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ECONO-MAN 1

**ECONO-CEL
OPERATION & MAINTENANCE MANUAL**

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Econo-Cel

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Introduction

The purpose of this manual is to describe the Dole Econo-Cel Eutectic Blower Unit and to present information relative to its maintenance. An attempt has been made to offer as much practical assistance as might be required to troubleshoot and resolve problems that may arise.

Dole Econo-Cel Eutectic Blower Units

Method Of Operation – The Dole Econo-Cel Holdover Plates is designed to maintain temperatures in refrigerated truck bodies. It consists essentially of a series of Dole vacuum holdover plates mounted in a rigid frame and protected by a galvanized housing with an aluminum front cover. Fans mounted at the top of the unit draw air in at the bottom of the unit, up and over the holdover plate surfaces, and out the top front fan outlets.

Econo-Cels are available for either ammonia or freon refrigerants. Refrigerant R-717 models have 1/2" F.P.T. inlet and outlet refrigerant connections. Direct expansion refrigerant models have 3/8" inlet and 7/8" outlet copper tube extensions. Direct expansion refrigerant models come equipped with thermostatic expansion valve(s).

Component Parts (built in)

Motor-Designed for DC operation with nominal ratings of 6.0 amps at 12 volt; DC; totally enclosed with replaceable brushes.

Fans-On all models, a 10" diameter fan rotates at 2100 RPM and delivers 1000 CFM; the fan consists of four aluminum blades riveted to a cadmium plated spider & hub.

Control Unit-Consists of a compact aluminum plate housing mounted in the upper section of the Econo-Cel and contains the following parts:

Alternating Current Relay-Isolates fan from truck battery voltage when the unit is connected to a 115 or 230 VAC power source.

Transformer-Transforms the primary voltage from 230 volt single phase AC to a secondary voltage of 16 volts AC.

Rectifier-Converts 16 volts AC to DC voltage required by fan motor.



Direct Current Relay-Energizes or de-energizes fan motor in response to manual toggle switch, door switches, dash switch or thermostat.

Circuit Breaker- (25 Amp) protects motor circuit from overload.

Terminal Block-provides positive and convenient method for making required electrical connections as indicated on Control Unit Wiring Diagram.

Component Parts-supplied separately

Dash Switch-When mounted on dash panel, allows driver to disconnect the fan motor in the event the truck will be out of service for an extended period of time, unless the switch is turned off it could discharge the truck battery as a result of the fan continuing to operate.

Pilot Light-when mounted on dash panel, indicates whether dash switch is on (lit) or off (unlit).



Installation Instructions

Uncrate Econo-Cel and examine for damage in transit. If such has occurred, notify carrier immediately. Consignee must make claims. Remove package containing 1 dash switch and 1 pilot light, checking to make sure there has been no loss or damage in shipment.

Check Voltage shown on nameplate of Econo-Cel against both that of the truck and available alternating current for nighttime use.

Provision For Drain-Drill hole in floor of body for drain tube.

Inspections Panels located on the front of the Econo-Cel unit, near the top, are readily removed by loosening the screws holding them in place. Upon removal, the expansion valve(s), fan motor and control unit are accessible.

Truck Body Temperature Control- It is recommended, if truck body temperature is critical, that a thermostat control the fan. In attempting to control the body temperature by condensing unit pressurestat only, there is a possibility of too low a temperature under some circumstances. Conversely, if the pressurestat setting is high enough to prevent this from happening, it may result in the unit cutting off before the eutectic solution in the plates is completely frozen. Control of the fan with a thermostat will keep the temperature above the danger point, while allowing the condensing unit to continue to store up holdover in the plates of the CHO Truk-Cel. The low-pressure control should be used as a safety switch, with a setting 25 degrees colder than the plate temperature. A cut in pressure of 10 psi or higher should be sufficient. For example, an 18 degree (F) plate using R22, the low pressure control should be set at 19 psig and the cut in should be 30 psig. Should short cycling occur after initial cut out, the low pressure cut in should be raised to provide an acceptable cycle time.

Refrigeration Instructions

Condensing Unit Self Contained

Liquid and suction lines of copper tubing, usually 3/8" and 7/8" respectively, are run between the outlet on the receiver of the condensing unit to the inlet of the Econo-Cel, and from the outlet of the Econo-Cel to the suction shut-off valve on the compressor. Tubing lines should be securely fastened to the body by clamps to prevent vibration and protected against the possibility of damage by running them through rigid conduit at points where such damage could occur. Flared or soft soldered joints are not recommended. Accepted procedures are to be followed with respect to evacuating, purging, leak testing and charging the system.

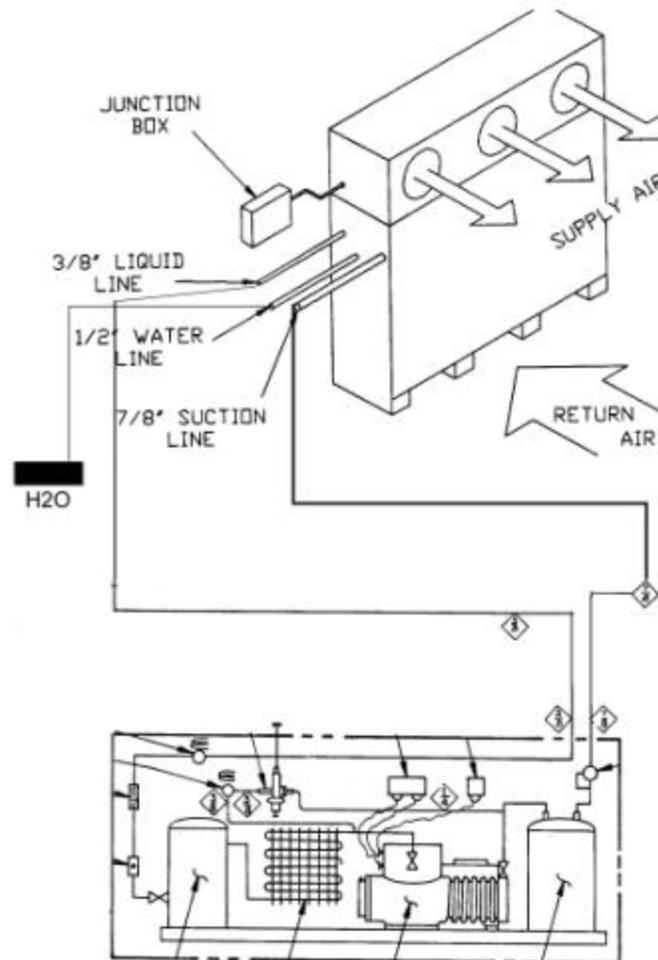


Figure 1
Refrigeration Diagram

Electrical Instructions

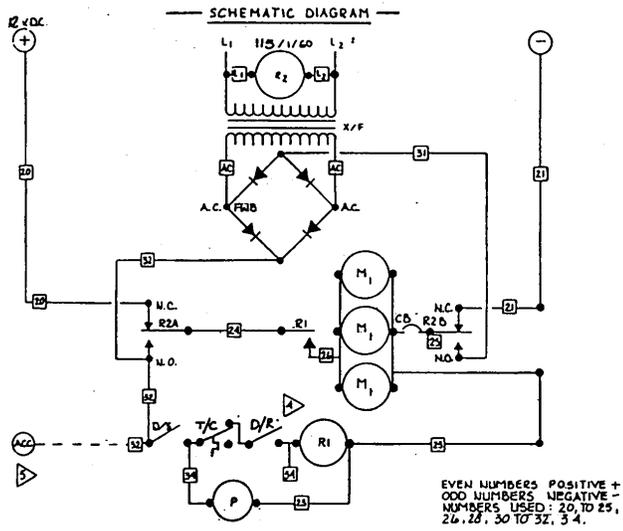
Electrical Hook Up-Careful study of the “Control Unit Wiring Diagram” (Figure 2A or 2B) is suggested. Most of the connections shown are already made in the control unit, with those left to be made in the field indicated in the diagram by the notation “Connections to be Made By The Customer”. In those cases where no one is responsible for the “plugging in” of the system, the optional wiring diagram may be used. This method will prevent the battery from becoming drained should the truck be parked (and not plugged into the A.C. power) for any prolonged period of time causing the system to revert to D.C. operation.

Control Circuit consisting of the wiring of the body, with the door switch, thermostat, if used, and dash switch hooked in series. The purpose of this control circuit is to actuate the D.C. relay. The amperage draw is small (about 0.1 amps on 12V). The pilot light is connected between the appropriate pole of the dash switch and ground, and lights when the dash switch is closed.

Power Line Circuit bringing single phase 115 or 230 volt alternating current to the Econo-Cel. The power supply serving the condensing unit may be used, but the line to the Econo-Cel must be taken off ahead of the compressor starter, as current to the Econo-Cel would be cut off when the compressor stops.

Battery Circuit bringing 12v direct current to the Econo-Cel. As specified in the diagram, one lead must come directly from the “hot” side of the battery. It must NOT be connected through the cold side of the ignition switch or voltage regulator since the D.C. relay must be energized for the fan motor to operate.

Holes are located in the top left side panel of the Econo-Cel housing through which the electrical lines are passed to the conversion unit.



115 V. ECONO-CEL WIRING DIAGRAM

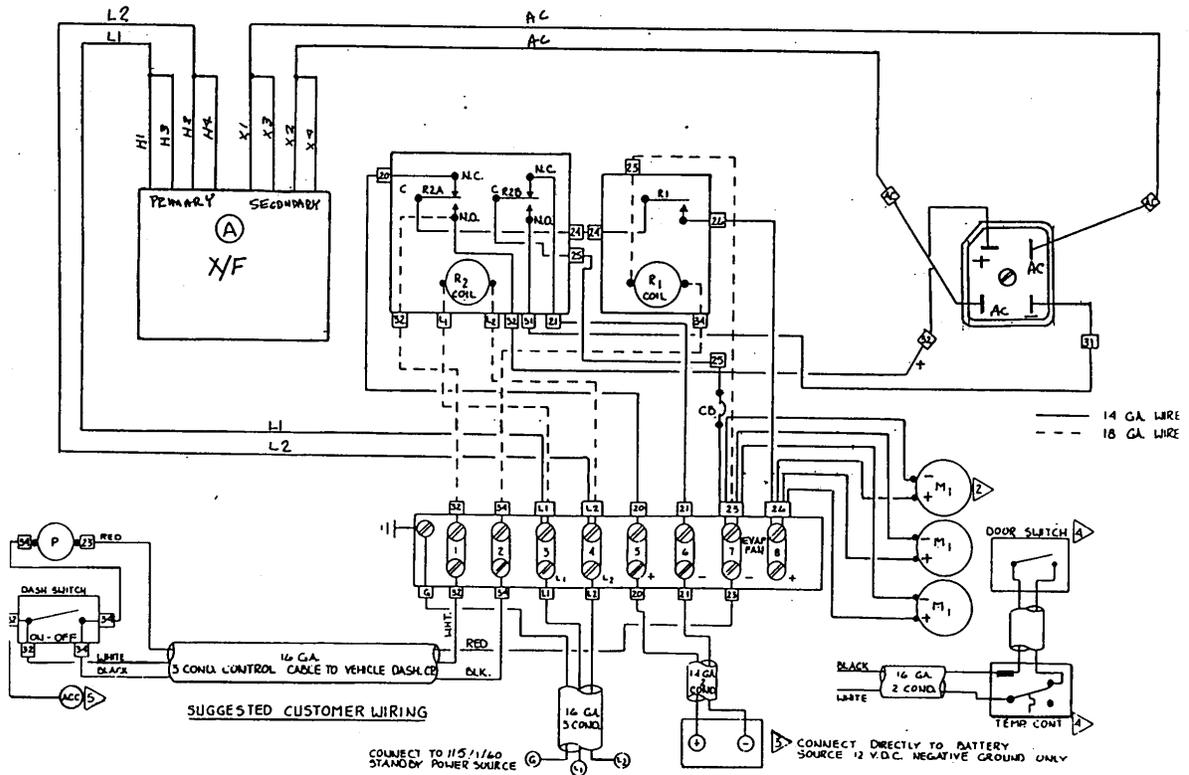
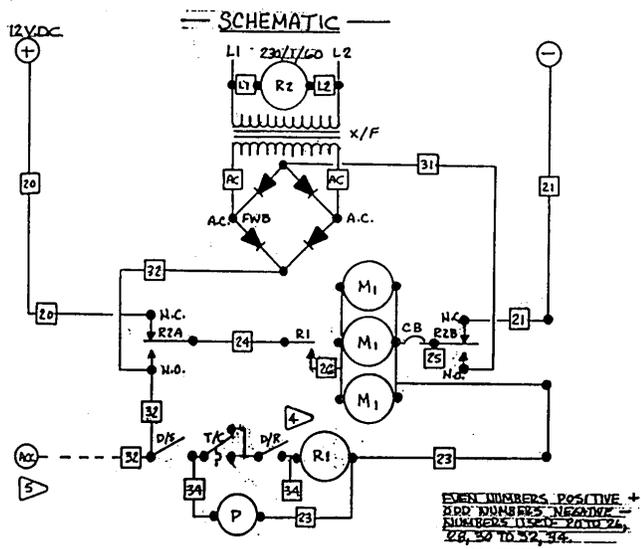


Figure 2A



230 V. ECONO-CEL WIRING DIAGRAM

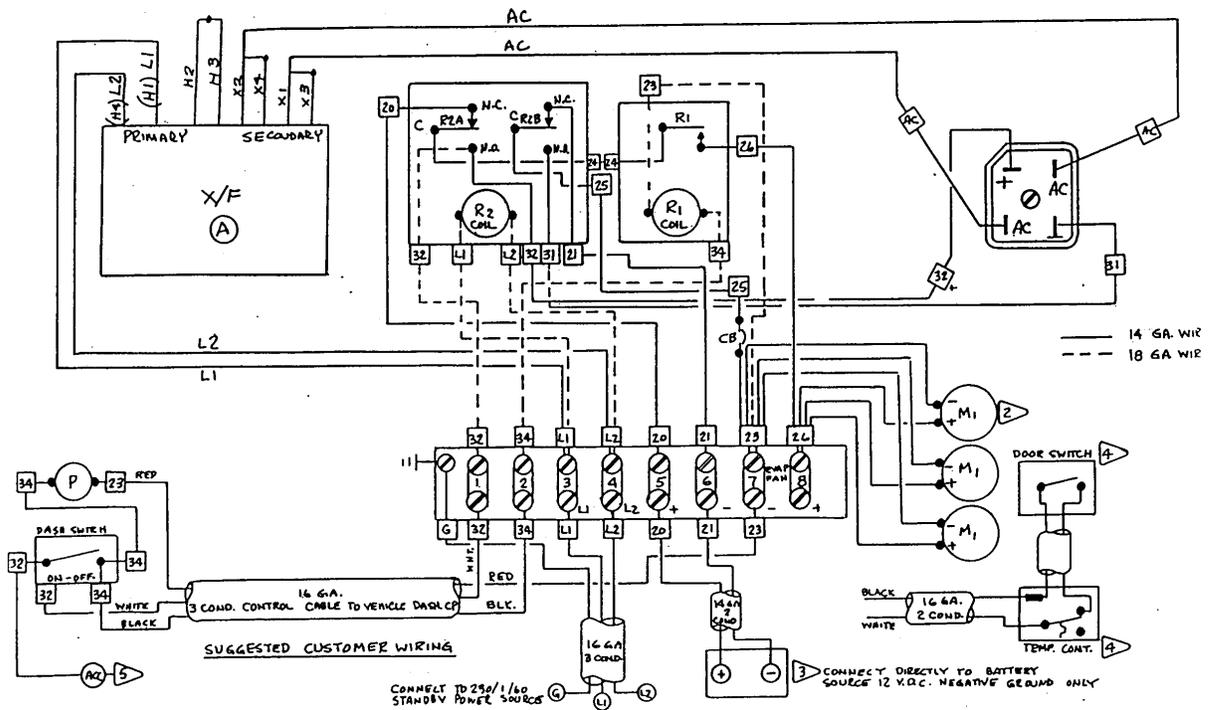


Figure 2B

Operating and Maintenance Instructions

The Dole Econo-Cel will give many years of satisfactory service with a minimum amount of maintenance. The following suggestions will add to the performance and life of your Econo-Cel.

- A. The product load should be arranged so that the air supply is not restricted at either the top or bottom of the Econo-Cel. Stacking product against the front of the unit should be also be avoided to allow free air flow.
- B. Periodically, at the end of a run, remove one of the inspection panels and check for frost build up on the plates. If frost buildup is greater than 1/4" it should be removed. This is accomplished by (a) continuing to operate the fan but leaving the compressor inoperative or (b) washing down plates with warm water (150 degree maximum) for rapid defrost.
- C. Lubricate motor bearings with 3 drops of SAE-20 oil in front and rear oil tubes every 3 months. Do not over lubricate.
- D. Check length of motor brushes every 6 months-if under 3/16" replace with new brushes (available from Dole); otherwise re-insert old brushes in same relationship to commutator as before.
- E. For longer motor life, dress commutator after two sets of brushes have been used.
- F. Clean fan blade periodically.
- G. Keep control switches clean and free from excessive moisture.
- H. Assure that wiring is protected adequately at wear points and does not run moisture traps.
- I. If the Econo-Cel fan motor should fail to operate, the following steps should be taken in an effort to locate the difficulty.
 - 1. Make sure the control, AC power line, and DC battery circuits are connected to terminal block as shown in Figure 2A or 2B. With respect to DC circuit, make sure that terminal 5 is connected to the hot side of the battery (not through the voltage regulator or ignition switch) and terminal 6 is connected to ground.
 - 2. Make sure that AC and DC voltages being supplied to Econo-Cel correspond to voltages shown on the Econo-Cel nameplate.



3. Make sure that all switches in the control circuit are in the “on” position.
4. Check for free rotation of motor shaft by manually turning fan blade.
5. Check that circuit breaker has not been tripped.
6. Check AC relay by connecting and disconnecting Econo-Cel AC line to outside source of AC power. Field repair of AC and DC relays is not recommended.
7. With Econo-Cel AC line not connected to outside source of AC power:
 - a. Check that 12v DC is being supplied to control unit by connecting voltmeter across terminals 5 and 6. If optional wiring circuit is used, be sure ignition switch is in the “on” position.
 - b. Check continuity of control circuit by connecting the voltmeter across terminals 1 and 6.
 - c. Check DC operation of motors by connecting terminal 8 to terminal 5 with a jumper wire; non-operation indicates a defective motor or motors.
 - d. In the previous step, if the motor runs only when the jumper wire is used, defective internal wiring or a defective relay is indicated. To check R1 relay, connect terminal 5 to terminal 2 with a jumper wire. If motor does not run, a faulty R1 relay is indicated.
8. With Econo-Cel AC line connected to outside source of AC power:
 - a. Check that AC current (115v and 230v) is being supplied to conversion unit by connecting voltmeter across terminals 3 and 4.
 - b. Check transformer output (approx. 16v AC) to rectifier by connecting voltmeter across rectifier terminals AC.
 - c. Check output of rectifier by connecting voltmeter across rectifier terminals + & - (wires 32 and 32).

If the above procedures do not reveal the source of difficulty, the control unit should be returned to Dole for complete checkout and repair.

Replacement Parts For Econo-Cel

Part No.	Description
09-303-----	12v DC Fan Motor
16-007-----	10" Diameter Fan Blade
7462-CS10-2-----	Complete Control Kit (230v/12v DC)
7462-CS10-1-----	Complete Control Kit (115v)
10-531-----	115v AC Relay
10-521-----	220v AC Relay
10-423-----	Transformer
MA7727-B200-----	Diode Assembly
10-522-----	12v DC Relay
11-709-----	Circuit Breaker
09-304-----	Brush & Spring Assembly
10-206-----	Toggle Switch
10-207-----	Toggle Switch Plate
11-107-----	Terminal Block
11-412-----	Pilot Light 12v (Green)
16-108-----	10" Fan Guard
28-427-----	Expansion Valve (R22)
28-423-----	Expansion Valve (R404A)



Warranty

Econo-Cel Eutectic Blower Unit

The Company warrants this Dole Econo-Cel Unit to be well made, of good material and free from defects. It is guaranteed against any defect in material or workmanship for the following period of time, providing, if claimed defective, the Econo-Cel or any part thereof is returned to the Company, transportation charges prepaid.

ECO Models

FAN MOTORS & VOLTAGE CONVERSION UNIT – 90 DAYS

BALANCE OF UNIT – 1 YEAR

PLATES- 5 YEARS. If Dole Plates should prove defective after TWO years and prior to the lapse of THREE years, the Company will replace said Dole Truck Plate for 45% of prices in effect at time of exchange, and if said Dole Plate shall become defective at the end of THREE years and prior to the lapse of FOUR years, the Company will replace said Dole Plate for 60% of prices in effect at time of exchange, and if said Dole Plate shall become defective at the end of FOUR years and prior to the lapse of FIVE years, the Company will replace said Dole Plate for 75% of prices in effect at time of exchange.

The Company shall not be liable for any damage of any nature caused by defects in workmanship or material or for any other reason, but its liability shall be limited to the value of the Dole Econo-Cel Unit guaranteed, and correction of any defects in workmanship or material shall constitute a fulfillment of its guarantee. The Company's liability in all events shall be limited to replacing or repairing the defective part, whichever it seems advisable.

