# TECHNICAL MANUAL

# OPERATOR'S, UNIT AND

# DIRECT SUPPORT MAINTENANCE MANUAL

# INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST)

# FOR

# SCOTSMAN CSW1 SELF CONTAINED CUBER

**This technical manual is an authentication of the manufacturer's commercial literature and does not conform with the format and the content requirements normally associated with Army technical manuals. This technical manual does, however, contain all essential information required to operate and maintain the equipment.**

**Approved for public release: distribution is unlimited**

**HEADQUARTERS, DEPARTMENT OF THE ARMY**

**28 SEPTEMBER 1990**

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## SUPPLEMENTARY INTRODUCTORY MATERIAL

1-1. Maintenance Forms and Records.

Department of the Army forms and procedures used for equipment maintenance will be those described by DA Pam 738-750, The Army Maintenance Management System.

1-2. Reporting Errors and Recommending Improvements.

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letters, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in the back of this manual, directly to: Commander, U.S. Army Troop Support Command, ATTN: AMSTR-MCTS, 4300 Goodfellow Blvd., St. Louis, MO 63120-1798. A reply will be furnished to you.

1-3. Destruction of Army Material to Prevent Enemy Use.

Refer to TM 750-244-3 for instructions covering the destruction of Army Material to prevent enemy use.

1-4. Administrative Storage of Equipment.

a. Placement of equipment in administrative storage should be for short periods of time when a shortage of maintenance effort exists. Items should be in mission readiness within 24 hours or within the time factors as determined by the directing authority. During the storage period appropriate maintenance records will be kept.

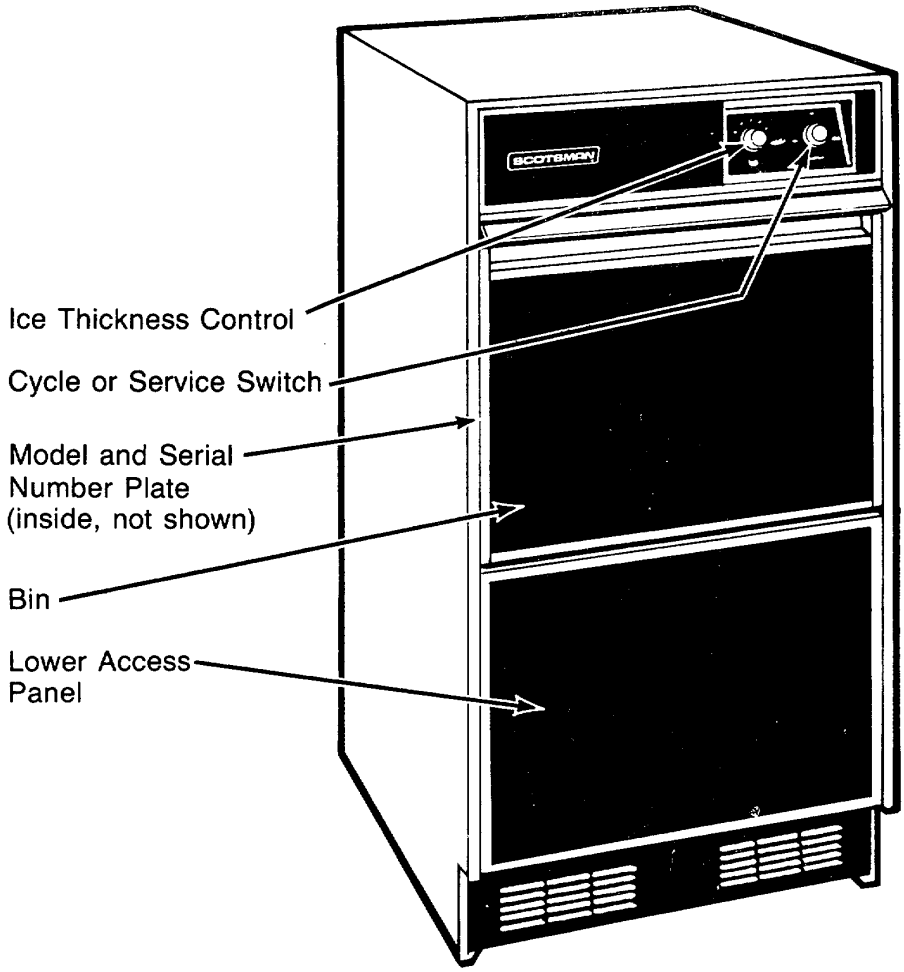
b. Before placing equipment in administrative storage, current preventive maintenance checks and services should be completed. Shortcomings and deficiencies should be corrected, and all modification work orders (MWO's) should be applied.

c. Storage site selection. Inside storage is preferred for items selected for administrative storage. If inside storage is not available, trucks, vans, conex containers and other containers may be used.

SCOTSMAN

**COMMERCIAL ICE SYSTEMS**

**Use and Care Guide**




**Model: CSW1 AE-1 B**

**Part No. 758969**

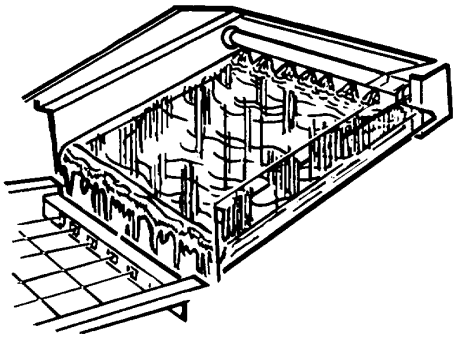
## BEFORE OPERATING THE ICE MAKER

It is your responsibility to make sure that the ice maker:

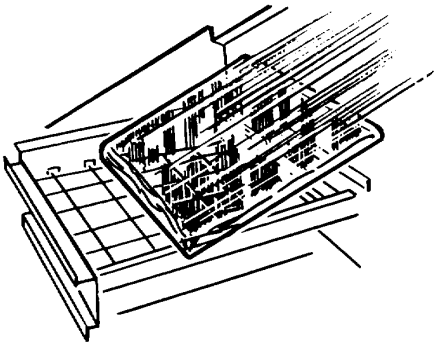
- has been installed where it is protected from the elements.
- is located so that the front is not blocked to restrict incoming or discharge air flow.
- is properly leveled.
- is located in a well ventilated area with temperatures above 550F (130C) and below 110°F (43°C). Best results are obtained at temperatures between 700F (210C) and 90°F (32°C).
- is properly connected to a water supply and drain.
- is properly connected to electricity. A 115 Volt, 60 Hz., 15 amp fused electrical supply is required. **NOTE: Time delay fuse or circuit breaker is recommended.**
- is properly electrically grounded.
- is not operated by anyone unable to use it properly.
- is used only for the job it was designed to perform.
- is properly maintained.

## ICE MAKER OPERATION

**How it makes ice:**



1. Water is constantly circulated over a freezing plate. As the water freezes into ice the minerals in the water are rejected. This produces a clear sheet of ice with a low mineral content.



2. When the desired thickness is reached, the ice sheet is released and slides on to a cutter grid. The grid divides the sheet into individual cubes.

3. The water containing the rejected minerals is drained after each freezing cycle.

4. Fresh water enters the machine for the next ice making cycle.

5. Cubes fall into the storage bin. When the bin is full the ice maker shuts off automatically and restarts when more ice is needed.

**To Operate the Ice Maker:**

1. Select ice thickness (Figure 1). The ice maker has been pre-set to produce ice approximately 1/2" thick, while operating in a room ambient of 70°F (21°C).

Operation in different ambient temperatures may require readjusting the control toward "THICK" or "THIN."

Best operation will be obtained with ice 1/2" to 5/8" thick.

If operating in a warm room ambient (above 90°F (32°C) DO NOT set control to maximum thickness or the unit may malfunction.

2. To start the normal ice making cycle, turn service or cycle switch to "ON."

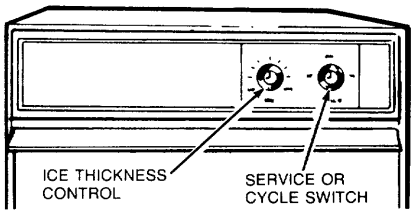



*FIGURE 1*

3. To stop ice maker operation, turn service or cycle switch to "OFF."

4. The "CLEAN" setting is used whenever solutions are circulated through the ice maker for cleaning. Only the water pump operates at this setting.

## GENERAL CARE AND CLEANING

Periodically inspect and clean the ice maker to keep in operating at peak efficiency and to prevent premature failure of system components.

Both the ice making system and the air cooled condenser need to be cleaned regularly.

**Cleaning exterior surfaces:**

Wash the exterior enamel surfaces and gaskets with warm water and mild soap or detergent. Rinse and dry. Regular use of a good household appliance cleaner and was will help protect the finish.

**NOTE: Do not use harsh or abrasive cleaners on enamel surfaces as they may scratch the finish.**

**Cleaning the condenser:**

A dirty or clogged condenser:

- prevents proper air flow.
- reduces ice making capacity.
- causes higher than recommended operating temperatures which may lead to component failure.

**To Clean:**

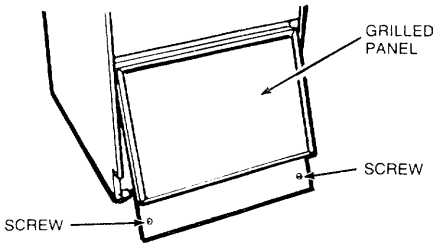



*FIGURE 2*

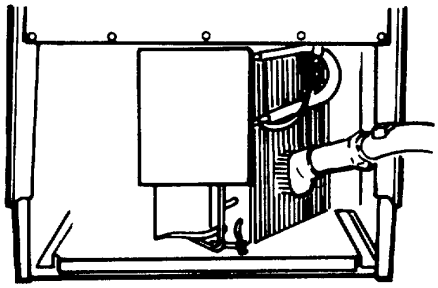
1. Disconnect electrical power supply to the machine or place the service switch in the "OFF" position. The condenser fan should not operate while removing dirt from the condenser.

2. Remove the two screws from the bottom of the grilled front panel. (Figure 2)

**CAUTION: Switch must be in "OFF" position to keep condenser fan from rotating. Do not touch condenser fins. They are sharp. Refrigerant tubing gets very hot during normal operation. Be careful.**

3. Pull forward and down to remove the panel.

*FIGURE 3*



4. Remove dirt and lint from the condenser fins with a soft brush and then use a vacuum cleaner to remove the dirt from the unit compartment (Figure 3).

**CAUTION: Condenser fins are sharp and can bend easily. Use care when brushing the condenser to keep from bending the fins. Condenser tubing gets hot enough during normal operation to burn your hand. Use care and do not touch the tubing.**

5. Replace the grilled front panel and screws.

**Ice making system:**
The minerals rejected from the circulating water during. the freezing cycle will eventually form a hard scaly deposit in the water system which prevents a rapid release of the ice.

Clean-ice and water system periodically to remove mineral scale build-up. Frequency of cleaning depends on water hardness. With soft water, cleaning may not be required for several years. With hard water (15 to 20 grains/gal.) cleaning may be required as frequently as every six months.

**To clean and sanitize, follow this procedure: ***
*Approved by the National Sanitation Foundation.

1. Place cycle or service switch in "OFF" position.

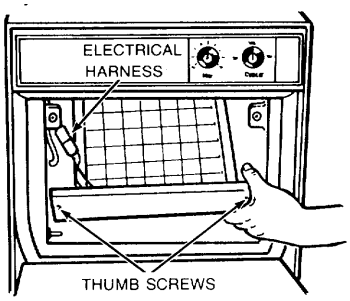



*FIGURE 4*

2. Remove the two thumb screws and slide the ice cutter grid out of the two slots near the water pan.

3. Unplug the electrical harness.

Any ice on the grid should be melted under running warm water. Attempting to pick the ice slab off the grid may stretch and damage grid wires.

4. Remove all ice from the storage bin and the freezing plate.

5. Drain the water pan by removing the drain plug (Figure 5) and then replace the plug.

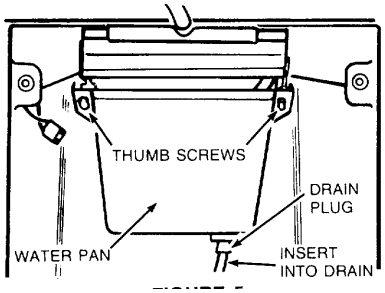



*FIGURE 5*

**WARNING: Most ice machine cleaners are citric or phosphoric acid which can cause irritation even after dilution. In case of contact with eyes, flush eyes thoroughly with fresh water and contact a physician immediately. In case of contact with skin. rinse well with water. If swallowed, give large amounts of water and contact a physician immediately. Do not induce vomiting.**
**KEEP OUT OF REACH OF CHILDREN.**

6. Pour 1/2 gallon (1.9 L) of hot tap water into the water pan and turn the service or cycle switch to "CLEAN." This warms up the system to make the cleaning solution more effective. Let circulate for five minutes. While tap water is circulating, prepare cleaning solution. Mix:

6 oz. (170g) powdered citric, or phosphoric acid into 1/2 gallon (1.9 L) hot water

(Citric acid and phosphoric acid crystals are available from many pharmacies or scientific supply houses.) Commercial Ice Machine cleaners (liquid) are also available from your dealer or refrigeration parts supply stores. Mix according to instructions on label (total quantity 1/2 gallon [1.9 L]).

7. Turn service or Cycle switch to "OFF", drain tap water and replace plug.

8. Turn the switch to "CLEAN" and slowly pour the hot cleaning solution into the water pan. (If the solution foams while pouring, wait until foaming stops.) Then add the balance of the solution.

Allow solution to curculate until the scale has dissolved (15 to 30 minutes). Severe scale build-up may require repeated cleaning with a fresh quantity of cleaning solution.

To clean scale off the side flanges of the freezing plate, use rubber gloves and scrub with a plastic scrubby or non-soap filled stainless steel pad dipped in cleaning solution.

9. Drain the cleaning solution. Using the rubber gloves, remove the drain plug and set the switch to "OFF".

10. Replace the plug and add 1/2 gallon (1.9 L) of fresh water. Set switch to clean, circulate five minutes, drain. Repeat rinsing process.

**Removal and cleaning of interior components:**

**Do not operate unit with panels removed.**

1. Turn the Cycle Control Knob to "OFF" and disconnect the electrical power supply to the machine. Open the storage bin door and remove any ice that is in the bin.

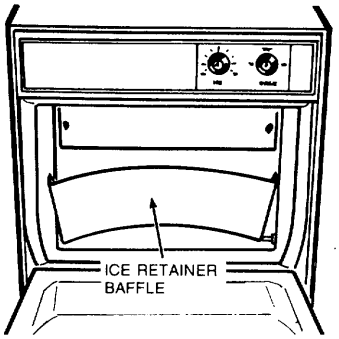



*FIGURE 6*

2. Remove ice retainer baffle by flexing it (Figure 6) and then slide it off the studs.

3. Remove the ice cutter grid by unscrewing the two thumb screws, sliding the grid forward and unplugging the electrical wire harness.

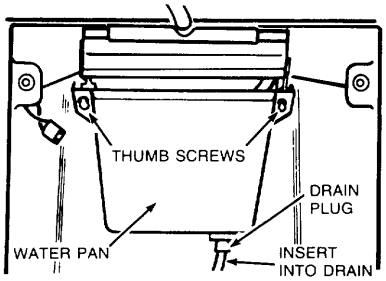



*FIGURE 7*

4. Remove the water pan by unscrewing the two thumb screws (Figure 7).

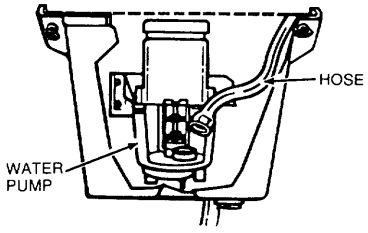



*FIGURE 8*

5. Remove the hose from the water pump. Clean the water inlet hose hanging in the water pan. (Figure 8)

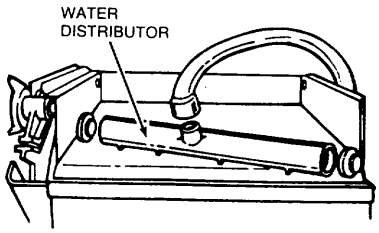



*FIGURE 9*

6. Remove the water distributor from the freezing plate. It is held in place by rubber end caps. Remove the inlet hose and clean all water distributor holes and the small orifice in the inlet side of the distributor. When replacing the distributor, make sure the end caps are located in the evaporator flange detents and that the water distributor holes face down.

7. Wash the **interior components** (ice retainer baffle, cutter grid, water pan, inlet hose and water distributor) and the storage bin, door gasket and ice scoop with mild soap or detergent and warm water. Rinse in clean water. These components should also be cleaned in a solution of 1 oz. (29.6 ml) of chlorine bleach in 1 gallon (3.8 L) warm water.

**DO NOT WASH PLASTIC PARTS IN DISHWASHER. They cannot withstand temperatures above 145°F (63°C).**

8. Replace the interior components: water distributor, inlet hose and water pan.

9. Check the following: * Hose from water valve is in water pan.

- Rubber drain plug is in water pan.
- Water distributor is seated and holes are facing down.
- Hose is reconnected to pump and water distributor.
- Hose from water pan is inserted into storage bin drain opening.

10. Reconnect electrical harness, slide cutter grid into place and tighten the thumb screws, replace the ice retainer baffle.

11. Turn Cycle Control to "ON."

## CHANGING THE FRONT PANELS

See Information in Installation Instructions.

## TO SHUT DOWN THE ICE MAKER

1. Turn ice maker to "OFF."

2. Remove all ice from storage bin.

3. Shut off the water supply.

4. Remove front grille (Figure 2).

5. Disconnect the inlet and outlet lines to water valve. Allow these lines to drain and then reconnect to the valve.

6. Replace front grille and screws.

7. Remove water from drain lines and drain water pan if the unit will be subjected to freezing temperatures during shut down.

8. Before using again, clean and sanitize the ice maker and storage bin.

**Oiling:**

All components of the ice maker are permanently lubricated at the factory. They should not require any additional oiling throughout the normal life of the machine.

## SELF-SERVICE CHECK LIST

Performance problems often result from little things you can find and fix yourself.

1. Unit does not run:
- Service or Cycle switch must be in "ON" position.
- Check to see that power cord is plugged in.
- Check for blown fuse or tripped circuit breaker in electrical supply to machine.
- Room temperature must be above 55°F. (13°C). Otherwise, bin thermostat may sense cold room temperature and shut off even though bin is not full of ice. Also, unit may not restart once it does shut off.

2. Unit runs but produces no ice:
- Service or Cycle switch must be in "ON" position.
- Check water supply to make sure it is open.
- If ice machine is operated at an elevation of 2,000 feet or more above sea level, both the bin thermostat and the ice thickness thermostat need to be recalibrated. See Installation Instructions.

3. Unit runs but produces very little ice:
- Room temperature may be extremely high, over 90°F. (32°C). In this case, it is normal for ice production to be low.
- Dirt or lint may be blocking the air flow through the finned condenser. Condenser needs to be cleaned.
- Check to see if the unit has a scale build-up in water and freezing system. Clean, if necessary.

4. Grid is not cutting ice sheets:
- Check the grid harness plug to make sure the connection is secure.

5. Taste in ice cubes:
- There may be an unusually high mineral content in water supply. Water may need to be filtered or treated.
- Do not store any foods in the ice bin.
- Packaging material not all removed.

A more detailed "Trouble Diagnosis Chart" and other technical information is shipped with each unit and is located in the unit compartment section.

Service repair and replacement parts manuals may be ordered directly from:

Scotsman Ice Systems
505 Front Street Albert Lea, Minn. 56007
Telephone 507-373-3961

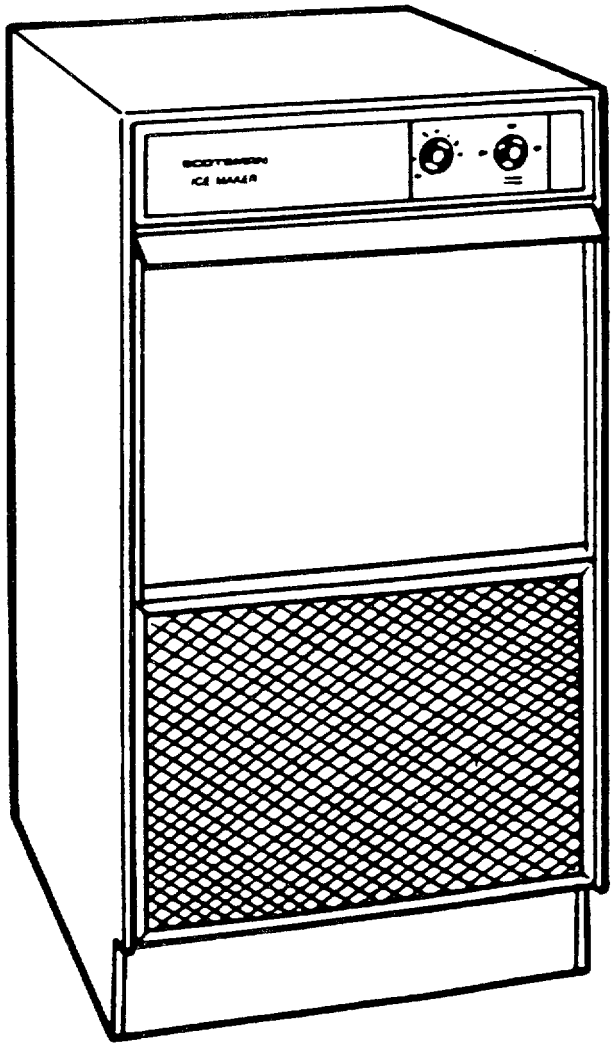
Specify the model number of the ice machine when ordering.

**PART NO. 758969**

SCOTSMAN

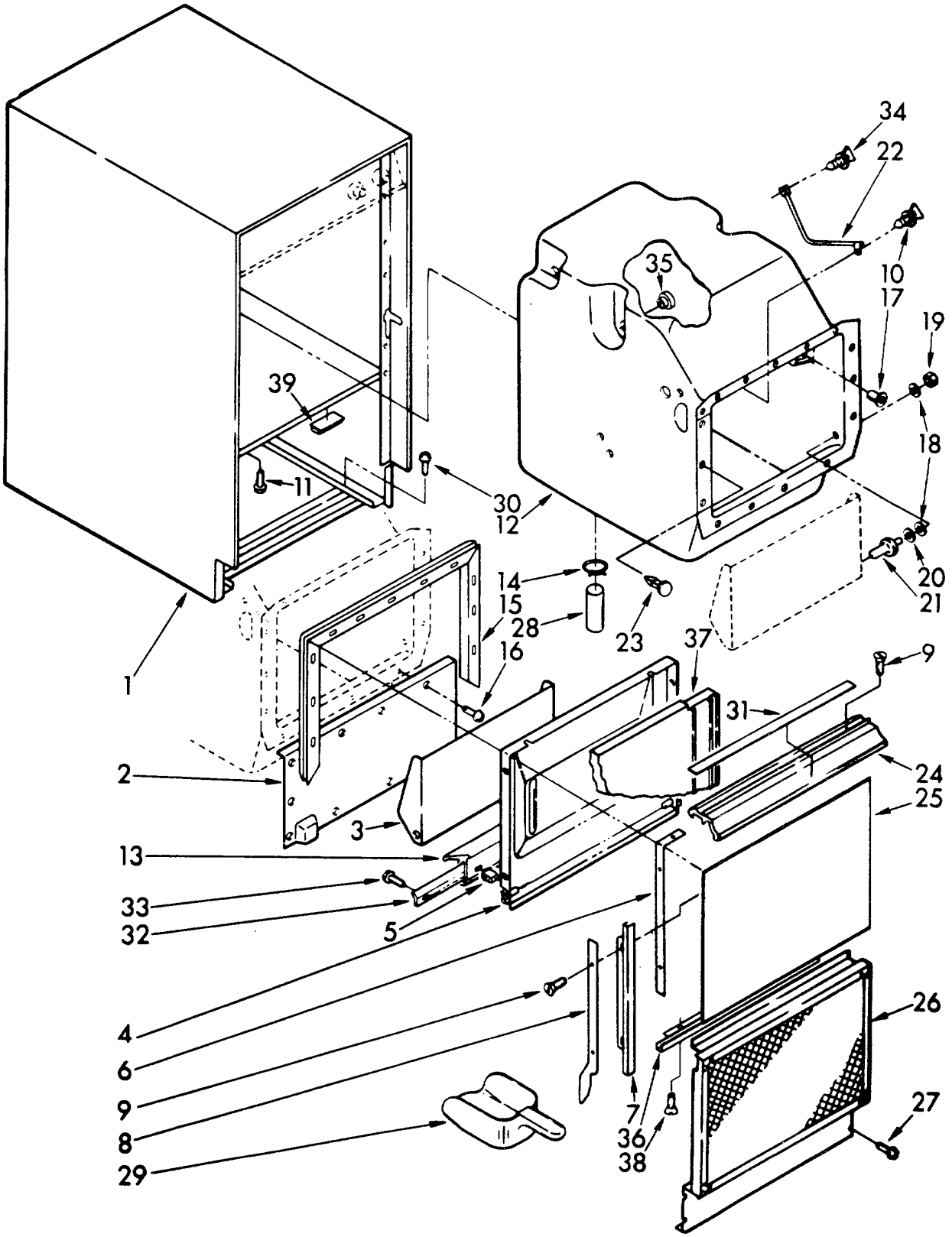
COMMERCIAL ICE SYSTEMS

# REPAIR PARTS LIST
# AC50A E-1



Part No. 17-1622-01

**CABINET, LINER AND DOOR PARTS**
**For Model: AC50AE-1**



## CABINET, LINER AND DOOR PARTS
## For Model: AC50AE-1

| Illus. No. | Part No. | DESCRIPTION |
|---|---|---|
| 1 | 0757942 | Shell |
| 2 | 0756563 | Front, Shell |
| 3 | 0756330 | Door, Inner Bin |
| 4 | 0593786 | Liner, Door |
| 5 | 0593192 | Plug, Hinge |
| 6 | 0593104 | Strip, Tapping (2) |
| 7 | | Trim, Door |
| | 0755675 | R.S. |
| | 0755676 | L.S. |
| 8 | 0593184 | Rail, R.S. |
| | 0593185 | Rail, L.S. |
| 9 | 0681459 | Screw, 8-32 x 5/8 (6) |
| 10 | 0680930 | Thumbscrew |
| 11 | 0681036 | Screw, Ground |
| 12 | 0756350 | Liner (Includes Illus. 17, 18, 19, 20& 21) |
| 13 | 0756347 | Gasket, Bottom |
| 14 | 0596023 | Clamp (2) |
| 15 | 0756663 | Gasket |
| 16 | 0595431 | Screw, 8-15 x 3/8 |
| 17 | 0680982 | Nut, Molly |
| 18 | 0680902 | Washer |
| 19 | 0680637 | Nut, 1/4 Hex |
| 20 | 0596005 | Washer (2) |
| 21 | 0596004 | Stud (2) |
| 22 | 0593183 | Well, Bin Thermostat |
| 23 | 0596772 | Clip, Panel (16) |
| 24 | 0756662 | Pull, Door |
| 25 | | Panel, Exterior |
| | 0756870 | Vinyl, Covered |
| 26 | 0593550 | Grille |
| 27 | 0681308 | Screw, 8-32 x 1/2 |
| 28 | 0593577 | Connector, Hose |
| 29 | 0585158 | Scoop |
| 30 | 0680811 | Screw, 10-32 x 3/8 |
| 31 | 0758531 | Insert, Handle |
| 32 | 0587960 | Strip, Gasket |
| 33 | 0681149 | Screw, 8-15 x 1/2 |
| 34 | 0681419 | Thumbscrew, 10-1/2 |
| 35 | 0596715 | Well Nut (3) |
| 36 | 0755677 | Trim, Door (Lower) |
| 37 | 0756655 | Insulation, Door |
| 38 | 0681196 | Screw |
| 39 | 0596762 | Retainer, Wire |

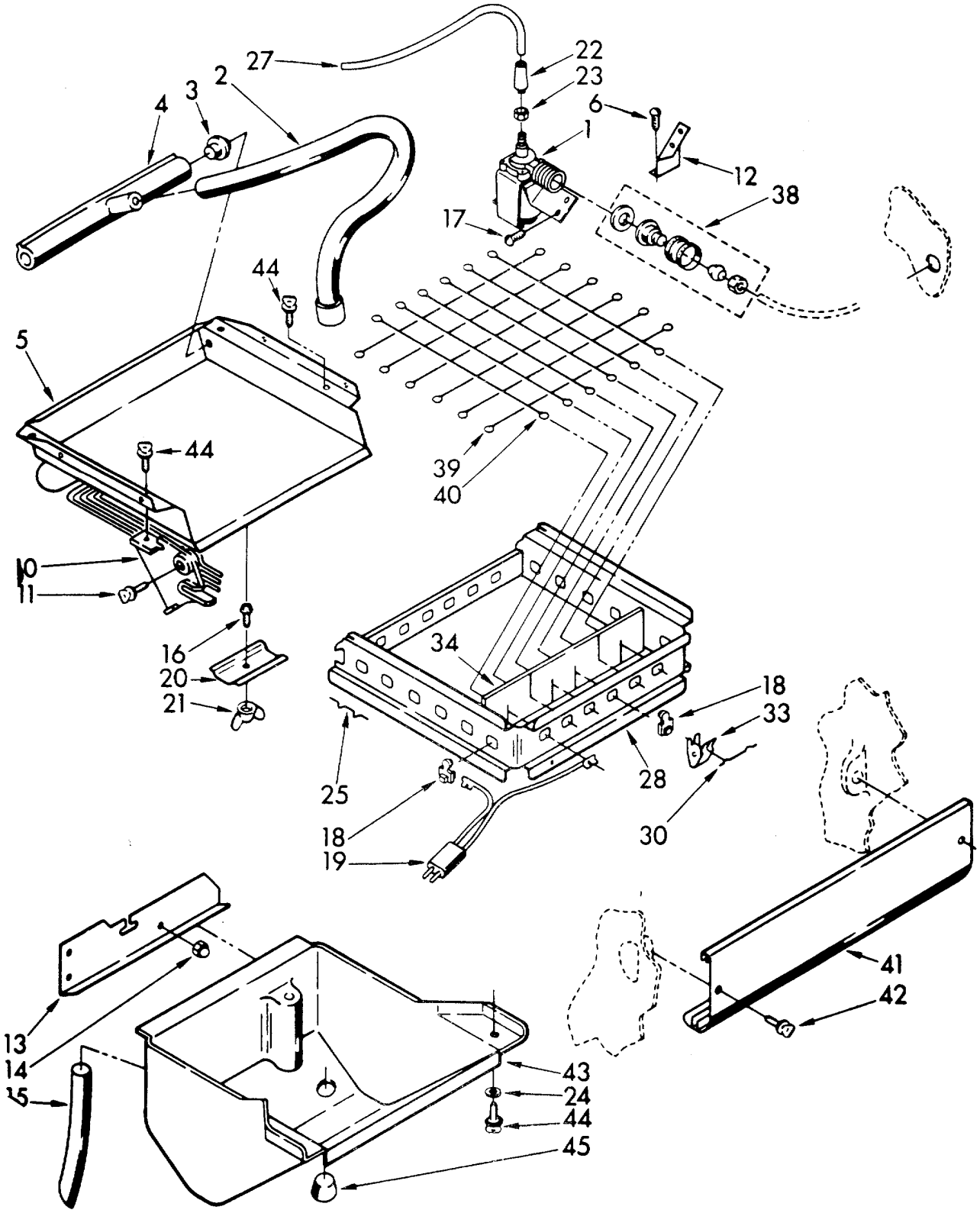
**Following Parts Not Illustrated**

| | | |
|---|---|---|
| | 0503695 | Cork Sealer |
| | 0799351 | Blend, Thinner (1 Gal.) |
| | 0797403 | Cement, Insulation (1 Oz.) |
| | 0505587 | Sealer Mastic (1 Qt.) |
| | 0799833 | Kit, Evaporator Repair (Aluminum Epoxy) |
| | *0206922 | Primer, White (12 Oz. Spray Can) |
| | *0206925 | Leveler, Enamel (12 Oz. Spray Can) |
| | *0350956 | Enamel, Almond (13 Oz. Spray Can) |
| | 0212643 | Sealer, Gum (22 Pcs. 3/16" x 7") |
| | 0479976 | Kit, Insulation (5 Pcs. 3" x 24" x 48") |
| | 0978025 | Valve, Access (1/'4") |
| | 0978026 | Valve, Access (5/16") |
| | 0978027 | Valve, Access (3/8") |
| | 0978028 | Valve, Access (1 /2") |
| | 0978029 | Valve, Access (5/8") |
| | 0978030 | Valve, Access (3/4") |
| | 0758459 | Tech Sheet |
| | 0758532 | Instructions, Installation |
| | 0758533 | Instructions, Owner's |
| | 0877481 | List, Parts |

***Note: DO NOT Spray Paints Where They May Come In Contact With Door Gaskets.**

FOR ORDERING INFORMATION REFER TO PARTS PRICE LIST

**EVAPORATOR, ICE CUTTER GRID AND PUMP PARTS**
**For Model: AC50AE-1**




FOR ORDERING INFORMATION REFER TO PARTS PRICE LIST

**EVAPORATOR, ICE CUTTER GRID AND PUMP PARTS**
**For Model: AC50AE-1**

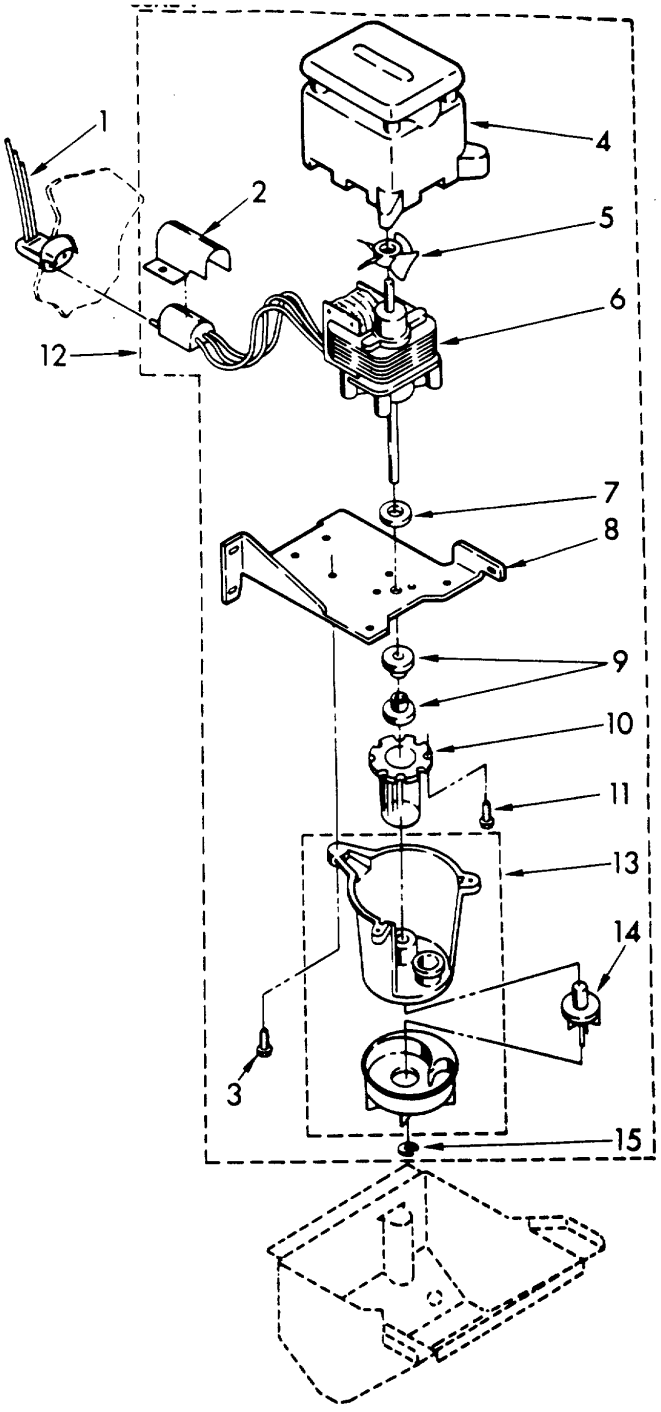
| Illus. No. | Part No. | DESCRIPTION |
|---|---|---|
| 1 | 0758039 | Valve, Complete Water |
| 2 | 0585856 | Tube, Plastic |
| 3 | 0564061 | Plug (2) |
| 4 | 0585813 | Dispenser, Water |
| 5 | 0758028 | Evaporator |
| 6 | 0681167 | Screw |
| 10 | 0756564 | Bracket, Grid Mounting (2) |
| 11 | 0681611 | Thumbscrew |
| 12 | 0756343 | Bracket, Water Valve |
| 13 | 0585853 | Shelf, Water Pan |
| 14 | 0681432 | Nut, Acorn (3) |
| 15 | 0593369 | Hose, Overflow |
| 16 | 0596037 | Screw, 10-32 x 1/2 |
| 17 | 0681305 | Screw, 1/4 x 20 x 1/2 |
| 18 | 0598277 | Insulator (38) |
| 19 | 0587639 | Cord, Grid |
| 20 | 0587662 | Clamp |
| 21 | 0595188 | Nut, Wing |
| 22 | 0841707 | Insert |
| 23 | 0627018 | Nut & Sleeve Assembly |
| 24 | 0681245 | Washer |
| 25 | 0587111 | Pin, Cutter Wire (17) |
| 27 | 0758037 | Tube, Plastic |
| 28 | 0563887 | Frame, Grid (Not A Service Item) |
| 30 | 0587112 | Pin (4) |
| 33 | 0564072 | Clip (19) |
| 34 | 0563890 | Shield |
| 38 | 0533238 | Adapter (Supplied In Literature Package) |
| 39 | 0588048 | Kit (Includes 9 Pcs. 587503 Grid Cutter Wires) |
| 40 | 0588109 | Kit (Includes 10 Pcs. 587504 Grid Cutter Wires) |
| 41 | 0593171 | Panel, Grid |
| 42 | 0680930 | Thumbscrew, 10-32 x 5/8 |
| 43 | 0756659 | Pan |
| 44 | 0681419 | Thumbscrew, 10 x 1/2 |
| 45 | 0593572 | Stopper, Water Pan |

FOR ORDERING INFORMATION REFER TO PARTS PRINCE LIST

**PUMP PARTS**
For Model: AC50AE-1

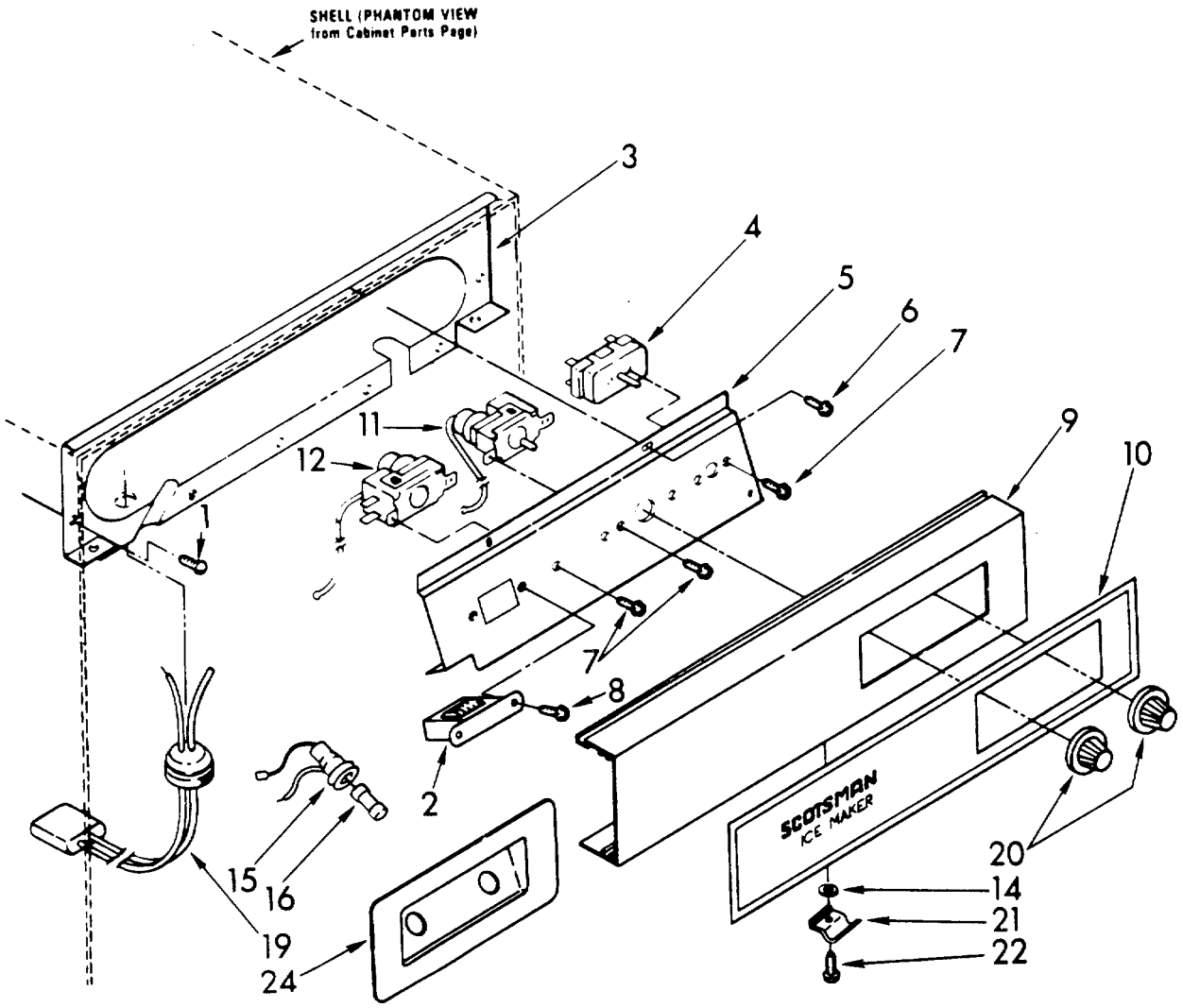
**PUMP COMPLETE**
0756782

| Illus. No. | Part No. | DESCRIPTION |
|---|---|---|
| 1 | | Plug, Pump |
| 2 | | Cover, Plug |
| 3 | | Screw, 8-18x3/4 |
| 4 | | Housing, Motor |
| 5 | | Blade, Fan |
| 6 | 0756950 | Motor, Pump |
| 7 | | Washer |
| 8 | | Bracket, Pump |
| 9 | | Grommet (2) |
| 10 | | Sleeve |
| 11 | | Crew, 8-32x3/8 |
| 12 | 0756782 | Pump, Water Complete Assembly |
| 13 | | Pump, Assembly |
| 14 | | Impeller (Includes Retaining Ring 15) |
| 15 | | Ring, Retainer |




FOR ORDERING INFORMATION REFER TO PARTS PRICE LIST

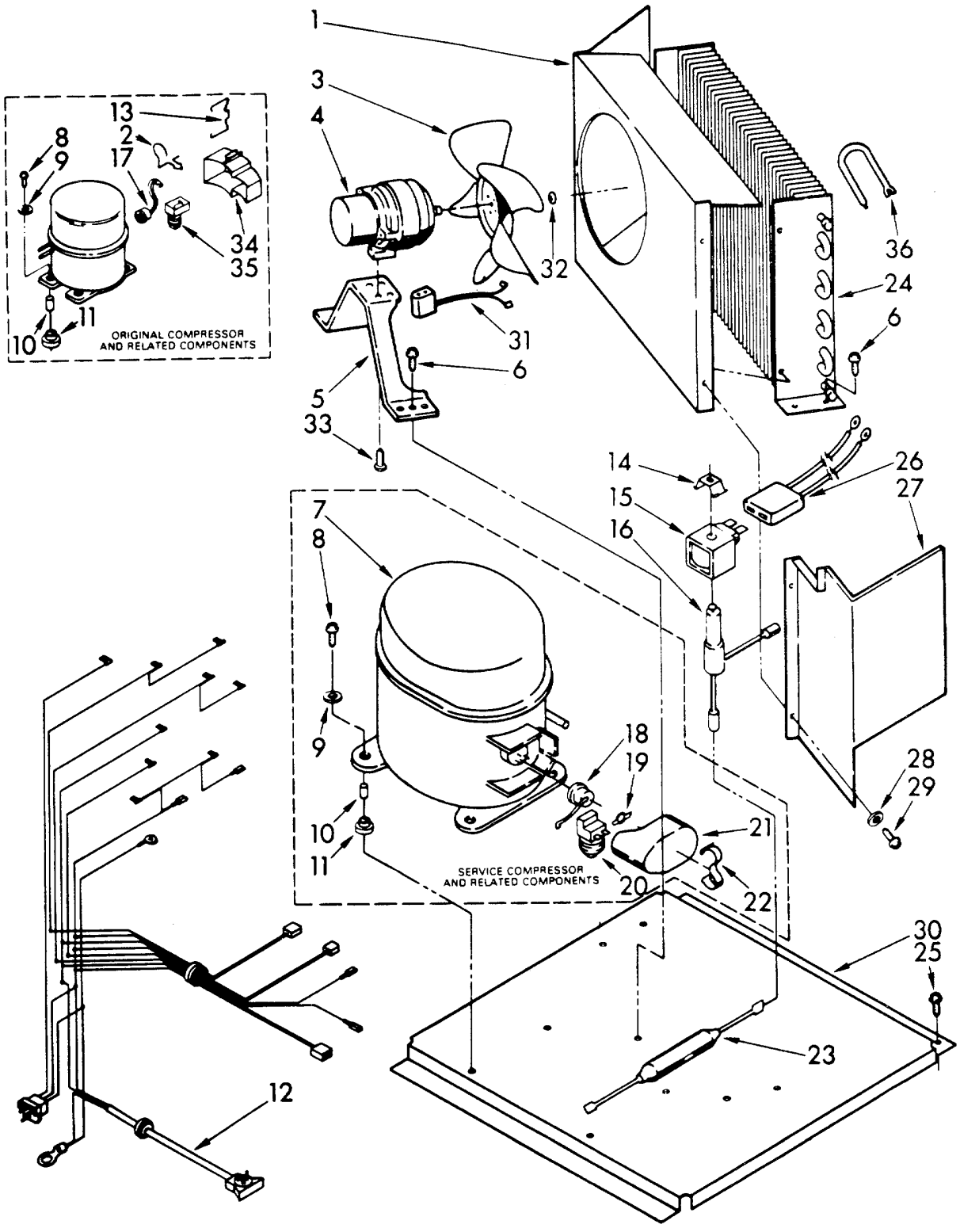
## ESCUTCHEON AND CONTROL PARTS
## For Model: AC50AE-1




| Illus. No. | Part No. | DESCRIPTION | Illus. No. | Part No. | DESCRIPTION | Illus. No. | Part No. | DESCRIPTION |
|---|---|---|---|---|---|---|---|---|
| 1 | 0681036 | Screw | 8 | 0681632 | Screw | 14 | 0681245 | Washer |
| 2 | 0593165 | Transformer | 9 | 0593503 | Escutcheon | 15 | 0757055 | Fuse Holder |
| 3 | 0756664 | Escutcheon, Panel | 10 | 0758525 | Decal, Escutcheon | 16 | 0596009 | Fuse |
| 4 | 0593139 | Switch, Service | 11 | 0598235 | Thermostat, | 19 | 0756336 | Harness, Grid |
| 5 | 0756341 | Bracket, Control | | | Evaporator | 20 | 0756881 | Knob |
| 6 | 0595431 | Screw, 8-15 x 3/8 | 12 | 0593141 | Thermostat, Bin | 21 | 0593179 | Latch |
| 7 | 0595005 | Screw, 8-32 x 1/4 | | | Control | 22 | 0595142 | Screw, 8-32 x 1/2 |
| | | | | | | 24 | 0755361 | Cup, Escutcheon |

**FOR ORDERING INFORMATION REFER TO PARTS PRICE LIST**

**UNIT PARTS**
**For Model: AC50AE-1**




**FOR ORDERING INFORMATION REFER TO PARTS PRICE LIST**

**UNIT PARTS**
**For Model: AC50OAE-1**

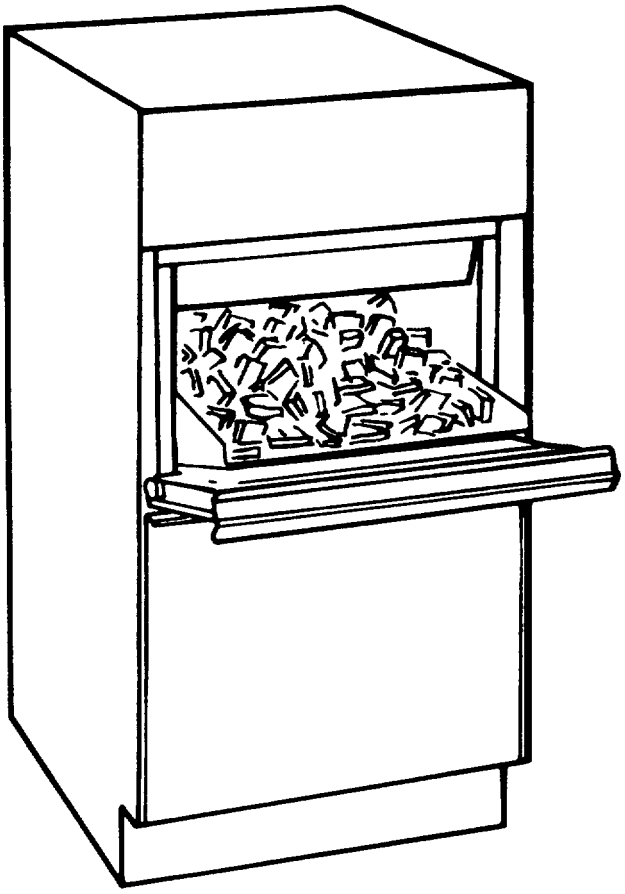
| Illus. No. | Part No. | DESCRIPTION |
|---|---|---|
| 1 | 0757955 | Shroud |
| 2 | 0727046 | Clip (Used W/Original Compressor) |
| 3 | 0572728 | Blade, Fan |
| 4 | 0593363 | Motor, Fan |
| 5 | 0560817 | Bracket |
| 6 | 0681305 | Screw, 1/4-20 x 1/2 (7) |
| 7 | 0485780 | Compressor |
| 8 | 0680233 | Screw (4) |
| 9 | 0595230 | Washer (4) |
| 10 | 0585564 | Sleeve (4) |
| 11 | 0596355 | Grommet (4) |
| 12 | 0756657 | Harness, Cabinet |
| 13 | 0727045 | Clamp (Used W/Original Compressor |
| 14 | 0564234 | Clamp, Coil Retainer |
| 15 | 0587970 | Coil, Solenoid |
| 16 | 0598086 | Valve Body |
| 17 | 0753505 | Overload (Used W/Original Compressor) |
| 18 | 0589231 | Overload (Used W/Service Compressor) |
| 19 | 0549086 | Spring (Used W/Service Compressor) |
| 20 | 0549337 | Relay (Used W/Service Compressor) |
| 21 | 0549336 | Case (Used W/Service Compressor) |
| 22 | 0549342 | Strap, Bale (Used W/Service Compressor) |
| 23 | 0755649 | Drier |
| 24 | 0756299 | Condenser |
| 25 | 0680811 | Screw |
| 26 | 0587971 | Harness, Coil |
| 27 | 0593519 | Deflector, Front |
| 28 | 0595385 | Washer |
| 29 | 0681167 | Screw |
| 30 | 0756345 | Base, Unit |
| 31 | 0585219 | Plug, Fan Motor |
| 32 | 0681650 | Washer, Conical |
| 33 | 0680439 | Screw, 8-36 x 1/2 |
| 34 | 0727044 | Cover, Terminal (Used W/Original Compressor) |
| 35 | 0753316 | Relay, Start (Used W/Original Compressor) |
| 36 | 0756298 | Accumulator |

**FOR ORDERING INFORMATION REFER TO PARTS PRICE LIST**

**IMPORTANT**

**INSTALLATION INSTRUCTIONS**

**for**



**AUTOMATIC ICE MAKER**

**PUMP ADAPTABLE MODEL**

## CHANGING THE BIN DOOR AND LOWER PANEL

The storage bin door and lower panel are designed to accept an optional decorative wood panel of your choice.

The wood panel should be no more than 1/4 inch (6mm) thick. Cut it to the same size as the production metal panel. See Figure 1.

To change the bin door panel:

1. Open the bin door.
2. Remove the two screws on top of the door which hold the handle.
3. Remove the handle.
4. Slide the metal panels out.
5. Break off the ribs on the door insulation to allow for the wood thickness. See Figure 2.
6. Slide the wood panel into the door frame.
7. Replace handle and screws.

To change the lower panel:

1. Remove the two screws at the bottom that hold the lower panel assembly to the ice maker.
2. Remove the two screws on the top of the panel assembly.
3. Slide the metal panels and spacers out.
4. Slide the wood panel into the door frame.
5. Replace the top of the panel assembly.

**NOTE: Make sure the galvanized panel is replaced in back of the panel assembly.**

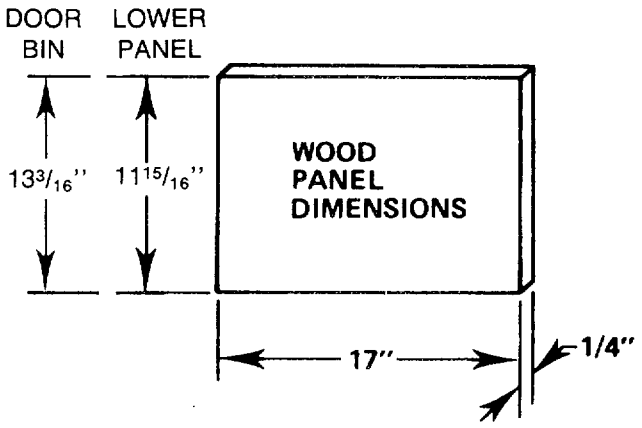



*FIGURE 1*

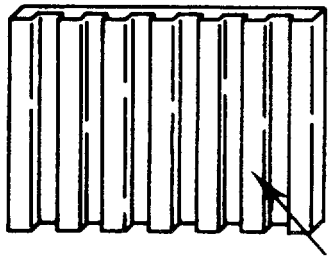



*FIGURE 2*

**NOTE:**
**Only those models which presently have a solid lower panel, and a toe space grill, can be fitted with a lower wood panel.**
**Other models have a grill and solid toe space. These models cannot be fitted with a lower wood panel.**

### THERMOSTAT CALIBRATIONS

If ice maker is installed above two thousand feet of altitude, the bin and evaporator thermostats must be adjusted to a warmer setting. Disconnect electricity, remove thermostat and follow the directions for turning the altitude adjustment screw as shown in the label on each thermostat.

### SHIPBOARD OPERATION

When this ice cube maker is installed aboard a ship, it will be necessary to purchase and install a water deflector. This deflector hangs between the lower edge of the evaporator and the cutter grid. It keeps the water flowing over the evaporator from spilling into the storage bin area. Order the necessary parts from your local ice maker dealer.

## GENERAL INFORMATION

### • UNPACK

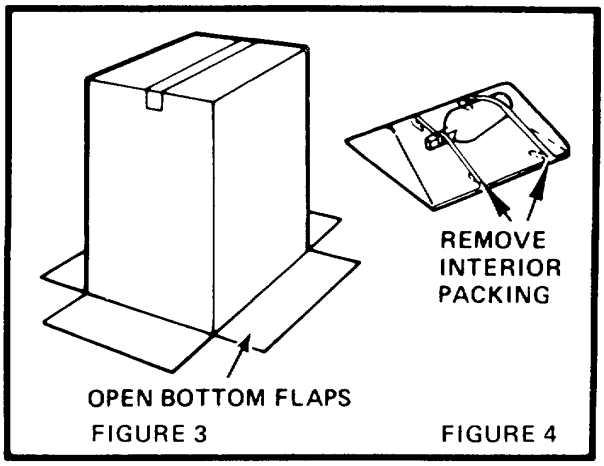
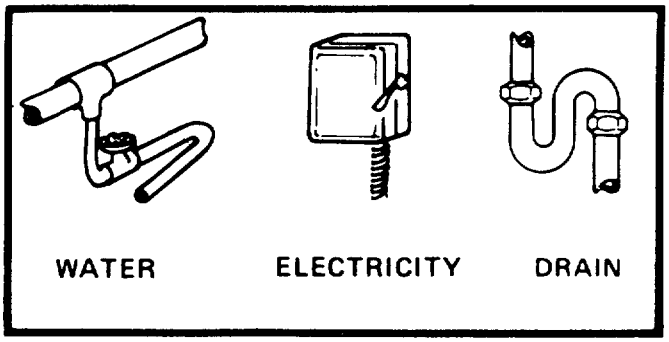



FIGURE 3 FIGURE 4

1 Lay carton on rear face and break open bottom flaps.
2 Set carton upright with all four flaps outward. See Figure 3.
3 Lift carton up and off of machine.
4 Remove all tape and packaging material from the outside and inside of the cabinet. See Figure 4.
5 Remove the front grill; take out the screws securing the grill at the bottom and lift it free of cabinet
6 Turn the fan by hand to make certain it moves freely.
7 Loosen thumb screws holding cutter grid and water pan to "thumb tight."

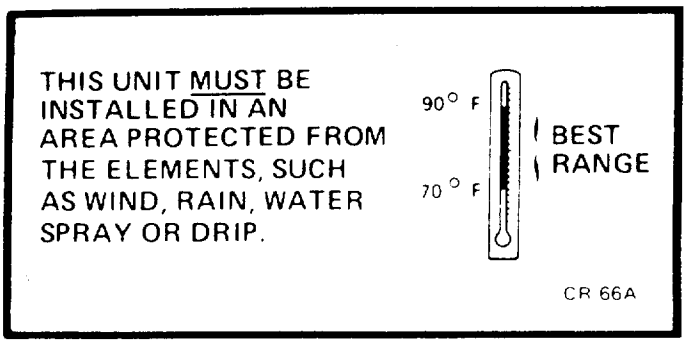
### • UTILITIES




**OBSERVE LOCAL CODES**
**Each installation is unique but will require:**

1 A cold water inlet of 1/4" OD soft copper tubing and a shut-off valve.
2 Either a gravity drain system or a sump pump to lift the water to an existing drain.
3 An electrical branch circuit of 115 Volt, 60 Hz, 1 phase, with a 15 Amp delayed action fuse or circuit breaker.

### • LOCATE UNIT




1 Place unit so the front side will be completely unobstructed. to provide proper air flow
2 Area should be well ventilated with temperature above 55°F and below 110°F. Best results are obtained between 70°F and 90°F.
3 Provision for electricity. water and drain connections should be determined.
4 The unit may be closed in on the top and three sides, but the front MUST BE unobstructed for air circulation and proper operation Installation should be such that the cabinet can be moved forward for servicing, if necessary.

### •· LEVEL UNIT

1 After placing unit in position, check to make certain the unit is level side to side and front to back.
2 Accurate leveling is essential for proper operation.
3 Unit should be shimmed so that it is solid as well as level. The shims should be of hard permanent type material such as masonite.
4 If required by sanitation code, seal the cabinet to the floor with an approved caulking compound.

## FOR THE PLUMBER

### CONNECT TO WATER
**(observe local codes)**

1. Use ¼" OD soft copper tubing for the cold water supply.
2. Provide a convenient manual shut-off valve in the water line
3. Position the tubing so it can enter the access hole located in the right-hand rear of the cabinet. The tubing should extend beyond the cabinet front when the cabinet is pushed back into position. See Figure 5.

### CONNECT THE DRAIN
**(observe local codes)**

1. The unit is provided with a gravity drain.
2. The ideal installation has a standpipe (1¼" minimum) installed directly below the outlet of the drain tube Refer to Figure 5 for the proper location of the standpipe.
3. It may be desirable to insulate drain line thoroughly up to drain inlet.

### CONDENSATE PUMP

1. When drain connection below the level of the unit is not available a condensate pump may be used to lift the water to an available drain.
2. Install condensate pump on floor behind ice maker with discharge tube to the rear. Run bin drain directly into pump as shown in Figure 5A.
3. Run power cord thru hole into unit compartment (See Figure 5A)
4. Remove lower grille assembly. (See Figure 5B)
5. Remove shunt from receptable and plug in condensate pump. (See Figure 5C)

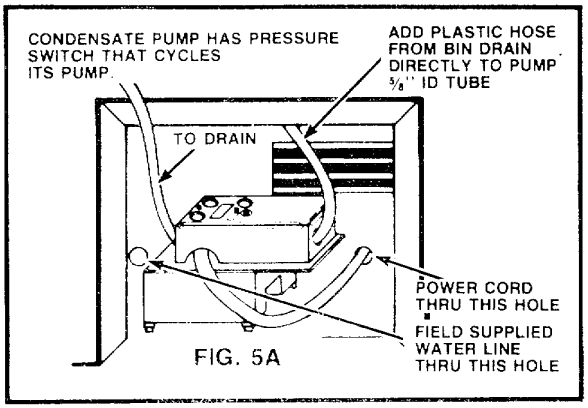


FIG. 5A

**NOTE:**
**Always purge the water line before making the final connection to the inlet of the water valve to prevent possible water valve malfunction.**

After the cabinet is in place, bend the tubing to meet the connection at the water valve. The garden hose threaded compression fitting is found in the parts bag. This joint provides a convenient disconnect for service. Be sure the tubing is clear of compressor, to prevent rattle.

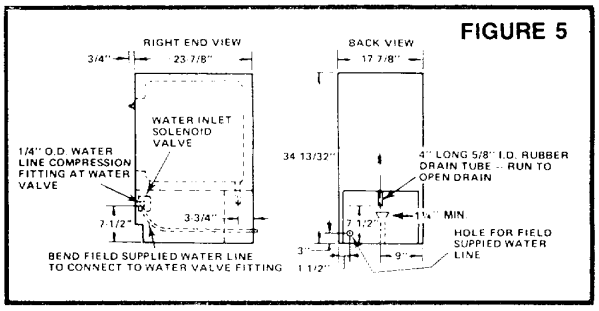


FIGURE 5

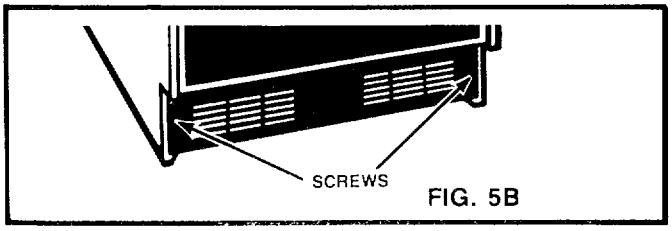


FIG. 5B

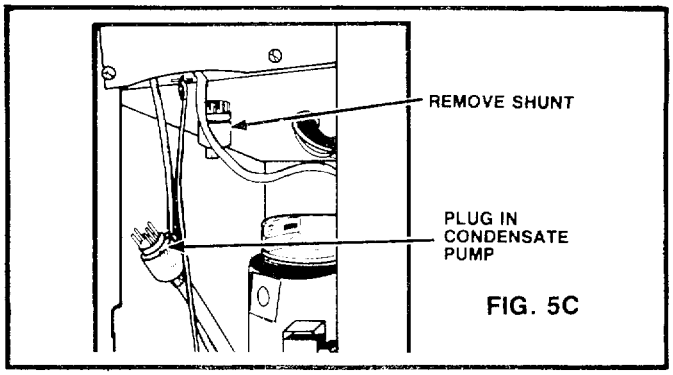


FIG. 5C

**NOTE:**
**Do not discard shunt that is removed from receptable. This must be replaced if unit is to be operated without condensate pump.**

**NOTE:**
**Your Ice Maker may, or may not include a DRAIN PUMP. If your Ice Maker model does not include a DRAIN PUMP, one can be ordered from your dealer.**

## FOR THE ELECTRICIAN

### ELECTRICAL REQUIREMENTS

A 115 Volt, 60 Hz, AC only, 15 Amp fused electrical supply is required (time delay fuse or circuit breaker is recommended). it is recommended that a separate circuit, serving only this appliance, be provided. DO NOT use an extension cord.

ELECTRICAL GROUND IS REQUIRED ON THIS APPLIANCE.

### RECOMMENDED GROUNDING METHOD

**DO NOT, UNDER ANY CIRCUMSTANCES, REMOVE THE POWER SUPPLY CORD GROUND PRONG.**

For your personal safety, this appliance must be grounded. This appliance is equipped with a power supply cord having a 3-prong grounding plug. To minimize possible shock hazard, the cord must be plugged into a mating 3-prong grounding type wall receptacle, grounded in accordance with the National Electrical Code and local codes and ordinances. If a mating wall receptacle is not available, it is the personal responsibility and obligation of the customer to have a properly grounded 3-prong wall receptacle installed by a qualified electrician. See Figure 6.

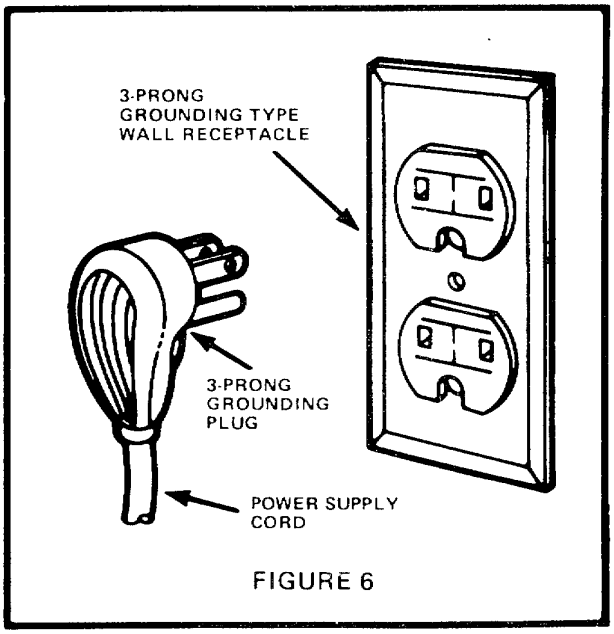



FIGURE 6

### ALTERNATE GROUNDING METHOD

**DO NOT, UNDER ANY CIRCUMSTANCES, REMOVE THE POWER SUPPLY CORD GROUND PRONG.**

If changing and properly grounding the wall receptacle is impossible and where local codes permit (consult your electrical inspector), a temporary adapter may be plugged into the existing 2-prong wall receptacle to mate with the 3-prong power supply cord See Figure 7. **THIS, HOWEVER, IS NOT RECOMMENDED.**

If this is done, you must connect the grounding eyelet on the adapter to the wall receptacle cover plate screw and from this same screw, you must connect a separate copper ground wire (No. 4 minimum) to a grounded cold water pipe *. See Figure 7. Do not ground to a gas supply pipe. Do not connect to electrical supply until appliance is permanently grounded.

* Cold water pipe must have metal continuity to electrical ground and not be Interrupted by plastic, rubber or other electrically insulating connectors including water meter or pump) without adding a jumper wire at these connections.

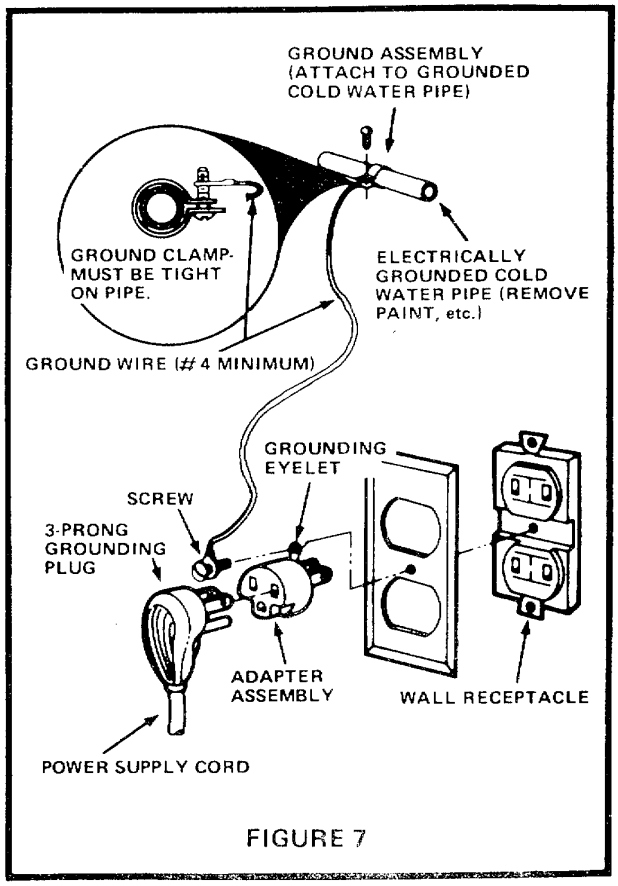



FIGURE 7

## HOW IT WORKS

- Compressor runs
- Condenser fan runs
- Water pump runs (circulates water)
- Cutter grid is warm to touch

**WHEN THE DESIRED ICE SLAB THICKNESS IS REACHED, THE HARVEST CYCLE BEGINS AND THE FOLLOWING HAPPENS:**

- Evaporator thermostat is satisfied
- Compressor keeps running
- Condenser fan stops or turns very slowly
- Water pump stops
- Hot gas solenoid opens
- Water inlet valve opens
- Excess water is flushed out of the drain pan
- Cutter grid is warm to the touch

**NOTE: Normal harvest cycle takes 60 to 120 seconds.**

**MACHINE RESUMES FREEZING AFTER SLAB IS RELEASED FROM EVAPORATOR AND THE CUTTING PROCESS BEGINS.**

**WHEN THE STORAGE BIN IS FILLED, BIN THERMOSTAT OPENS.**

- Cutter grid remains on

## THINGS TO REMEMBER

- Water enters only during the defrost cycle. Therefore the first cycle will be completed without water in the system.
- As the room and water temperatures vary, so will the amount of ice produced. This means that higher operating temperatures will result in reduced ice production.
- The unit will shut off when ice in the storage bin touches the bin thermostat well and will automatically cycle to keep the bin full.
- The storage bin is not refrigerated and some meltage will occur. This, too, varies with the room temperature.
- The unit needs good air circulation to perform efficiently. Keep the front grill and the condenser clean.
- The water system, including filter screen in the water inlet solenoid valve, needs to be cleaned periodically for good circulation. Instructions are located on the inner door panel.

## OPERATING INSTRUCTIONS

- For complete operating information, refer to the Use and Care Guide.
- Before starting, wash out interior of cabinet with a Baking Soda solution (2 tablespoons soda to a quart of warm water). Rinse thoroughly.
- Make certain the water is turned on.
- Turn switch to the "ON" position.

**IMPORTANT:**
**Allow unit to run for 3 hours before expecting ice and for 24 hours before trying to set the thickness control.**

**If installed above 2,000 feet altitude, see page 2 for thermostat adjustments.**

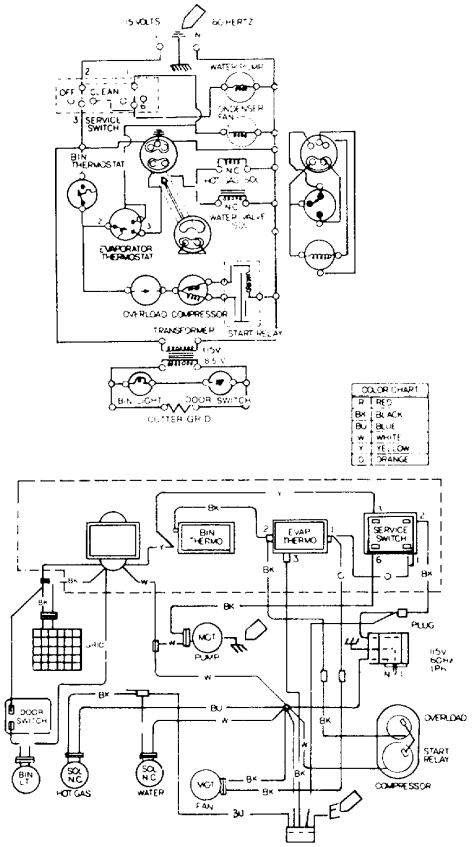
**UNIT WIRING DIAGRAM**

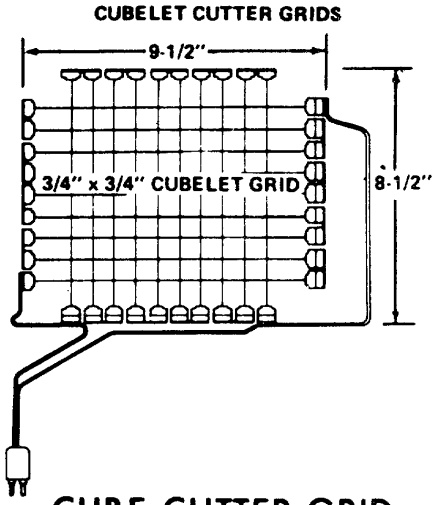
This model operates at 115 volts except for the cutter grid circuit which operates at 8.5 volts at 1 amp.

The compressor runs at all times except when the bin thermostat becomes satisfied and opens up. This de-energizes the system except for the transformer and cutter grid.

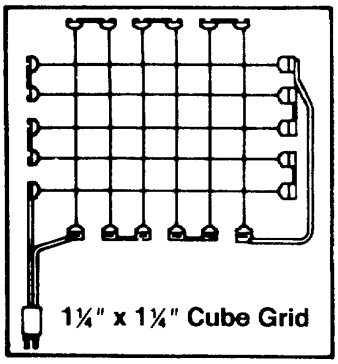
Under normal operating conditions, when the evaporator reaches the preset temperature (+10° to -30 F. depending on thickness of ice) the evaporator thermostat opens, terminating operation of the fan motor and pump motor. The hot gas solenoid and the water valve solenoid are energized at this time and remain so until the evaporator reaches 38 + 20 F.

**DANGER: ELECTRIC SHOCK HAZARD**
**DISCONNECT ROWER BEFORE SERVICING UNIT**
**MAXIMUM FUSE SIZE: 15 AMPS.**
**NOTE: CONTACTS SHOWN IN FREEZING CYCLE.**
**CHECK OPERATION**




**CUBE CUTTER GRID**




Start the unit by turning the service switch to "ON" and opening the line water valve.

- ✓ NOTE: Left is "OFF" - Middle is "ON" - Right is "CLEAN." In "CLEAN" position, only the pump operates.
- ✓ Check condenser fan to make sure it is revolving.
- ✓ Water will not enter pump pan until freezing plate gets cold and machine goes into a harvest cycle.
- ✓ Check for even water flow over freezing plate. Unit must be level for proper operation.
- ✓ Check for desired cube thickness and after 24 hours adjust if necessary. Maximum ice yield will be obtained with ice thickness at ½" to 5/8".
- ✓ Replace grill.

Part No. 758883

Printed in U.S.A.

**SCOTSMAN**

## COMMERCIAL ICE SYSTEMS

## CUSTOMER WARRANTY INFORMATION AND SCOTSMAN DISTRIBUTOR LIST
## UNITED STATES AND CANADA

Your new Scotsman Product has been designed and engineered to provide the highest quality possible.

Each unit is manufactured under stringent quality control measures to insure a quality product providing satisfactory operation to the user.

All Scotsman Commercial Products are backed by a manufacturer's limited warranty providing labor coverage for factory defects in material and/or workmanship occurring within the first twenty-four (24) months of operation. All component parts are covered for a full twenty-four (24) month period. We request that you read the warranty statements provided to become familiar with the product warranty provisions.

1. To insure that the product you have just purchased provides the high quality performance for which it was intended, it MUST be installed and started into operation by a qualified Scotsman service technician.
2. After the installation and start up has been completed, the Manufacturer's Registration Card must be completed and mailed to insure that your Scotsman Product has been duly registered.
3. A listing of all Scotsman Distributors is included in this booklet. If you are not familiar with the local Scotsman service agency, please contact the nearest Scotsman Distributor listed in this booklet to obtain the name, address and telephone number of the closest Scotsman service agency.
4. In the event a problem occurs with your product during the time the unit is protected by the manufacturer's limited warranty, you MUST contact the closest Scotsman Distributor or service agency for service.

If for some reason you cannot get in touch with the local distributor or obtain the information you require, you may contact the Factory Service Department directly by calling the following toll free number: 1-800-533-6006.

---

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(312) 628-6550 Zip 60148
**CHAMPAIGN**
**Duncan Supply Company, Inc.**
217 Locust Street
(217) 352-7888 Zip 61820
**PEORIA**
**Baker & Hauser Refrigeration**
(1330 NE Adams Street)
(309) 673-7966 Zip 61603
**INDIANA**
**BLOOMINGTON**
**Duncan Supply Co., Inc.**
2285 Industrial Drive
(812) 333-8331 Zip 47401
**INDIANA (Continued)**
**FORT WAYNE**
**King-Weyler Equipment, Inc.**
P.O. Box 15370 (4020 Wells Street)
(219) 482-4549 Zip 46815
**INDIANAPOLIS**
**Duncan Supply Company, Inc.**
910 N Illinois St
(317) 634-1335 Zip 46204
**KOKOMO**
**Duncan Supply Company, Inc.**
1100 South Ohio St.
(317) 452-5628 Zip 46901
**MUNCIE**
**Duncan Supply Company, Inc.**
601 East 15th Street
(317) 288-5549 Zip 47302
**SOUTH BEND**
**F.H. Langsenkamp Co.**
1139 Mishawaka Ave
(219) 233-8222 Zip 46615
**TERRE HAUTE**
**A/C & H Supply Co., Inc.**
10 Ohio St.
(812) 232-5355 Zip 47807
**IOWA**
**DAVENPORT**
**Holmes Sales & Service, Inc.**
P.O. Box 4542 (1803 W. 4th Street)
(319) 322-4212 Zip 52808
**DES MOINES**
**Taylor Industries, Inc.**
1533 E. Euclid
(515) 262-8221 Zip 50313
**KANSAS**
**WICHITA**
**Parco Distributors, Inc.**
750 East Pawnee
(316) 267-9423 Zip 67211
**KENTUCKY**
**BOWLING GREEN**
**Brock-McVey Co.**
P.O Box 1540 (704 31W By-Pass)
(502) 842-5609 Zip 42101
**CORBIN**
**Brock-McVey Refr. Supply Co.**
U.S. 25E
(606) 528-0740 Zip 40701
**HOPKINSVILLE**
**A/C & H Supply Co., Inc.**
1300 S Virginia
(502) 885-0859 Zip 42240
**LEXINGTON**
**Brock-McVey Refr. Supply Co.**
P.O Box 321
(1237 New Circle Rd N.E.)
(606) 255-1492 Zip 40555
**LOUISVILLE**
**Scotsman of Kentuckiana**
209 E Main St.
(502) 583-0105 Zip 40202
**OWENSBORO**
**A/C & H Supply Co., Inc.**
P.O. Box 1402
(502) 684-8881 Zip 42302-1402
**PRESTONBURG**
**Brock-McVey Refr. Supply Co.**
374 S Lake Drive
(606) 886-6801 Zip 41653
**LOUISIANA**
**BATON ROUGE**
**Acme Refrigeration**
11844 S. Choctaw
(504) 273-1740 Zip 70815
**LOUISIANA (Continued)**
**BOSSIER CITY (SHREVEPORT)**
**American Refrigeration and Ice**
1100 East Side Drive
(318) 742-7325 Zip 71111
**GONZALES**
**Acme Refr. of Gonzales**
1921 South Philippe Ave.
(504) 647-5344 Zip 70737
**HAMMOND**
**Acme Refr. of Hammond**
312 N. Cate St.
(504) 542-1135 Zip 70404
**HARAHAN (NEW ORLEANS)**
**Commercial & Industrial Parts Outlet**
666 Distributors Row
(504) 733-3700 Zip 70123
**LAFAYETTE**
**Acme Refr., Inc.**
515 6th St.
(318) 433-1783 Zip 70601
**LAKE CHARLES**
**Acme Refr., Inc.**
133 Monroe St.
(318) 234-8333 Zip 70501
**LECOMPTE**
**Louisiana Foodservice, Equipment Co.**
P.O. Box 9
1181 Highway 71 South
(318) 776-5011 Zip 71346
**NEW IBERIA**
**Acme Ref. of New Iberia**
1350 E. St. Peter
(318) 365-3449 Zip 70560
**SLIDELL**
**Acme Ref. of Slidell**
2099 Covington Hwy, Bx. 2052
(504) 641-2055 Zip 70459
**MAINE**
*Please contact nearest Distributor listed in adjacent state.*
**MARYLAND**
**BALTIMORE**
**The Zamoiski Co.**
3000 Waterview Ave.
(301) 539-3000 Zip 21230-3510
MASSACHUSETTS
**HOLYOKE**
**Eger Engineering Corp.**
121 Main Street
(413) 532-9486 Zip 01040
**WOBURN (BOSTON)**
**Preferred Equipment., Inc.**
130 Commerce Way
(617) 935-9130 Zip 01801
**MICHIGAN**
**BRIDGEPORT**
**Michigan Carbonic of Saginaw, Inc.**
6273 Dixie Hwy.
(517) 777-5170 Zip 48722
**GRAND RAPIDS**
**Keyes Refrigeration, Inc.**
3961 Roger B. Chaffee Blvd.
(616) 241-4495 Zip 49508
**TROY (DETROIT)**
**Premium Equipment Sales**
1300 Souter
(313) 585-5990 Zip 48083

**MINNESOTA**
**EAGAN (MINNEAPOLIS)**
**Scotsman Midwest**
Division Coca-Cola Btlg. Co.
2799 Hwy 55 East
(612) 681-3575 Zip 55121
**MISSISSIPPI**
**JACKSON**
**Dixie Supply**
P.O. Box 7636
(490 Julienne Ave., Bldg. C-1)
(601) 354-3025 Zip 39204
**MISSOURI**
**POPLAR BLUFF**
**Davis Service & Equip. Co.**
Jct. Hwy. 60-67
(314) 686-2462 Zip 63901
**SPRINGFIELD**
**National Paper & Hotel Supply**
1708 N. Robberson
(417) 869-9141 Zip 65803
**MONTANA**
**BILLINGS**
**N.T.C.C.**
108 Moore Lane
(406) 259-0300 Zip 59102
**GREAT FALLS**
**N.T.C.C.**
601 Third Avenue South
(406) 727-9080 Zip 59403
**MISSOULA**
**N.T.C.C.**
1345 Dakota
(406) 728-7884 Zip 59801
**NEBRASKA**
**OMAHA**
**Midwest Distributing Corp.**
3104 Cuming St.
(402) 341-5600 Zip 68131
**NEVADA**
**LAS VEGAS**
**Lloyd's Refrigeration, Inc.**
3575 West Naples Drive
(702) 798-1010 Zip 89103
**RENO**
**Silver State Refr., Inc.**
5695 Panther Drive
(702) 329-4041 Zip 89506
**NEW HAMPSHIRE**
*Please contact nearest Distributor listed in adjacent state.*
**NEW JERSEY**
**ATLANTIC CITY**
**Thermec Company Inc.**
Products Division
122 No. California Avenue
(609) 348-9126 Zip 08401
**W. CALDWELL**
**Montgomery Engineering Company**
241 Clinton Road
P.O. Box 1225
(201) 227-9550 Zip 07006
**NEW MEXICO**
**ALBUQUERQUE**
**Southwest Bar & Rest. Equip.**
1215 Fourth N.W.
(505) 242-5151 Zip 87102
**NEW YORK**
**ALBANY**
**A-1 Ice Equipment Distributors, Inc.**
1143 Central Avenue
(518) 459-4775 Zip 12205

**NEW YORK (Continued)**
**AUBURN (SYRACUSE)**
**Van-Halloran Equipment Co.**
P.O. Box 1280
309 W. Genesee St.
(315) 255-3441 Zip 13021
**LONG ISLAND (Farmingdale)**
**Reese and Long/Long Island**
#2 Rome Street
(516) 454-8833 Zip 11801
**NEW YORK**
**Reese and Long**
Refrigeration Products, Inc.
1891 Park Avenue
(212) 876-7978 Zip 10035
**NORTH TONAWANDA**
**E.E.C. Distributors, Inc.**
940 River Road
(716) 693-3970 Zip 14120
**ROCHESTER**
**Allen Associates, Inc.**
60 Saginaw Drive
(716) 244-5104 Zip 14623
**UTICA**
**Trl-Temp Refr. Equipment Co.**
1046 Erie Street
(315) 735-0675 Zip 13502
**NORTH CAROLINA**
**ASHEVILLE**
**Ansel's Refrigeration Co., Inc.**
573 Fairview Rd., P.O. Box 5293
(704) 274-0353 Zip 28813
**CHARLOTTE**
**Gardner & Benolt, Inc.**
P.O. Box 30005 (228 East 9th Street)
(704) 332-5086 Zip 28230
**FAYETTEVILLE**
**Noland Company**
125 Drake Street
(919) 483-0341 Zip 28302
**KINSTON**
**Noland Company**
1000 Greenville Hwy.
(919) 523-6171 Zip 28501
**RALEIGH**
**Noland Company**
P.O. Box 26028
(1117 Downtown Blvd.)
(919) 832-2071 Zip 27611
**WILMINGTON**
**Jacobi-Lewis Co., Inc.**
622 South Front St.
(919) 763-6201 Zip 28401
**WILSON**
**Noland Company**
P.O. Box 2029 (Hwy. 301 No.)
(919) 243-6146 Zip 27893
**WINSTON-SALEM**
**Salem Refrigeration Co., Inc.**
600 Aureole Street
(919) 784-8815 Zip 27107
**NORTH DAKOTA**
*Please contact nearest Distributor listed in adjacent state.*
**OHIO**
**AKRON**
**R. M. Paddison Company**
655 N. Main Street
(216) 762-9741 Zip 44310

**OHIO (Continued)**
**CINCINNATI**
**Cincinnati Ice Machine Co., Inc.**
2350 Gilbert Ave.
(513) 861-9000 Zip 45206
**CLEVELAND**
**The H. A. Redmond Company**
7901 Old Rockside Rd.
(216) 447-3050 Zip 44131
**COLUMBUS**
**Scotsman Mid-Ohio**
356 No. Grant St.
(614) 221-0061-2-3-4 Zip 43215
**DAYTON**
**Dayton Ice Machine Co., Inc.**
3463 Successful Way
(513) 236-4166 Zip 45414
**TOLEDO**
**Wichman Co.**
1720 Arlington Avenue
(419) 385-9121 Zip 43609
**OKLAHOMA**
*Please contact nearest Distributor listed in adjacent state.*
**OREGON**
*Please contact nearest Distributor listed in adjacent state.*
**PENNSYLVANIA**
**FRAZIER (Philadelphia)**
**S. Soskl Piroeff, Inc.**
335 Lancaster Ave.
(215) 648-0100 Zip 19355
**HARRISBURG**
**United Restaurant Equipment, Inc.**
2980 Jefferson St.
(717) 238-1214 Zip 17105
**NORTH EAST**
**Lindsey Refrigeration, Inc.**
P.O. Box 302
(6 Loomis Street)
(814) 725-4561 Zip 16428
**PITTSBURGH**
**Standard Air & Lite**
33rd & Liberty Ave.
(412) 281-6505 Zip 15201
**WILKES-BARRE**
**B & R Equipment Co.**
237 Old River Road
(717) 824-8945 Zip 18702
**RHODE ISLAND**
*Please contact nearest Distributor listed in adjacent state.*
**SOUTH CAROLINA**
**AIKEN**
**Baker Bros., Inc.**
1114 Richland Ave., W.
(803) 648-3225 Zip 29801
**CHARLESTON**
**Noland Company**
P.O. Box 71246
(3695 N. Meeting Street Road)
(803) 744-8213 Zip 29405
**COLUMBIA**
**Noland Company**
730 Elmwood Avenue
(803) 779-6680 Zip 29201

**SOUTH CAROLINA (Cont.)**
**FLORENCE**
**Noland Company**
413 No. Irby Street
(803) 662-5216 Zip 29501
**GREENVILLE**
**Palmetto Comm. Reir.**
6725 Augusta Rd.
(803) 277-6156 Zip 29605
**GREENWOOD**
**Baker Bros., Inc.**
Sullivan Street
(803) 223-3889 Zip 29646
**MYRTLE BEACH**
**East Coast Refrigeration**
181 Spencer St.
(803) 626-3034 Zip 29578
**SPARTANBURG**
**Noland Company**
P.O. Box 1718 (717 Union Street)
(803) 583-2701 Zip 29301
**SOUTH DAKOTA**
*Please contact nearest Distributor listed in adjacent state.*
**TENNESSEE**
**CHATTANOOGA**
**Icemakers, Inc.**
4121 South Creek Road
(615) 622-0886 Zip 37406
**JOHNSON CITY**
**Noland Company**
Walnut & Wataugh
(615) 928-1121 Zip 37601
**KINGSPORT**
**Noland Company**
2016 American Way
(615) 246-8171 Zip 37660
**KNOXVILLE**
**Institutional Commercial Equipment Co.**
10001 Kingston Pike
Comm. Plaza #1
(615) 690-4423 Zip 37922
**MEMPHIS**
**Barnett Supply Company, Inc.**
P.O. Box 4891 (2089 York Ave.)
(901) 278-0440 Zip 38104
**NASHVILLE**
**Scotsman Supply Co.**
P.O. Box 100443 (516 5th Ave. S.)
(615) 242-6451-2-3 Zip 37210
**TEXAS**
**AUSTIN**
**Mid-Tax Sales & Service**
11424 North Interregional Hwy.
(512) 836-5123 Zip 78753
**BEAUMONT**
**Interstate Dist. of Houston**
1180 South Fourth St.
(409) 835-4904 Zip 77701
**CORPUS CHRISTI**
**Marshall Webb Co.**
606 Tulip St.
(512) 887-1813 Zip 78408
**DALLAS**
**Interstate Distributors, Inc.**
9136 Viscount Row (P.O. Box 569060)
(214) 631-7582 Zip 75356-9060
**EL PASO**
**Thermal Control Inc.**
3509 Durazno
(915) 544-6634 Zip 79905
**HARLINGEN**
**Stepco**
804 W. Harrison
(512) 423-2491 Zip 78550
**HOUSTON**
**Scotsman-Norwood Co.**
DBA Interstate Distributors
P.O. Box 167 (640 W. 6th Ave.)
(713) 861-4455 Zip 77001
**LONGVIEW**
**Keith's Commercial Refr.**
306 Enterprise
(214) 753-3397 Zip 75604
**LUBBOCK**
**W-F Equipment Co.**
P.O. Box 3595 (Zip 79452)
(3612 Avenue A - Zip 79408)
(806) 763-9797
**SAN ANTONIO**
**Marshall Webb Company**
4540 Tejasco
(512) 828-4464 Zip 78218
**TEXARKANA**
**Phillips & Sons Refrigeration, Inc.**
1102 Bowie Street
(214) 794-8021 Zip 75501
**WICHITA FALLS**
**Wichita Restaurant Supply, Inc.**
1122 Scott at 12th
(817) 766-4389 Zip 76307
**UTAH**
**MURRAY (SALT LAKE CITY)**
**Bainco Rest. Equip., Inc.**
4868 S. State Street
(801) 263-3571 Zip 84107
**VERMONT**
**BURLINGTON**
**Blodgett Supply Company**
44 Lakeside Avenue
(802) 864-9831 Zip 05402
**RUTLAND**
**Blodgett Supply Co.**
74 River Street
(802) 775-3342 Zip 05701
**VIRGINIA**
**CHARLOTTESVILLE**
**Noland Company**
307 Ridge Street
(804) 293-5161 Zip 22901
**CHESAPEAKE**
**Noland Company**
663 Woodlake Drive
(804) 424-5616 Zip 23320
**NEWPORT NEWS**
**Noland Company**
12515 Jefferson
(804) 874-8000 Zip 23602
**RICHMOND**
**Noland Company**
P.O. Box 11065
(2101 Staples Mill Road)
(804) 254-8100 Zip 23230
**ROANOKE**
**Noland Company**
P.O. Box 13000
(1226 Center Ave. N.W.)
(703) 345-8101 Zip 24030
**WASHINGTON**
**SEATTLE**
**ALPAC Corporation**
2300 26th Avenue South
(206) 323-2932 Zip 98144
**WEST VIRGINIA**
**CHARLESTON**
**Hooten Equipment Co.**
P.O. Box 109 (961 Virginia Street W.)
(304) 346-0521 Zip 25302
**WISCONSIN**
**BROOKFIELD (Milwaukee)**
**Wisconsin Allied Products**
4170 N. 126th Street
(414) 781-2038 Zip 53005
**WYOMING**
*Please contact nearest Distributor listed in adjacent state.*

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**CANADA**
**ALBERTA**
**CALGARY**
**Warner's Refr. Co. Ltd.**
424A 36 Ave. SE
(403) 243-0233 T2G 1W1
**EDMONTON**
**Werner's Refr. Co. Ltd.**
11735-108th Ave.
(403) 452-7434 T5H1B8
TLX #0372479
**BRITISH COLUMBIA**
**BURNABY**
**Werner's Refr. Co., Ltd.**
1769 Douglas Rd.
(604) 291-7788 V5C 5W2
**KELOWNA**
**Werner's Refr. Co., Ltd.**
#15-1851 Kirschner Road
(604) 860-3667 VIY 4N6
**VANCOUVER**
**Werner's Refrigeration Co., Ltd.**
156 W. 6th Ave.
(604) 876-9278 V5Y 1 K6
**MANITOBA**
*Please contact nearest Distributor listed in adjacent province.*
**ONTARIO**
**BRAMPTON (TORONTO)**
**Shipley, Inc.**
22 Bramsteele Road
(416) 457-6100 L6W 1B3
TLX #0697688
**QUEBEC**
**MONTREAL**
**Shipley, Inc.**
9570 Boul Del'Acadie Blvd.
(514)382-3620 H4N-1L8
**SASKATCHEWAN**
*Please contact nearest Distributor listed in adjacent province.*

# APPENDIX A
# REFERENCES

A-1. **Scope**. This appendix contains all forms, pamphlets and technical manuals referenced in both the Air mobile and Semitrailer mounted Laboratories.

A-2. **Forms.**

Recommended Changes to Publications ..... DA Form 2028
DA Form 2028-2
Quality Deficiency Report ..... SF 368
Equipment Inspection and Maintenance Work Sheet ..... DA Form 2404
Hand Receipts ..... DA Form 2062

A-3. **Field Manuals.**

Petroleum Testing Facilities:
Laboratories and Kits ..... FM 10-72
Inspecting and Testing Petroleum Products ..... FM 10-70
ASTM Test Method Supplement to ..... FM 10-92C1/C2

A-4. **Technical Manuals.**

Atlas-Copco Compressor ..... TM 10-4310-392-13&P
Alcor Jet Fuel Thermal Oxidation Tester Operating
and Maintenance Manual ..... TM 10-6635-210-13&P
Bacharach Gas Alarm and Calibration Data ..... TM 10-6665-297-13&P
Brother Portable Typewriter ..... TM 10-7430-218-13&P
Chemtrix Field Ph Meter ..... TM 10-6630-237-13&P
Elkay Manufacturing 30 GPH Cooler ..... TM 10-4130-240-13&P
Emcee Micro-Separometer ..... TM 10-6640-222-13&P
Foxboro Pressure Recording Gauge ..... TM 10-6685-365-13&P
Gammon Aqua Glo Water Detector ..... TM 10-6640-221-13&P
Gammon Mini Monitor Fuel Sampling Kit ..... TM 10-6630-230-13&P
Jelrus Burn-Out Furnace ..... TM 10-6640-231-13&P
Koehler Cleveland Open Tester ..... TM 10-6630-236-13&P
Koehler Cloud and Pour Point Chamber ..... TM 10-6630-238-13&P
Koehler Copper Strip Corrosion Bomb Bath ..... TM 10-6640-220-13&P
Koehler Distillation Apparatus ..... TM 10-6630-233-13&P
Koehler Dropping Point Apparatus ..... TM 10-6635-211-13&P
Koehler Electric Pensky-Martins Tester ..... TM 10-6630-231-13&P
Koehler Foaming Characteristics Determination Apparatus ..... TM 10-6640-228-13&P
Koehler Kinematic Viscosity Bath ..... TM 10-6630-239-13&P
Koehler Tag Closed Cup Flash Tester ..... TM 10-6630-235-13&P
Lab-Line Explosion Proof Refrigerator ..... TM 10-6640-219-13&P
Lily Freezer ..... TM 10-6640-234-13&P
Millipore OM 39 Filter Holder ..... TM 10-6640-225-13&P
Millipore Vacuum Pump ..... TM 10-6640-217-13&P
Ohaus Harvard Trip Balance ..... TM 10-6670-278-13&P
Precision Gas-Oil Distillation Test Equipment ..... TM 10-6630-219-13&P
Precision General Purpose Water Bath ..... TM 10-6640-229-13&P

Precision High Temperature Bronze Block Gum Bath ..... TM 10-6630-234-13&P
Precision General Purpose Ovens..... TM 10-6640-218-13&P
Precision Heater Instruction Manual and Parts List..... TM 10-6640-223-13&P
Precision Oxidation Stability Bath ..... TM 10-6640-232-13&P
Precision Pensky-Martens Flash Testers..... TM 10-6630-231-13&P
Precision Reid Vapor Pressure Bath..... TM 10-6640-226-13&P
Precision Slo-Speed Stirrer ..... TM 10-6640-224-13&P
Precision Universal Centrifuge ..... TM 10-6640-230-13&P
Precision Universal Penetrometer ..... TM 10-6640-228-13&P
Sargent-Welch Vacuum Pump ..... TM 10-4310-391-13&P
Sartorious Analytical Balance..... TM 10-6670-277-13&P
Scotsman Cuber ..... TM 10-6640-227-13&P
Soltec VOM-Multimeter..... TM 10-6625-3127-13&P
Teel Self-Priming Centrifugal Pump..... TM 10-6640-217-13&P
Teel Submersible Pump..... TM 10-4320-320-13&P
Texas Instrument TI-5030II Calculator..... TM 10-7420-210-13&P

A-5. **Pamphlets.**
The Army Maintenance Management System (TAMMS) ..... DA Pam 738-750

A-6. **Miscellaneous Publications.**
The Army Integrated Publishing and Printing Program ..... AR 25-30
Laboratory, Airmobile, Aviation Fuel ..... MIL-L-52733A(ME)
Apparatus, Instruments, Chemicals, Furniture, and Supplies for Industrial,
Clinical, College and Government Laboratories .....Fisher Scientific Laboratories Catalog
Petroleum-Petrochemical Testing Equipment..... Precision Scientific Catalog

# APPENDIX B

# MAINTENANCE ALLOCATION CHART

## Section I. INTRODUCTION

**B-1. General.**

a. This section provides a general explanation of all maintenance and repair functions authorized at various maintenance categories.

b. The Maintenance Allocation Chart (MAC) in Section II designates overall authority and responsibility for the performance of maintenance functions on the identified end item or component. The application of the maintenance functions to the end item or component will be consistent with the capacities and capabilities of the designated maintenance categories.

c. Section III lists the tools and test equipment (both special tools and common tool sets) required for each maintenance function as referenced from Section II.

d. Section IV contains supplemental instructions and explanatory notes for a particular maintenance function.

**B-2. Maintenance Functions**. Maintenance functions will be limited to and defined as follows:

*a. Inspect*. To determine the serviceability of an item by comparing its physical, mechanical, and/or electrical characteristics with established standards through examination (e.g., by sight, sound, or feel).

*b. Test*. To verify serviceability by measuring the mechanical, pneumatic, hydraulic, or electrical characteristics of an item and comparing those characteristics with prescribed standards.

*c. Service*. Operations required periodically to keep an item in proper operating condition, i.e., to clean (includes decontaminate, when required)to preserve, to drain, to paint, or to replenish fuel, lubricants, chemical fluids, or gases.

*d. Adjust*. To maintain or regulate, within prescribed limits, by bringing into proper or exact position, or by setting the operating characteristics to specified parameters.

*e. Align*. To adjust specified variable elements of an item to bring about optimum or desired performance.

*f. Calibrate*. To determine and cause corrections to be made or to be adjusted on instruments or test, measuring, and diagnostic equipments used in precision measurement. Consists of comparisons of two instruments, one of which is a certified standard of knob accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared.

*g. Remove/Install*. To remove and install the same item when required to perform service or other maintenance functions. Install may be the act of emplacing, seating, or fixing into position a spare, repair part, or module (component or assembly)in a manner to allow the proper functioning of an equipment or system.

*h. Replace*. To remove an unserviceable item and install a serviceable counterpart in its place. "Replace" is authorized by the MAC and is shown as the third position code of the SMR code.

*i.* *Repair*. The application of maintenance services, [1]including fault location/troubleshooting,[2] removal/installation, and disassembly/assembly procedures,[3] and maintenance actions,[4] to identify troubles and restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module (component or assembly)end item, or system.

*j.* *Overhaul*. That maintenance effort (service/action) prescribed to restore an item to a completely serviceable/operational condition as required by maintenance standards in appropriate technical publications (i., DMWR). Overhaul is normally the highest degree of maintenance performed by the Army. Overhaul does not normally return an item to like-new condition.

*k.* *Rebuild*. Consists of those services/actions necessary for the restoration of unserviceable equipment to a like-new condition in accordance with original manufacturing standards. Rebuild is the highest degree of materiel maintenance applied to Army equipment. The rebuild operation includes the act of returning to zero those age measurements (hours/miles, etc. considered in classifying Army equipment/components.

**B-3. Explanation Of Columns In The MAC, Section II.**

*a.* *Column 1. Group Number*. Column 1 lists functional group code numbers, the purpose of which is to identify maintenance significant components, assemblies, subassemblies, and modules with the next higher assembly. End item group number shall be "00."

*b.* *Column 2. Component/Assembly*. Column 2 contains the names of components, assemblies, subassemblies, and modules for which maintenance is authorized.

*c.* *Column 3. Maintenance Function*. Column 3 lists the functions to be performed on the item listed in column 2. (For a detailed explanation of these functions, see paragraph B-2.)

*d.* *Column 4. Maintenance Category*. Column 4 specifies, by the listing of a work time figure in the appropriate subcolumn(s), the category of maintenance authorized to perform the function listed in column 3. This figure represents the active time required to perform that maintenance function at the indicated category of maintenance. If the number or complexity of the tasks within the listed maintenance function vary at different maintenance categories, appropriate work time figures will be shown for each category. The work time figure represents the average time required to restore an item (assembly, subassembly, component, module, end item, or system) to a serviceable condition under typical field operating conditions. This time includes preparation time (including any necessary disassembly/ assembly time), troubleshooting/fault location time, and quality assurance/quality control time in addition to the time required to perform the specific tasks identified for the maintenance functions authorized in the maintenance allocation chart. The symbol designations for the various maintenance categories are as follows:

---

1 *Services - inspect, test, service, adjust, align, calibrate, and/or replace.*

2 *Fault locate/troubleshoot - the process of investigating and detecting the cause of equipment malfunctioning; the act of isolating a fault within a system or unit under test (UUT).*

3 *Disassemble/assemble - encompasses the step-by-step taking apart (or breakdown) of a spare/functional group coded item to the level of its least componency identified as maintenance significant (i.e., assigned an SMR code) for the category of maintenance under consideration.*

4 *Actions - welding, grinding, riveting, straightening, facing, remachining, and/or resurfacing*.

C..... Operator/Crew
O..... Unit Maintenance
F..... Direct Support Maintenance
H..... General Support Maintenance
D..... Depot Maintenance

*e.* *Column 5. Tools and Equipment*. Column 5 specifies, by code, those common tool sets (not individual tools) and special tools, TMDE, and support equipment required to perform the designated function.

*f.* *Column 6. Remarks*. This column shall, when applicable, contain a letter code, in alphabetic order, which shall be keyed to the remarks contained in section IV.

**B-4. Explanation Of Columns In Tool And Test Equipment Requirements, Section III.**

*a.* *Column 1. Reference Code*. The tool and test equipment reference code correlates with a code used in the MAC, section II, column 5.

*b.* *Column 2. Maintenance Category*. The lowest category of maintenance authorized to use the tool or test equipment.

*c.* *Column 3. Nomenclature*. Name or identification of the tool or test equipment.

*d.* *Column 4. National Stock Number*. The National stock number of the tool or test equipment.

*e.* *Column 5. Tool Number*. The manufacturer's part number.

**B-5. Explanation Of Columns In Remarks, Section IV.**

*a.* *Column 1. Reference Code*. The code recorded in Column 6, Section II.

*b.* *Column 2. Remarks*. This column lists information pertinent to the maintenance function being performed as indicated in the MAC, section II.

**Section II. MAINTENANCE ALLOCATION CHART**

| (1) | (2) | (3) | (4) Maintenance Level | | | | | (5) | (6) |
|---|---|---|---|---|---|---|---|---|---|
| | | | UNIT | | DIRECT SUPPORT | GEN. SUPPORT | DEPOT | | |
| Group Number | Component/Assembly | Maintenance Function | C | O | F | H | D | Tools and Equipment | Remarks |
| 01 | CWS1 CUBER | INSPECT | 0.1 | | | | | | |
| | | REPLACE | | 1.0 | | | | 2 | |
| | | REPAIR | | | 4.0 | | | 1,2,3,4 | |

## Section III. TOOL AND TEST EQUIPMENT REQUIREMENTS FOR MAINTENANCE ALLOCATION CHART

| (1) TOOL OR TEST EQUIPMENT REF CODE | (2) MAINTENANCE CATEGORY | (3) NOMENCLATURE | (4) NATIONAL/NATO STOCK NUMBER | (5) TOOL NUMBER |
|---|---|---|---|---|
| 1 | O,F | TOOL KIT, GENERAL AUTOMOTIVE | 5180-00-177-7033 | (50980) SC 5180-90-CL-N26 |
| 2 | F | SHOP EQUIPMENT, AUTOMOTIVE MAINTENANCE AND REPAIR: COMMON No. 1 (LESS POWER) | 4910-00-754-0654 | (19204) SC 4910-95-CL-A74 |
| 3 | F | MULTIMETER, 0-500V | 6625-00-691-2453 | |
| 4 | F | KIT, SOLDERING GUN, 115V, 60 CYCLE, COMPLETE WITH SOLDER AND CASE | 3439-99-618-6623 | |

## Section IV. REMARKS

**NOT APPLICABLE**

# APPENDIX C
# COMPONENTS OF END ITEM AND BASIC ISSUE ITEMS LISTS
## Section I. INTRODUCTION

**C-1. Scope.**
This appendix lists components of end item and basic issue items for the CWS1 Cuber to help you inventory items required for safe and efficient operation.

**C-2. General.**

The Components of End Item and Basic Issue Items Lists are divided into the following sections:

*a.* *Section II. Components of End Item*. This listing is for informational purposes only, and is not authority to requisition replacements. These items are part of the end item, but are removed and separately packaged for transportation or shipment. As part of the end item, these items must be with the end item whenever it is issued or transferred between property accounts. Illustrations are furnished to assist you in identifying the items.

*b.* *Section III. Basic Issue Items*. These are the minimum essential items required to place the CWS1 Cuber in operation, to operate it, and to perform emergency repairs. Although shipped separately packaged, BII must be with the shelter during operation and whenever it is transferred between property accounts. The illustrations will assist you with hard-to-identify items. This manual is your authority to request/requisition replacement BII, based on TOE/MTOE authorization of the end item.

**C-3. Explanation of Columns.**

The following provides an explanation of columns found in the tabular listings:

*a.* *Column (1) - Illustration Number (Illus Number).* This column indicates the number of the illustration in which the item is shown.

*b.* *Column (2) - National Stock Number.* Indicates the National stock number assigned to the item and will be used for requisitioning purposes.

*c.* *Column (3) - Description.* Indicates the Federal item name and, if required, a minimum description to identify and locate the item. The last line for each item indicates the CAGEC (in parentheses) followed by the part number.

*d.* *Column (4) - Unit of Measure (U/M).* Indicates the measure used in performing the actual operational/maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., ea, in, pr).

*e.* *Column (5) - Quantity required (QTY RQR).* Indicates the quantity of the item authorized to be used with/on the equipment.

## Section II. COMPONENTS OF END ITEM

| (1) Illus Number | (2) National Stock Number | (3) Description CAGEC and Part Number | Usable On Code | (4) U/M | (5) Qty rqr |
|---|---|---|---|---|---|
| | 7320-00-234-3512 | CRUSHER, ICE (45168) 551, (45168) 571-06 | | EA | 1 |

## Section III. BASIC ISSUE ITEMS

**NOT APPLICABLE**

# APPENDIX D

## ADDITIONAL AUTHORIZATION LIST

**NOT APPLICABLE**

# APPENDIX E

## EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST

**NOT APPLICABLE**

**By Order of the Secretary of the Army:**

**CARL E. VUONO**
*General, United States Army*
*Chief of Staff*

**Official:**

**THOMAS F. SIKORA**
*Brigadier General, United States Army*
*The Adjutant General*

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# The Metric System and Equivalents

### *Linear Measure*

1 centimeter = 10 millimeters = .39 inch
1 decimeter = 10 centimeters = 3.94 inches
1 meter = 10 decimeters = 39.37 inches
1 dekameter = 10 meters = 32.8 feet
1 hectometer = 10 dekameters = 328.08 feet
1 kilometer = 10 hectometers = 3,280.8 feet

### *Weights*

1 centigram = 10 milligrams = .15 grain
1 decigram = 10 centigrams = 1.54 grains
1 gram = 10 decigram = .035 ounce
1 dekagram = 10 grams = .35 ounce
1 hectogram = 10 dekagrams = 3.52 ounces
1 kilogram = 10 hectograms = 2.2 pounds
1 quintal = 100 kilograms = 220.46 pounds
1 metric ton = 10 quintals = 1.1 short tons

### *Liquid Measure*

1 centiliter = 10 milliters = .34 fl. ounce
1 deciliter = 10 centiliters = 3.38 fl. ounces
1 liter = 10 deciliters = 33.81 fl. ounces
1 dekaliter = 10 liters = 2.64 gallons
1 hectoliter = 10 dekaliters = 26.42 gallons
1 kiloliter = 10 hectoliters = 264.18 gallons

### *Square Measure*

1 sq. centimeter = 100 sq. millimeters = .155 sq. inch
1 sq. decimeter = 100 sq. centimeters = 15.5 sq. inches
1 sq. meter (centare) = 100 sq. decimeters = 10.76 sq. feet
1 sq. dekameter (are) = 100 sq. meters = 1,076.4 sq. feet
1 sq. hectometer (hectare) = 100 sq. dekameters = 2.47 acres
1 sq. kilometer = 100 sq. hectometers = .386 sq. mile

### *Cubic Measure*

1 cu. centimeter = 1000 cu. millimeters = .06 cu. inch
1 cu. decimeter = 1000 cu. centimeters = 61.02 cu. inches
1 cu. meter = 1000 cu. decimeters = 35.31 cu. feet

# Approximate Conversion Factors

| *To change* | *To* | *Multiply by* | *To change* | *To* | *Multiply by* |
|---|---|---|---|---|---|
| inches | centimeters | 2.540 | ounce-inches | newton-meters | .007062 |
| feet | meters | .305 | centimeters | inches | .394 |
| yards | meters | .914 | meters | feet | 3.280 |
| miles | kilometers | 1.609 | meters | yards | 1.094 |
| square inches | square centimeters | 6.451 | kilometers | miles | .621 |
| square feet | square meters | .093 | square centimeters | square inches | .155 |
| square yards | square meters | .836 | square meters | square feet | 10.764 |
| square miles | square kilometers | 2.590 | square meters | square yards | 1.196 |
| acres | square hectometers | .405 | square kilometers | square miles | .386 |
| cubic feet | cubic meters | .028 | square hectometers | acres | 2.471 |
| cubic yards | cubic meters | .765 | cubic meters | cubic feet | 35.315 |
| fluid ounces | milliliters | 29,573 | cubic meters | cubic yards | 1.308 |
| pints | liters | .473 | milliliters | fluid ounces | .034 |
| quarts | liters | .946 | liters | pints | 2.113 |
| gallons | liters | 3.785 | liters | quarts | 1.057 |
| ounces | grams | 28.349 | liters | gallons | .264 |
| pounds | kilograms | .454 | grams | ounces | .035 |
| short tons | metric tons | .907 | kilograms | pounds | 2.205 |
| pound-feet | newton-meters | 1.356 | metric tons | short tons | 1.102 |
| pound-inches | newton-meters | .11296 | | | |

# Temperature (Exact)

| | | | | |
|---|---|---|---|---|
| °F | Fahrenheit temperature | 5/9 (after subtracting 32) | Celsius temperature | °C |

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|---|---|---|---|
| | | | |

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