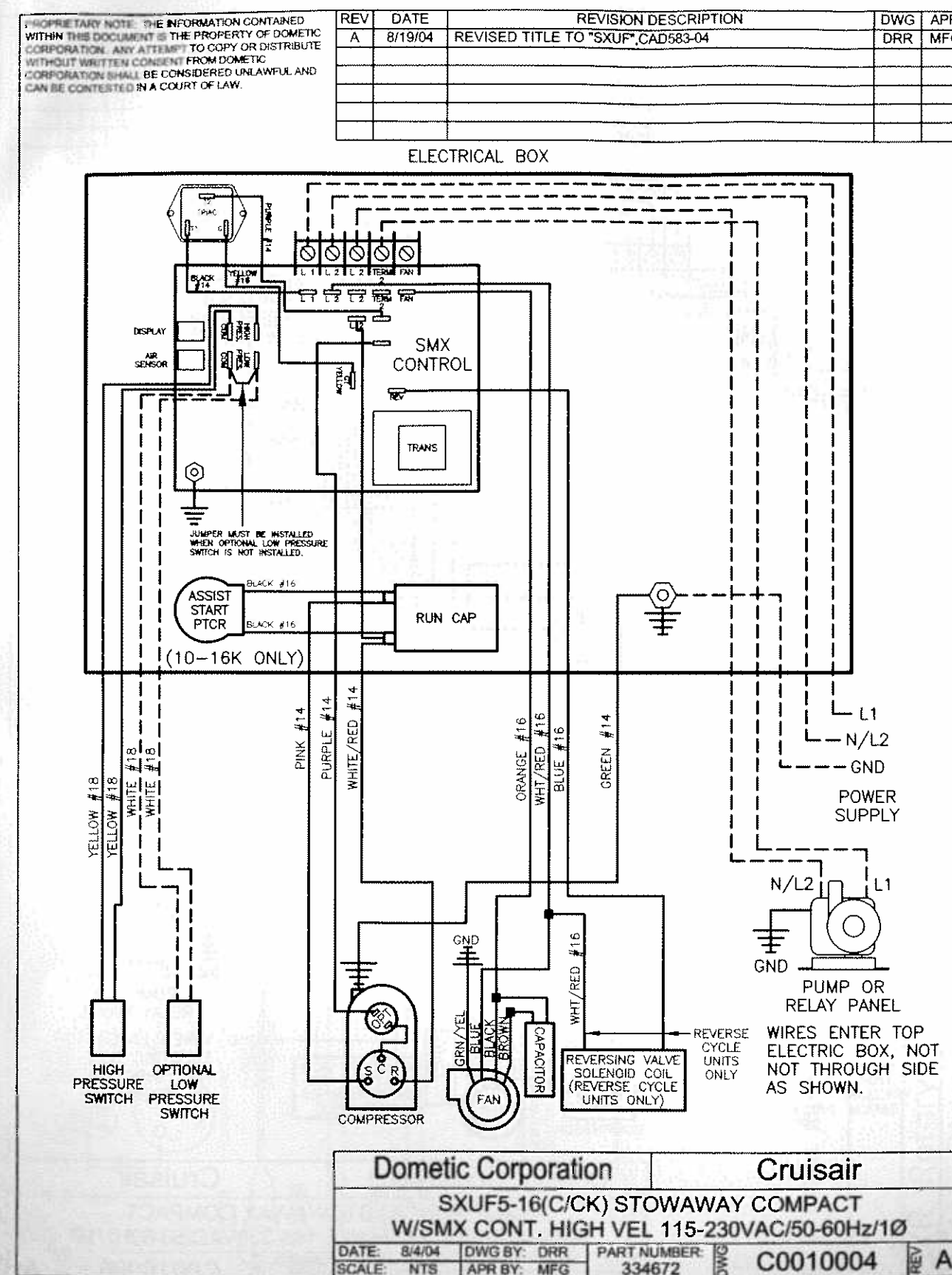


Fig. 6 SX7-24CK; 115/230V, 50-60Hz

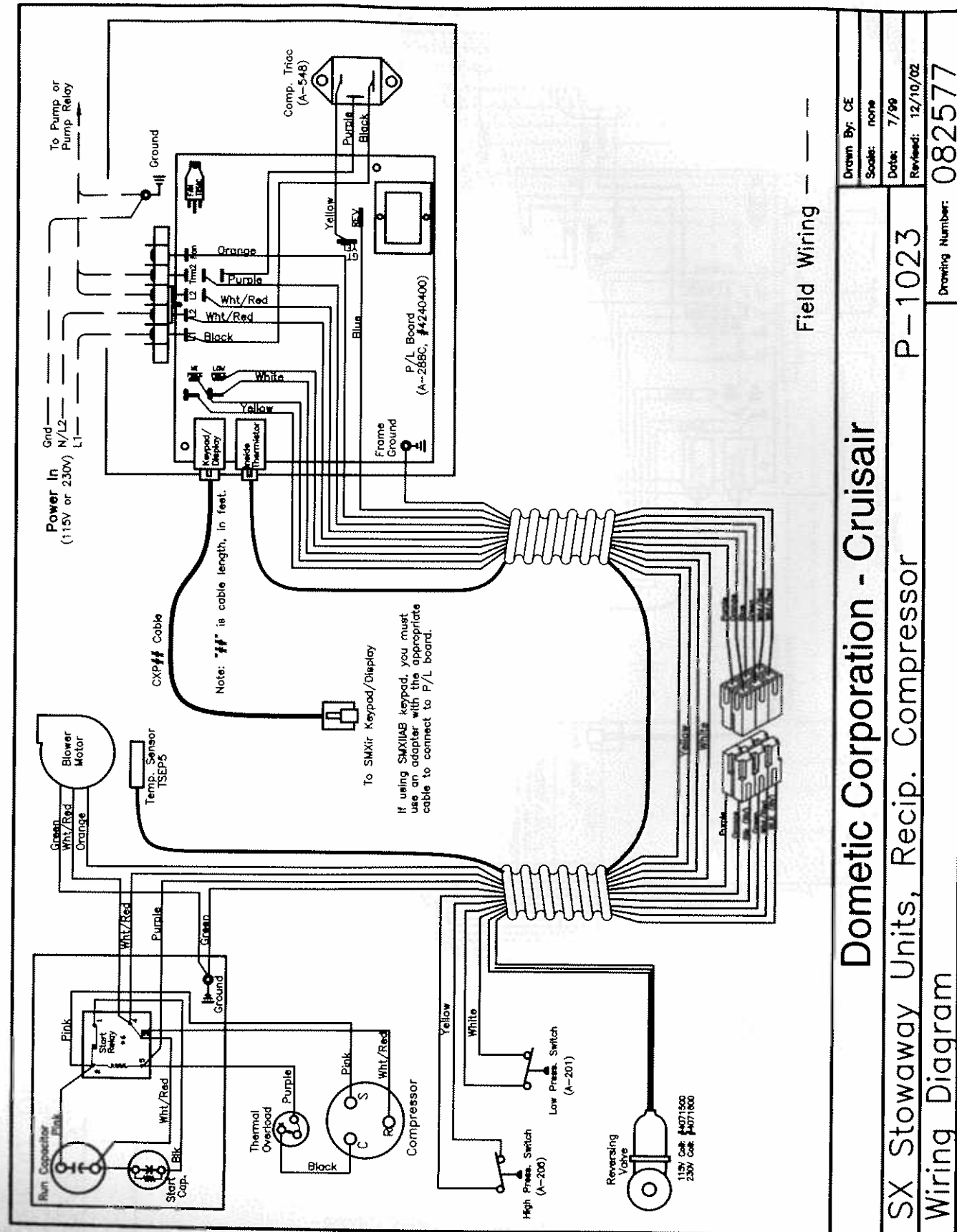


Fig. 7 RX/FX5-36CK; 115/230V, 50-60Hz

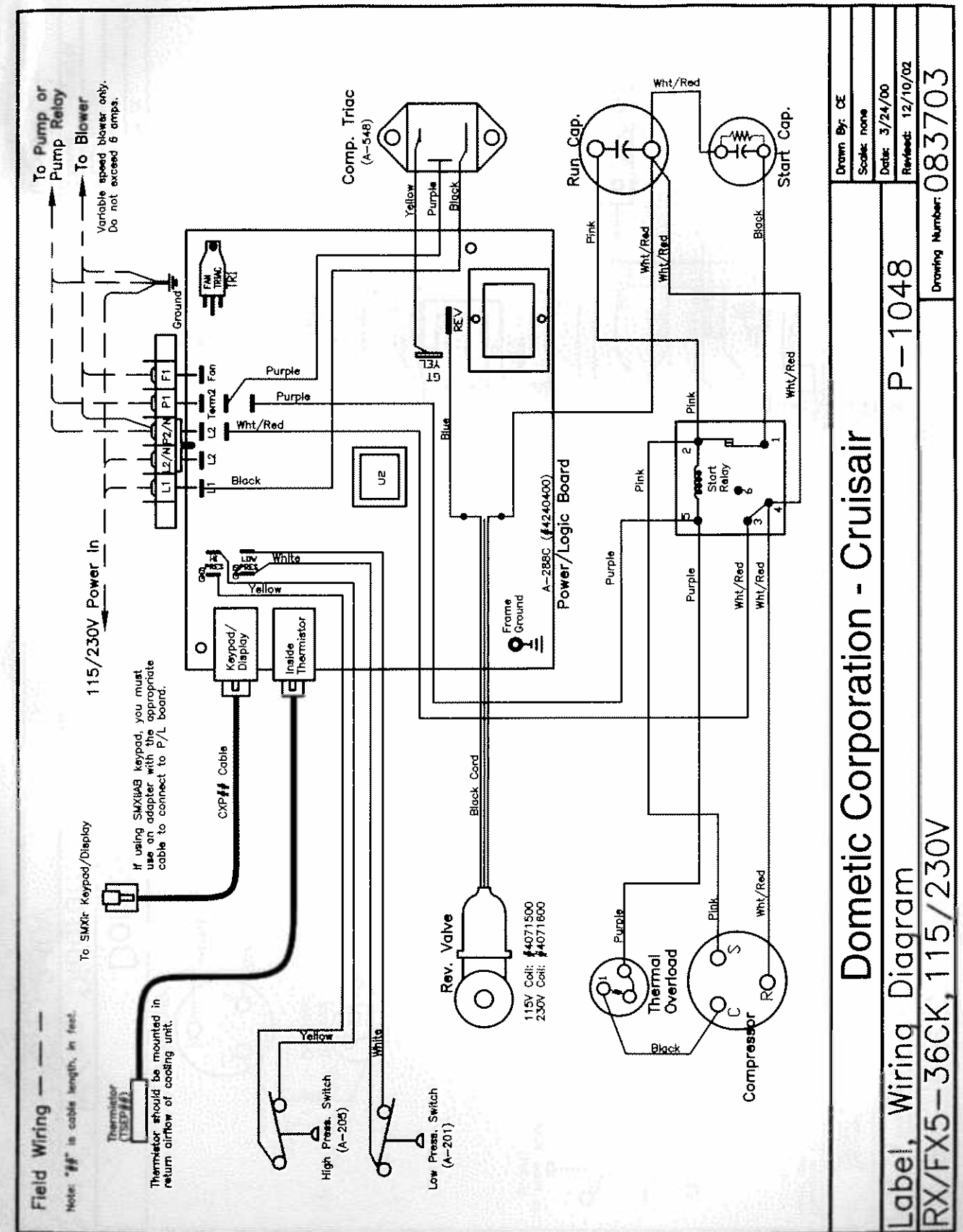


Fig. 10 SMX II Retrofit, Typ. 3-knob

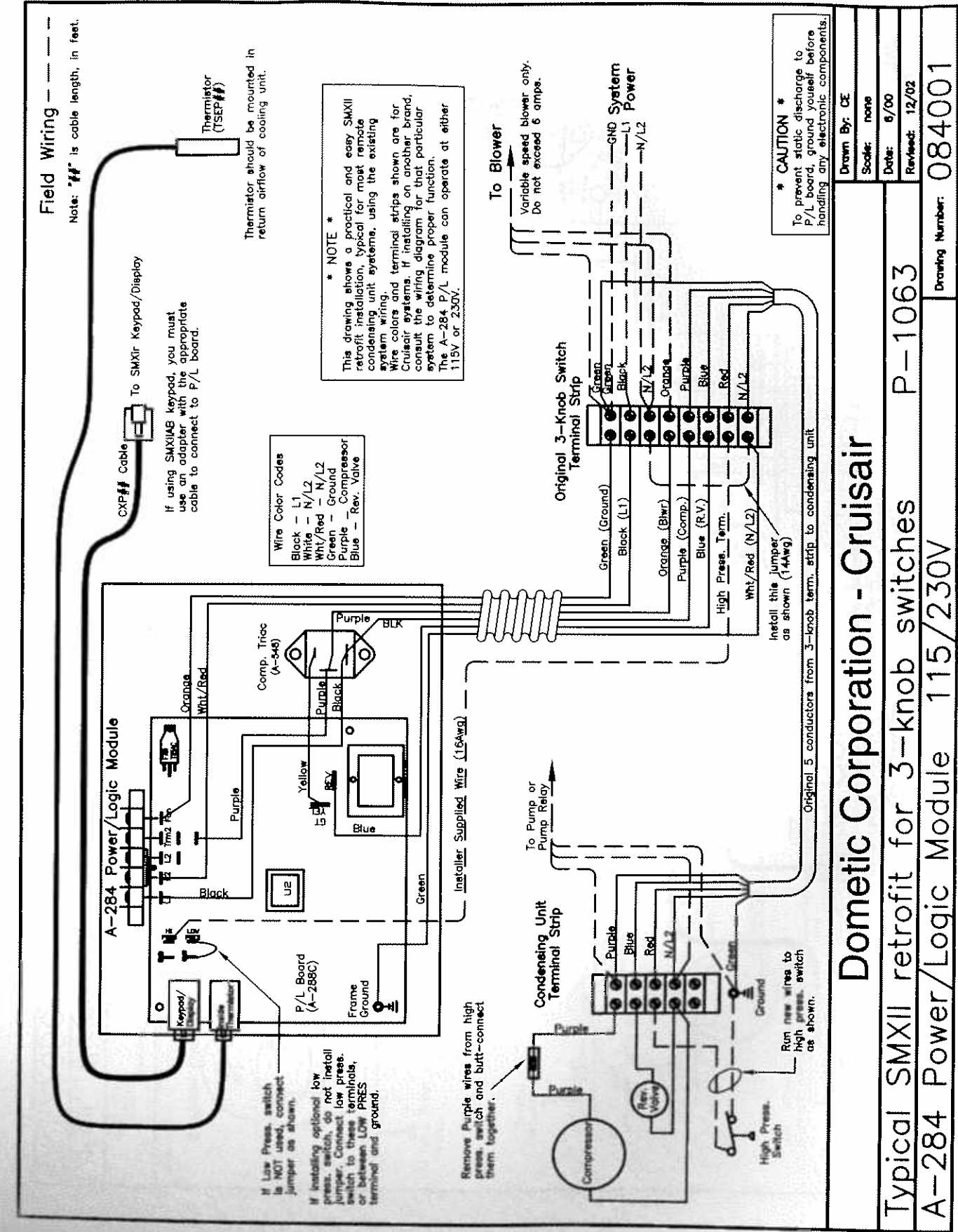
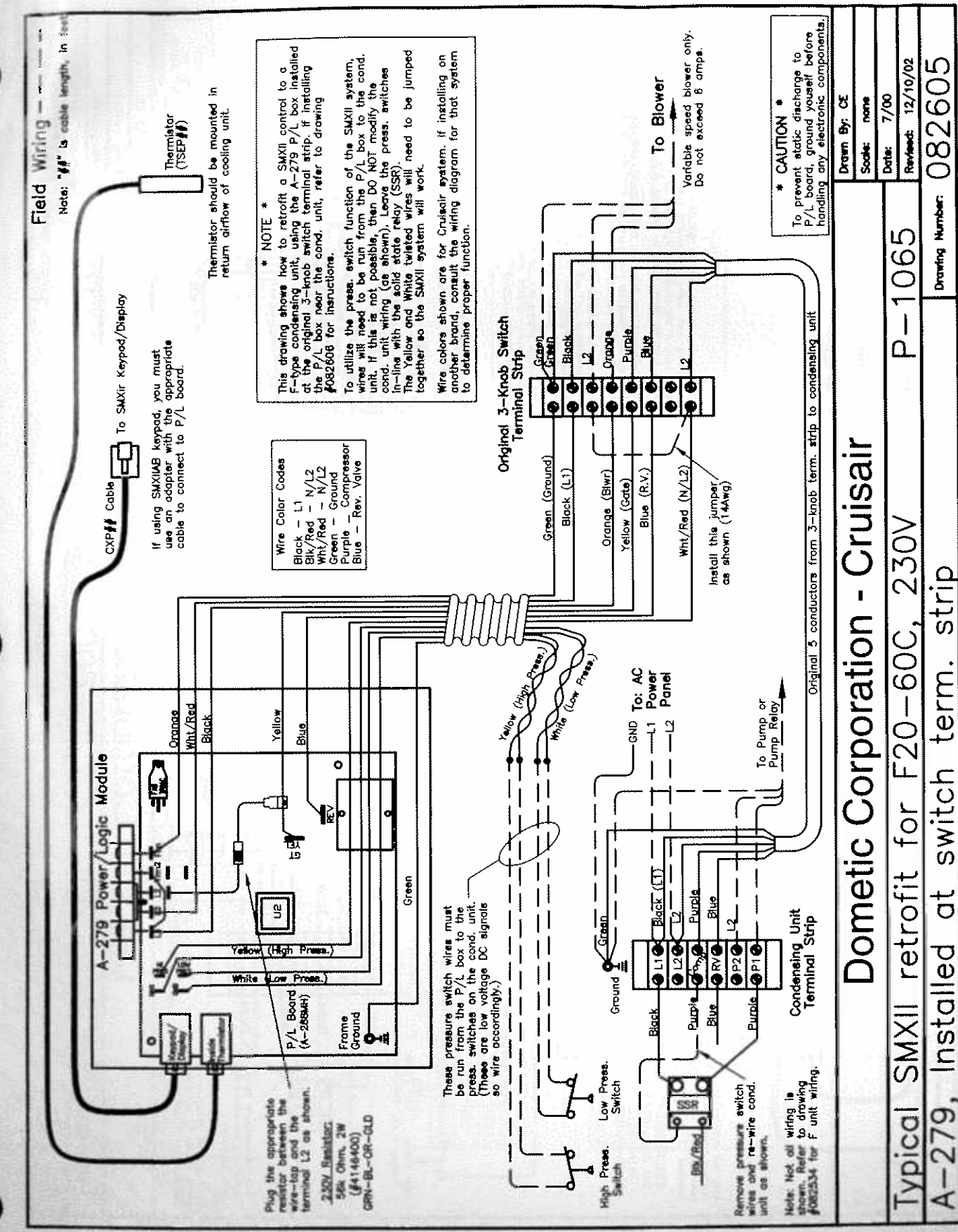


Fig. 11 SMX II Retrofit, F20C-48RC, to 3-knob term. strip



1-2384 Drawings/Diagrams



L-2382 Drawings/Diagrams



Fig. 14 SMXir Mounting Template and Instructions

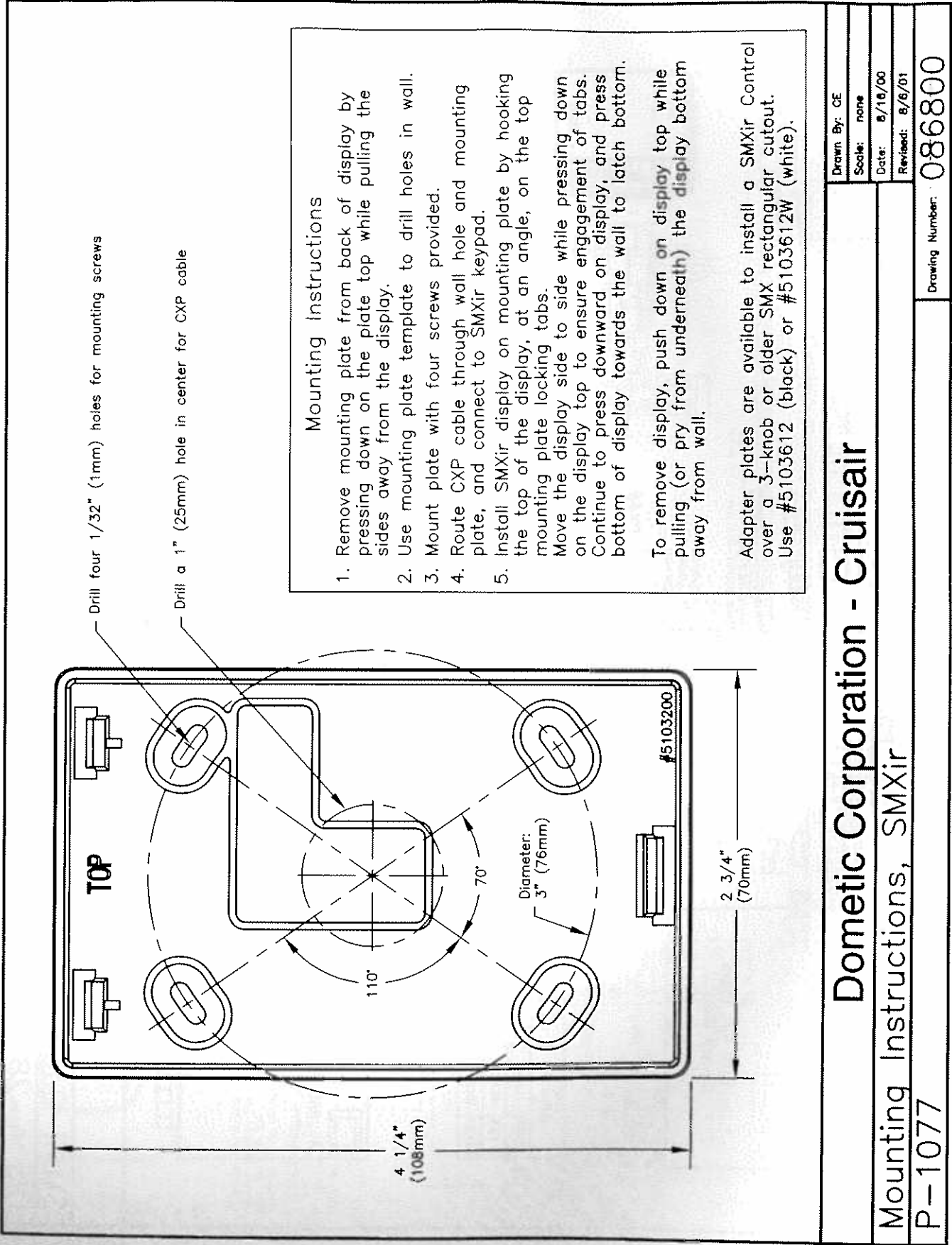


Fig. 15 SMXht Keypad/Display Mounting Instructions and Dimensions

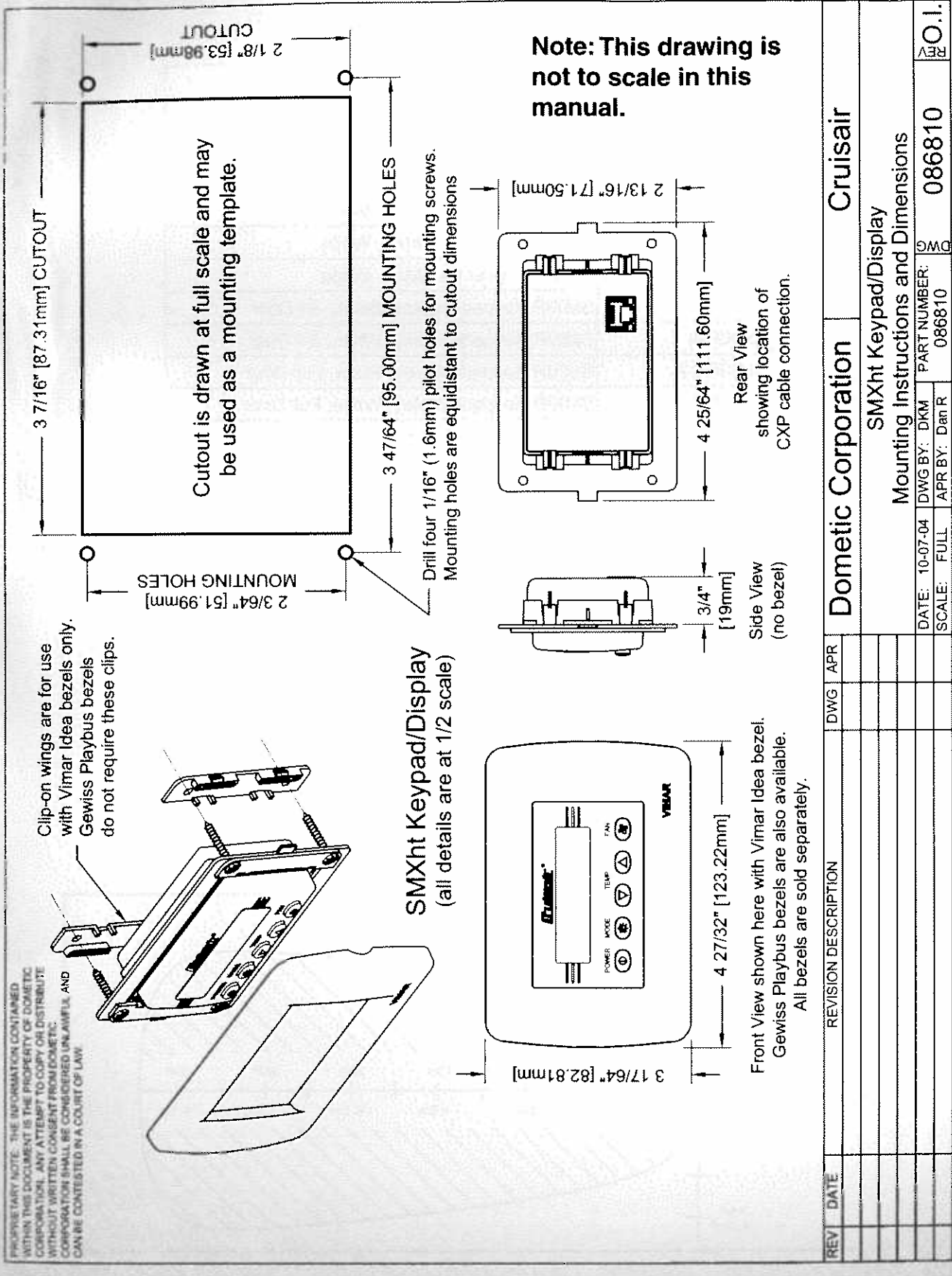


Fig. 16 Replacement DX SMX II Parts

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. 17 SMXir Remote Control Operation Range

