



INSTALLATION INSTRUCTIONS

MODEL: EIFMC-2

ECONOMIZER WITH EXHAUST

**FOR USE WITH BARD
CT241 MODEL WALL MOUNTED CABINET
AIR CONDITIONER**

BARD MANUFACTURING COMPANY
Bryan, Ohio 43506

Since 1914...Moving ahead, just as planned.

Manual:	2100-320
Supersedes:	
File:	Volume III, Tab 19
Date:	04-23-98

CONTENTS

General Information	1
General	1
Features	1
Unpacking	1
Description	1
Economizer Operation	2
Installation	3
Basic Installation	3
Sequence of Operation	6
Wall Thermostat	6
Wiring Diagram	8

Figures

Figure 1	3
Figure 2	4
Figure 3	4
Figure 4	5
Figure 5	6
Figure 6	7

Tables

Table 1	5
---------------	---

GENERAL INFORMATION

GENERAL

The economizer should only be installed by a trained heating and air conditioning technician. These instructions serve as a guide to the technician installing the economizer package. They are not intended as a step by step procedure with which the mechanically inclined owner can install the package.

The economizer housing is shipped in one carton which contains the intake assembly, exhaust assembly, miscellaneous hardware and installation instruction.

The economizer installation requires an additional two stage cooling thermostat in place of the normal single stage cooling thermostat.

If using a Bard master controller, the MC91AE master controller is designed specifically to control two (2) redundant Bard wall mount units equipped with economizers.

Any unit equipped with an economizer must also have a low ambient control installed. This control is factory installed.

FEATURES

- Two piece construction – easy to install with no mechanical linkage adjustment required.
- Exhaust air damper – provides exhaust air capability to prevent pressurization of tight buildings.
- Actuator motor – 24 volt, power open, spring return with built in torque limiting switch.
- Proportioning type control – for maximum “Free Cooling” economy and comfort with up to 100% outside air.
- Moisture eliminator and prefilter – permanent, washable aluminum construction.
- Enthalpy control to monitor outdoor temperature and humidity – adjustable.
- Minimum position potentiometer – adjustable to control minimum damper blade position.
- Mixed air sensor to monitor outdoor and return air to automatically modulate damper position.

UNPACKING

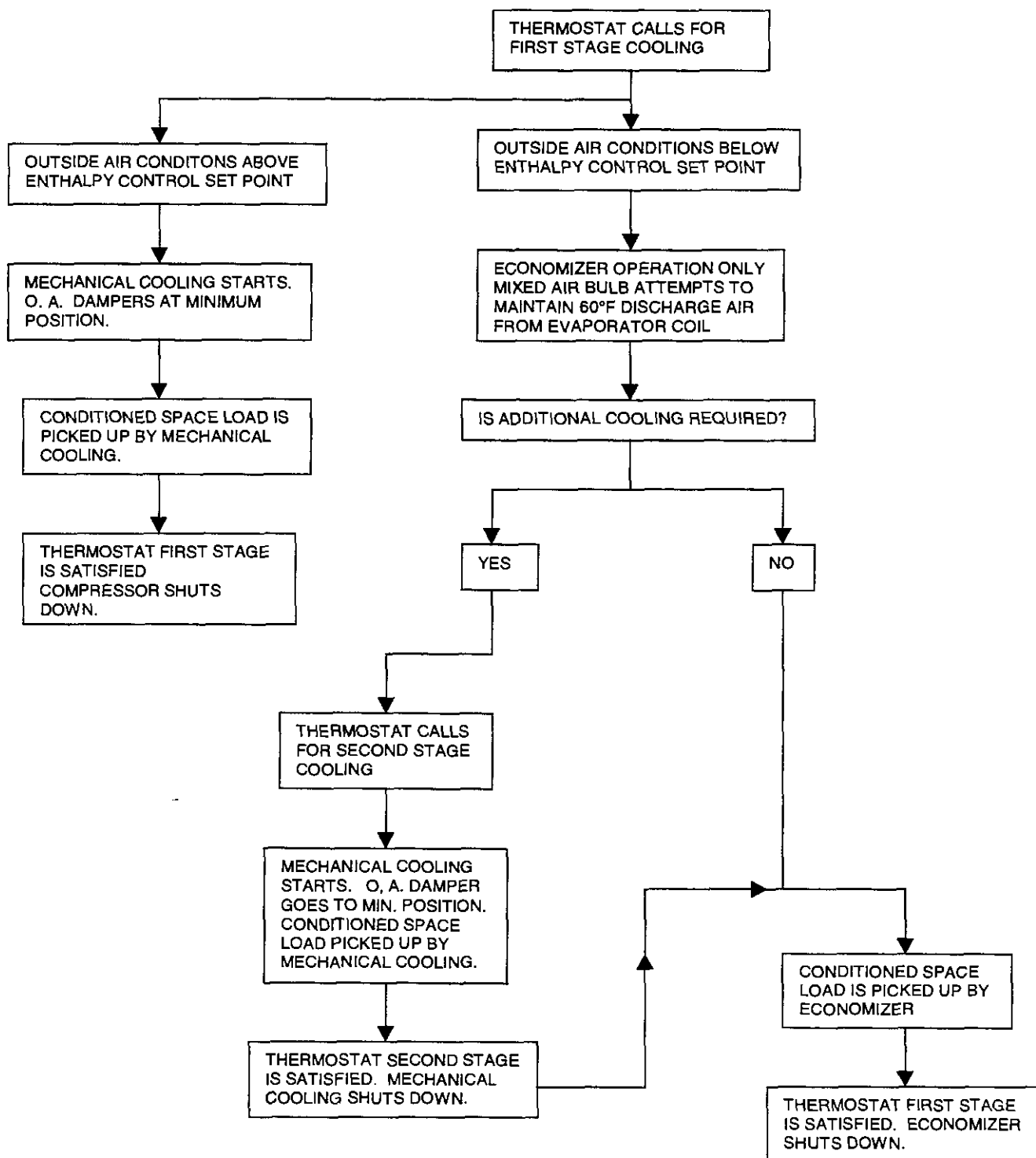
Upon receipt of the equipment, be sure to compare the model number found on the shipping label with the accessory identification information on the ordering and shipping document to verify that the correct accessory has been shipped.

Inspect the carton housing of each economizer as it is received, and before signing the freight bill, verify that all items have been received and that there is no visible damage. Note any shortages or damage on all copies of the freight bill. The receiving party must contact the last carrier immediately, preferably in writing, requesting inspection by the carrier’s agent. Concealed damage not discovered until after loading must be reported to the carrier within 15 days of its receipt.

DESCRIPTION

The economizers are designed to be used with Bard air conditioners equipped with low ambient fan cycling controls. They are electromechanical economizer systems designed to provide “free” cooling where the outdoor air temperature is cool enough to provide the needed cooling without running the compressor. When cooling is need, the system automatically takes advantage of the cold outdoor air when available and uses it for first stage cooling. This then reduces the need to run the air conditioning compressor providing lower operating costs and increasing the service life of the equipment. If the outdoor air gets too warm or humid to be helpful, the enthalpy control detects the condition and automatically closes the outdoor air and exhaust damper, opens the return air damper and switches to the compressor operation. This is all done automatically to achieve maximum savings without attention from the user. See a block diagram of the economizer operation logic flow. The unit is equipped with a full modulating type damper motor which controls the damper position to a factory set minimum supply air temperature.

ECONOMIZER OPERATION FOR SINGLE-COMPRESSOR UNITS



INSTALLATION

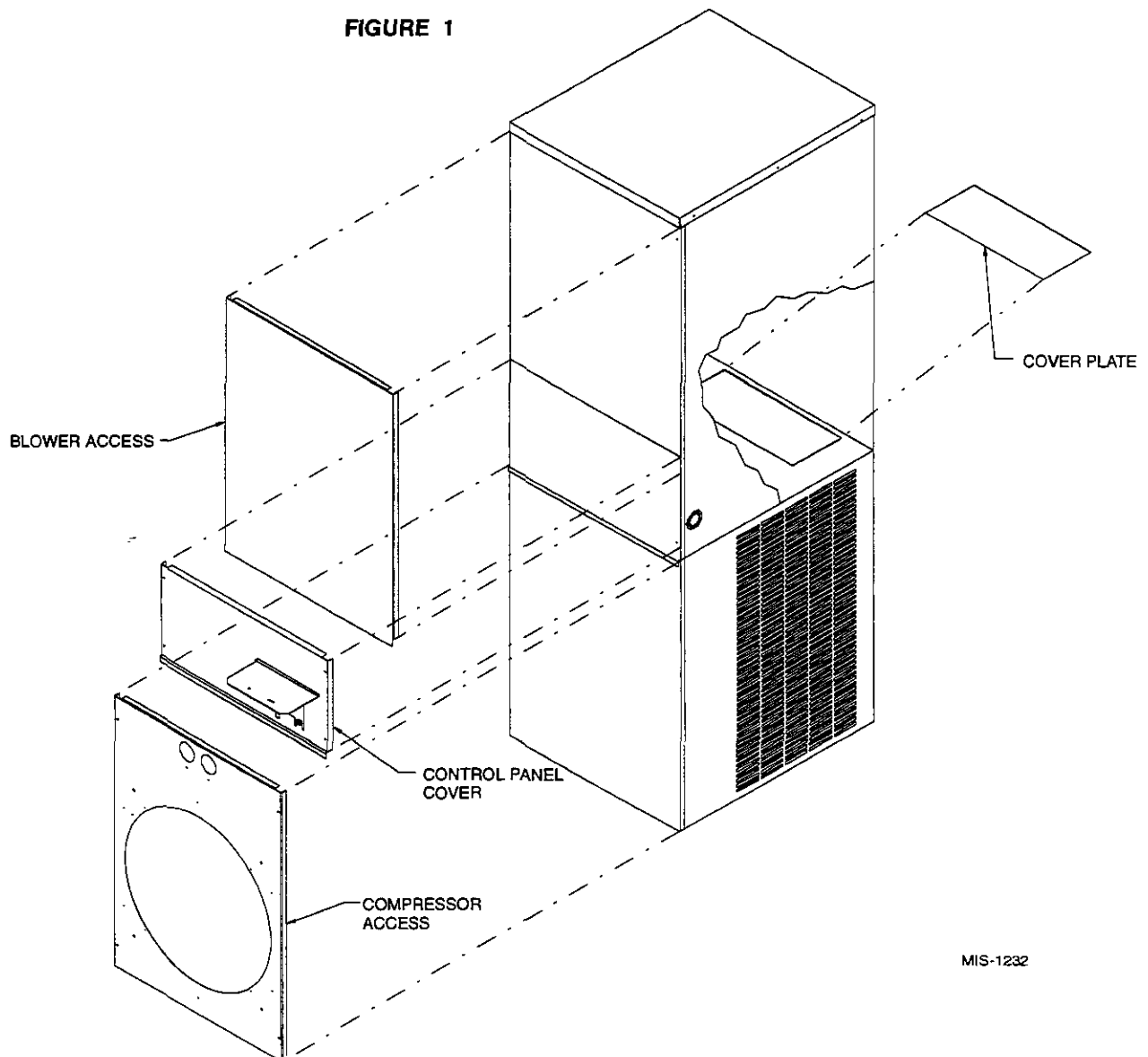
BASIC INSTALLATION

1. Unpack the economizer which includes the intake assembly, exhaust assembly, miscellaneous hardware and installation instructions.
2. Remove and save the existing exterior blower access, control panel cover and compressor units. (See Figure 1.) Remove existing cover plate for exhaust damper from partition in compressor compartment.

⚠ WARNING

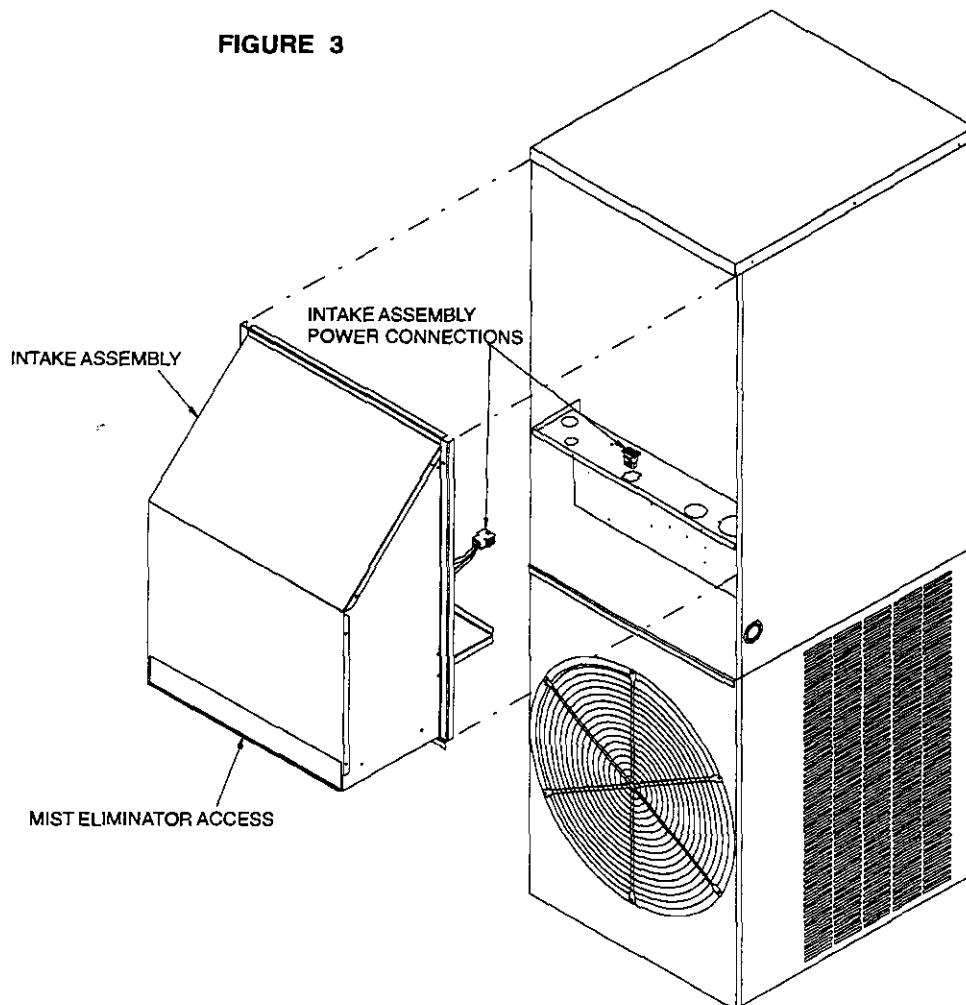
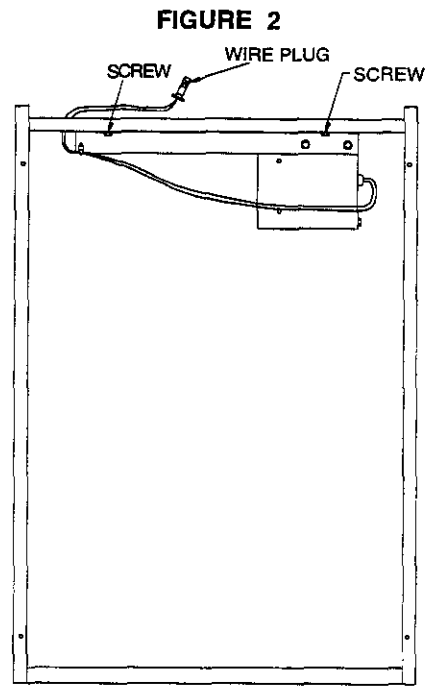
Open and lock unit disconnect switch before installing this accessory to prevent injury or death due to electrical shock or contact with moving parts. Turn thermostat to off.

FIGURE 1



MIS-1232

3. Install exhaust damper assembly into opening where cover plate was removed in the compressor compartment with damper motor on right, as it would appear when mounted. Secure with same screws removed with cover plate. Plug damper motor power 2-pin plug into mating 2-pin connection in partition under control panel. (See Figure 2)
4. Reinstall compressor access panel making sure to reconnect fan motor connector to motor.
5. Install intake assembly in place of blower access panel making sure to plug 9-pin connector from intake damper assembly into mating 9-pin connector in control panel top. (See Figure 3.)
6. Reinstall control panel cover.



7. ECONOMIZER CHECKOUT

- A. Remove mist eliminator. (See Figure 3.) Locate the minimum position potentiometer. (See Figure 4.)
- B. Energize the evaporator blower by switching the thermostat to the manual fan position with the heat/cool switch in the off position.
- C. Cycle the minimum position potentiometer (factory set for 0% fresh air) 0 to full open. (See Figure 4.) Throughout checkout procedure observe operation of damper to insure there is free, unobstructed operation through the entire angle of damper travel. Then adjust the damper minimum open position to meet local codes or application requirements. See example below.

EXAMPLE:

1. Measure return air temperature (RAT).
(Assume 75°F for example.)
2. Measure outdoor air temperature (OAT).
(Assume 60°F for example.)
3. Calculate the mixed air temperature (MAT) which will result from the desired combination of OAT (10 percent) and RAT (90 percent).

$$.1 \text{ OAT} + .9 \text{ RAT} = \text{MAT}$$

or substituting example value

$$.1 (60^\circ\text{F}) + .9 (75^\circ\text{F}) = 73.75^\circ\text{F}$$

4. Adjust the minimum position potentiometer knob until proper mixed air temperature as calculated above is reached. Care should be taken to insure thermometer is sensing air that is well mixed.
5. Mark correct setting on dial of minimum position potentiometer for future reference.
- D. Adjust the enthalpy control to position A, B, C, or D to achieve the maximum combination of temperature and humidity acceptable for the instillation as per Table 1. The suggested setting is between A & B 70°DB @ 55 percent RH. It is further

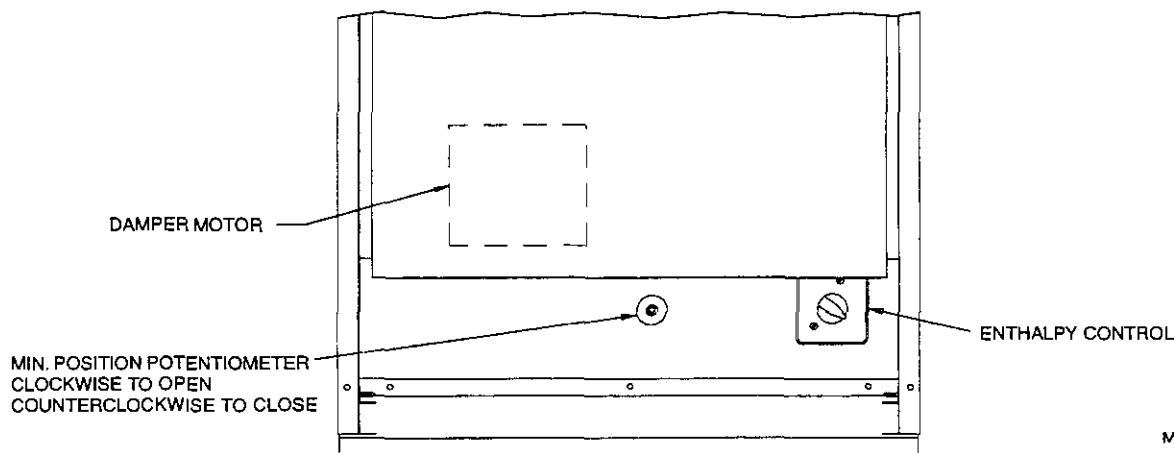
recommended to always set the control at C or above. (See Figure 4.)

TABLE 1

	Dial Setting	20% RH	50% RH	80% RH
Enthalpy Control Setting	A	78°F (26°C)	73°F (23°C)	68°F (20°C)
	B	73°F (23°C)	68°F (20°C)	63°F (17°C)
	C	68°F (20°C)	63°F (17°C)	59°F (15°C)
	D	62°F (17°C)	58°F (17°C)	53°F (12°C)

- E. Switch the thermostat fan control to automatic and position the heat cool switch to cool. Adjust the thermostat temperature to engage the first stage of cooling only (Y). This will cause the dampers to modulate to achieve mixed air temperature of 55° provided outside air enthalpy is sufficiently low. If enthalpy is too high for economizing, low enthalpy can be simulated by temporarily removing and jumping leads on terminal 2 and 3 of enthalpy control together. This will also cause the economizer damper to modulate away from minimum position. (Be sure to properly reconnect leads at end of checkout procedure.)
- F. Readjust temperature on the thermostat to engage the second stage of cooling (Y2). The damper motor should return to previously set minimum position. Compressor motor should start.
- G. Switch thermostat to off fan and off heat/cool positions to de-energize unit. Economizer damper should return to full closed (100 percent return air) position. Checkout is complete.
8. Replace mist eliminator.
9. Economizer is now ready for operation.

FIGURE 4



MIS-1235

ECONOMIZER SEQUENCE OF OPERATION

CONDITION A – COOL OUTDOORS

First stage cooling closes and powers the economizer dampers to economizer dampers to economizer mode and the indoor blower starts. Mixed Air Sensor senses a mixture of return air and outdoor air and modulates the dampers accordingly. Compressor operation is inhibited. (See Figure 5.)

If second stage closes on the thermostat, the dampers return to the closed or minimum position setting and the compressor starts for mechanical cooling.

CONDITION B – WARM OUTDOORS

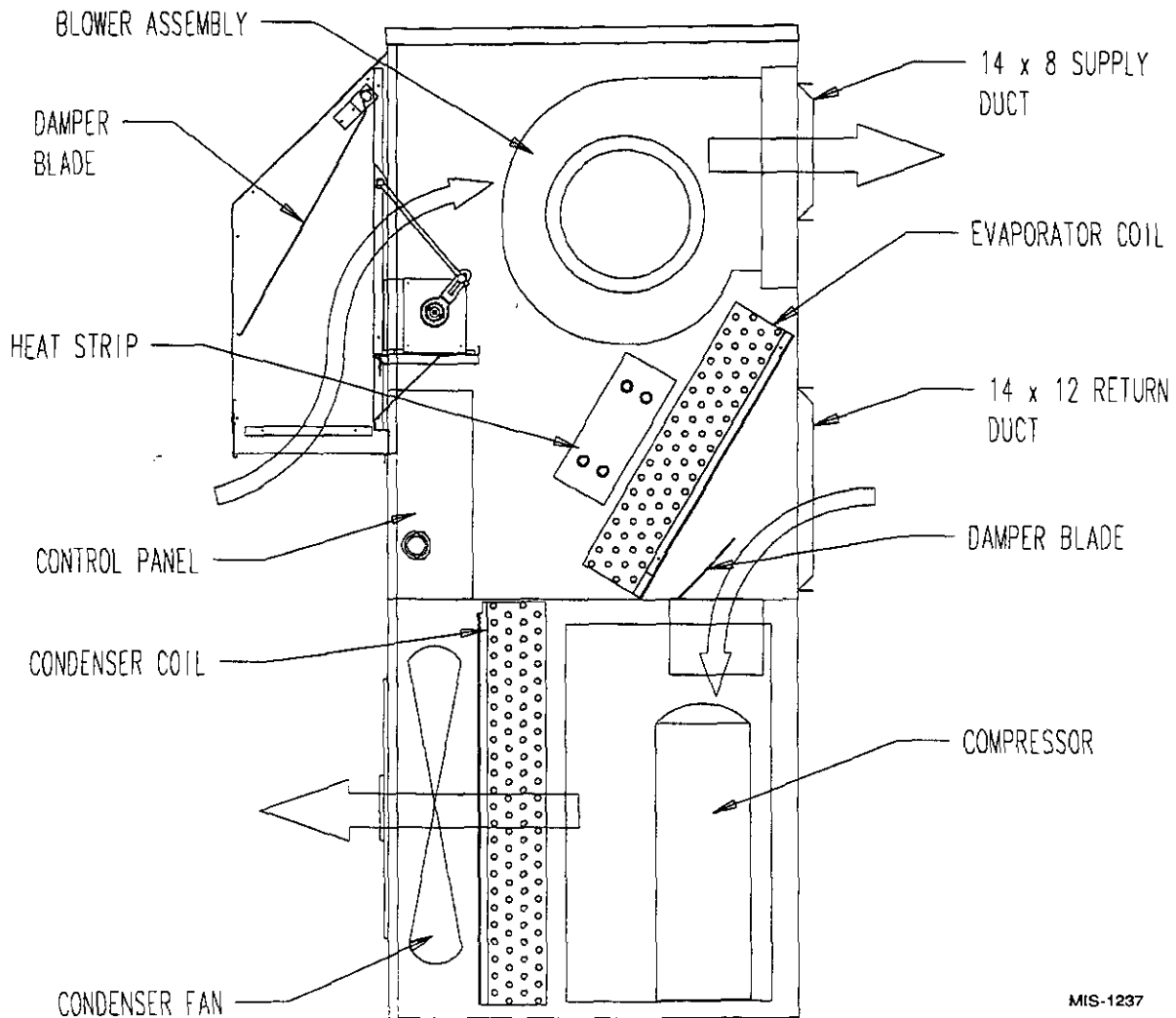
First stage cooling cycles the compressor and dampers remain in the mechanical cooling mode. (See Figure 6.)

WALL THERMOSTAT

The following is the information for the thermostat and subbase to be used with the EIFMC-2 economizer.

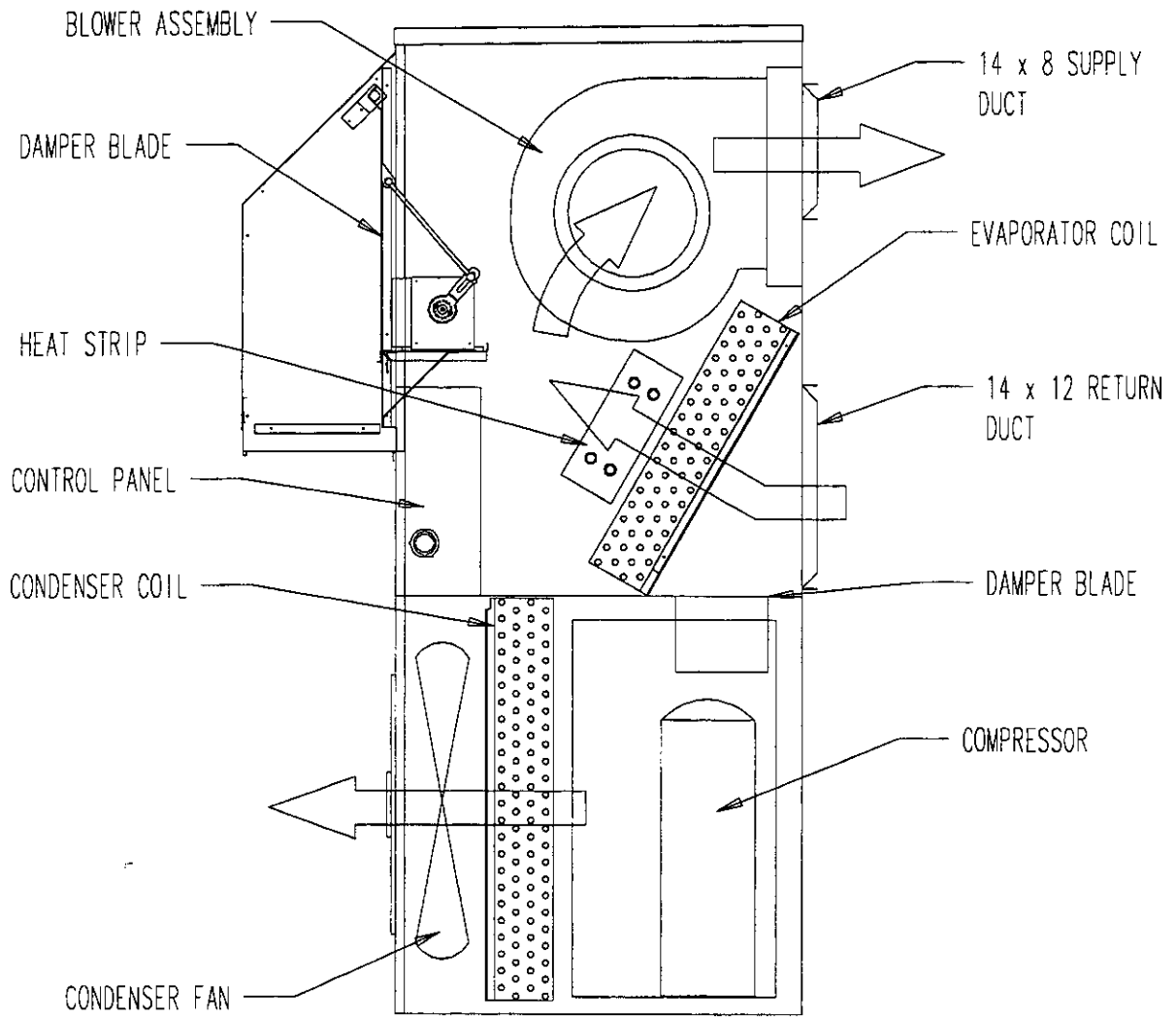
Thermostat and Subbase	Vendor Part Number	Specific Features
8403-021 8403-012	T874D1934 Q674A1001	2 stage cool, 2 stage heat

FIGURE 5



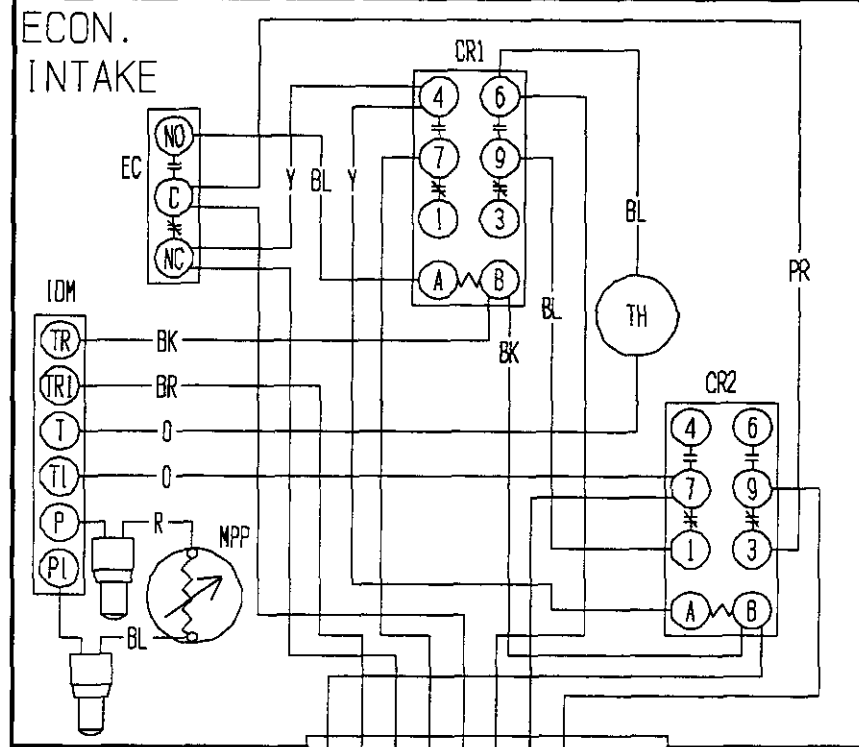
MIS-1237

FIGURE 6



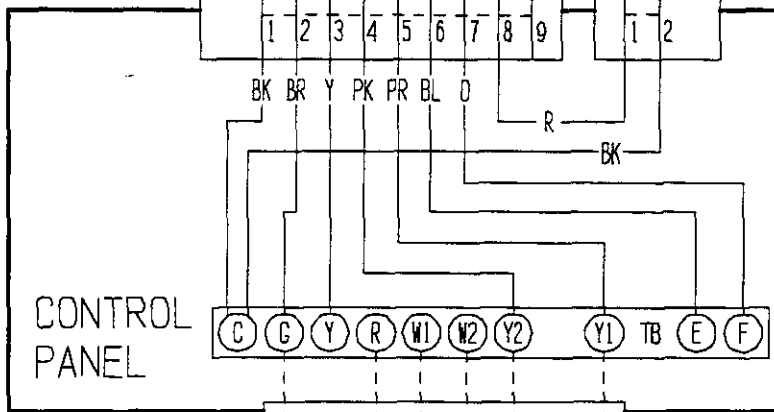
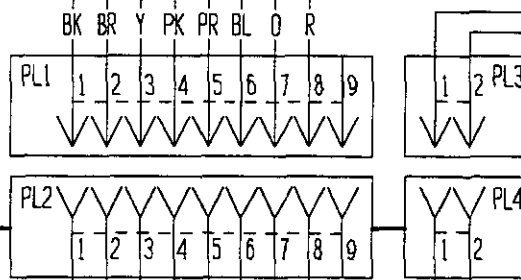
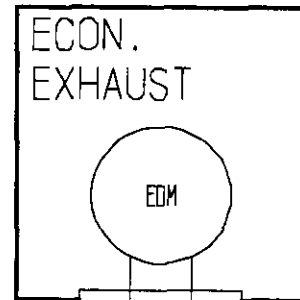
MIS-1236

ECON.
INTAKE



COLOR CODE

BK	BLACK
BR	BROWN
R	RED
O	ORANGE
Y	YELLOW
BL	BLUE
PR	PURPLE
PK	PINK



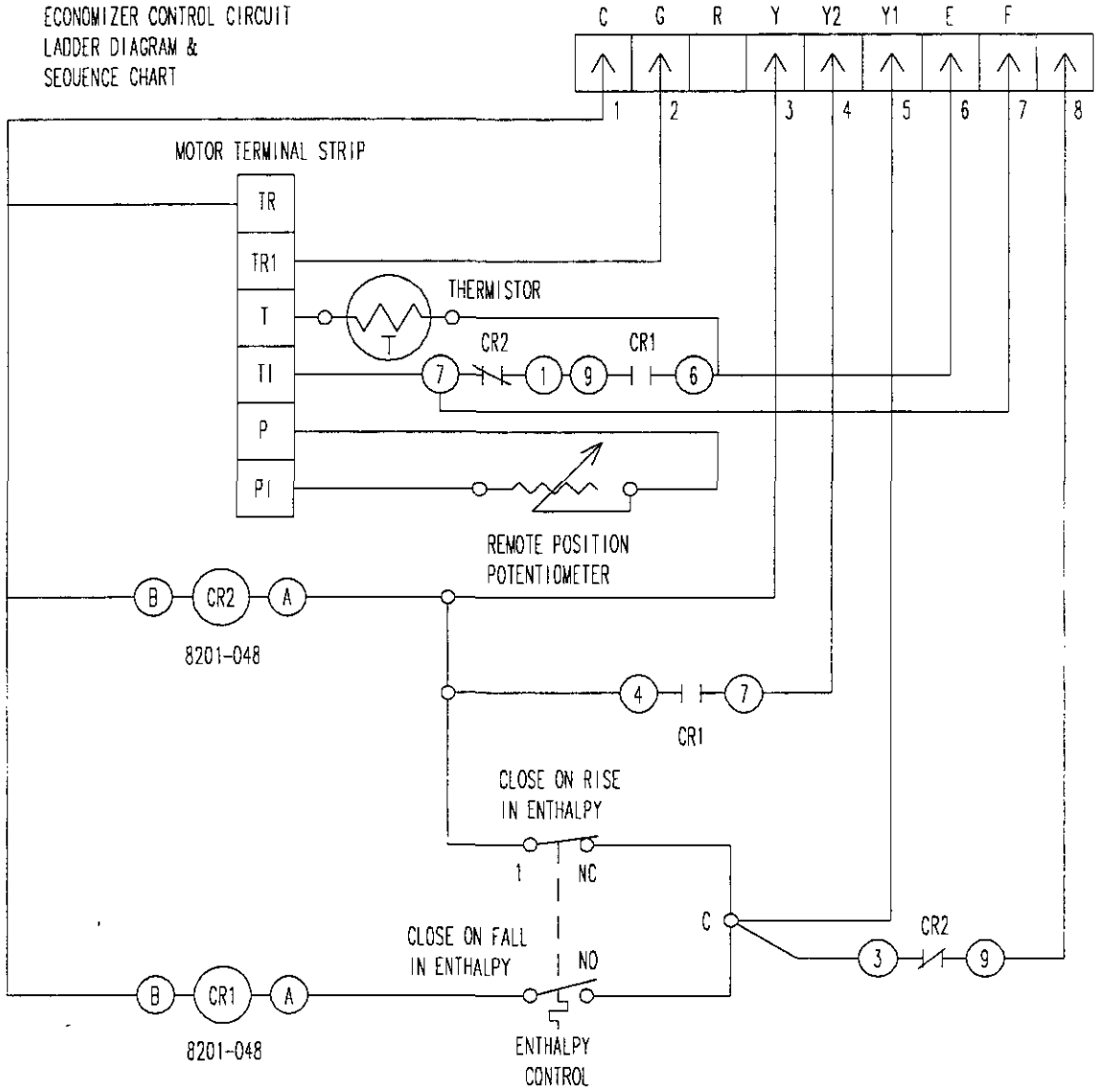
THERMOSTAT T874D1934
 BARD PART #8403-021
 SUBBASE Q674A1001
 BARD PART #8404-012

PART LIST

CR1	CONTROL RELAY #1
CR2	CONTROL RELAY #2
IDM	INTAKE DAMPER MOTOR
EC	ENTHALPY CONTROL
EDM	EXHAUST DAMPER MOTOR
MPP	MINIMUM POSITION POT.
PL1	9 PIN MALE AMP CONN.
PL2	9 PIN FEMALE AMP CONN.
PL3	2 PIN MALE AMP CONN.
PL4	2 PIN FEMALE AMP CONN.
TB	LOW VOLT. TERM. STRIP
TH	THERMISTOR

4056-170

ECONOMIZER CONTROL CIRCUIT
LADDER DIAGRAM &
SEQUENCE CHART



OUTDOOR CONDITIONS		HIGH ENTHALPY	LOW ENTHALPY
ENTHALPY CONTROL (LOW) NO		OPEN	CLOSED
ENTHALPY CONTROL (HIGH) NC		CLOSED	OPEN
FIRST STAGE COOLING (Y1 ENERGIZED)		COMPRESSOR	ECONOMIZER
	CR1	DE-ENERGIZED	ENERGIZED
	CR2	ENERGIZED	DE-ENERGIZED
SECOND STAGE COOLING (Y2 ENERGIZED)		COMPRESSOR	ECONOMIZER
	CR1	DE-ENERGIZED	ENERGIZED
	CR2	ENERGIZED	ENERGIZED

4074-153

