SECTION 6

ICEMAKER OPERATION

COMPACT ICEMAKER

All 600 series units utilize a "compact icemaker." The icemaker operation is not complex, however, an understanding of its components and its cycle of operation is necessary in order for a serviceman to make a proper diagnosis.

⚠ WARNING
To avoid electrical shock, always disconnect electrical power to unit when working on icemaker.

NOTE: *The ICE ON/OFF key at the control panel activates the icemaker system. If "ICE" is not displayed on the LCD, the icemaker system is OFF.*

NOTE: *To allow ice to freeze fully and reduce effects of low water pressure, the 600 Series electronic control system disables the icemaker system for 45 minutes after each ice harvest.*

NOTE: *The ice bucket in models 601F, 611 and 650, have a tab at the left rear corner that activates a switch when the ice bucket is in place. The ice bucket in the model 690 also activates a switch when in place. If the ice bucket is not in proper position, ice production will stop.*

NOTE: *The icemaker relay on the control board also controls the fill tube heater and water valve.*

COMPACT ICEMAKER COMPONENT DESCRIPTIONS

Ice mold - Where the eight crescent shaped ice cubes are formed. (See Figure 6-1).

Mold Heater - The mold heater thaws the ice free from the mold. (See Figure 6-1).

⚠ WARNING
Heater can be very hot!

Ice stripper - The stripper is attached to the dumping side of the mold. It serves as a decorative side cover and prevents ice pieces from falling back into the mold. (See Figure 6-1).

Ice ejector - The ejector has eight blades which sweep the ice from the mold cavities during the ejection phase of the cycle. (See Figure 6-1).

Thermostat - The thermostat is a single-pole, single-throw, bi-metal switch. At approximately 10°F it closes, starting the ice ejection phase. Since the thermostat is in-series with the mold heater, it also acts as an overheating safety in case of mechanical failure. (See Figure 6-2).

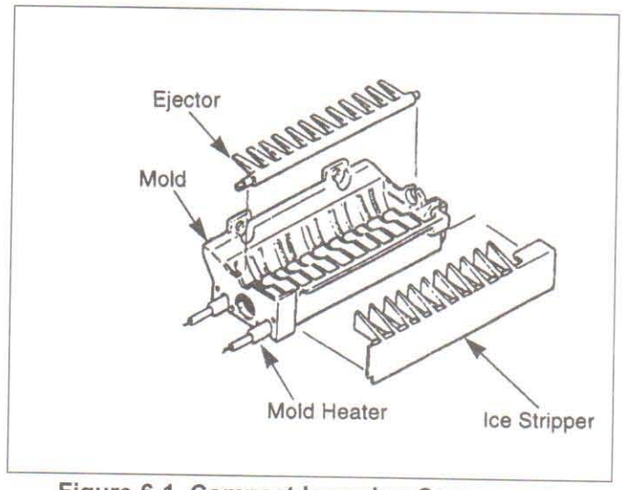

Figure 6-1. Compact Icemaker Components

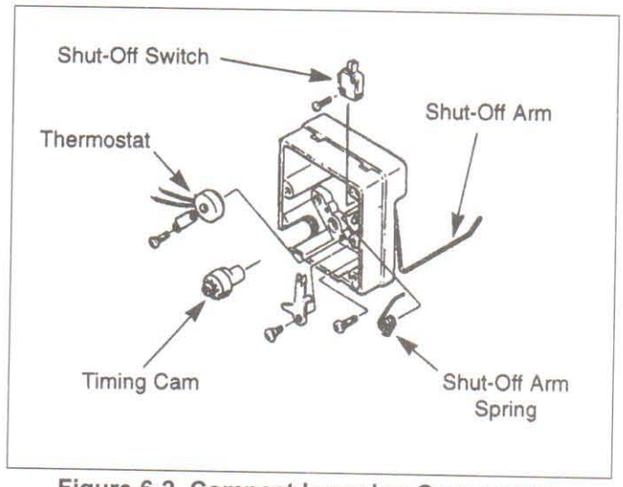

Figure 6-2. Compact Icemaker Components

Shut-off Arm & Linkage - The shut-off arm is cam-driven and operates the shut-off switch to control the quantity of ice production. The arm is raised and lowered during each of two revolutions of the timing cam. If the shut-off arm comes to rest on top of the ice in the storage bin during either revolution, the shut-off switch will remain open, stopping ice production at the end of that revolution. (See Figure 6-2).

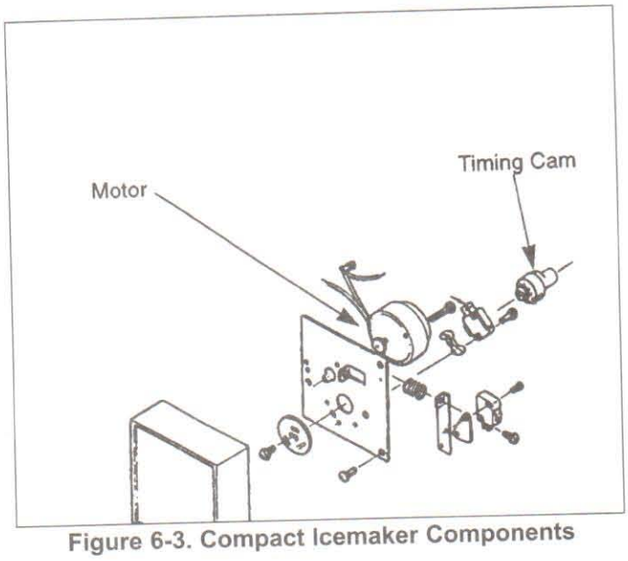

Figure 6-3. Compact Icemaker Components

Motor - The motor drives the timing gear which is connected to the timing cam and ejector. (See Figure 6-3).

ICEMAKER OPERATION

The following series of electrical schematics illustrates a typical compact icemaker cycle of operation. At the bottom right of each schematic is an illustration (See Example: Figure 6-4) showing the various components and their relative position during the cycle.

The Freezing Phase of the Icemaker Cycle: (See Figure 6-5)

- the mold is filled with water (100-110 cc. or ~ 3.5-3.75 oz.)
- the thermostat is open.
- all icemaker components are non-energized.

The Start of the First Revolution: (See Figure 6-6)

- the water in the mold has turned to ice.
- At approximately 10°F the thermostat closes.
- the mold heater is energized through the thermostat.
- the motor is started through the thermostat and "normally closed" terminal of the holding switch, and the ejector blades begin to turn.

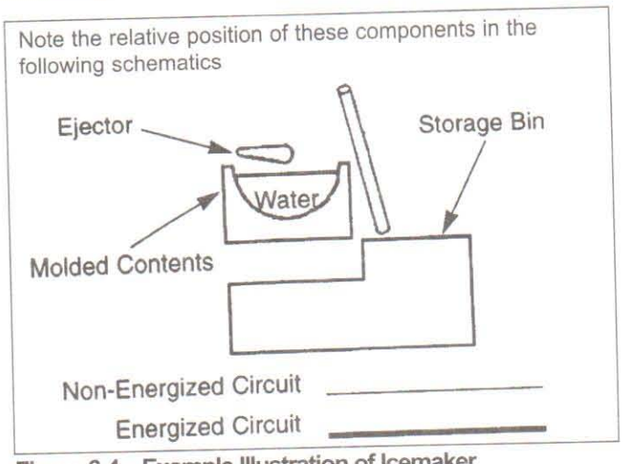

Figure 6-4. Example Illustration of Icemaker Components (See bottom right corner of following schematics)

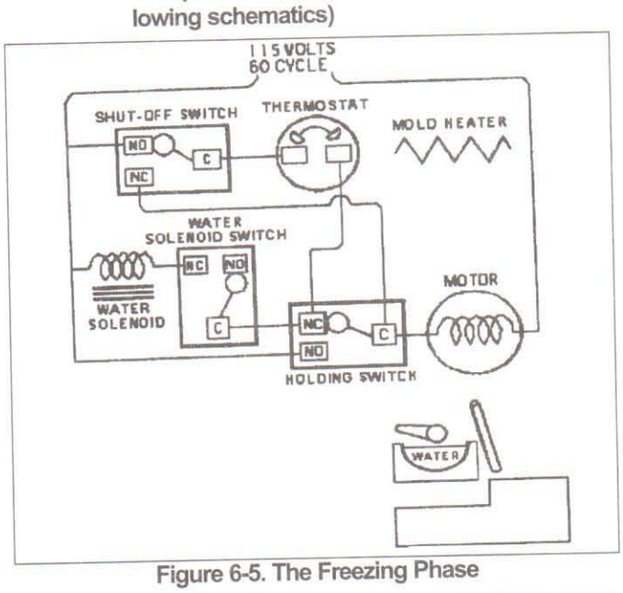

Figure 6-5. The Freezing Phase

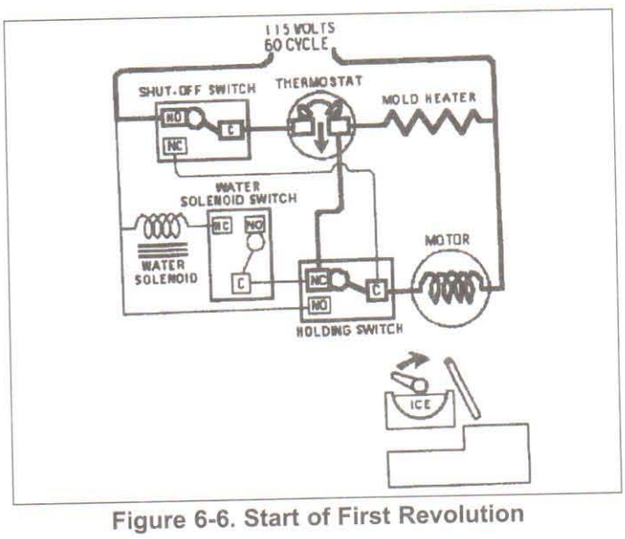

Figure 6-6. Start of First Revolution

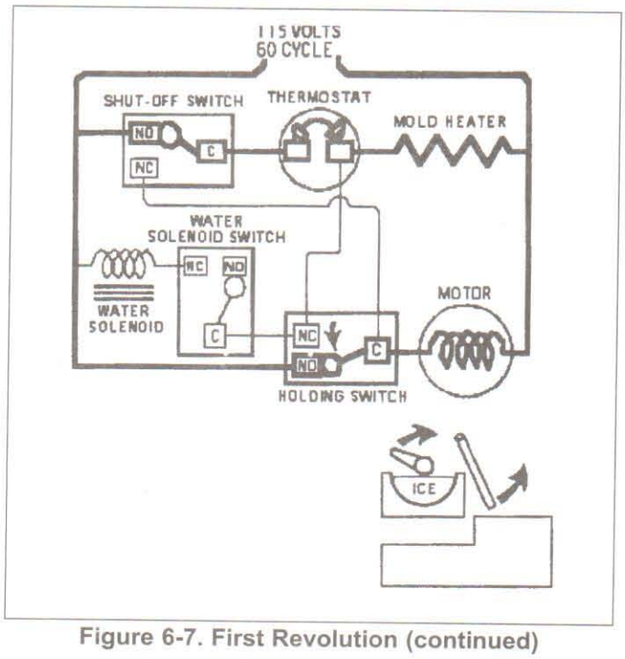

Figure 6-7. First Revolution (continued)

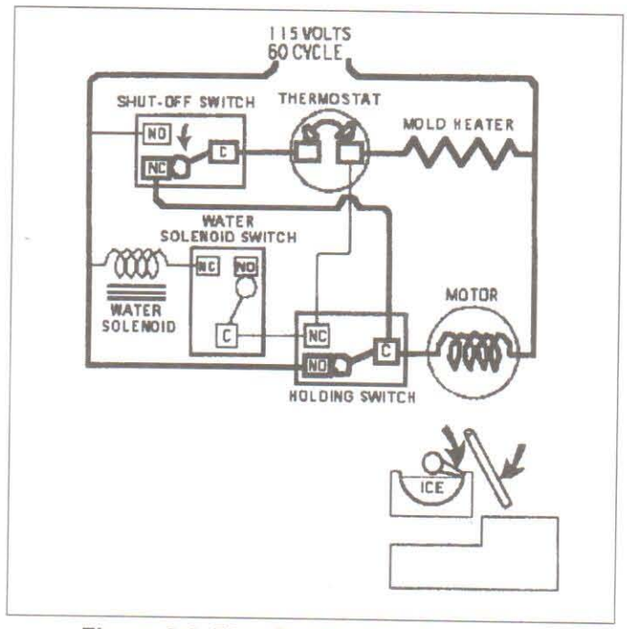

Figure 6-8. First Revolution (continued)

First Revolution (Continued):
(See Figure 6-7)

- The holding switch is tripped by the timing cam to "normally open" thus holding power to the motor.
- The mold heater remains energized through the thermostat.
- The shut-off arm is raised by the timing cam.

First Revolution (Continued):
(See Figure 6-8)

- The ejector blades reach the ice in the mold.
- The ice releases from the mold as the ejector blades begin to rotate the cubes out.
- The motor remains energized through the holding switch.
- The mold heater remains energized through the thermostat.
- The shut-off switch is tripped to "normally closed", as the shut-off arm raises and then begins to lower.

First Revolution (Continued):
(See Figure 6-9)

- The ice has released from the mold.
- The motor remains energized through the holding switch.

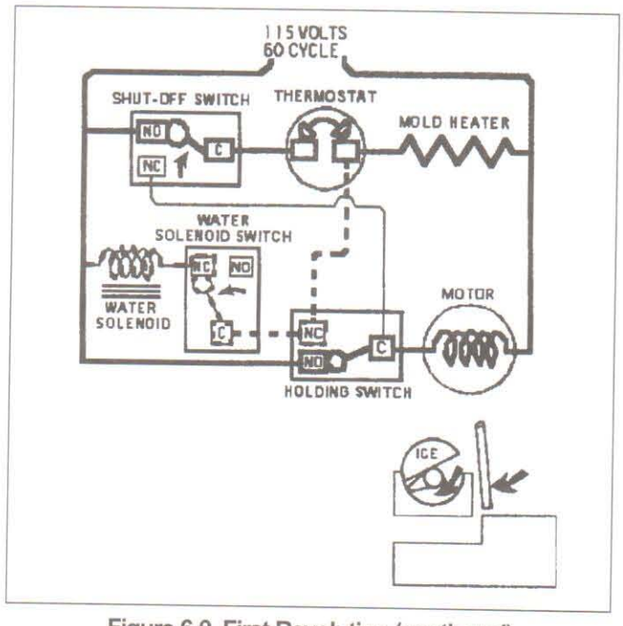

Figure 6-9. First Revolution (continued)

- The shut-off switch is tripped back to "normally closed", as the shut-off arm lowers.
- The water solenoid switch is tripped by the timing cam, but the solenoid is not energized because the thermostat is still closed and energizing the mold heater. (Electrical current follows the path of least resistance.)

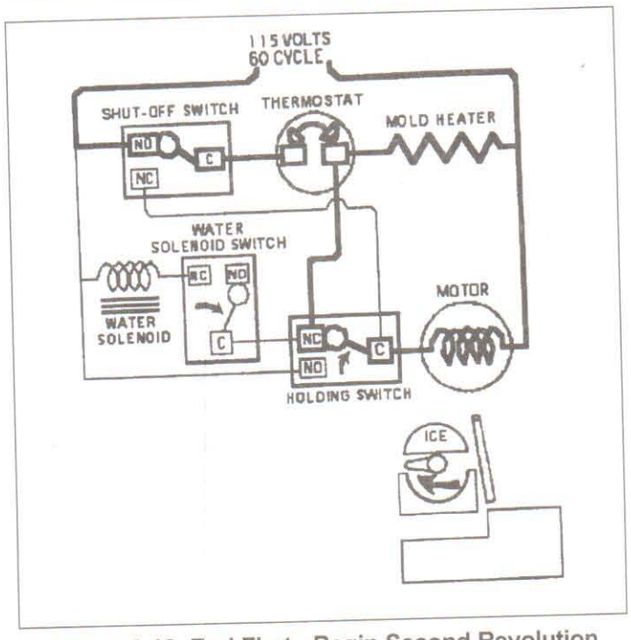

Figure 6-10. End First - Begin Second Revolution

End of First Revolution / Start of Second Revolution:(See Figure 6-10)

- The water solenoid switch is tripped by the timing cam back to "normally open."
- The timing cam trips the holding switch to "normally close," which ends the first revolution, but the thermostat is still closed, so the motor is again started.
- The mold heater remains energized through the thermostat.

Second Revolution (Continued): (See Figure 6-11)

- The ice falls into the storage bin.
- The holding switch is again tripped by the timing cam to "normally open" thus holding power to the motor.
- The shut-off switch is tripped to "normally closed", as the shut-off arm raises and then begins to lower.
- The mold heater remains energized through the thermostat.

Second Revolution (Continued): (See Figure 6-12)

- The mold heater has warmed the thermostat, so the thermostat opens, and the mold heater is de-energized.

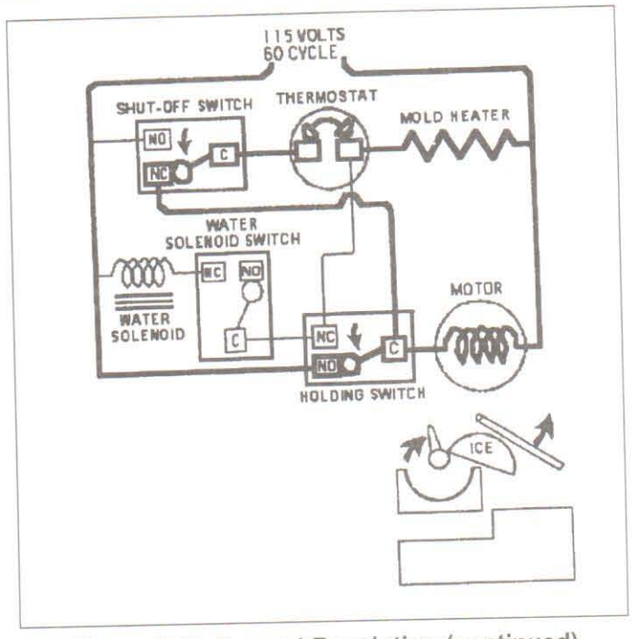

Figure 6-11. Second Revolution (continued)

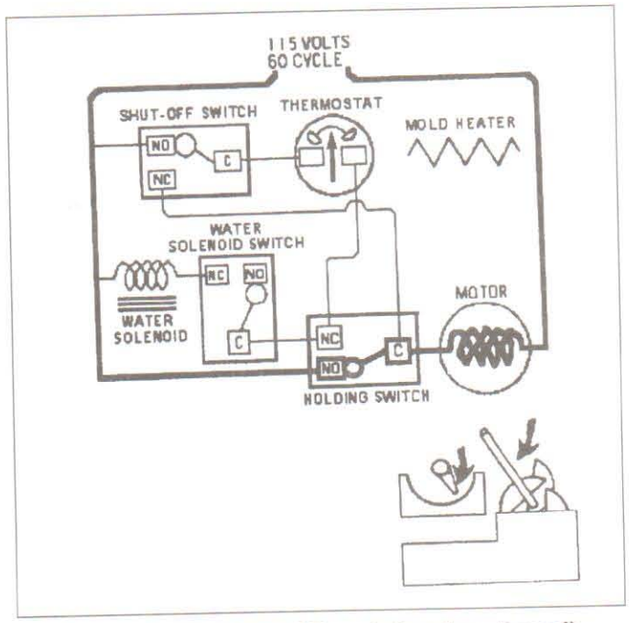

Figure 6-12. Second Revolution (continued)

- If the shut-off arm comes to rest on top of the ice in the storage bin (as illustrated), the shut-off switch will remain in the "normally closed" position.
- The motor remains energized through the holding switch.

Second Revolution (Continued):
(See Figure 6-13)

- The water solenoid switch is tripped by the timing cam. This time the solenoid is energized because the thermostat is open. The water solenoid is open for approximately seven seconds, filling the mold with water (100-110 cc. or ~ 3.5-3.75 oz.).
- the mold heater is energized through the solenoid switch and holding switch.

End of Second Revolution:
(See Figure 6-14)

- The water solenoid switch is tripped by the timing cam back to "normally open" ending the water fill.
- The timing cam trips the holding switch to "normally close," which ends the second revolution.
- The thermostat is still open, so it does not start the motor.
- If the shut-off arm has come to rest on top of the ice in the storage bin (as illustrated), the shut-off switch remains in the "normally closed" position. This interrupts power from reaching the thermostat, until sufficient ice has been removed from the storage bin allowing the shut-off arm to lower.

NOTE: *To allow ice to freeze fully and reduce effects of low water pressure, the 600 Series electronic control system disables the icemaker system for 45 minutes after each ice harvest.*

To bypass this 45 minute dwell for service purposes, press the ICE key OFF then ON.

NOTE: *To manually start the icemaker for service, rotate the ejector blades clockwise by hand while turning the drive gear counterclockwise.*

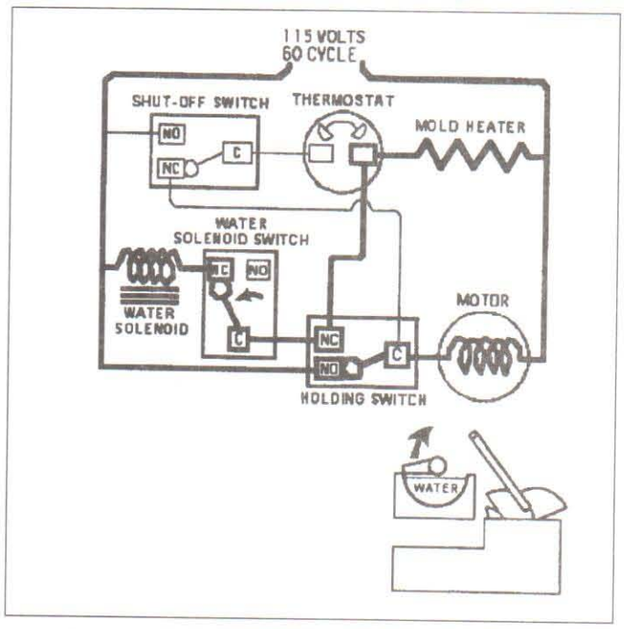

Figure 6-13. Second Revolution (continued)

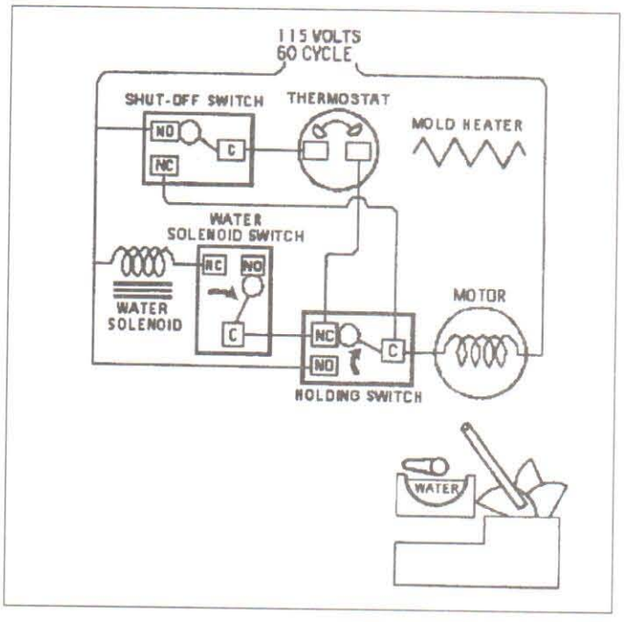

Figure 6-14. End of Second Revolution