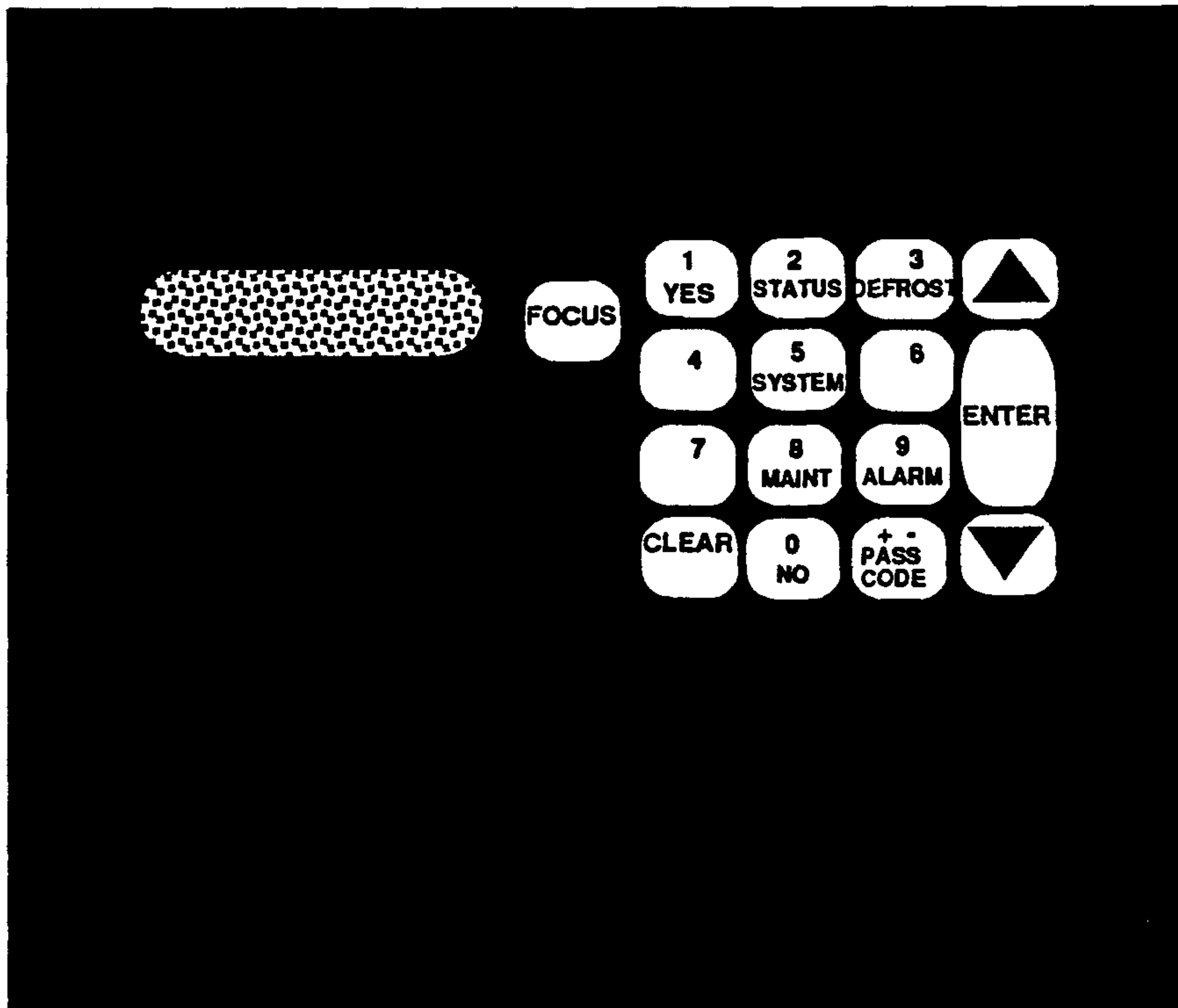


HUSSMANN®

Unloader Control



EPC-2000

Installation & Operation Manual

P/N 365300
August, 1992

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WARRANTY

IMPORTANT

KEEP IN STORE FOR FUTURE REFERENCE

Quality that sets industry standards

This merchandiser conforms to the
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EPC-2000 Unloader Control

INTRODUCTION

GENERAL

This instruction is to be used as an addendum to the EPC-2000 Installation Instruction for Super Plus (P/N 334495). The items contained here are additions to the basic EPC-2000 controller.

Unloader control reduces energy consumption for compressors which translates to cost savings for the customer. This reduction in energy is accomplished by cycling the unloader faster and more often to provide smoother control over suction pressure fluctuations. This quicker cycling of the unloader allows the compressor to operate longer with fewer starts and stops.

The EPC-2000 Unloader Control has the capability of controlling up to eight unloaders. Each unloader module consists of four unloader relays per board.

COMPONENTS

Unloader Relay Board w/ Interconnect Cable	0365218
Control Circuit Plug Assemblies	0334196

Unloader Relay Board

The Unloader relay board is connected to the EPC-2000 compressor relay board through a 10 conductor cable assembly.

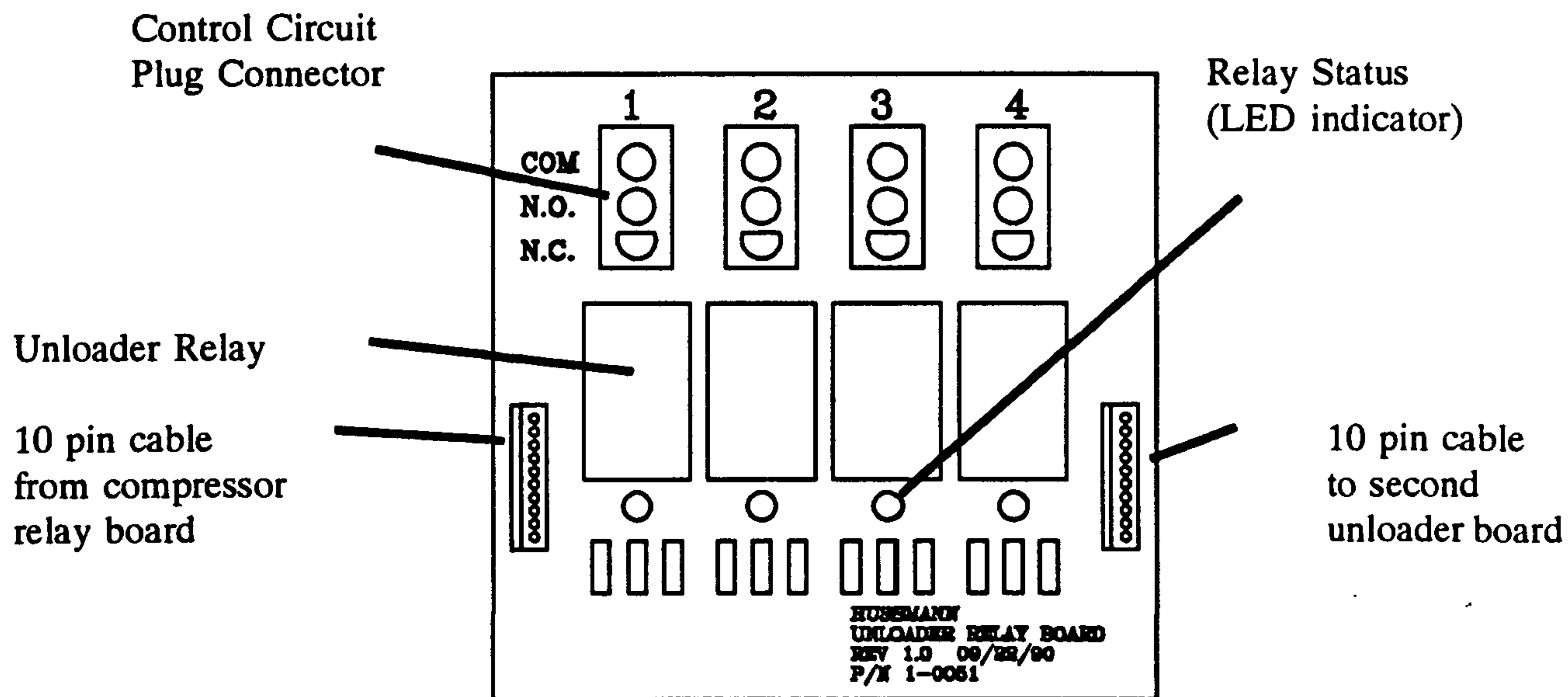


Figure 1-1. Unloader Relay Board

Control Circuit Plug Assemblies

The control circuit plug assemblies shown in Figure 1-2 connect the Unloader Control circuit to the relay board.

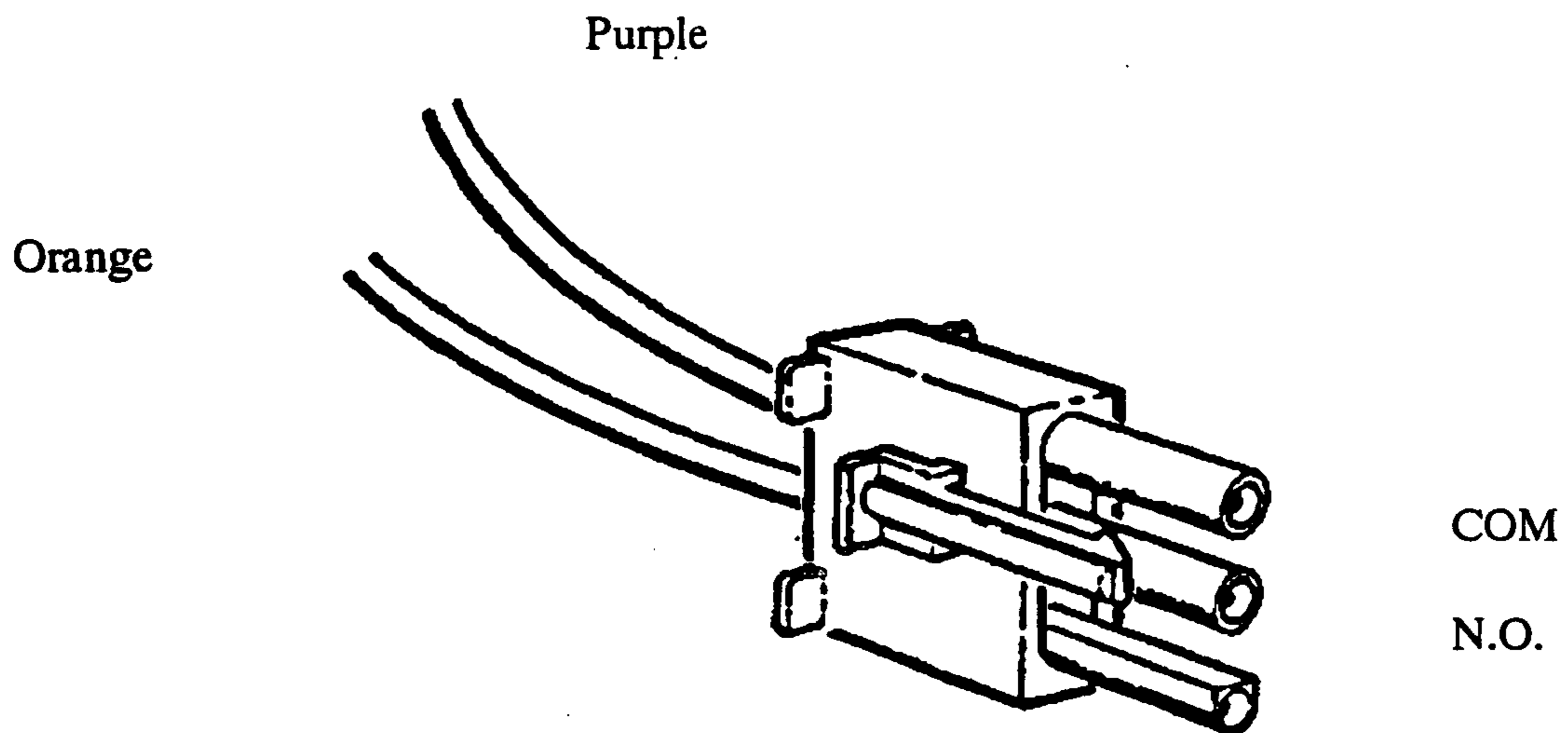


Figure 1-2. Control Plug Assembly

Interconnect Cable

The interconnect cable serves two purposes: (1) to connect the first unloader module to the compressor relay board and (2) to connect a second unloader module to the first unloader module. Each Unloader relay board will come equipped with this Interconnect Cable.



Figure 1-3. Interconnect Cable

INSTALLATION

FACTORY WIRING

Figure 2-1 shows the standard method of factory wiring an unloader to the Unloader Relay Board. Please refer to the EPC-2000 manual (P/N 334495) for proper installation of components within the Super Plus System.

When the Unloader solenoid (ULS) in Figure 2-1 is de-energized the compressor capacity will be at 100 percent. Inversely, when the Unloader solenoid is energized the capacity of the compressor is decreased. Figure 2-1 shows the compressor at full capacity. Under normal operation, when the EPC-2000 control relay energizes, the normally open contact closes to energize the unloader solenoid. This will reduce the capacity of the compressor. This method of wiring allows for a fail-safe condition when operating under mechanical backup. The Unloader will not operate and the compressor will be at full capacity when operating under mechanical backup.

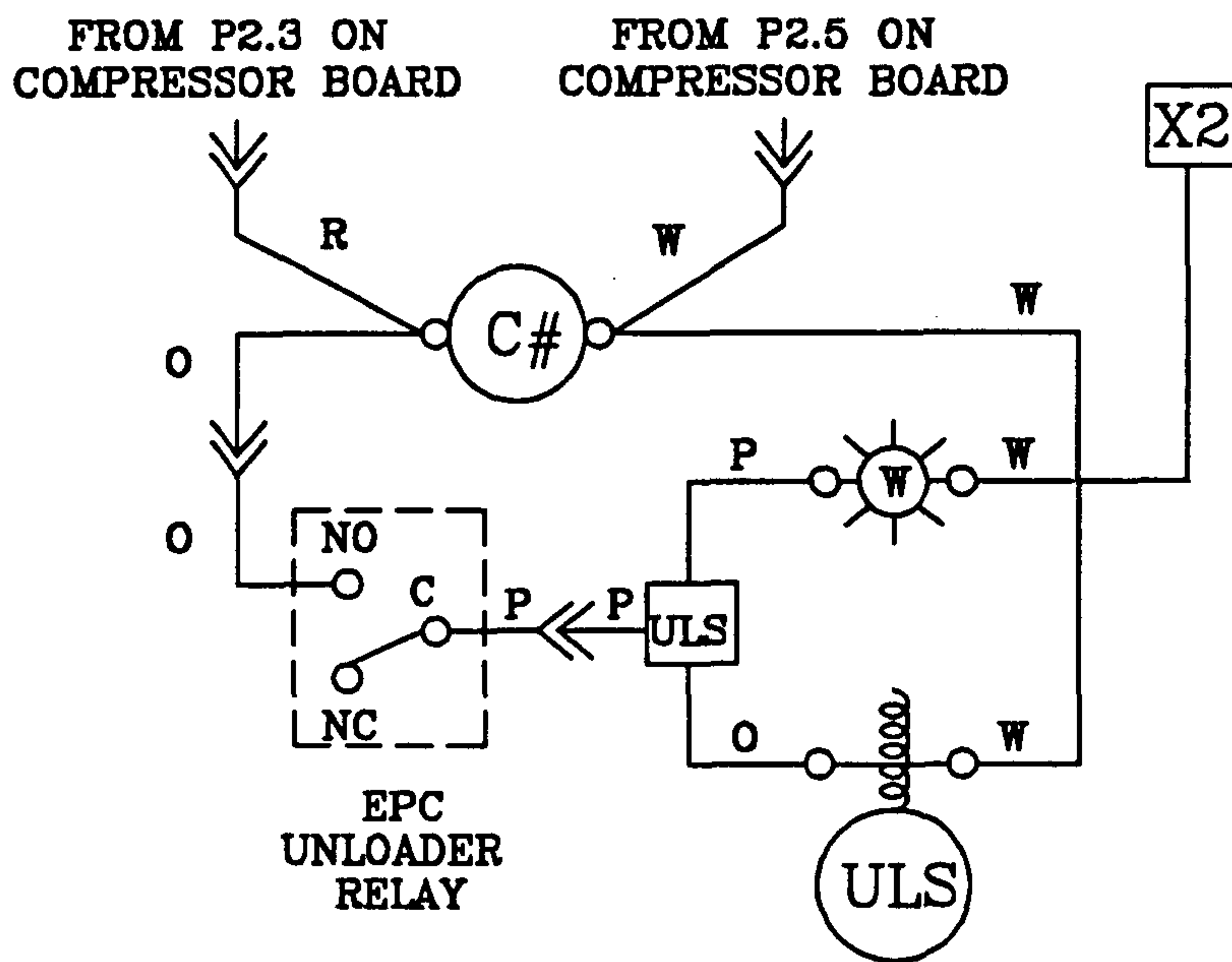


Figure 2-1. Unloader wiring diagram

OPERATION

GENERAL

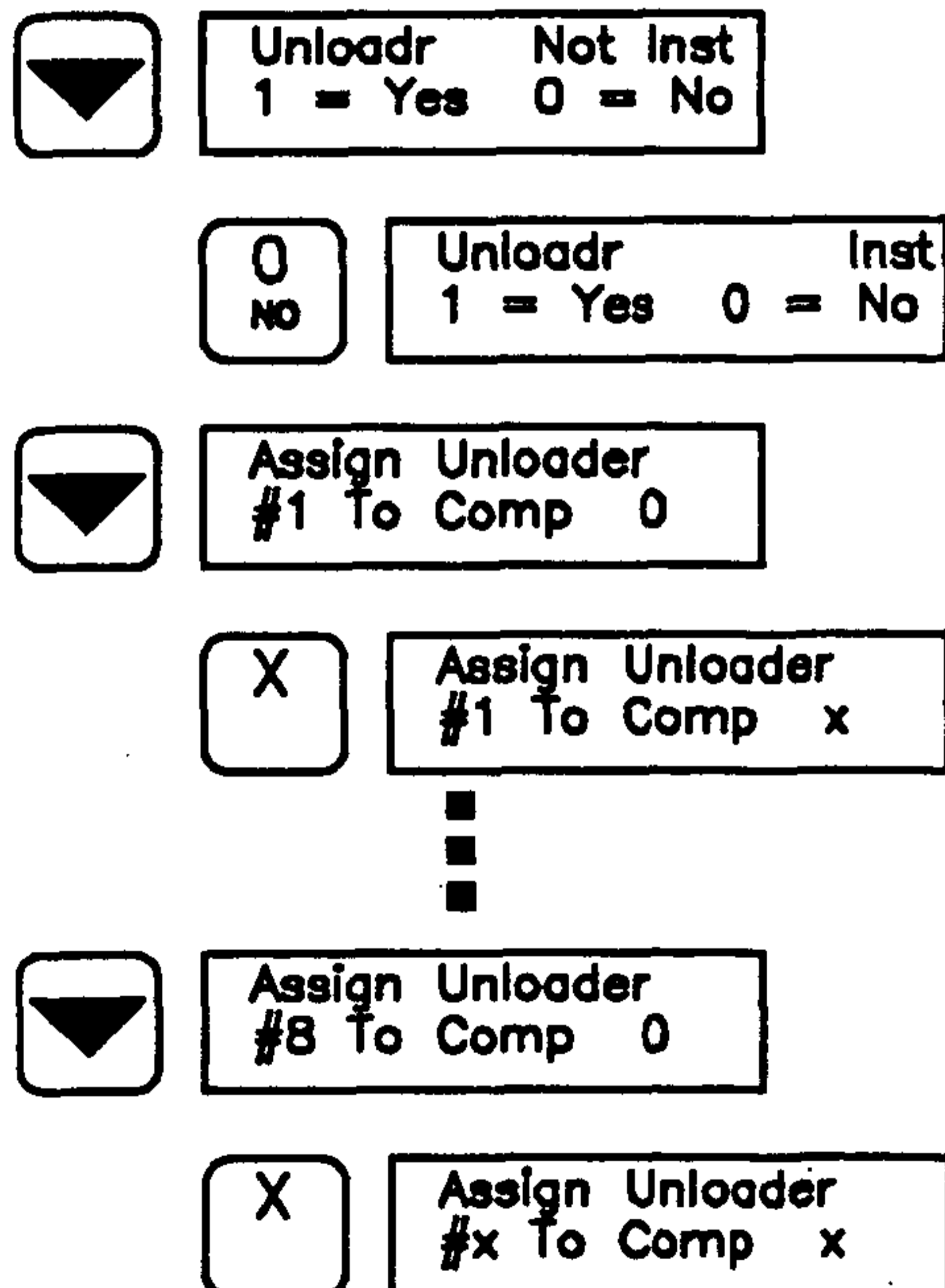
The EPC-2000 Unloader Control was developed to take advantage of the energy cost savings that unloading of compressors can offer to the customer. Because unloaders can react quickly to changes in suction pressure, unloader control approaches the accuracy of variable speed compressor systems. This reduces the number of cycles on a compressor.

MENU DISPLAYS

The following pages reflect additional messages shown for EPC-2000 Unloader Control. Refer to the EPC-2000 manual (P/N 334495) for complete menus. The new messages that appear are in these menus:

- | | |
|---------------------|---|
| 1. System Menu | The messages shown in this menu contain the screens necessary to install the unloader control. |
| 2. Status Menu | The messages shown in this menu display the current operating status of each unloader. |
| 3. Maintenance Menu | The messages shown in this menu contain the screens for manually forcing on and off a unloader. |

System Menu



This screen is necessary to install the unloader control option. The screen is in the form of a question: 'Unloader Not Inst' implies that the Unloader control is currently not installed and 'do you want it to remain that way'. An answer of NO to this question install the unloader control option.

The assignment screens will not display if the unloader control is not installed.

The assignment screen allows you to assign a unloader to a specific compressor.

You can assign all eight unloaders to the same compressor or one unloader to one compressor.

IMPORTANT: You must assign all eight unloaders for proper operation. If the unloader is not used, assign it to zero '0'.

Status Menu

The status menu screens provide a quick method to see which unloaders are currently on and which ones are currently off.



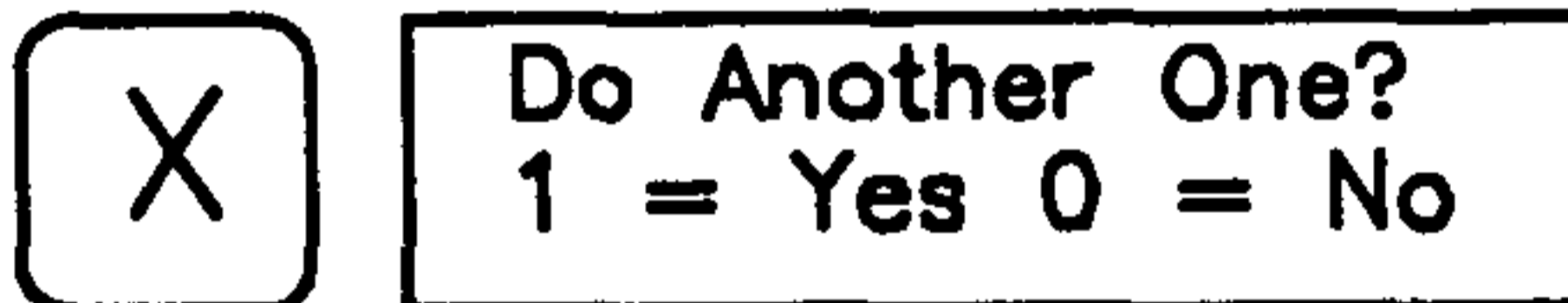
The status screen shows which unloaders are currently on, or energized.

Maintenance Menu

The maintenance menu is used to manually force on and off unloaders. This feature can be used when installing new equipment and checking out wiring and installation or it can be used to simply troubleshoot possible field problems.



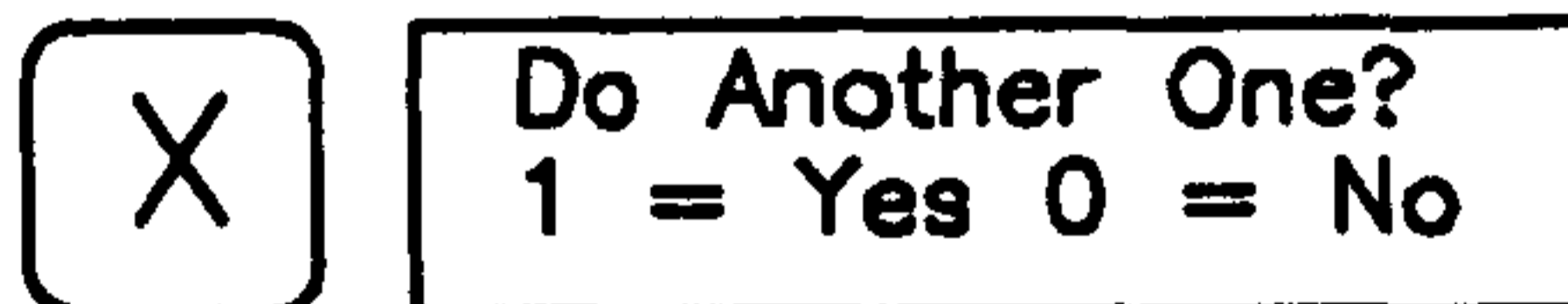
You can force on a particular unloader by entering its number. In this example, unloader number X has been forced on.



The EPC-2000 will ask you if you want to force ON another unloader.



You can force off a particular unloader by entering its number.



The EPC-2000 will ask you if you want to force OFF another unloader.

SERVICE

GENERAL

This section of the manual is designed to assist the serviceman in troubleshooting the Unloader control option of the EPC-2000. A step-by-step procedure is included to isolate the malfunction. For additional service techniques, refer to the EPC-2000 operating manual P/N 334495.

RECORDING INFORMATION

Upon arrival at the refrigeration rack, make a record of the following information for future reference.

- A. Rack model and serial number
- B. EPC-2000 model and serial number
- C. EPC-2000 options installed on the rack

Record the following applicable settings and present readings as shown in the STATUS menu.

Suction Pressure	_____	psi
Suction Setpoint	_____	psi
Unloaders ON	_____	

Record the compressor number that each unloader is assigned. This information can be found in the SYSTEM menu.

Unloader	Compressor
1	_____
2	_____
3	_____
4	_____
5	_____
6	_____
7	_____
8	_____

Check the alarm log for a history of rack alarms. Note the most recent alarm entered and the time and date.

APPARENT MALFUNCTIONS

Based upon your observations and recordings of the above settings, proceed through the checkout procedures on the following pages until the fault is isolated.

CHECKOUT AND TROUBLESHOOTING PROCEDURE

OBSERVATION: THE UNLOADER IS NOT ENERGIZING.

- Step 1 Go to Maintenance menu and force ON an unloader. Observe the indicator light for the forced unloader on the unloader relay board.
- Q. Did the relay on the unloader relay board force ON?
- A. Yes. Goto Step 3
- A. No. Goto Step 2
- Step 2 Go to Maintenance menu and force ON a compressor. Observe the indicator light for the forced compressor on the compressor relay board.
- Q. Did the compressor force ON?
- A. Yes. Replace unloader cable between the compressor and unloader relay board.
- A. No. Check that compressor cable from EPC is secured. Possibly you have a bad EPC.
- Step 3 Check that the normally open set of contacts of the unloader relay closed. Remove the Control Plug Assembly from the Control Circuit Plug Connector and measure across the 'C' and 'NO' set of pins (refer to Figure 1-1). Use a digital voltmeter with the scale set to read ohms.
- Q. Did the meter measure a closed circuit?
- A. Yes. Goto Step 4.
- A. No. Replace unloader relay board.
- Step 4 Verify that the unloader energized by one of the following:
1. Place the jaws of an amp probe around the body of the unloader. This should cause the needle of the amp probe to move up and down.
 2. Tap center post of solenoid with a screwdriver to detect the presence of a magnetic field applied to the screwdriver.
- Q. Did the unloader solenoid energize?
- A. Yes. Goto Step 6.
- A. No. Goto Step 5.
- Step 5 Use voltmeter to check voltage at solenoid coil.
- Q. Is 120 volts present across the solenoid coil?
- A. Yes. Replace unloader solenoid.
- A. No. Check wiring from relay board to solenoid.
- Step 6 Q. Is compressor unloaded?
- A. Yes. Checkout procedure complete.
- A. No. Checkout for one of the following as malfunctioning:
1. Unloader solenoid valve.
 2. Internal mechanism of compressor valve plate.