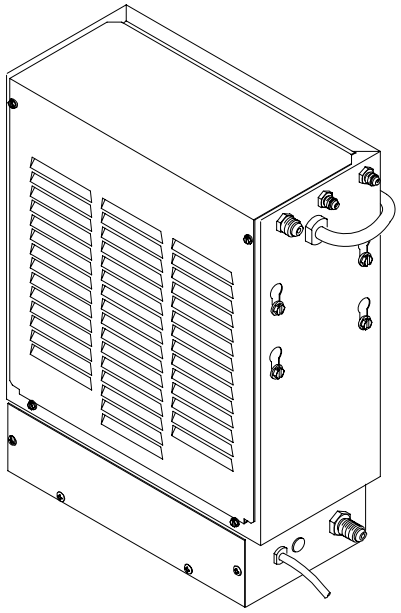
CORNELIUS INC ■ One Cornelius Place ■ Anoka, MN 55303-6234

Telephone (800) 238-3600 Facsimile (763) 422-3246

Installation Manual
CARBONATOR
With Plain-Water Booster



IMPORTANT:

It is the responsibility of the Service Person to ensure that the water supply to the dispensing equipment is provided with protection against backflow by an air gap as defined in ANSI/ASME A112. 1.2-1979; or an approved vacuum breaker or other such method as proved effective by test.

Water pipe connections and fixtures directly connected to a potable water supply shall be sized, installed, and maintained according to Federal, State, and Local codes.

When installing in an area regulated by the City of Los Angeles Plumbing and/or Mechanical Codes, a City of Los Angeles approved reduced pressure principle backflow preventer shall be installed on each potable water supply to each carbonator.

Publication Number: 319642005
Revision Date: May 05, 2014
Revision: E

THIS DOCUMENT CONTAINS IMPORTANT INFORMATION
This Manual must be read and understood before installing or operating this equipment

TABLE OF CONTENTS

LIST OF FIGURES

TABLE OF CONTENTS (cont'd)

LIST OF TABLES

SAFETY INFORMATION

Recognize Safety Information

This is the safety-alert symbol. When you see this symbol on our machine or in this manual, be alert to the potentially of personal injury.

Follow recommended precautions and safe operating practices.

Understand Signal Words

A signal word - ***DANGER, WARNING,*** *OR* ***CAUTION*** is used with the safety-alert symbol. ***DANGER*** identifies the most serious hazards.

Safety signs with signal word ***DANGER*** or ***WARNING*** are typically near specific hazards.

General precautions are listed on ***CAUTION*** safety signs. ***CAUTION*** also calls attention to safety messages in this manual.

Follow Safety Instructions

Carefully read all safety messages in this manual and on your machine safety signs. Keep safety signs in good condition. Replace missing or damaged safety signs. Learn how to operate the machine and how to use the controls properly. Do not let anyone operate the machine without instructions. Keep your machine in proper working condition. Unauthorized modifications to the machine may impair function and/or safety and affect the machine life.

CO_2 (Carbon Dioxide) Warning

CO_2 Displaces Oxygen. Strict Attention *must* be observed in the prevention of CO_2 (carbon dioxide) gas leaks in the entire CO_2 and soft drink system. If a CO_2 gas leak is suspected, particularly in a small area, *immediately* ventilate the contaminated area before attempting to repair the leak. Personnel exposed to high concentration of CO_2 gas will experience tremors which are followed rapidly by loss of consciousness and suffocation.

Shipping, Storing, Or Relocating Unit

CAUTION: All water must be purged from the Unit if exposed to freezing temperature. A freezing ambient temperature will cause residual water remaining inside the Unit to freeze resulting in damage to internal components of the Unit.

THIS PAGE LEFT BLANK INTENTIONALLY

GENERAL INFORMATION

TO THE USER OF THIS MANUAL

This Manual is a guide for installing and operating this equipment. Refer to Table of Contents for page location of detailed information pertaining to questions that may arise during installation or operation of this equipment. A Service Manual (P/N 319642004) for this equipment is available upon request.

This Unit must be serviced by a qualified Service Person. This Unit contains no User serviceable parts.

CLAIMS INSTRUCTIONS

Claims: In the event of shortage, notify the carrier as well as Cornelius immediately. In the event of dam-age, notify the carrier. **Cornelius is not responsible for damage occurring in transit, but will gladly render assistance necessary to pursue your claim. Merchandise must be inspected for concealed dam-age within 15 days of receipt.**

WARRANTY REFERENCE INFORMATION

Warranty Registration Date (to be filled out by customer)
Unit Part Number:
Serial Number:
Install Date:
Local Authorized Service Center:

DESIGN DATA

Table 1. Design Data	
Model Numbers	
115 VAC Unit	416417000
230 VAC Unit	496417000
230 VAC Unit	496417020
230 VAC Unit	496417040
Overall Dimensions:	
Width	6-3/8 inches
Height	18-1/4 inches
Depth	14 inches

Table 1. Design Data (cont'd)	
Weight:	
Dry	35 pounds
Shipping	38 pounds
Ambient Operating Temperature	40° F to 100° F
Maximum CO_2 Operating Pressure	125 psi
Electrical Requirements:	
Model No. 416417000:	
Operating Voltage	115 VAC, 60 Hz
Current Draw	6.5 Amps
Model No. 496417000, 496417020, and 496417040:	
Operating Voltage	220/230 VAC, 50/60 Hz
Current Draw	3.3 Amps

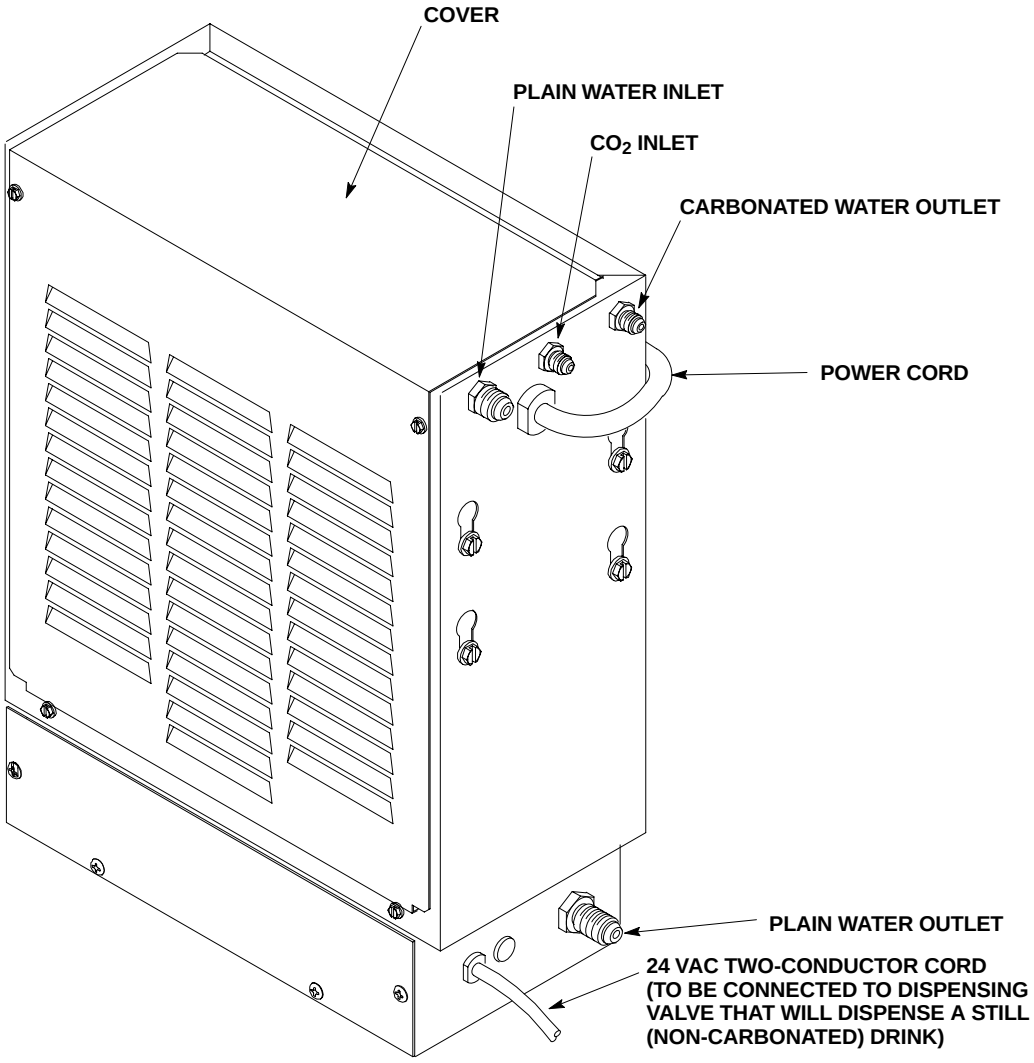


FIGURE 1. CARBONATOR WITH PLAIN-WATER BOOSTER

UNIT DESCRIPTION

The carbonator is a compact Unit that may be installed in a remote location from where its carbonated water outlet is to be connected to a post-mix dispenser or a system. The purpose of the Unit is to mix plain water and carbon dioxide (CO_2) gas which results in and provides carbonated water for a post-mix dispenser or a system. The Unit consists basically of a water pump, motor and a carbonated water tank. The water pump has a double-liquid check valve on its outlet to prevent carbonated water from back flowing into the city water system. The Unit CO_2 inlet has a single check valve to prevent carbonated water back flow into CO_2 regulator.

THEORY OF OPERATION

A CO_2 cylinder delivers carbon dioxide (CO_2) gas through a CO_2 regulator to the carbonator tank. When carbonator tank calls for water, an electrical circuit is completed through the level control switches, which opens the water solenoid valve and also starts the water pump motor. Plain water is pumped through the water solenoid valve into the carbonator tank which is carbonated by CO_2 which is also entering the tank. When carbonator tank is full, the weight of the water in the tank forces the tank and the balance control mechanism down activating the level control switches which stops the water pump motor and also closes the water solenoid valve.

When still (non–carbonated) drink dispensing valve is activated, it sends an electrical signal to start the carbonator water pump motor. The carbonator water pump provides pressurized plain-water to the dispensing valve which dispenses a still (non-carbonated) drink. When the dispensing valve lever is released, the electrical signal to the carbonator water pump motor is cut off which stops the water pump motor.

THIS PAGE LEFT BLANK INTENTIONALLY

INSTALLATION

UNPACKING AND INSPECTION

NOTE: This Unit was thoroughly inspected before leaving the factory and the carrier has accepted and signed for it. Any damage or irregularities should be noted at the time of delivery and immediately re-ported to the delivering carrier. Request a written inspection report from the Claims Inspector to sub-stantiate any necessary claim. File the claim with the delivering carrier, not Cornelius Inc.

1. After unit has been uncrated, remove shipping tape and other packing material. Check for obvious damage and follow procedure in preceding NOTE if damage is evident.

2. Unpack LOOSE–SHIPPED PARTS. Make sure items are present and in good condition.

Table 2. Loose-Shipped Parts

Item No.	Part No.	Name	Qty.
1	178025100	Tapered Gasket, White	2
2	311304000	Tapered Gasket, Black	2

IDENTIFICATION OF LOOSE–SHIPPED PARTS

1. TAPERED GASKETS, WHITE (item 1) are used to seal connections when connecting lines to fittings labeled CO_2 INLET and CARB WATER OUTLET on the Unit.

2. TAPERED GASKETS, BLACK (item 2) are used to seal connections when connecting water inlet supply line to the Unit and when connecting plain-water line from the post–mix dispenser or system to the Unit plain-water outlet.

SELECTING LOCATION

CAUTION: This Unit must not be installed in an unsheltered outdoor location where it will be exposed to the elements.

Locate unit so following requirements are satisfied.

1. Locate the Unit in a cool area close to a properly grounded and fused electrical outlet with proper electrical requirements (see TABLE 1). For accessibility, the electrical outlet must not be located behind the Unit.

2. Close to a food grade flexible plastic potable water inlet supply line with proper water inlet supply line requirements.

3. Unit must be installed in up-right level position for proper operation.

INSTALLING UNIT

IMPORTANT: Before putting the carbonator into operation, the front cover must be removed and the packing block *must* be removed from below the water pump motor.

CONNECTING PLAIN WATER INLET SUPPLY LINE

(see Figure 1)

NOTE: Cornelius Inc. recommends that a water shutoff valve and water filter be installed in the potable water inlet supply line. A Cornelius Water Filter (P/N 313860000) and Quick Disconnect Set (P/N 313867000) are recommended.

CAUTION: Check minimum flow rate and pressure of potable water inlet supply line. MINIMUM FLOW RATE MUST BE AT LEAST 100-GALLONS PER HOUR AND WATER PRESSURE MUST NOT EXCEED 30-PSI. If flow rate is less than 100-gallons per hour, starving of carbonator water pump will occur. Starving will allow carbonator water pump to overheat causing safety thermostat on pump outlet to disrupt electrical power to and stop water pump motor. Overheating could occur if plain water inlet supply line flow rate drops below 100-gallons per hour.

If fitting connector is not available, tap into plain water supply line with a 3/8-flare saddle valve (P/N 315664000) or equivalent.

1. Make sure food grade flexible plastic potable water inlet supply line provides adequate water flow rate and pressure as outlined in CAUTION note.

   Before connecting the potable water inlet supply line to the Unit, open the water line for a period of time to flush out any metal shavings resulting from connecting the water line to the fitting connector or the saddle valve.

2. Remove shipping cap from 3/8-inch flare (5/8-18) male fitting on the Unit stamped WATER INLET.

3. Install TAPERED GASKET, BLACK (item 2) in water inlet supply line swivel nut, then connect water inlet supply line to 3/8-flare male fitting labeled WATER INLET on the Unit.

CONNECTING CO_2 INLET SUPPLY LINE

(see Figure 1)

1. Remove shipping cap from 1/4–inch flare (7/16-20) male fitting on the Unit stamped CO_2 INLET.

2. Connect CO_2 inlet supply line from CO_2 regulator to 1/4-inch flare (7/16-20) male fitting on the Unit labeled CO_2 INLET. Seal connection with TAPERED GASKET, WHITE (item 1).

CONNECTING CARBONATED WATER OUTLET LINE

(see Figure 1)

WARNING: *Under no circumstances* should copper tubing, copper fittings, or brass fittings be used to connect the Unit carb (carbonated) water outlet to the post–mix dispenser or system. CO_2 gas contact with copper tubing, copper fittings, or brass fittings will cause a health hazard.

1. Remove shipping cap from 1/4–inch flare (7/16-20) male fitting stamped CARB WATER on the Unit.

2. Extend length of food grade flexible plastic tubing from the Unit carbonated water outlet to the carbonated water inlet of the post-mix dispenser or system, then connect to dispenser or system.

3. Connect food grade flexible plastic tubing to 1/4-inch flare (7/16-20) male fitting labeled CARB WATER on the Unit. Seal connection with TAPERED GASKET, WHITE (item 1).

CONNECTING PLAIN WATER OUTLET LINE

(see Figure 1)

1. Remove shipping cap from 3/8-inch flare (5/8-18) plain-water outlet male bulkhead fitting on the Unit.
2. Install TAPERED GASKET, BLACK (item 2) in water line swivel nut from post-mix dispenser or system, then connect line to the Unit 3/8-inch flare (5/8-18) plain-water outlet bulkhead connector.

CONNECTING UNIT 24 VAC TWO–CONDUCTOR CORD TO ELECTRIC DISPENSING VALVE

(see Figure 1 and applicable Figure 3, 4, 5)

1. Route unit 24 VAC two–conductor cord (24-ft. long) following plain-water line) to the dispensing station.
2. Route two-conductor cord to inside of the dispensing station, then connect cord to the dispensing valve solenoid coil as shown in applicable Figure 3, 4, 5.

PERMANENT ELECTRICAL POWER CONNECTION TO DOMESTIC UNIT IF REQUIRED BY LOCAL CODES

(see applicable Figure 2, 3, or 4)

1. Loosen two screws securing the motor wiring compartment cover, then remove the cover.
2. Disconnect ground electrical wire from under the ground terminal connection screw located inside the motor wiring compartment.
3. Disconnect the black and white power cord wires inside the motor wiring compartment.
4. Remove power cord and strain relief from the Unit.

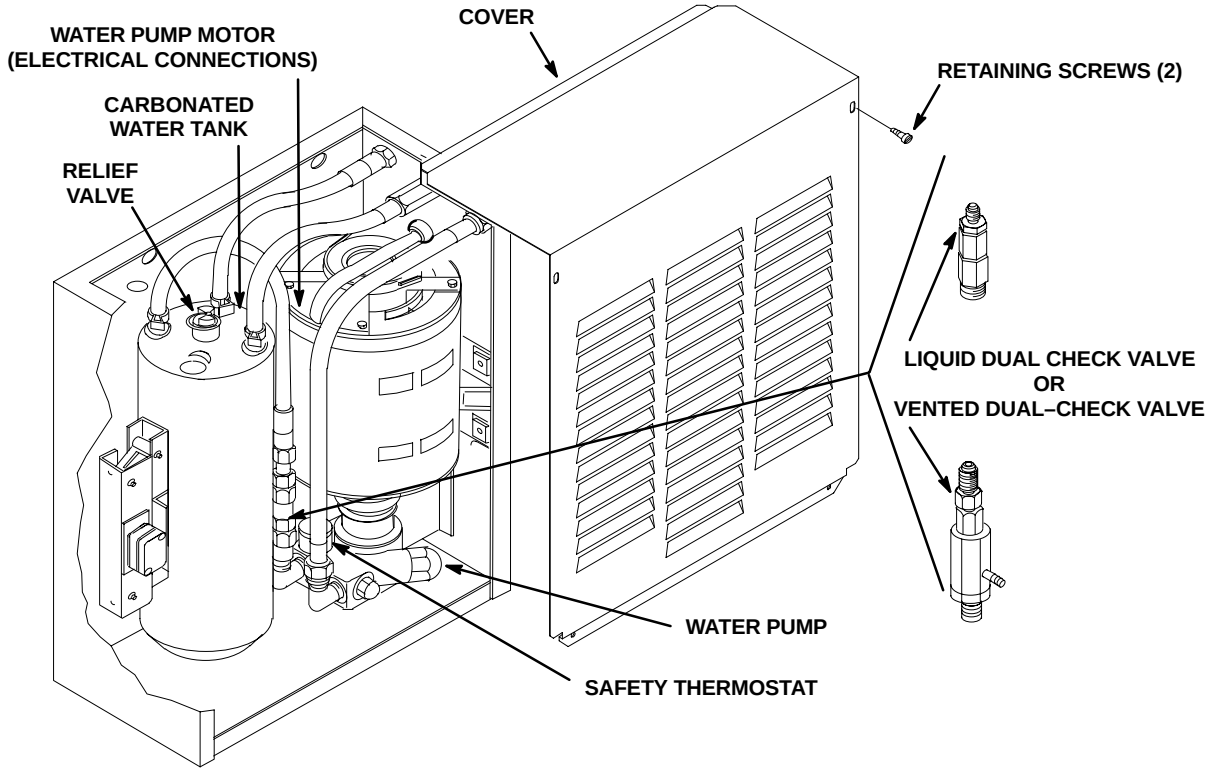


FIGURE 2. CARBONATOR ASSEMBLY COMPONENTS

WARNING: The Unit must be electrically grounded to avoid possible fatal electrical shock or serious injury to the operator. The Unit power cord is equipped with a three-prong plug. If a three-hole (grounded) electrical outlet is not available, use an approved method to ground the Unit.

5. Connect 115 VAC, 60 Hz or 220–240 VAC, 50 Hz electrical power from the disconnect switch (not furnished) fused at 15-amps (slow-blow) to the Unit with No. 16 AWG wire in suitable conduit or BX sheath. Install power source green or green/yellow wire under the ground terminal lug located inside control box as shown. Connect black or brown power cord wire with wire nut and white or blue wire under nut on motor terminal. All WIRING MUST CONFORM TO NATIONAL AND LOCAL ELECTRICAL CODES.
6. Install motor wiring compartment cover and secure the two cover screws.
7. Install cabinet cover and secure with two screws.

PREPARATION FOR OPERATION

ADJUST CARBONATOR CO_2 REGULATOR AND TURN WATER INLET SUPPLY LINE ON

CAUTION: Before connecting CO_2 regulator assembly to the CO_2 cylinder, turn the regulator adjusting screw to the left (counterclockwise) until all tension is relieved from adjusting screw spring.

1. Open (counterclockwise) CO_2 cylinder valve slightly to allow lines to slowly fill with gas, then open valve fully to back-seat valve. (Back-seating valve prevents leakage around the valve shaft).
2. Adjust carbonator CO_2 regulator as instructed.
3. Open post-mix system dispensing valve to exhaust trapped air inside the carbonator tank.

CAUTION: Never operate the carbonator with the water inlet supply line shutoff valve closed. “Dry running” the water pump will burn out the pump. A pump damaged in this manner is not covered by warranty.

4. Open water inlet supply line shutoff valve.

UNIT OPERATION

WARNING: Unit must be electrically grounded to avoid possible fatal electrical shock or serious injury to operator. Unit power cord is equipped with a three-prong plug. If a three-hole (grounded) electrical outlet is not available, use an approved method to ground unit.

CAUTION: To prevent a fire hazard, no object should be placed or stored on top of the Unit.

1. Connect electrical power to the Unit. The water pump will start and fill the carbonator tank. The water pump will stop when the carbonator tank is full.
2. Open the dispensing valve that will dispense a noncarbonated (still) drink. Dispense from the valve until all air is purged from the system and a solid stream of plain water is dispensed.
3. Check for water leaks and tighten any loose connections.

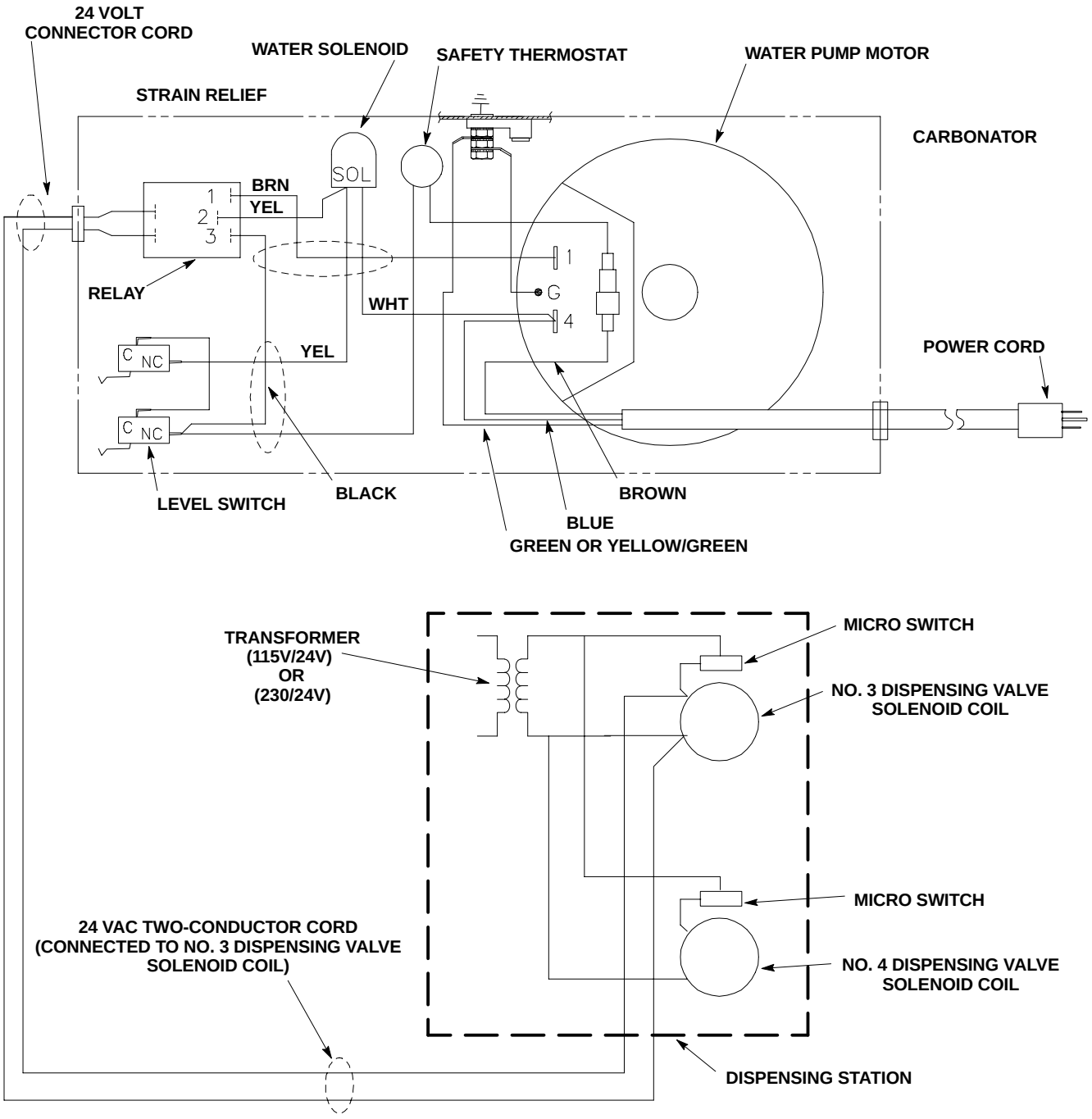
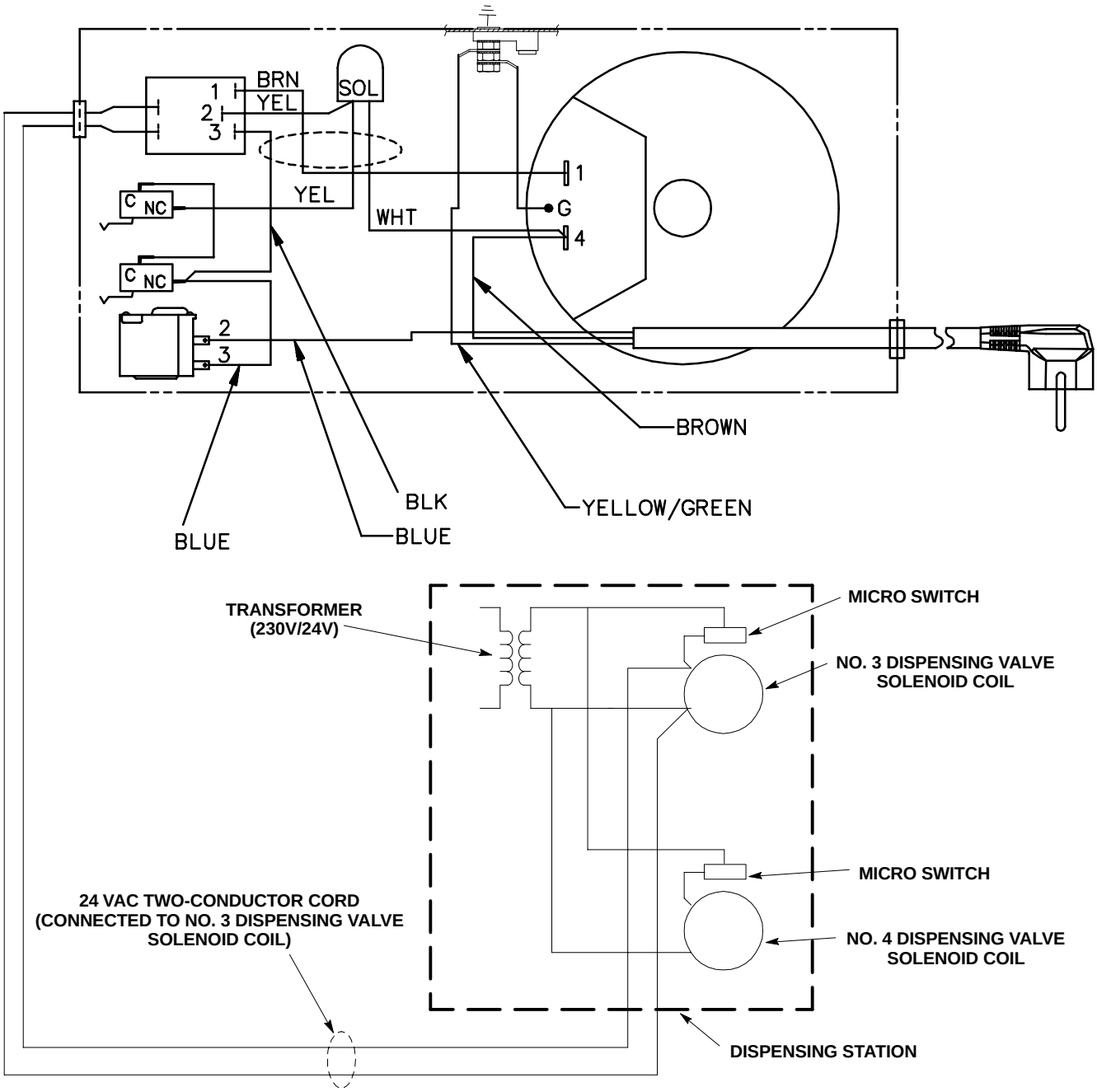


FIGURE 3. WIRING DIAGRAM (MODEL NO. 416417000 AND 496417000)



496417020
REV: J

FIGURE 4. WIRING DIAGRAM (MODEL NO. 496417020)

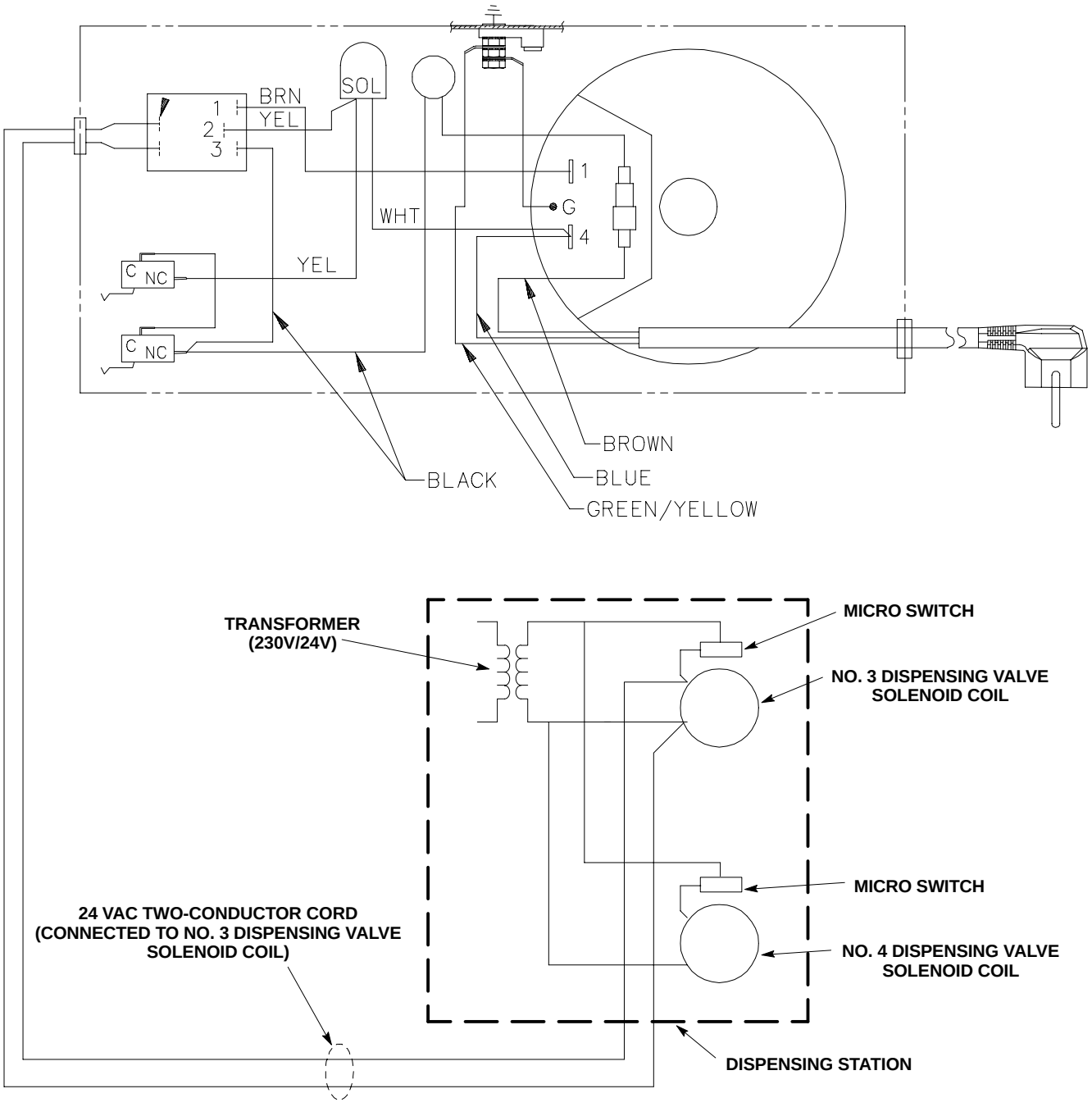


FIGURE 5. WIRING DIAGRAM (MODEL NO. 496417040)

TROUBLESHOOTING

IMPORTANT: Only qualified personnel should service internal components or electrical wiring.

WARNING: If repairs are to be made to a product system, remove quick disconnects from the applicable product tank, then relieve the system pressure before proceeding. If repairs are to be made to the CO_2 system, stop dispensing, shut off the CO_2 supply, then relieve the system pressure before proceeding. If repairs are to be made to the refrigeration system, make sure electrical power is disconnected from the unit.

Trouble	Probable Cause	Remedy
WATER PUMP MOTOR WILL NOT OPERATE.	A. Power cord unplugged or circuit breaker open in panel box.	A. Plug in power cord or reset circuit breaker.
	B. Inoperative water pump motor.	B. Replace water pump motor as instructed.
	C. Dirty balance mechanism.	C. Clean balance mechanism.
	D. Loose connections and/or open electrical circuit.	D. Tighten connections and/or repair open circuit. Check line voltage.
	E. Overheated motor cut off by thermal overload protector.	E. Check for proper line voltage. Check for restricted pump discharge or water solenoid not opening.
	F. Inoperative level control switches.	F. Replace level control switches as instructed.
	G. Binding or damaged balance mechanism.	G. Repair or replace balance mechanism.
	H. Water pump binding (new or replacement pumps only).	H. Remove water pump from motor, rotate pump or motor shaft 180 degrees, then recouple pump to motor.
	I. Water pump damaged.	I. Replace water pump as instructed.
	J. Safety thermostat inoperative.	J. Replace safety thermostat as instructed.
WATER PUMP MOTOR WILL NOT SHUT OFF.	A. Foreign object restricting tank movement.	A. Remove foreign object.
	B. Dirty balance mechanism.	B. Clean balance mechanism.
	C. Leak in carbonated water line.	C. Tighten or replace line.
	D. Inoperative level control switches.	D. Replace level control switches as instructed.
	E. Binding or damaged balance mechanism.	E. Repair or replace balance mechanism.

Trouble	Probable Cause	Remedy
ERRATIC CYCLING OF CARBONATOR.	A. Balance mechanism spring obstructed or “cocked”.	A. Remove obstructions. Make sure spring is perpendicular to spring release and is not twisted.
	B. Dirty balance mechanism.	B. Clean balance mechanism
	C. Erratic safety thermostat.	C. Replace thermostat.
	D. Erratic water inlet supply to carbonator causing safety thermostat to interrupt electrical supply to pump motor.	D. Correct water supply (refer to manual for water supply requirements).
WATER PUMP MOTOR OPERATES BUT WATER PUMP DOES NOT PUMP WATER.	A. Water pump inlet water strainer screen dirty.	A. Clean or replace water strainer screen as instructed.
	B. Kinked water supply line.	B. Straighten water supply line.
	C. Restriction between water pump outlet and carbonator tank inlet or water solenoid not operating.	C. Remove restriction or replace water solenoid.
	D. Foreign object in water pump bypass.	D. Clean. (Note: Count number of turns bypass screw makes when removing and install same number of turns.)
	E. Water pump worn out.	E. Replace water pump as instructed.
WATER PUMP CAPACITY TOO LOW.	A. Water pump inlet water strainer screen dirty.	A. Clean or replace water strainer screen as instructed.
	B. Water supply capacity too low.	B. Inlet water supply must be at a minimum of 100-gallons per hour not to exceed water pressure of 30-psi.
	C. Water filter clogged.	C. Replace water filter.
	D. Water pump worn out.	D. Replace water pump as instructed.
NO PLAIN WATER DISPENSED WHEN DISPENSING VALVE IS OPENED.	A. Inoperative dispensing valve micro switch or solenoid coil.	A. Replace micro switch or coil.
	B. Poor electrical connection or broken 24 VAC service cord from dispensing valve to carbonator.	B. Repair connection or repair or replace service cord.
	C. Inoperative carbonator 24 VAC relay.	C. Replace relay as instructed.

CORNELIUS INC.

CORPORATE HEADQUARTERS:

One Cornelius Place
Anoka, Minnesota 55303-6234
(763) 421-6120
(800) 238-3600