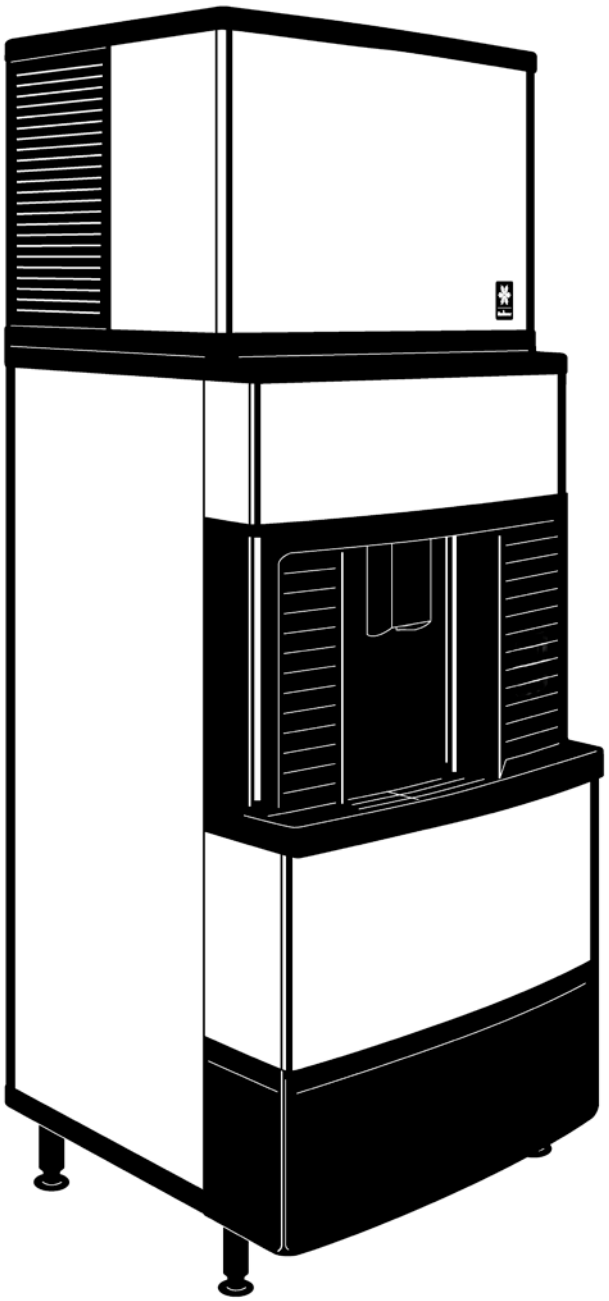
Manitowoc®



Q MODEL DISPENSER
Q160/290/300

Service Manual

Thank you for selecting a Manitowoc Dispenser, the dependability leader in ice making equipment and related products. With proper care and maintenance, your new Manitowoc Dispenser will provide you with many years of reliable and economical performance.

This manual is updated as new information and models are released.
Visit our website for the latest manual. **www.manitowocice.com**

Part Number 80-1389-3
6/04

Safety Notices

Installation and start-up of this equipment should be done by a qualified service technician.

When using or servicing a Q Model Dispenser, be sure to pay close attention to the safety notices in this manual. Disregarding the notices may lead to serious injury and/or damage to the dispenser.

Throughout this manual, you will see the following types of safety notices:

⚠ WARNING

Text in a Warning box alerts you to a potential personal injury situation. Be sure to read the Warning statement, and then proceed carefully.

⚠ CAUTION

Text in a Caution box alerts you to a situation in which you could damage the dispenser. Be sure to read the Caution statement, and then proceed carefully.

⚠ CAUTION

Proper care and maintenance are essential for trouble-free operation of your Manitowoc Dispenser.

Read and understand this manual. It contains valuable care and maintenance information. If you encounter problems not covered by this manual, feel free to contact Manitowoc Ice, Inc. We will be happy to provide assistance.

Procedural Notices

When using or servicing a Q Model Dispenser, be sure to read the procedural notices in this manual. These notices supply helpful and important information.

Throughout this manual, you will see the following types of procedural notices:

NOTE: Text set off as a Note provides you with simple, but useful, extra information.

Important

Important boxes serve two functions.

They call the operator's attention to important information.

They also provide the service technician with information that may help perform a procedure more efficiently. Disregarding this information may slow down the work.

⚠ WARNING

Personal Injury Potential

Do not operate equipment that has been misused, abused, neglected, damaged, or altered/modified from that of original manufactured specifications.

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Troubleshooting

This manual is a reference guide for the owner/operator, service agent and installer of this equipment. Please read this manual before installation or operation of the machine. If you encounter a problem, first consult the Trouble shooting Guide or Adjustments sections of this manual. If you cannot correct the problem, call your Manitowoc Service Agent, Distributor or the Factory. Always have your model and serial number available when you call.

Q1000 Ice Machines are not approved for use on a Q-Model Dispenser.

Earthquake kits are available to secure the ice machine to the dispenser and the dispenser to the floor.

Adapter Kit

A 22'' wide machine mounted to a 30'' wide dispenser requires an adapter kit

Locations of Model Number and Serial Number



Front of Dispenser

Label with Model Number and Serial Number is located behind the front panel, to the right of the rocking chute.

Back of Dispenser

A second location for the Model Number and Serial Number is on the back of the dispenser, in the **upper right corner.**

Dispensers Covered in This Manual

Series	Rocking Chute Operated	Card Operated	Coin Operated	Glass Fill Dispenser
Q160	QPA160	QRA164	QCA163	N/A
Q300	QPA310	QRA340	QCA330	N/A
Q290	N/A	N/A	N/A	QFA291

NOTE: These dispensers are designed to dispense both dice and half dice ice.
These dispensers may be used in conjunction with a Manitowoc ice machine for automatic fill of dispenser.
Q160 dispensers are capable of storing 120 lbs. of ice.
Q290/Q300 dispensers are capable of storing 180 lbs. of ice.

Warranty Information

The packet containing this manual also includes warranty information. Warranty coverage begins the day your new dispenser is installed.

Important

Complete and mail the OWNER WARRANTY REGISTRATION CARD as soon as possible to validate the installation date.

If you do not return your OWNER WARRANTY REGISTRATION CARD, Manitowoc will use the date of sale to the Manitowoc Distributor as the first day of warranty coverage for your new dispenser.

Warranty Coverage

The following Warranty outline is provided for your convenience. For a detailed explanation, read the warranty bond shipped with each product.

Contact your local Manitowoc representative or Manitowoc Ice, Inc. if you need further warranty information.

PARTS

Manitowoc warrants the dispenser against defects in materials and workmanship, under normal use and service, for three (3) years from the date of original installation.

LABOR

Labor required to repair or replace defective components is covered for three (3) years from the date of original installation.

EXCLUSIONS

The following items are not included in the dispenser's warranty coverage:

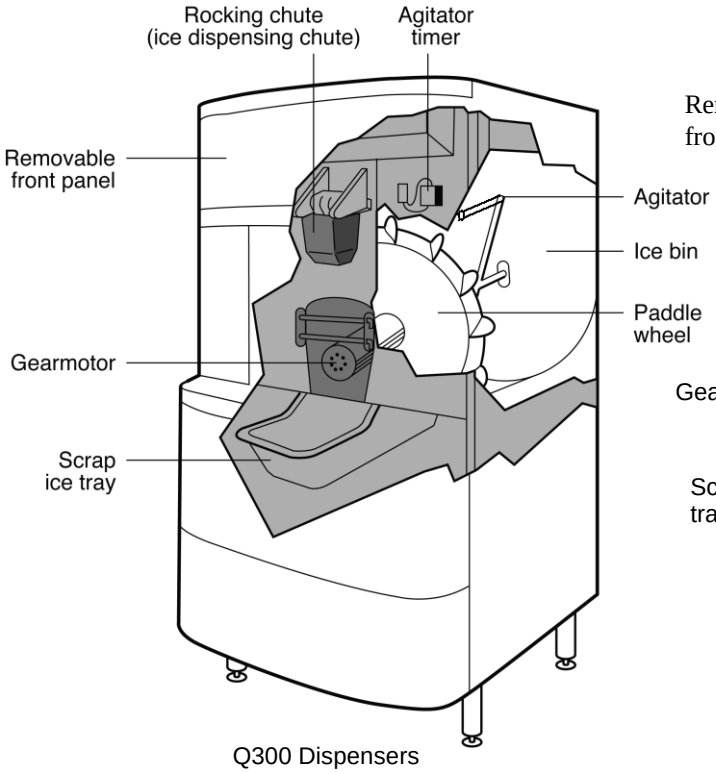
1. Normal maintenance, adjustments and cleaning as outlined in this manual.
2. Repairs due to unauthorized modifications to the dispenser or the use of non-standard parts without prior written approval from Manitowoc Ice, Inc.
3. Damage caused by improper installation of the dispenser, electrical supply, water supply or drainage, or damage caused by floods, storms, or other acts of God.
4. Premium labor rates due to holidays, overtime, etc.; travel time; flat rate service call charges; mileage and miscellaneous tools and material charges not listed on the payment schedule. Additional labor charges resulting from the inaccessibility of the dispenser are also excluded.
5. Parts or assemblies subjected to misuse, abuse, neglect or accidents.
6. Damage or problems caused by installation, cleaning and/or maintenance procedures inconsistent with the technical instructions provided in this manual.

AUTHORIZED WARRANTY SERVICE

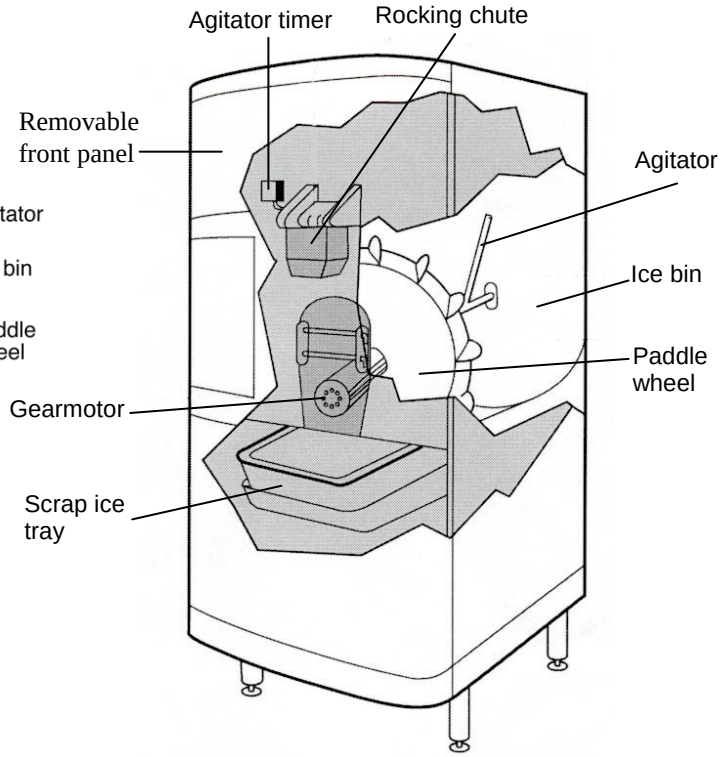
To comply with the provisions of the warranty, a refrigeration service company, qualified and authorized by a Manitowoc distributor, or a Contracted Service Representative must perform the warranty repair.

NOTE: If the dealer the dispenser was purchased from is not authorized to perform warranty service, contact the Manitowoc distributor or Manitowoc Ice, Inc. for the name of the nearest authorized service representative.

Equipment Overview



Q300 Dispensers



Q160 Dispensers

The operation of the Q Series ice dispenser can be divided into three main operations. They are Dispenser Activation, Ice Pick-Up and Ice Delivery.

Dispenser Activation

Dispenser activation can be accomplished with a number of different mechanisms.

- **Rocking Chute (Push for Ice) Activation –**User pushes the Rocking Chute, which energizes a microswitch. The energized microswitch engages the gearmotor.
- **Room Key Card Activation –** User places their hotel room key card into a slot on the dispenser. The room key card activates the microswitch. The user then presses the Rocking Chute (Push for Ice) for ice dispense. This action activates the gearmotor.
- **Coin Operated Activation –** User places one quarter into dispenser. The quarter activates the coin mechanism. The user then presses the Rocking Chute (Push for Ice) for ice dispense. This action activates the gearmotor.

Ice Pick-Up

When the customer activates the dispenser, the gearmotor inside the dispenser begins to turn.

The gearmotor shaft is attached to the paddle wheel inside the bin of the dispenser. As the paddle wheel turns it picks up ice from the dispenser bin. The paddle wheel will bring the pocket containing the ice to the top of the travel area.

Ice Delivery

When the paddle wheel pocket reaches the top of its travel, the ice falls from the paddle wheel to the ice chute opening of the dispenser bin. The bin chute then directs the ice to the door assembly.

If the door closes before all the ice is dispensed, some ice may be held back by the door assembly. If the door is open, the ice will fall through the door and the ice chute. The ice chute will direct the ice into the customer's container.

Model QFA-291 is equipped with an optional water valve. When the water valve lever is pressed, water flows through the system to the water valve nozzle.

Room Key Card Activation

1. User places ice bucket under ice chute.
2. User places their hotel room key card into a slot on the dispenser which is labeled “Insert Room Key Card”. The room key activates the microswitch.
3. The user then presses the Rocking Chute (Push for Ice) for ice dispense. Pushing the ice chute activates the gearmotor.

   The room key card must stay in the slot for the microswitch to remain activated.



Coin Operated Activation

1. User places ice bucket under ice chute.
2. User places one quarter (U.S. currency only) into dispenser.
3. The user then presses the Rocking Chute (Push for Ice) for ice dispense.

   Pushing the ice chute activates the gearmotor. Ice will dispense for up to one minute for each 25 cent activation per factory setting.

Important

Coin Operated Activation will accept U.S. quarters only. No other coin is accepted and no change is returned to the user. To allow use of Canadian coins refer to instructions in this manual.



⚠ WARNING
Unplug unit before servicing or cleaning.

Ice dispenser bin contains parts that can move at any time and will cause injury if hands are in the way.

⚠ WARNING
Unplug unit before servicing or cleaning.
The agitator is operated by a timer and can agitate at anytime
Electric Shock Hazard.

Problem: Ice Does Not Dispense When Rocking Chute is Depressed.

Problem	Possible Cause	To Correct
There is power to the dispenser, however nothing runs.	The dispenser is plugged in with power to the receptacle. With a meter, check to see if power is getting to the white and black cord wires inside the electric box.	If no power is present, check the cord and plug of the dispenser, Replace cord set if wire is broken.
	Is power able to conduct through the microswitch? With the dispenser unplugged and the ohm meter probes on the "C" and "NC" terminals, depress the microswitch lever. The mere reading should display ohms. Release the microswitch lever. The ohm value should register continuity.	Check continuity at the microswitch, replace the switch or repair the connection if defective.
	If the gearmotor attempts to start but fails to do so, check the capacitor. Use a capacitor checker according to the instructions supplied.	If the capacitor does not test correctly, replace the capacitor.
	If gearmotor fails to attempt to start, check the gearmotor. First, disconnect power from the dispenser. Then disconnect the gearmotor wires in the junction box. Check for continuity through the gearmotor.	If gearmotor tests open, replace the gearmotor.

Problem: Ice Does Not Dispense When Rocking Chute is Depressed. (continued)

Problem	Possible Cause	To Correct
The gearmotor runs, but the dispensing paddle wheel does not turn.	Remove the paddle wheel pin. Is this pin broken, damaged, or missing?	If the paddle wheel pin is broken or missing, replace the pin.
	Remove the agitator and paddle wheel. Are you able to turn the shaft from the gearmotor without turning the motor armature itself?	The gearbox of the gearmotor contains a stripped gear. Replace the gearmotor.
Dispenser runs but does not dispense ice.	Is there any ice in the bin?	If the ice is not sufficient, add additional to bin.
	Is the ice in the bin proper size ice?	Replace ice with acceptable type.
Dispenser runs, ice does not dispense but does congeal ice into a large ball.	The agitation timer should be checked. See Section 3 for proper checkout procedure.	Adjust or replace the agitation timer as required.
	Is excess water running into the dispenser from the top mounted ice machine?	Repair top mounted ice machine to reduce the amount of water falling on the ice in the dispenser.
	Is the bin drain clean and open?	Clean the bin drain.

Problem: Dispenser Crushes Ice as it Dispenses

Problem	Possible Cause	To Correct
Dispenser crushes ice as it dispenses.	The ice in the bin is not the proper size and type? Is the ice being used a full size piece of ice, i.e., are cubes full, not shallow, etc.?	Replace ice with acceptable. Adjust ice machine to make a good, complete, not hollow piece of ice.

Problem: Ice Continues to Dispense or Dispenses by Itself

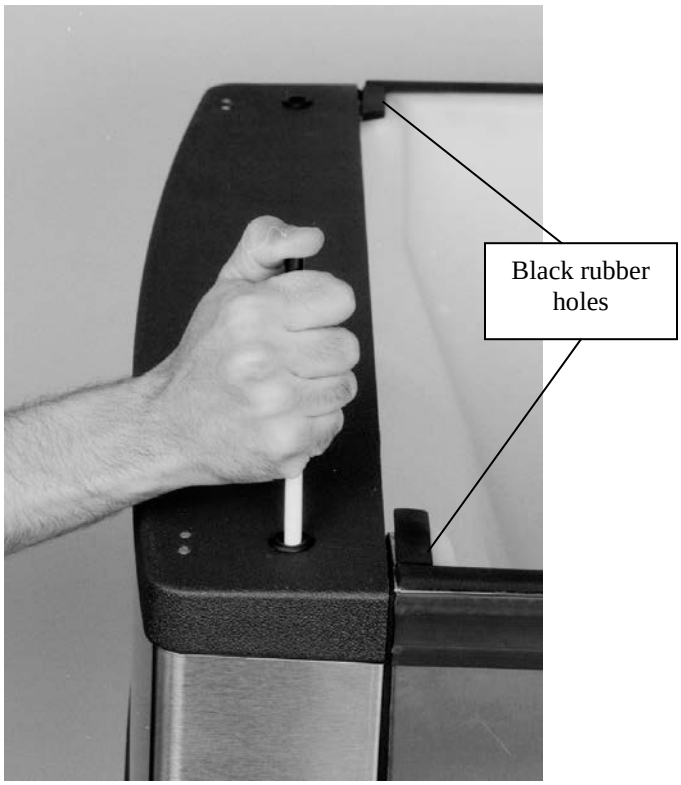
Problem	Possible Cause	To Correct
Is the agitation timer set properly?	Timer should agitate for two seconds every four hours.	Adjust or replace timer if necessary. See Section 3 "Component Disassembly".
Is the ice door opening fully when the dispenser operates?	The ice door should open a minimum of 1.5 in. (3.8 cm).	Adjust door to minimum or larger opening.
Does ice continue to dispense after the cup has been pulled away?	Does the gearmotor continue to run during this time?	Microswitch may be sticking. Check and clean the microswitch and linkage to the microswitch. Replace microswitch if necessary.
Does the ice dispense by itself without anyone around the dispenser?	Does the dispenser do this at regular intervals?	Check the agitation timer. Adjust the timer to two seconds on time and four hours off time. Also check to see if timer has a short.

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Disassembling the Dispenser Parts For Cleaning

⚠ WARNING
Unplug unit before servicing or cleaning.
The agitator is operated by a timer and can agitate at anytime.
Electric Shock Hazard.

1 Shut off water to ice machine.

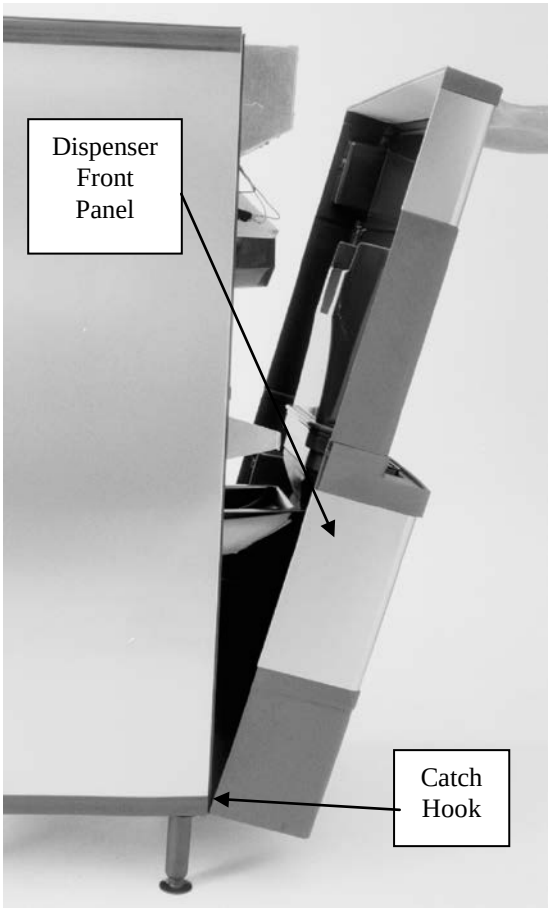


2 Locate a cylindrical object, such as a ballpoint pen with a cap on the pen.

Insert the pen into the left and right black rubber holes in the top of the front panel of the dispenser.

This action releases the two clips which hold the dispenser front panel in place.

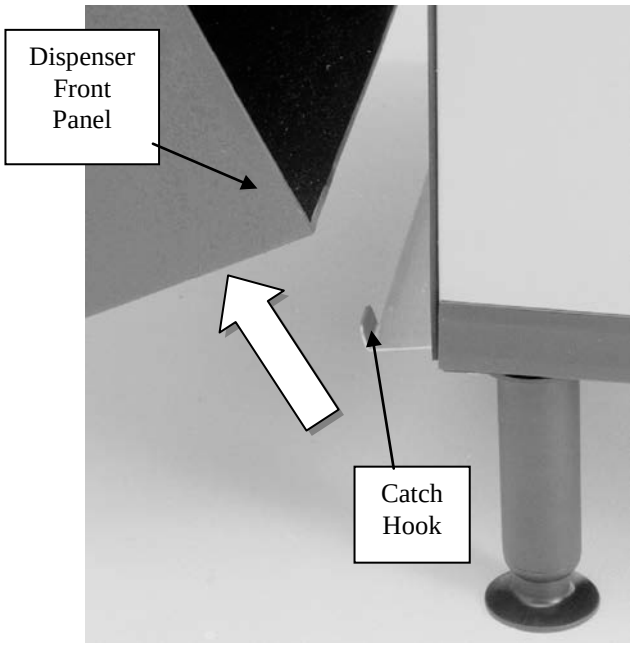
While applying pressure on the pen, pull the front panel forward slightly, so the clip in the panel does not snap back into place.



3 Hold the front panel of the dispenser on both sides and tilt the panel forward. The front panel will be resting on the catch hooks at the bottom of the panel.

4 QFA-291 ONLY - Disconnect water line at the front panel “quick disconnect” fitting.

Disassembling the Dispenser Parts For Cleaning (continued)

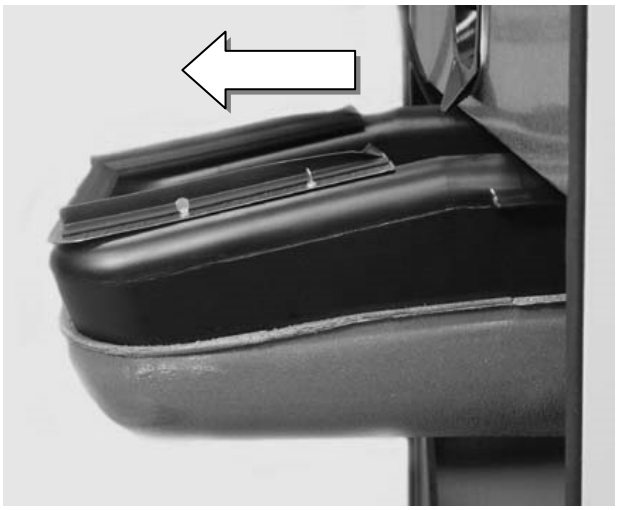


5 Lift the front panel off the catch hooks and set the panel aside.

Removing the Drain Pan



1 The drain pan is visible when the front panel of the dispenser is removed.



2 Slide the drain pan forward.

3 Remove scrap ice if any scrap ice has accumulated.

Removing the Drain Pan (continued)



4 Remove the inner drain pan. Clean the inner drain pan with sanitizing solution. (See page 4-9.)

5 After cleaning, place inner drain pan back into outer drain pan.

6 Slide drain pan back into place.

Disassembling the Rocking Chute/Door

⚠ WARNING
Unplug unit before servicing or cleaning.

Electric Shock Hazard.

1 Remove the front panel as described on pages 4-1 and 4-2.

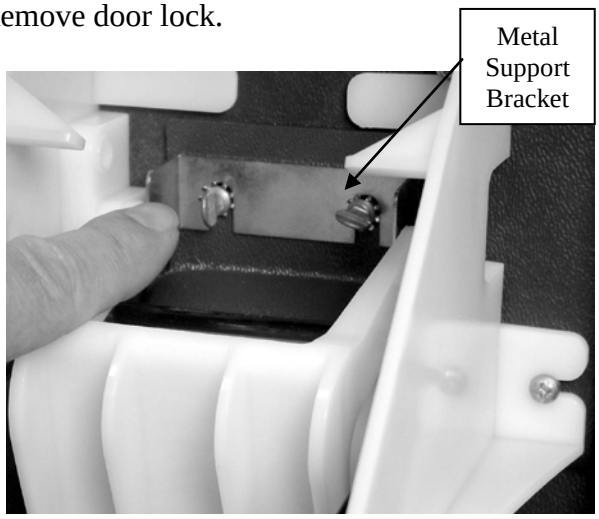


2 Remove outer bracket.

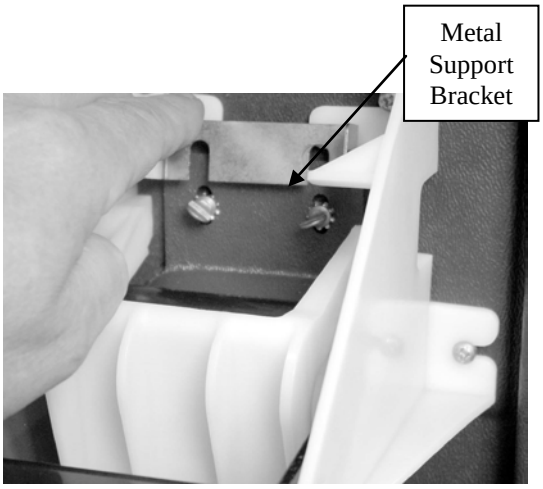
Disassembling the Rocking Chute/Door (continued)



3 Remove door lock.



4 Loosen the two thumbscrews of the metal support bracket.



5 Remove metal support bracket.

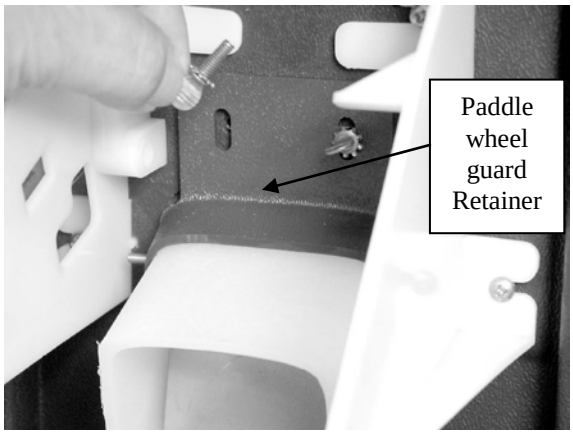


6 Remove door.

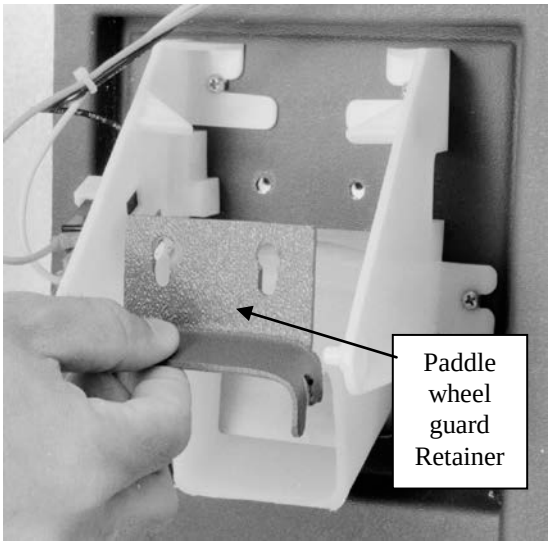


7 Remove ice chute.

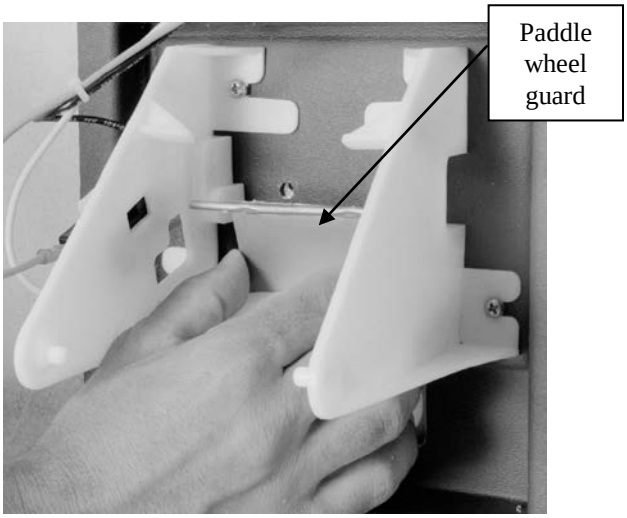
Disassembling the Rocking Chute/Door (continued)



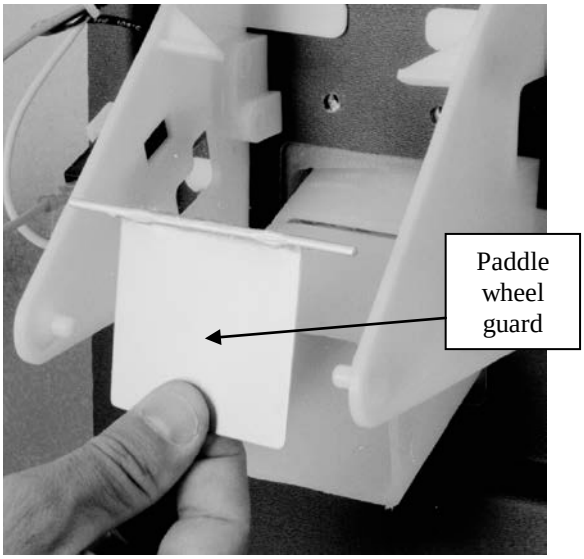
8 Remove the two thumb screws from the plastic paddle wheel guard retainer.



9 Remove the paddle wheel guard retainer

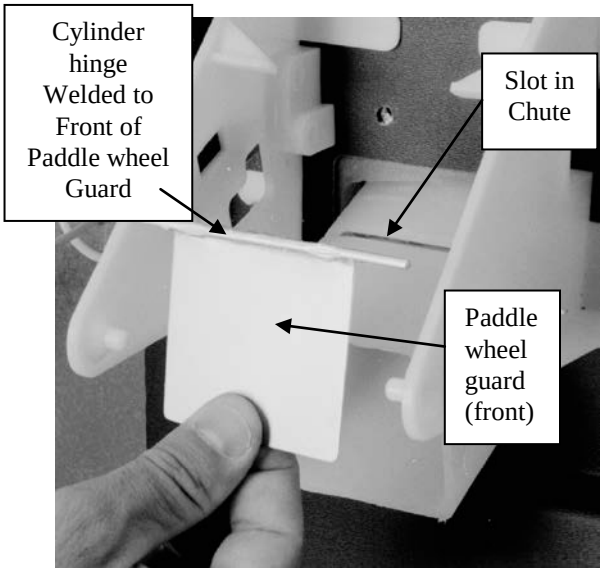


10 Pull the stainless steel paddle wheel guard from the slot that is cut into the chute…



11 …and remove the paddle wheel guard retainer.

Re-Installing the Paddle Wheel Guard



1 When re-assembling the rocking chute/door, the paddle wheel guard is placed in the slot in the ice chute.

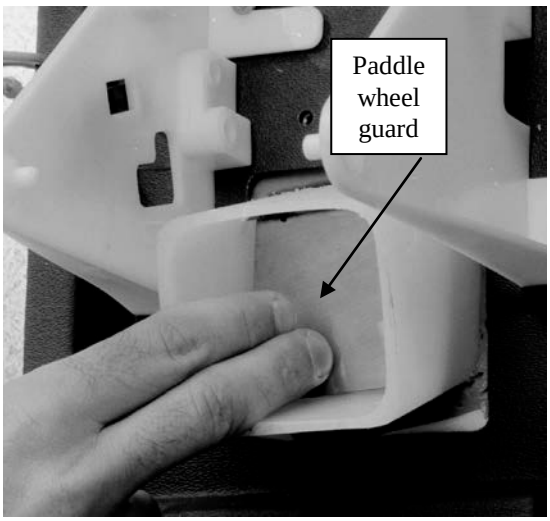
Notice that a cylinder hinge is welded to the top front side of the paddle wheel guard, as shown in the picture above.

When the paddle wheel guard is placed in the slot in the ice chute, the cylinder hinge on the front of the paddle wheel guard faces forward, as shown in the picture above.

When the paddle wheel guard is correctly installed, the paddle wheel guard will swing outward toward the front of the chute, allowing ice to flow out of the chute.

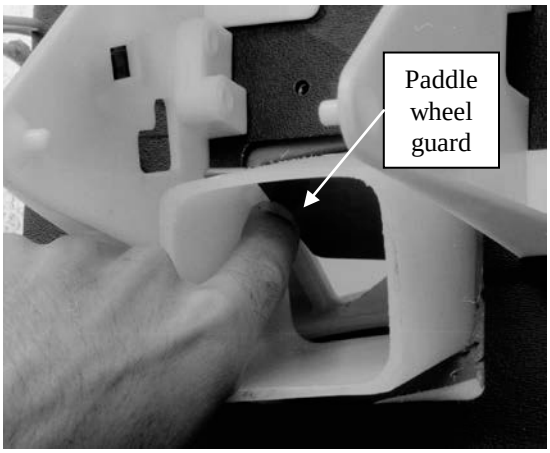
If incorrectly installed, the paddle wheel guard will not swing outward and ice delivery is blocked.

Correct Installation



2 **Correct Installation:**
If you press your finger forward against the paddle wheel guard, the paddle wheel guard does not swing back open.

Incorrect Installation



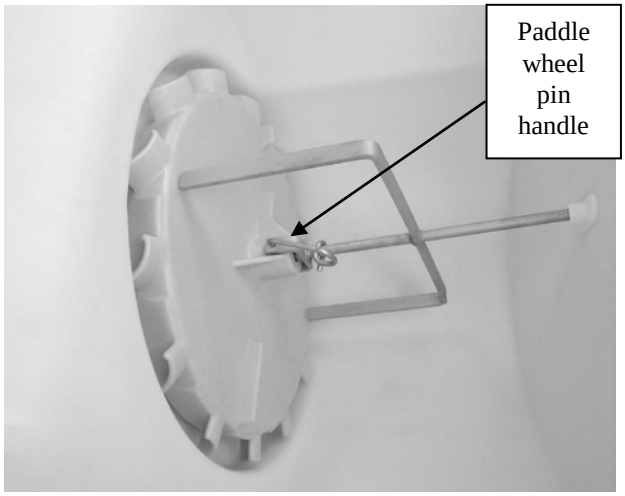
3 **Incorrect Installation:**
If you press your finger forward against the paddle wheel guard, the paddle wheel guard does swing back open.

Disassembling the Dispenser Parts For Bin Cleaning

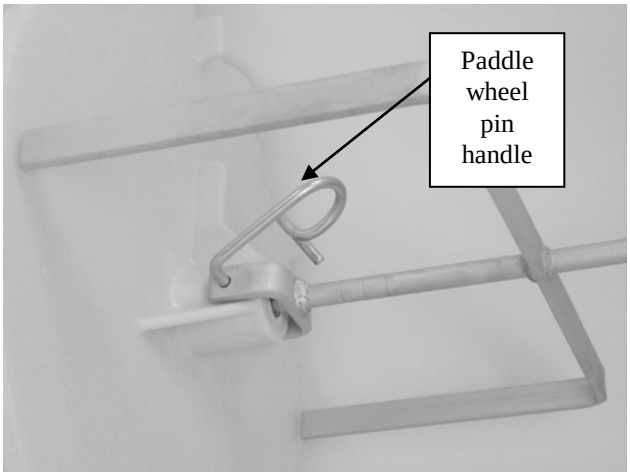
⚠ WARNING

Unplug unit before servicing or cleaning.

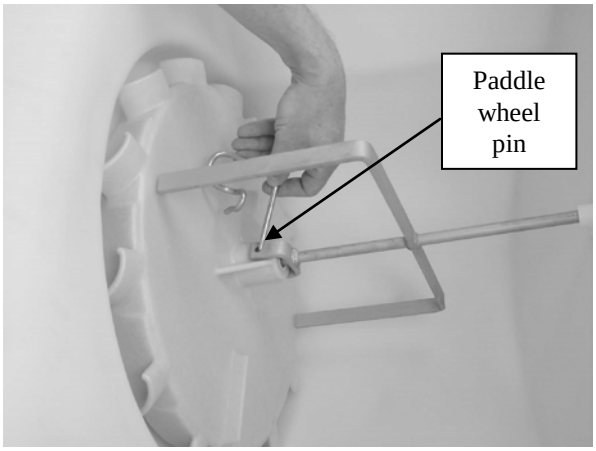
Ice dispenser bin contains moving parts that can move at any time and will cause injury if hands are in the way.



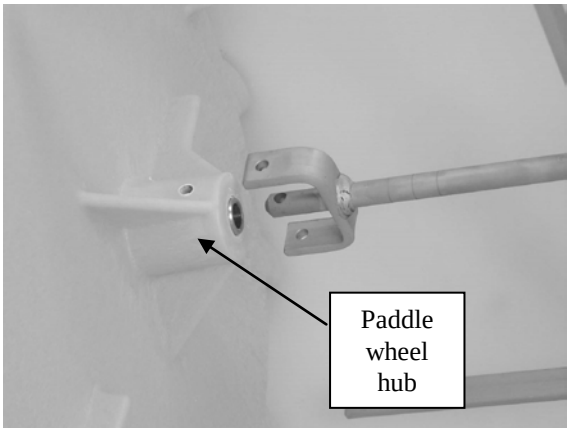
1 Inside the dispenser, rotate the agitator arm so the paddle wheel pin handle is pointing up, toward the ceiling.



2 Un-clip the hand-removable paddle wheel pin from the agitator…

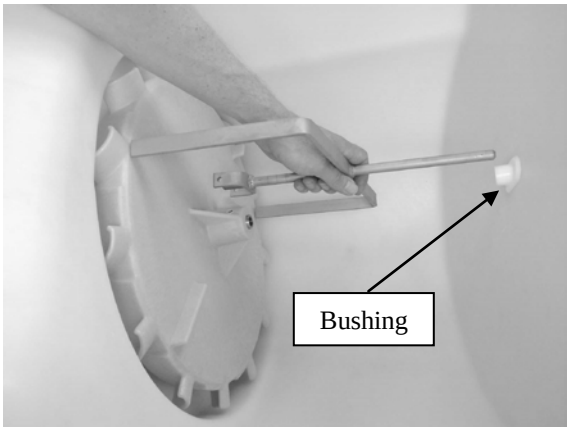


3 …Then remove the paddle wheel pin by firmly rotating the pin and pulling upward.



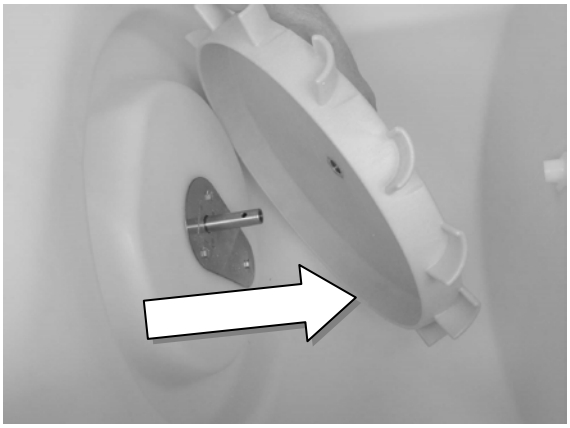
4 Push the agitator bar toward the back of the bin until agitator is free of the paddle wheel hub.

Disassembling the Dispenser Parts For Bin Cleaning (continued)



5 Move the agitator to one side and slide the agitator forward until the rear of the agitator shaft is clear of the bushing.

6 Remove the agitator from the bin area.



7 Slide the paddle wheel from its shaft.

Removal of the Gearmotor

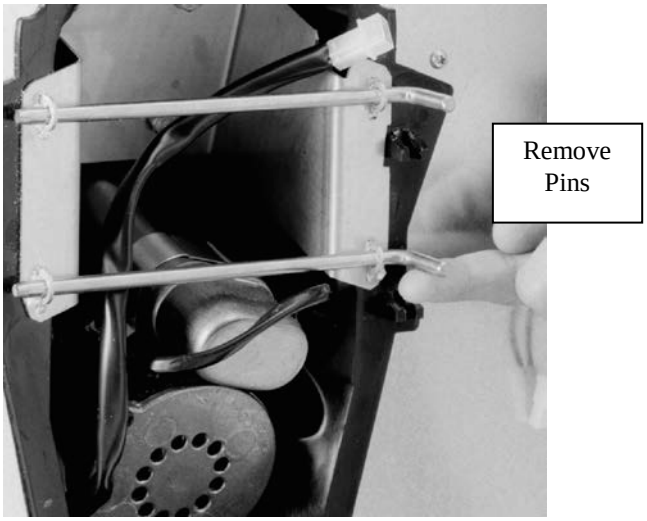
⚠ WARNING
Unplug unit before servicing or cleaning.
Electric Shock Hazard.

1 Remove the front panel from dispenser. (See pages 4-1 and 4-2.)

2 Remove paddle wheel pin, agitator, and paddle wheel. (See pages 4-5 and 4-6.)

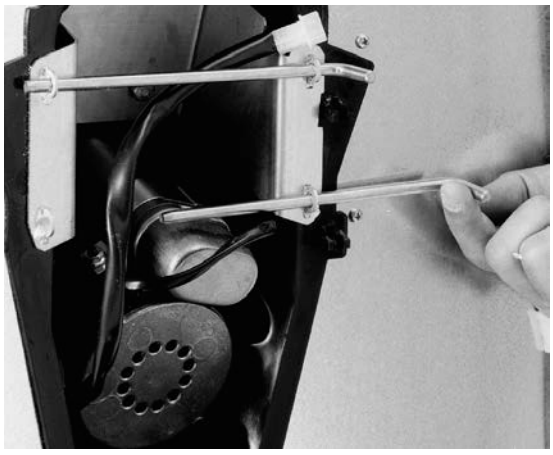


3 Unplug the gearmotor wire.

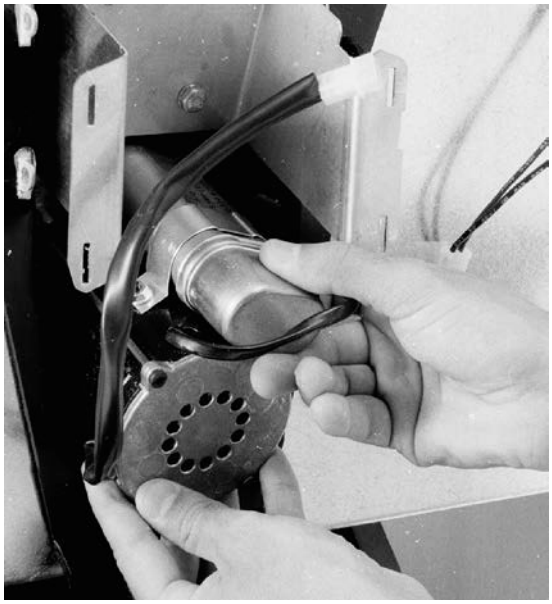


4 Turn the two removal pins toward you as shown in photo.

5 Pull removal pins out to the right.



6 As soon as the second pin is removed, be sure to hold onto the gearmotor as it slides forward. Then place the gearmotor aside.



Gearmotor Shaft Seal Replacement

⚠ WARNING

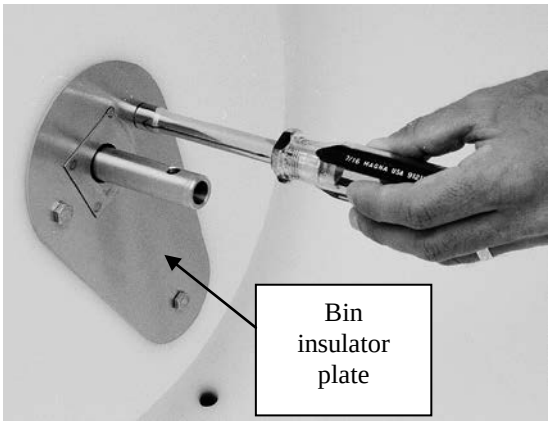
Unplug unit before servicing or cleaning. The agitator is operated by a timer and can agitate at anytime

Electric Shock Hazard.

1 If the dispenser is top mounted with an ice machine, remove the ice machine front panel. Most will allow access to the bin.

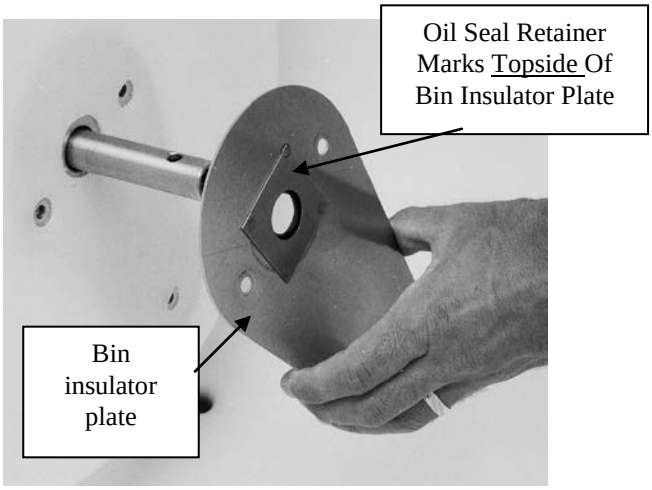
NOTE: The following photos show a bin that is not top-mounted with an ice machine.

2 Remove the paddle wheel pin, agitator, and paddle wheel. (See pages 4-5 and 4-6.)



3 The motor shaft seal can be replaced with the gearmotor in or out.

With a 7/16” nut driver, remove the three bolts on the bin insulator plate.



4 Remove the bin insulator plate.

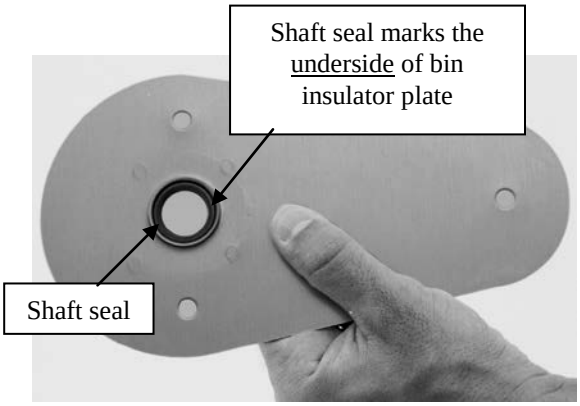
⚠ CAUTION

It is important to know which side of the bin insulator plate you are accessing, the topside or the underside.

The topside of the bin insulator plate can be noted by an approximately two-inch square of oil seal retainer welded to the top of the bin insulator plate. (As shown in Step 4 above.)

The underside of the bin insulator plate is where the shaft seal is located. (As shown in Step 5 on page 5-2.)

Gearmotor Shaft Seal Replacement (continued)

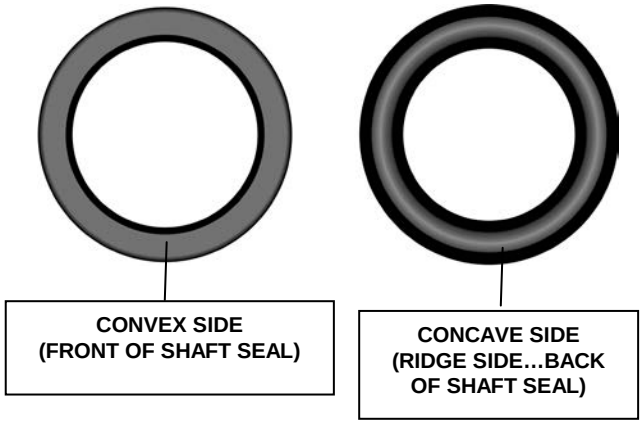


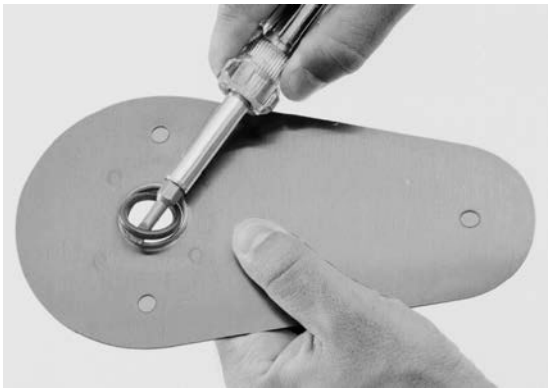
5 Locate the shaft seal on the underside of the bin insulator plate.

⚠ CAUTION

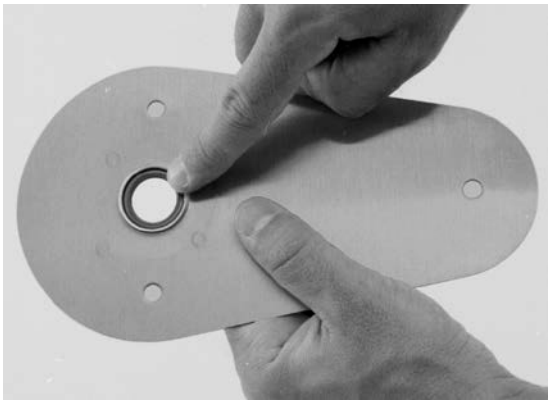
Know which side of the shaft seal you are accessing, the convex side or the concave (ridge) side.

Snap in the new seal with the concave (ridge) side down. Otherwise the seal will not work and the dispenser will leak.





6 Using a screwdriver, pry out the shaft seal, then throw the shaft seal away.



7 With the convex side of the shaft seal facing up (and the concave, ridge side facing down), snap the new shaft seal onto the bin insulator plate.

⚠ CAUTION

Preventive maintenance note:
Replace the motor shaft seal once a year.

Gearmotor Shaft Seal Replacement (continued)



8 Press the bin insulator plate back into place.

9 Replace the three bolts. Using a 7/16” nut driver, tighten a quarter turn past tight.

10 Replace the paddle wheel, agitator and paddle wheel pin in the dispenser.

11 Refill the dispenser or restart the ice machine.

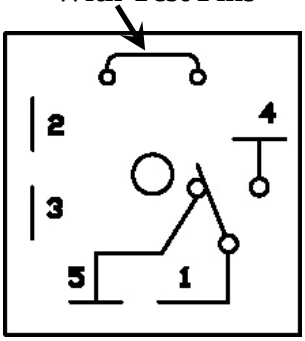
12 Restore power to the dispenser and ice machine.

Agitation Timer

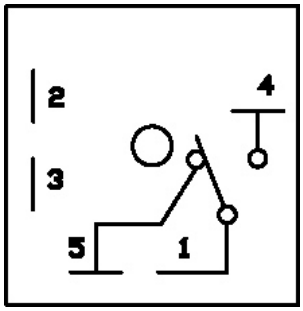
NON-ADJUSTABLE TIMER W/ TEST PINS

The new timer is equipped with test pins. This allows you to test the timer by removing the jumper between the two pins. Non adjustable timers with test pins must be wired as shown below.

With Test Pins



Without Test Pins



The agitation timer is standard equipment for the floor standing dispenser. The purpose of the timer is to periodically agitate the ice in the bin to prevent congealing. Non adjustable timers with test pins are used on all current production models.

The timer is non-adjustable and is set to agitate the ice for three seconds every three and one half-hours. Activating the dispenser will reset the timer. After 3.5 hours of non-use the timer will energize the dispenser motor.

To check for correct function of the agitation timer, use the following procedure:

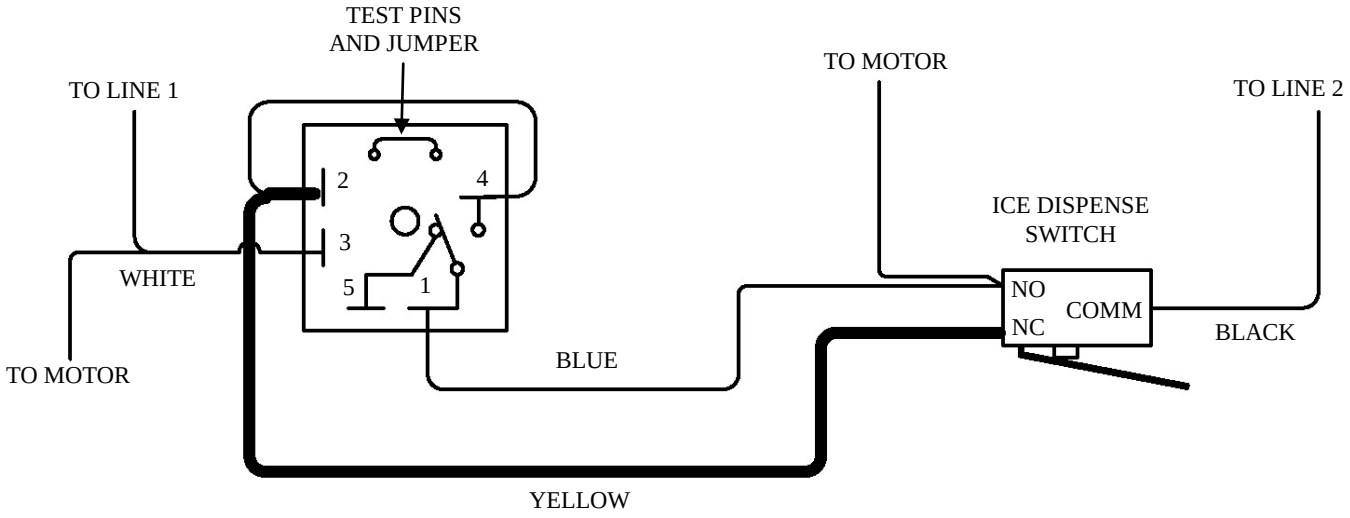
The agitation timer is located at the front of the dispenser on the left side of the ice chute.

1. Remove the jumper between the two pins.
2. The timer will cycle every 55 seconds.
3. If the timer does not cycle every 55 seconds, replace the timer.
4. Make sure to replace jumper to pins after testing.

> ⚠ **CAUTION**
> Never operate in with jumper removed. Damage will occur.

Correct Wiring

See next page if wiring on the machine is incorrect.



Re-Wiring Procedure

A wiring change must be made if the existing timer on the dispenser is wired with the yellow wire from the timer routed to the common side of the ice dispense switch.

1. Disconnect power to the unit.
2. Remove the black and yellow wires attached to the common terminal of the ice dispense switch.
3. Cut the yellow and black wire where it inserts into the female terminal connector.
4. Strip the yellow and black wire insulation back and crimp an insulated female spade connector on the end of each wire.
5. Connect the black wire to the common side of the ice dispense switch.
6. Connect the yellow wire to the NC terminal on the ice dispense switch.
7. Reconnect power to the unit.

NON-ADJUSTABLE TIMER

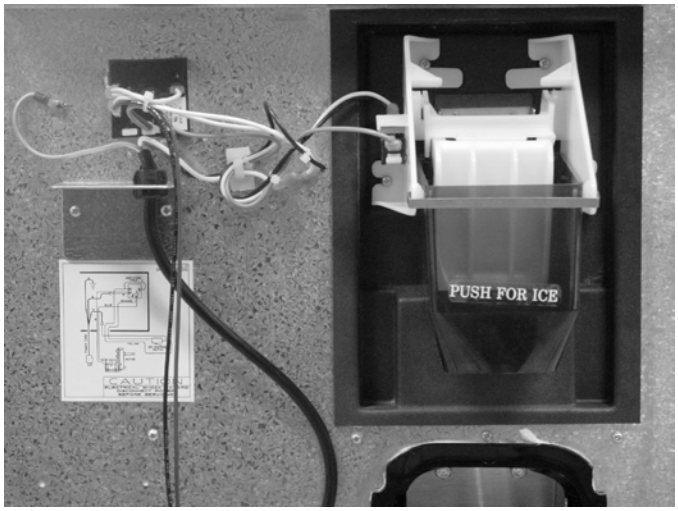
The agitation timer is standard equipment for the floor standing dispenser. The purpose of the timer is to periodically agitate the ice in the bin to prevent congealing. Non adjustable timers are used on all current production models.

The timer is located in the electrical box of the dispenser. The timer is non-adjustable and is set to agitate the ice for three seconds every three and one half-hours. Activating the dispenser will reset the timer. After 3.5 hours of non-use the timer will energize the dispenser motor.

To check for correct function of the agitation timer, use the following procedure:

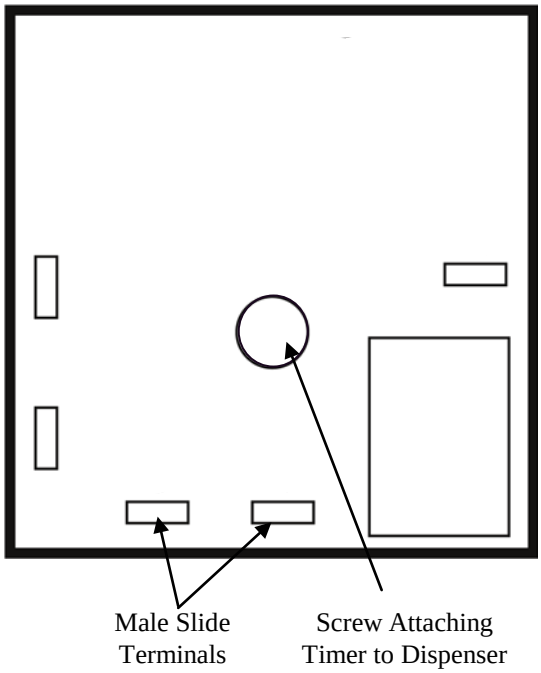
5. Disconnect and reapply line voltage to the dispenser.

6. The dispenser motor will energize for 3 seconds after power is reapplied, then cycle off.



The agitation timer is located at the front of the dispenser on the left side of the ice chute.

Non-Adjustable Timer



ADJUSTABLE TIMER

The agitation timer is standard equipment for the floor standing dispenser. The purpose of the timer is to periodically agitate the ice in the bin to prevent congealing.

The timer is located in the electrical box of the dispenser. The two dials on the timer should be set to agitate the ice for two second every four hours. Activating the dispenser will reset the timer. After 4 hours of non-use the timer will energize the dispenser motor.

To check the agitation timer, use the following procedure:

1. Place a small screwdriver in the adjustment dial marked “OFF TIME” (see illustration at right).

2. Gently turn the adjustment dial counter clockwise until the dial stops. You will be turning the dial so it points to the “O-MIN” position.

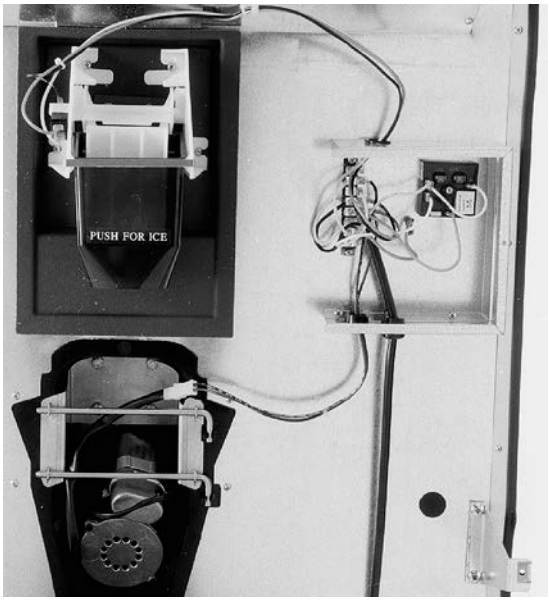
3. Do not use the dispenser for 15 minutes. Within that time period, the agitator will turn. If the agitator does not turn replace the timer.

To reset the agitation timer, Use the following procedure:

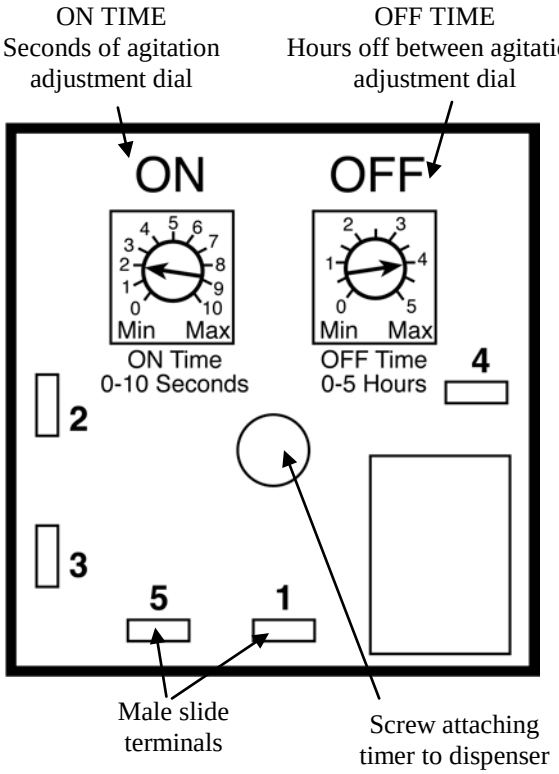
1. With a small screwdriver, gently turn both dials counterclockwise until they stop. You will be turning the dial so it pints to the “O-MIN” position, which stands for O-minimum.

2. Turn the “ON TIME” (left dial) from the “0” to the “2”, for two seconds of agitation.

3. Turn the “OFF TIME (right dial) from the “0” to the “4”, so agitation will begin approximately every four hours.



The agitation timer is located in the electrical box at the front of the dispenser.
The drawing shows the position of the dials when the timer is set correctly.

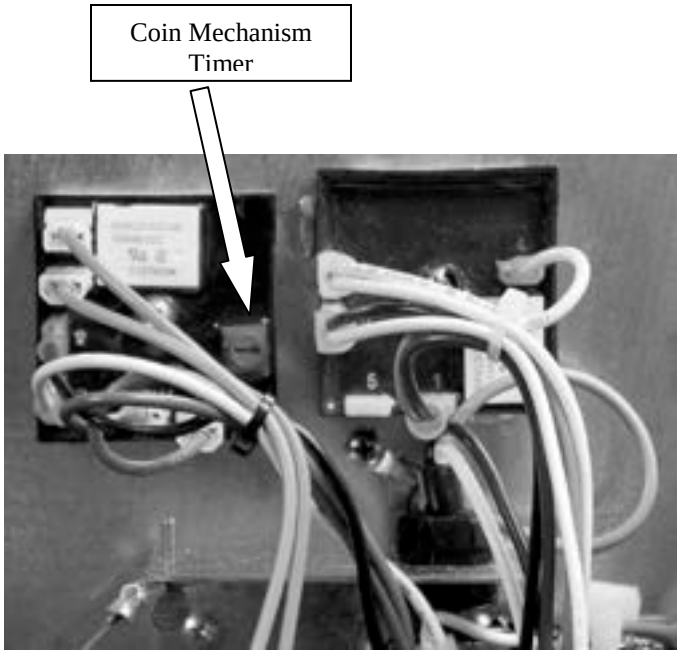


NOTE: Dials on actual agitation timer are not marked with numbers, only small notches

Adjusting the Coin Mechanism Timer

1. Remove the control box cover. On the inside of the control box there is a white instruction label which shows how to set intervals for coin mechanism dispense times.
2. Inside the control box, the coin mechanism timer is to the left. The ice agitation timer is to the right.
3. With a small Phillips head screwdriver, adjust the coin mechanism timer. For timer adjustment reference information, see below or refer to the white instruction label inside the control box cover.
4. The timer is factory set at the midpoint (as shown above) for 60 seconds of dispense time. The adjustment pot can be set (counterclockwise) for as low as 12 seconds of dispense time.

The adjustment pot can be set (clockwise) for as high as 120 seconds of dispense time.

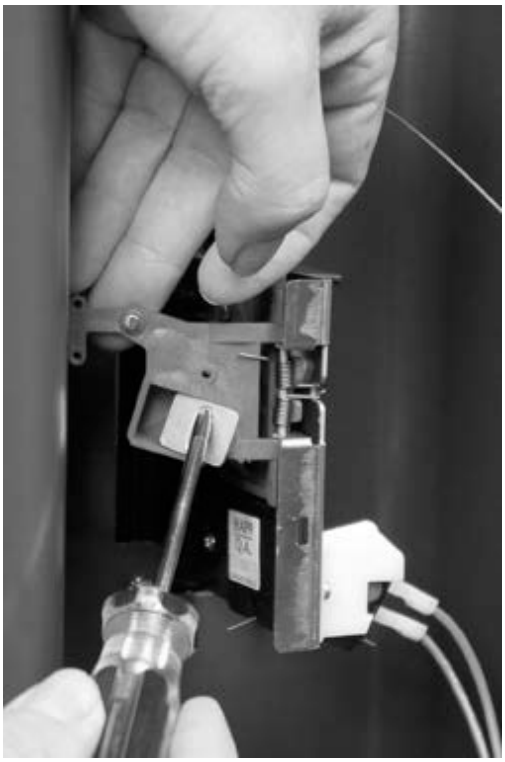


Adjusting the Coin Mechanism for Canadian Coins

Important

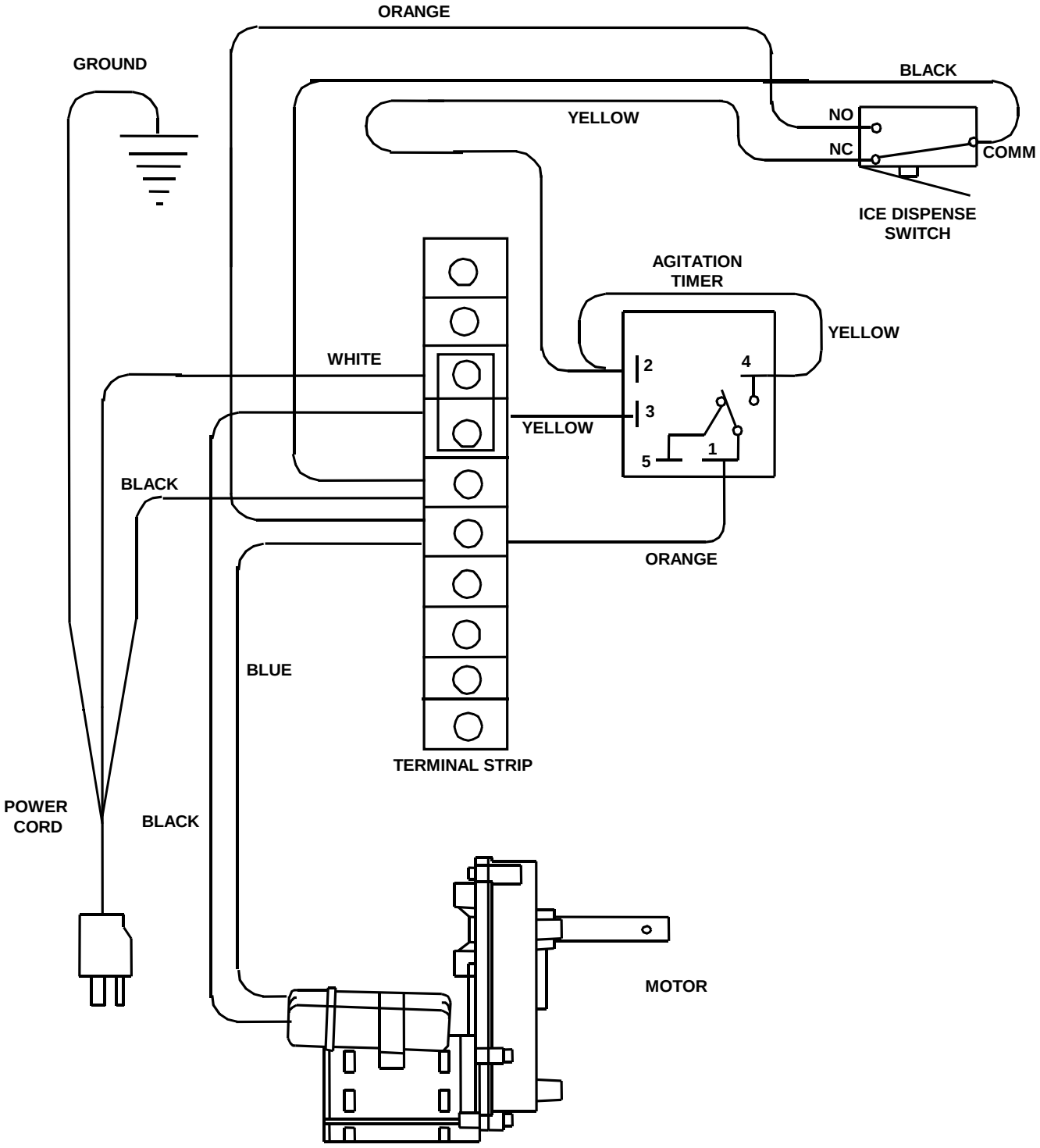
Canadian quarters are magnetic. Therefore the magnet inside the coin mechanism must be removed so Canadian quarters will drop through the coin mechanism.

1. Remove the front panel of the dispenser. The coin mechanism can be changed while in place in the dispenser door, as shown above.
2. Pivot the coin magnet housing section away from the rest of the coin mechanism.
3. Using a small screwdriver, loosen the set screw which holds an aluminum plate in the coin magnet housing.
4. Remove the aluminum plate.
5. Using a metal screwdriver tip, pull out the magnet from the magnet housing. (The back side of the magnet has the stronger magnetic attraction.)
6. The aluminum plate and magnet have now been removed from the coin magnet housing. Pivot the empty coin magnet housing section back into place.
7. Reinstall the front door of the dispenser.

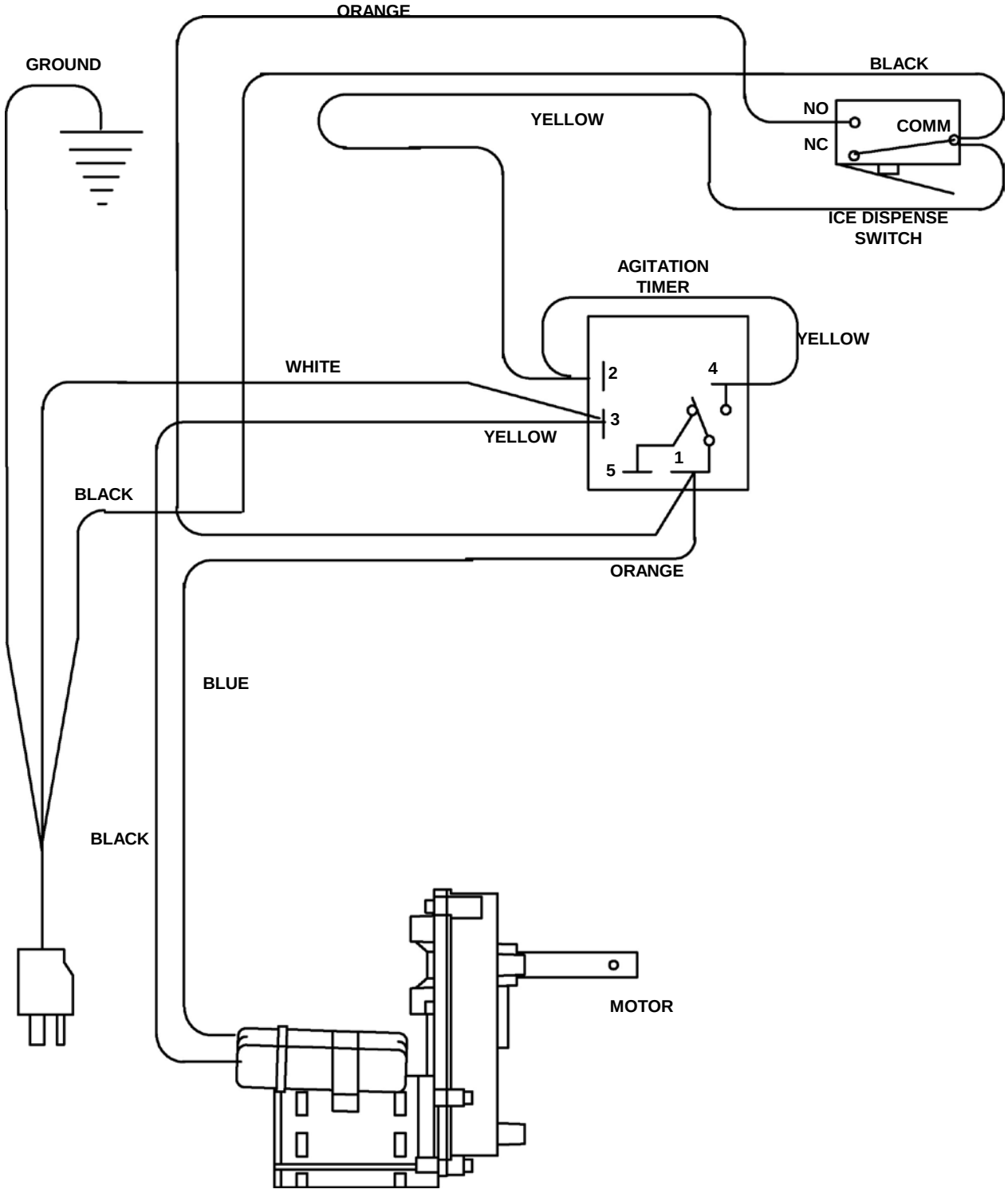


Wiring Diagrams

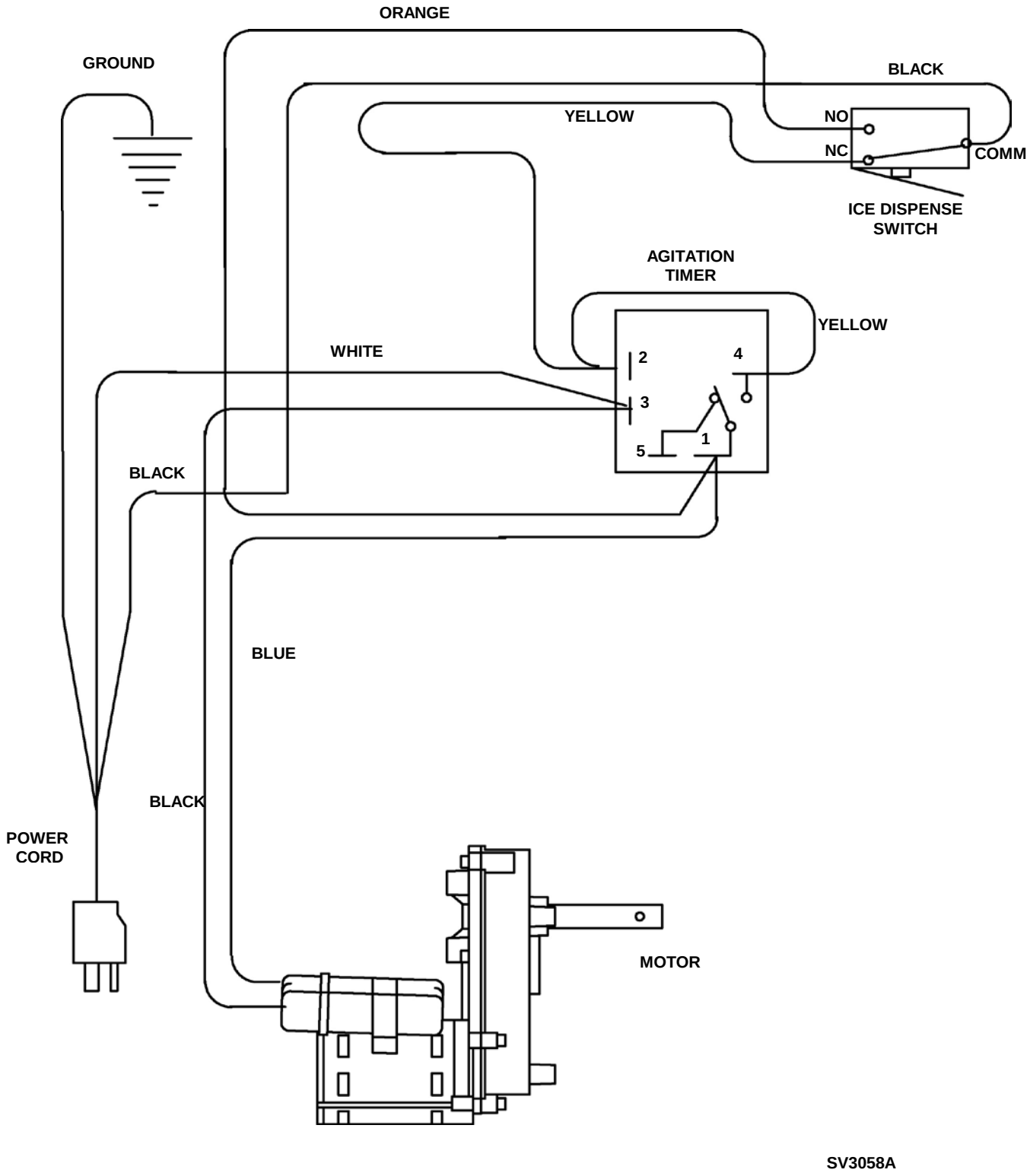
QPA-310 QPA-160 QFA-291
115/60/1 PH
Before Serial Numbers 990400000



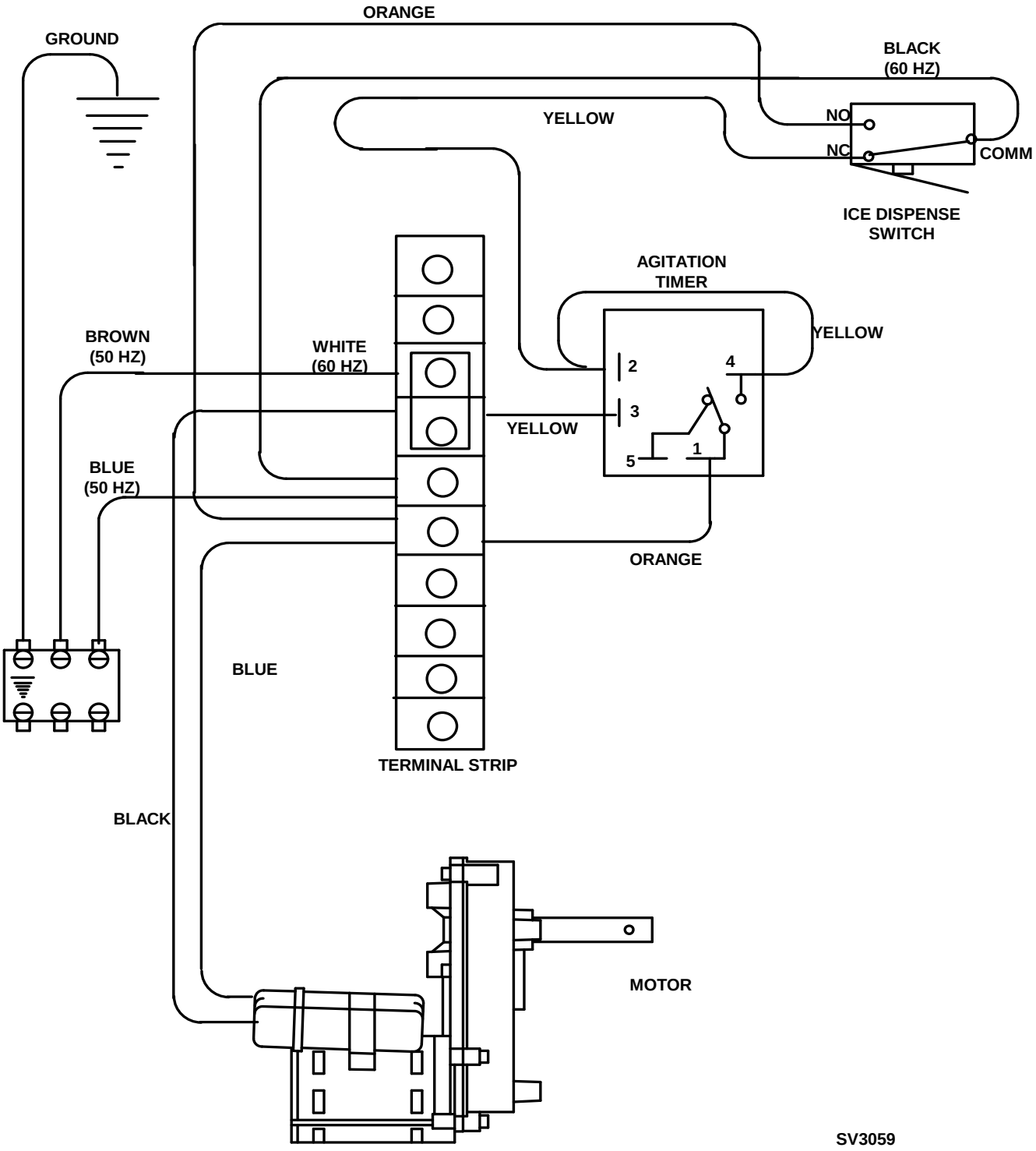
QPA-310 QPA-160 QFA-291
115/60/1 PH
Serial Numbers 990400000 to 040500000



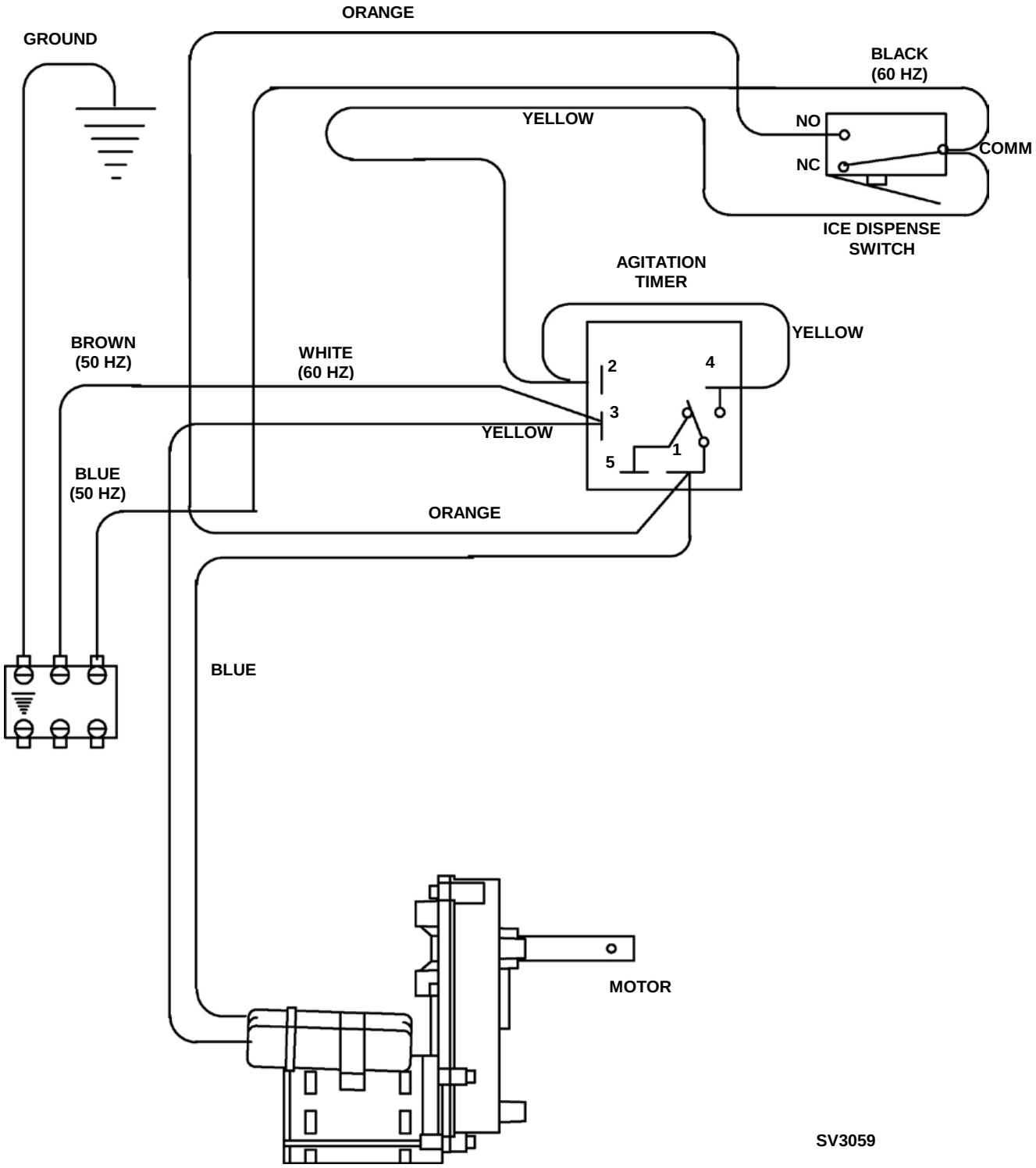
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115/60/1 PH
After Serial Numbers 040500000



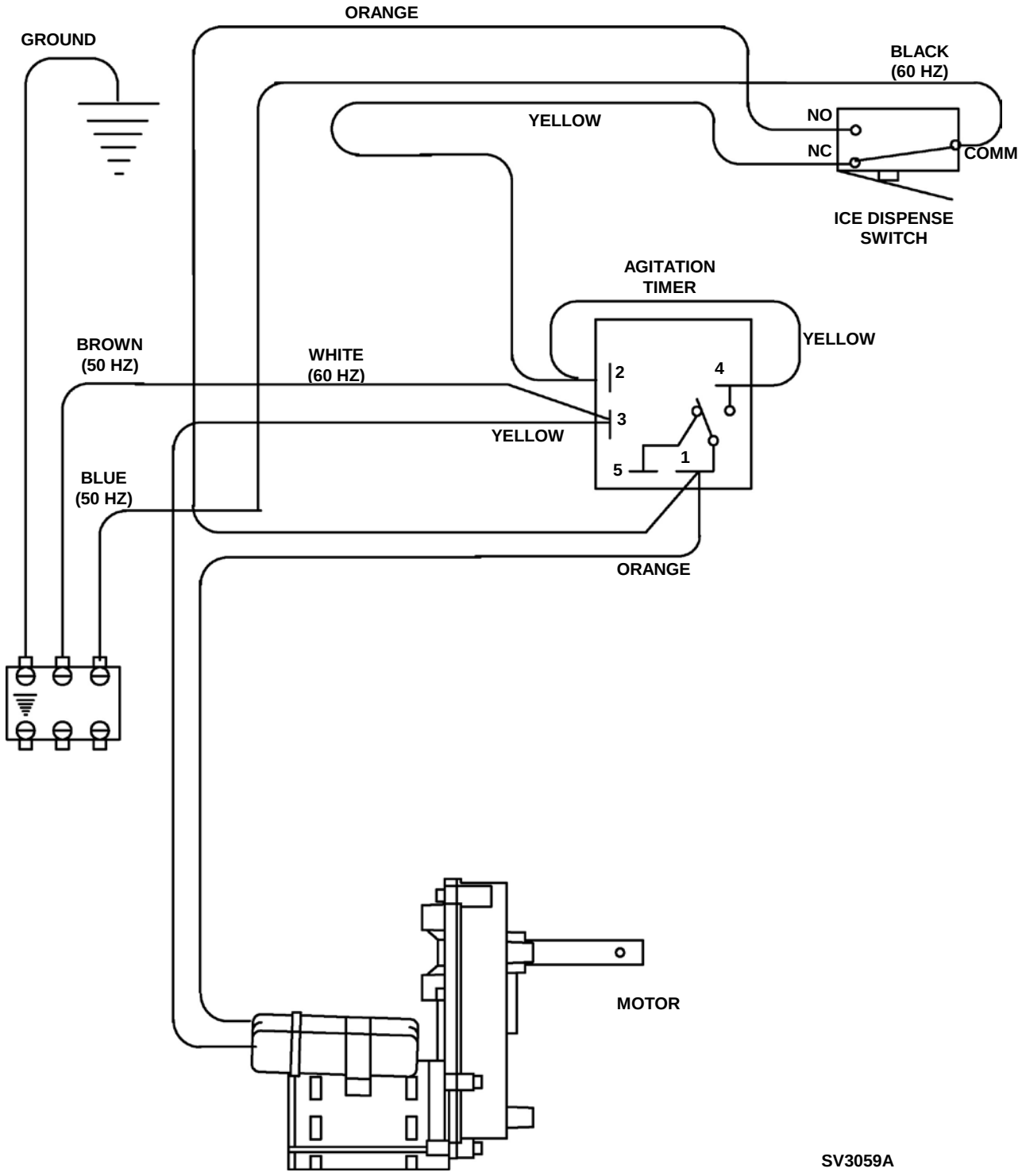
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230/60/1
230/50/1
Before Serial Numbers 990500000



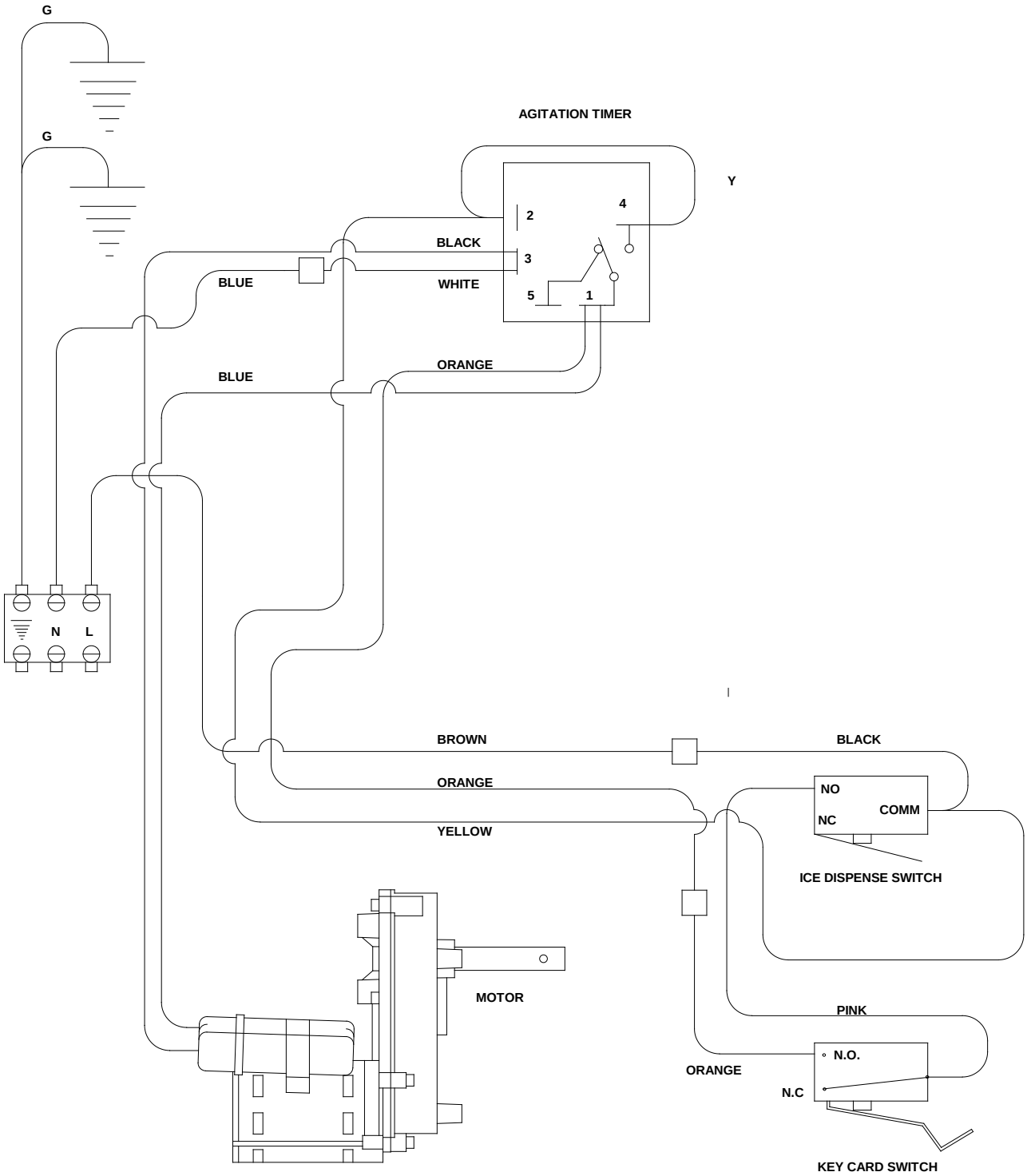
QPA-310 QPA-160 QFA-291
230/60/1
230/50/1
Serial Numbers 990400000 to 040500000



QPA-310 QPA-160 QFA-291
230/60/1
230/50/1
After Serial Numbers 040500000

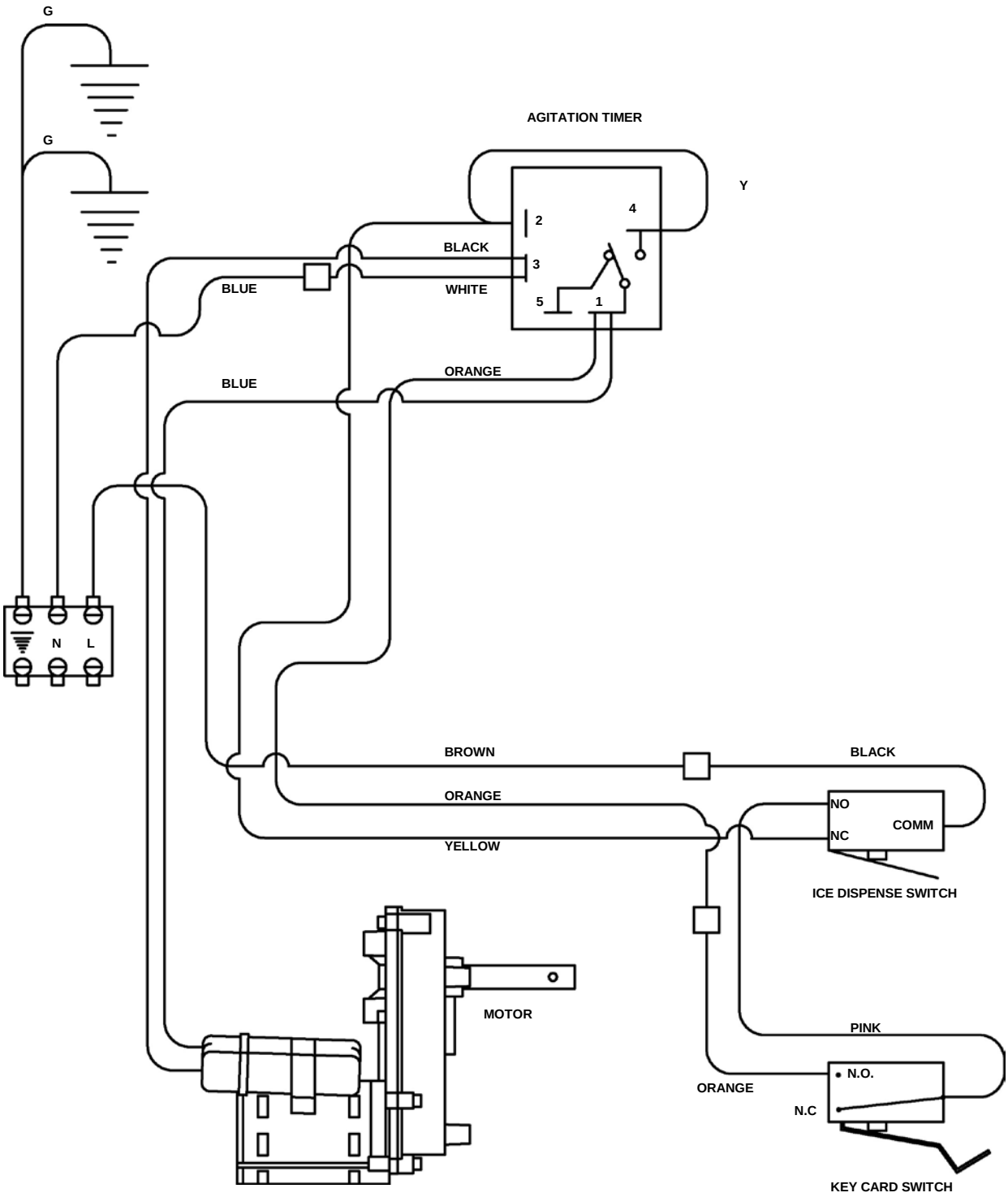


QRA-340 QRA-164 CARD OPERATED
230/60/1 PH
230/50/1 PH
Before Serial Numbers 040500000



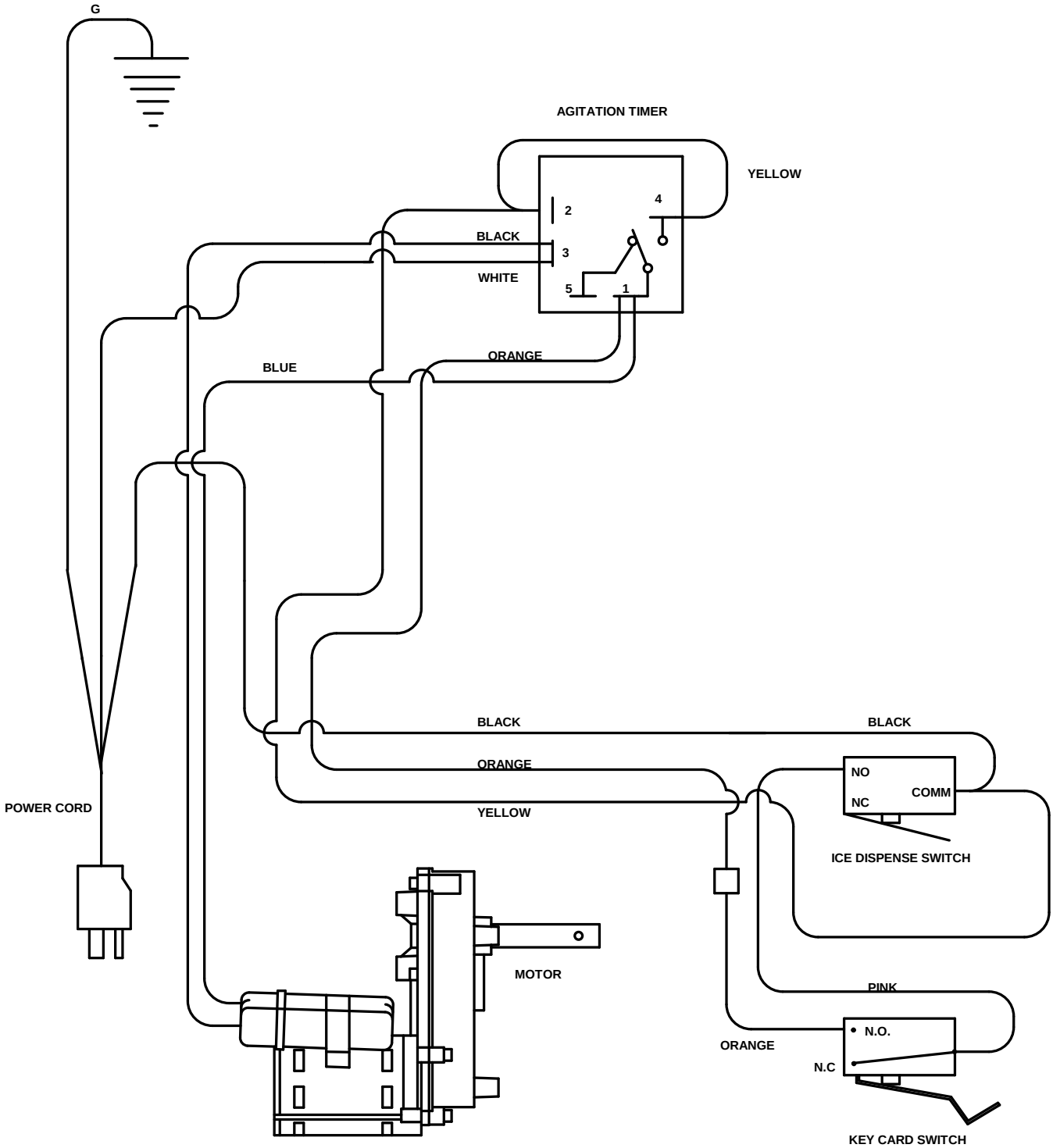
SV3060

QRA-340 QRA-164 CARD OPERATED
230/60/1 PH
230/50/1 PH
After Serial Numbers 040500000



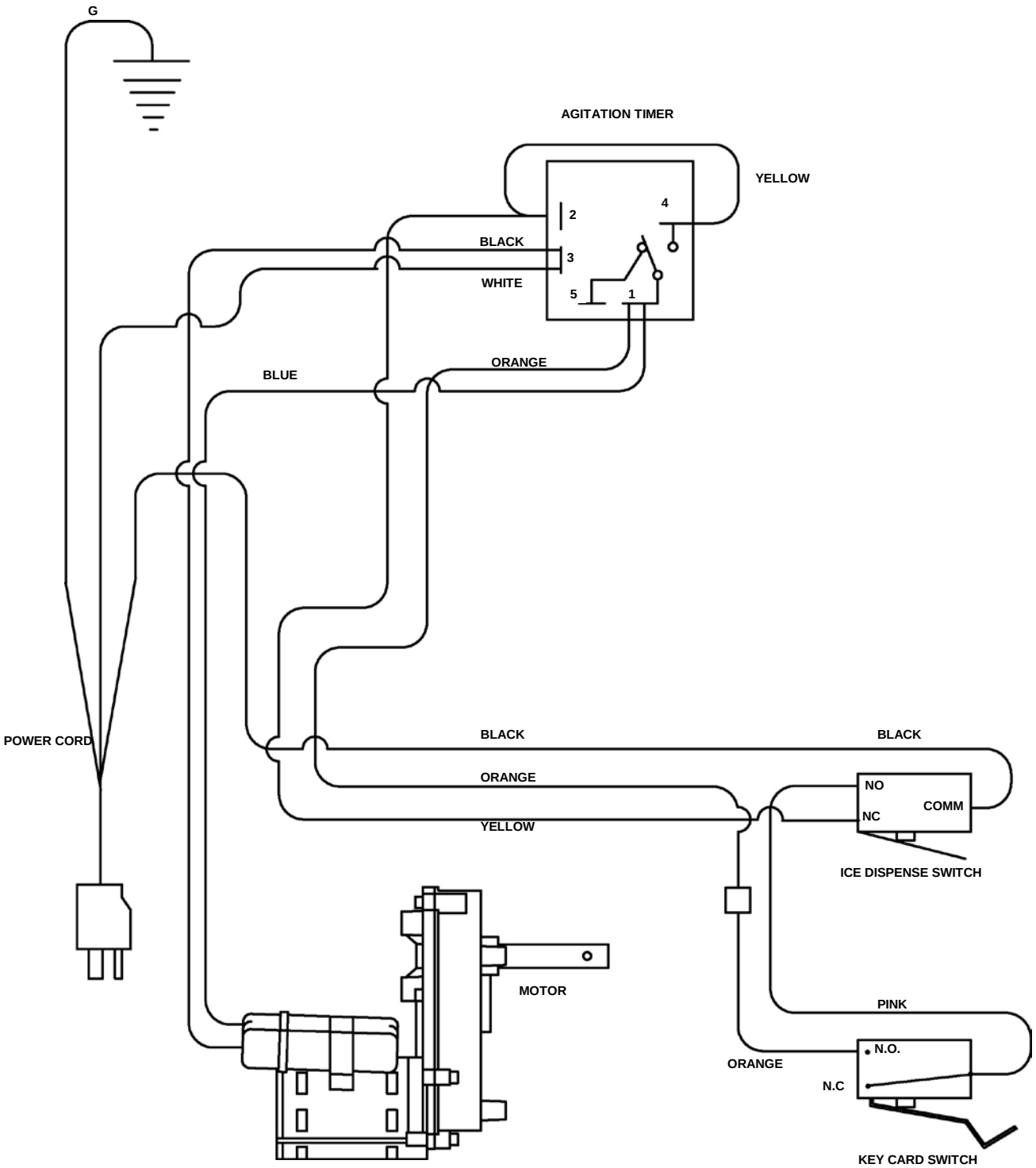
SV3060A

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115/60/1 PH
Before Serial Numbers 040500000

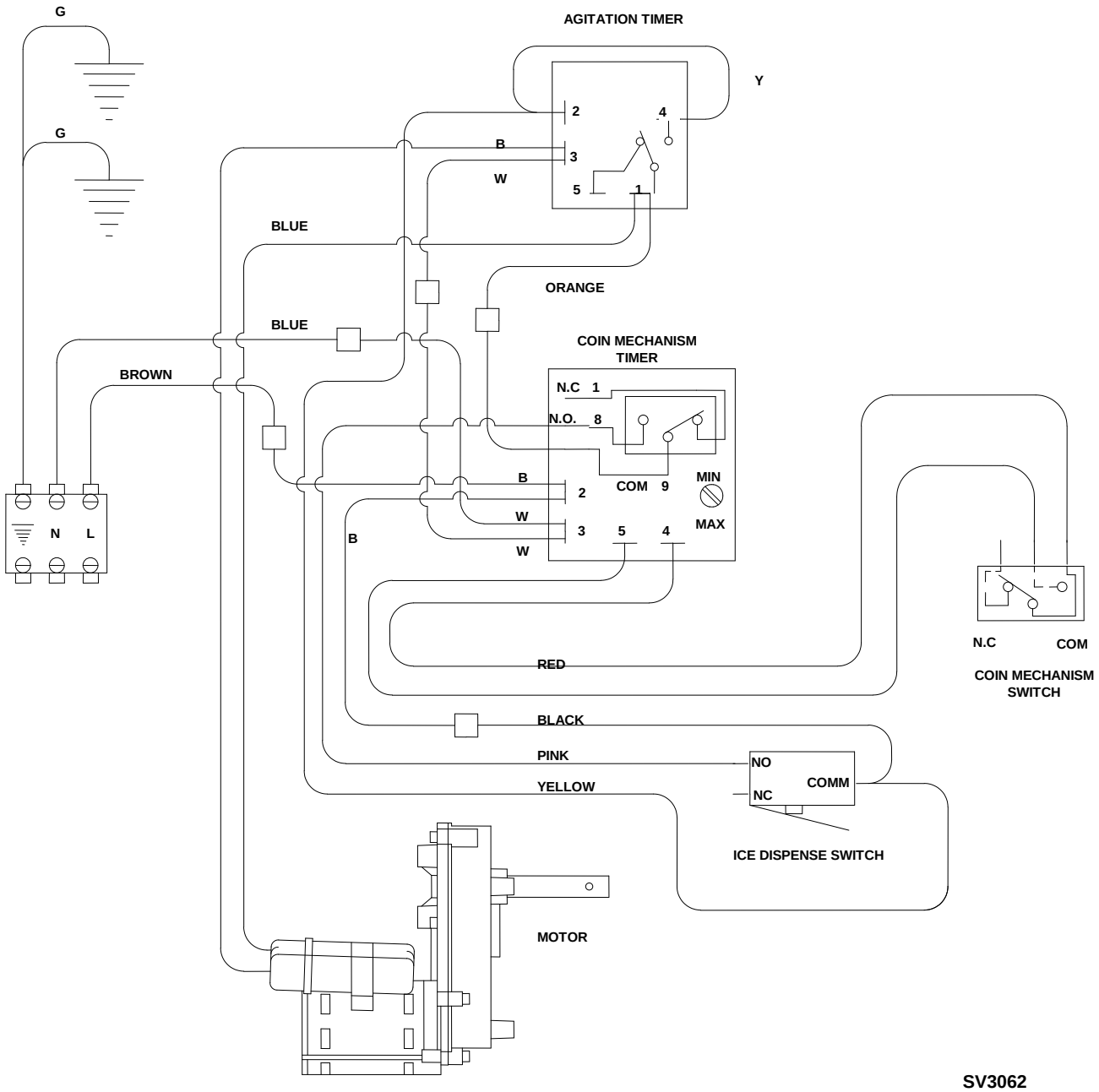


SV3061

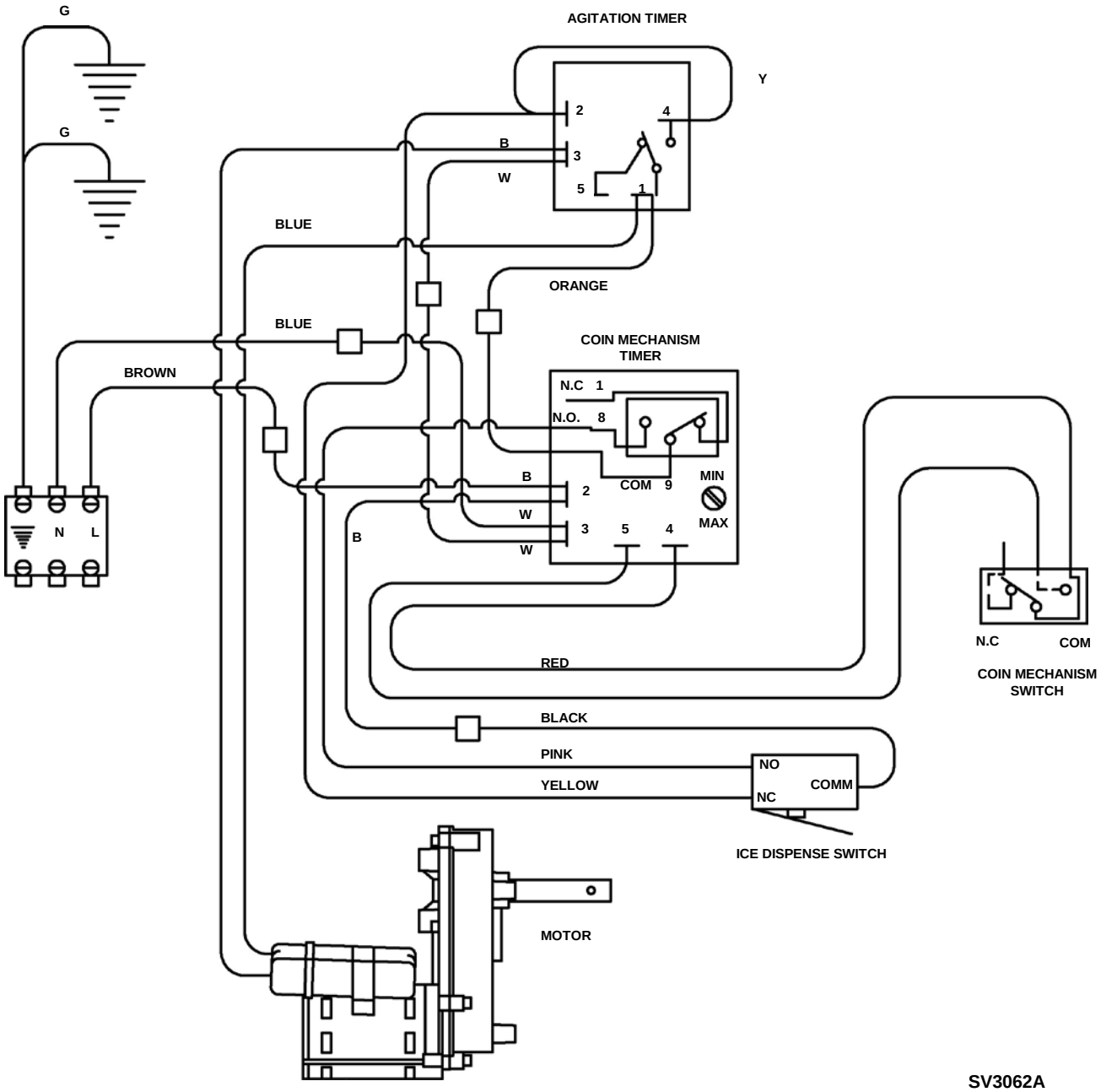
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115/60/1 PH
Before Serial Numbers 040500000



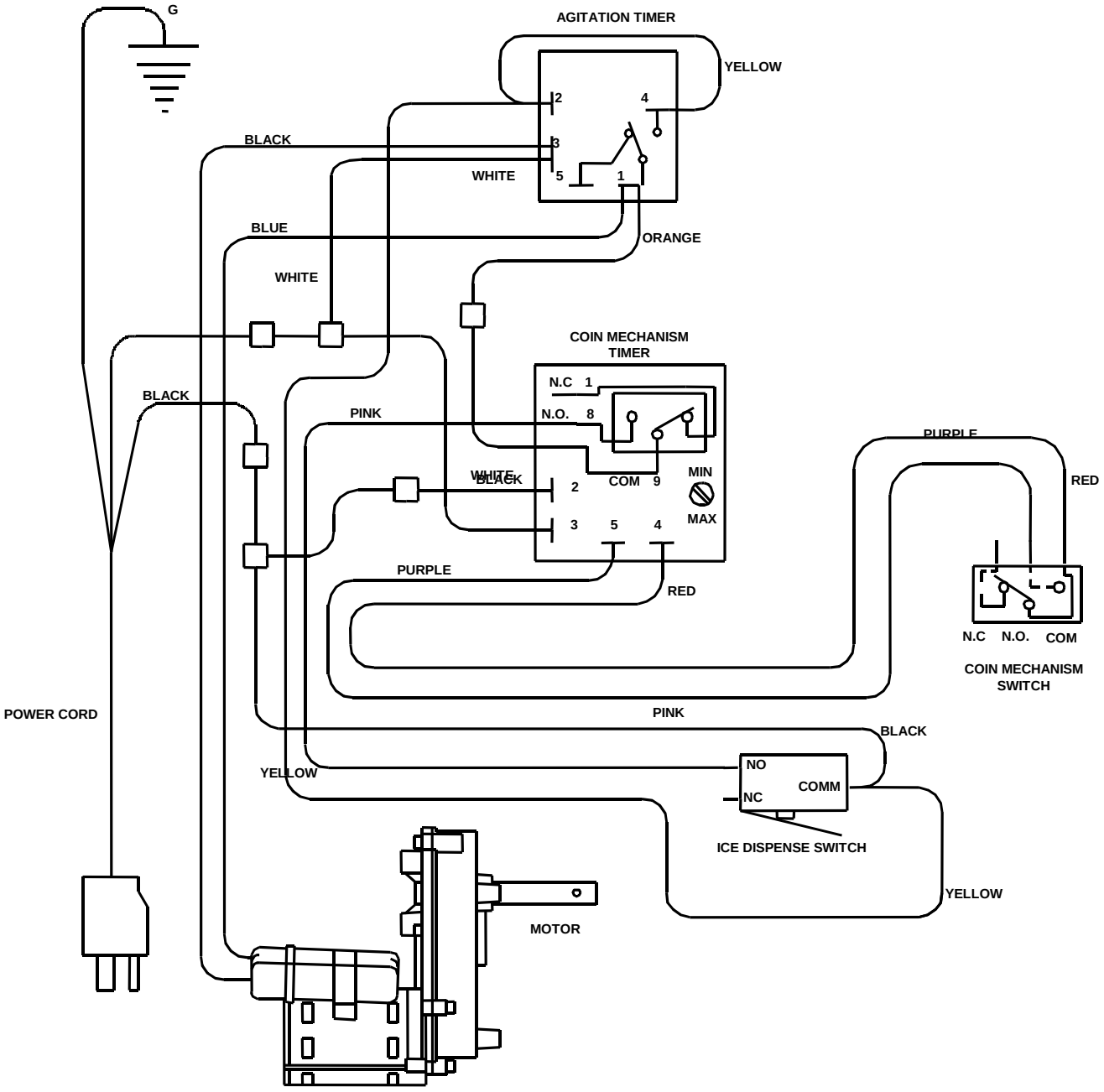
QCA-330 QCA-163 COIN OPERATED
230/60/1 PH
230/50/1 PH
Before Serial Number 0405000000



QCA-330 QCA-163 COIN OPERATED
230/60/1 PH
230/50/1 PH
After Serial Number 0405000000

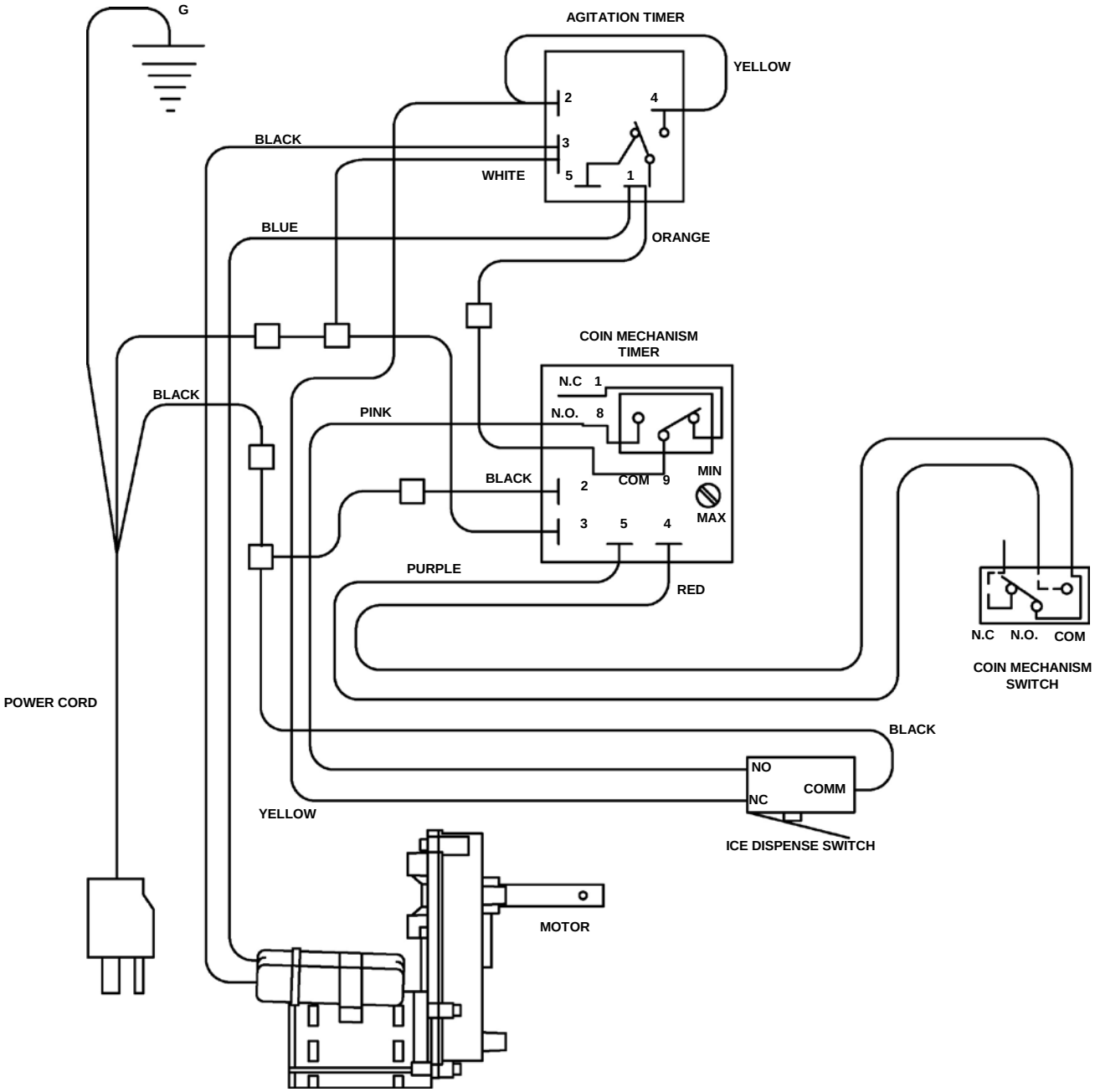


QCA-330 QCA-163 COIN OPERATED
115/60/1 PH
Before Serial Number 0405000000



SV3063

QCA-330 QCA-163 COIN OPERATED
115/60/1 PH
After Serial Number 0405000000



SV3063A

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