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HOSHIZAKI
SHUTTLE ICE DISPENSER

MODEL DSM-12CE
DSM-12DE

SERVICE MANUAL

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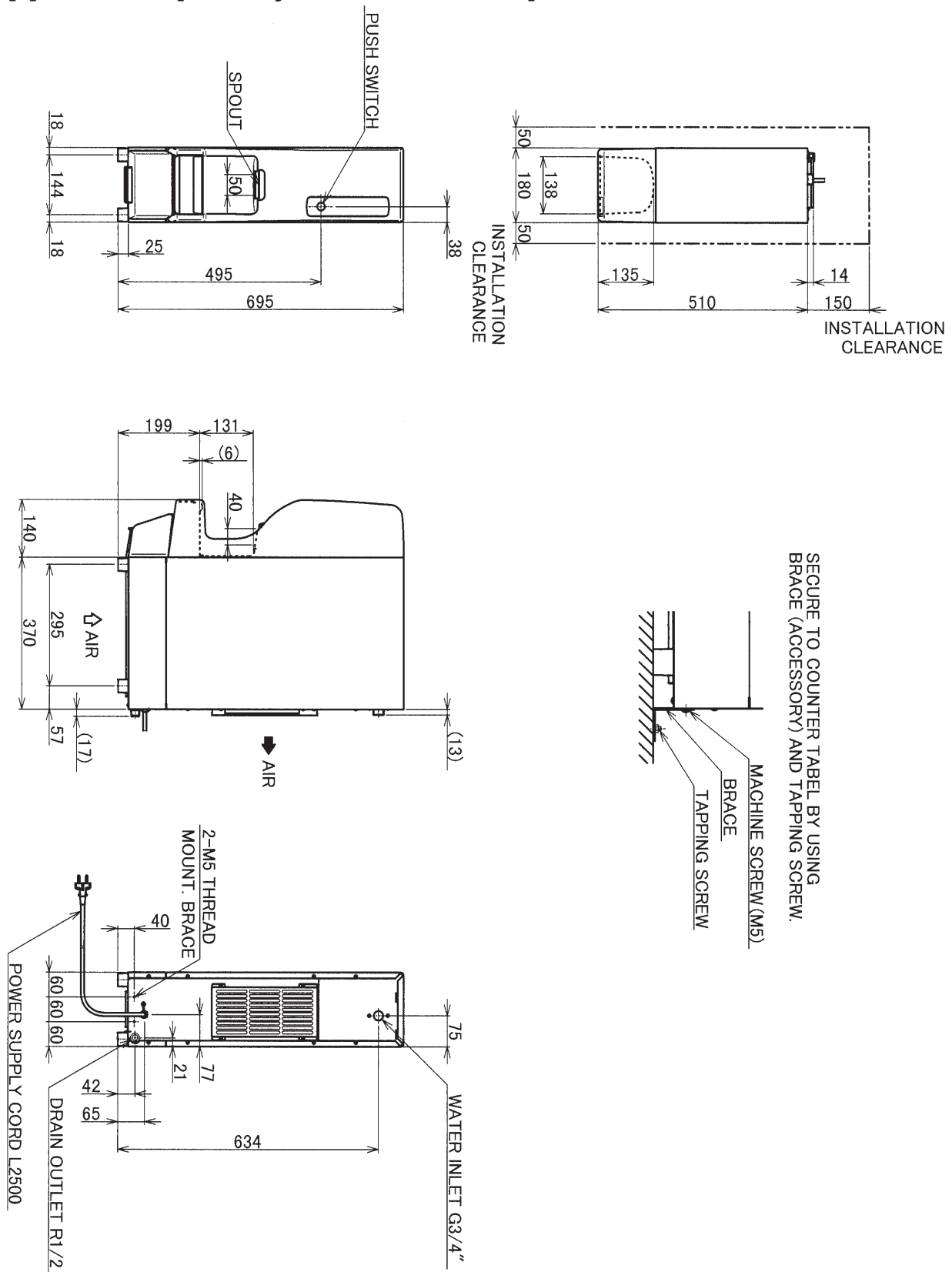
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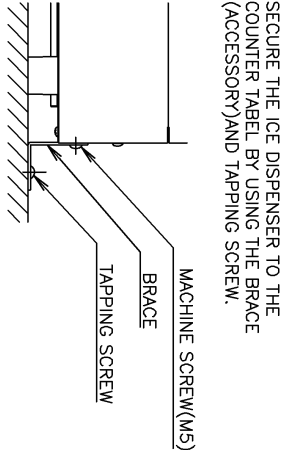
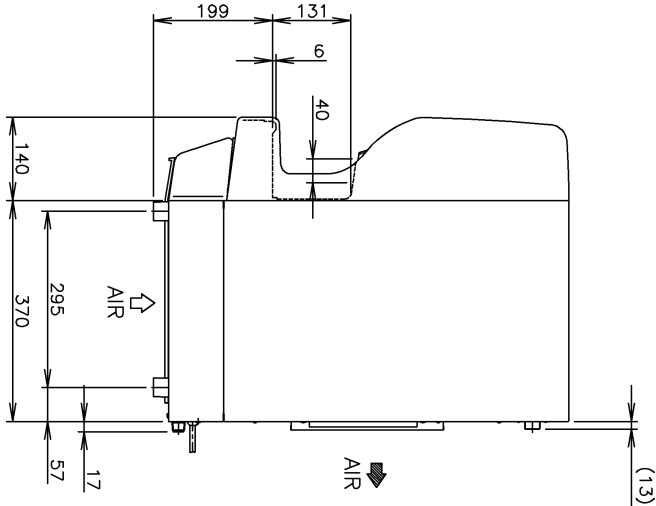
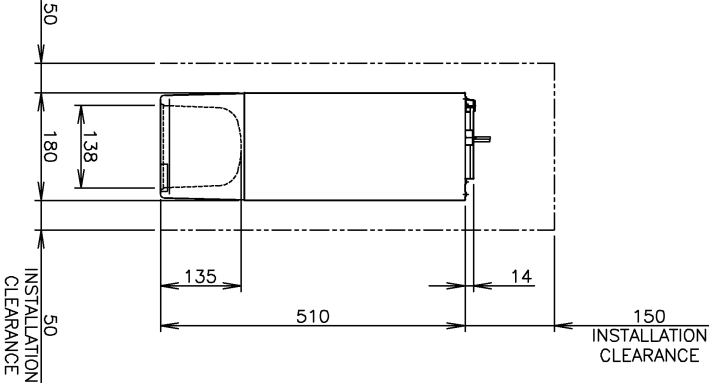
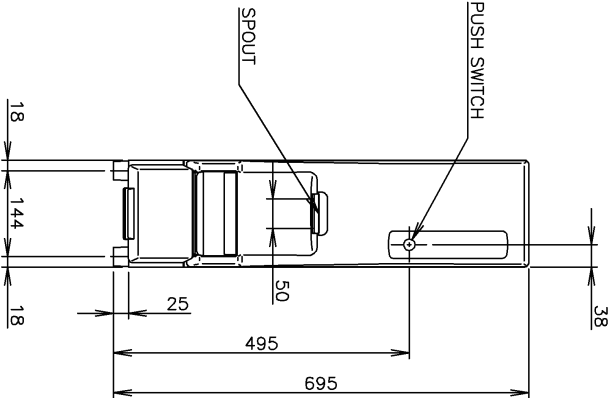
I. SPECIFICATIONS

1. DIMENSIONS/CONNECTIONS

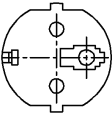
[a] DSM-12CE [Auxiliary code V-1 and earlier]



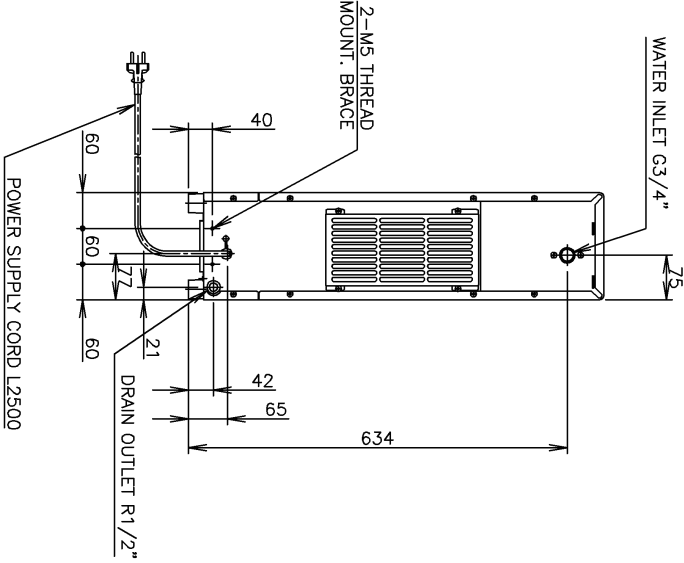
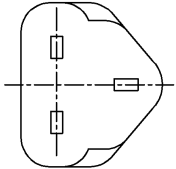
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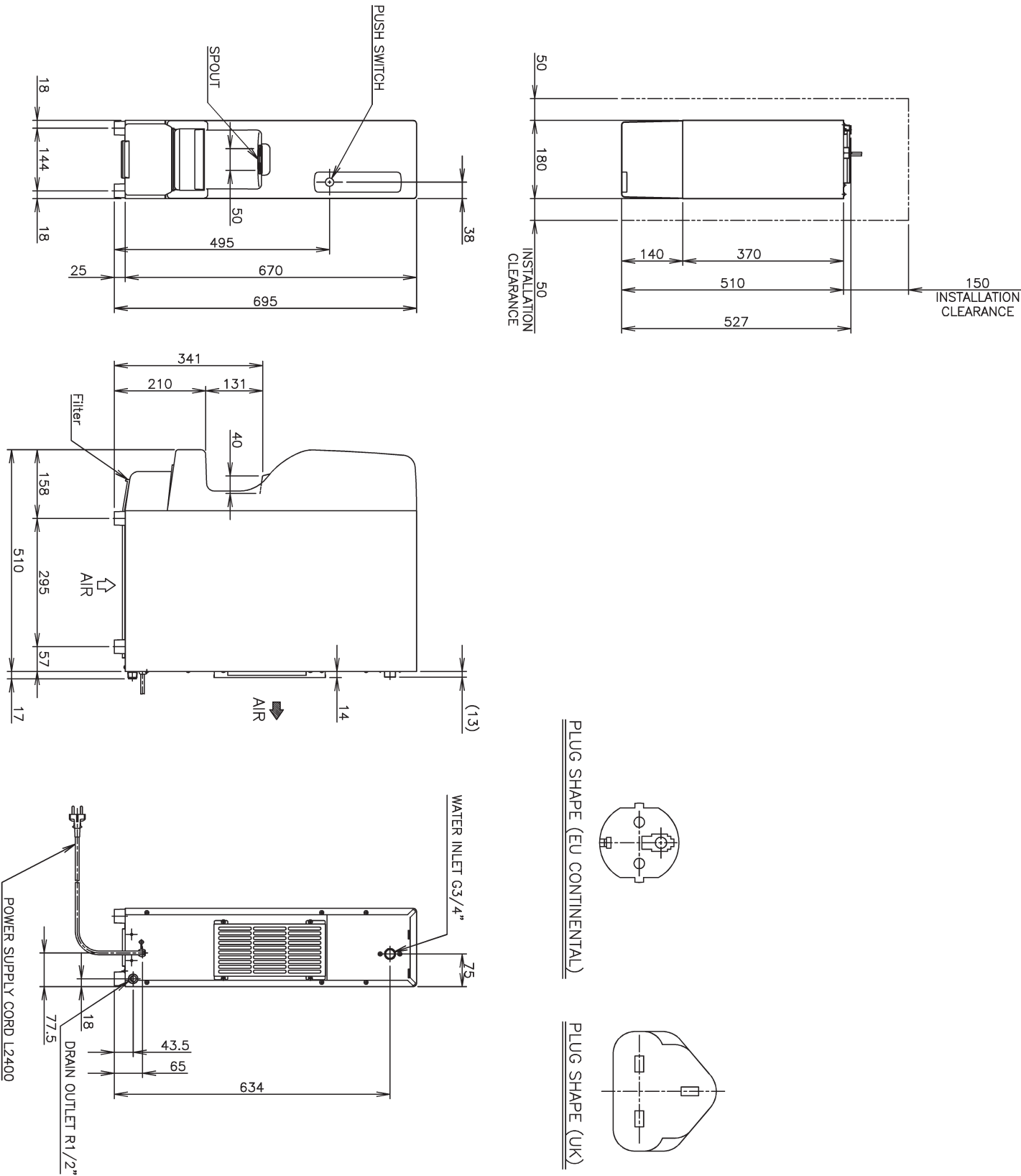
PLUG SHAPE (EU CONTINENTAL)



PLUG SHAPE (UK)

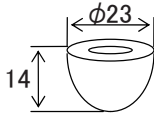


[c] DSM-12DE

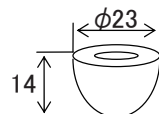


2. SPECIFICATIONS


[a] DSM-12CE (CONT.) [Auxiliary code V-1 and earlier]

AC SUPPLY VOLTAGE AMPERAGE STARTING AMPERAGE ELECTRIC CONSUMPTION POWER FACTOR POWER SUPPLY CAPACITY	1PHASE 220-240 V 50 Hz 1.6 A (Ambient temp. 32°C, Water temp. 21°C) 7.5 A 260 W (Ambient temp. 32°C, Water temp. 21°C) 68 % 0.49 kVA (2.0 A)	
ICE PRODUCTION PER 24 h	Approx. 13 kg (Ambient temp. 10°C, Water temp. 10°C) Approx. 10 kg (Ambient temp. 21°C, Water temp. 15°C) Approx. 8 kg (Ambient temp. 32°C, Water temp. 21°C)	
WATER CONSUMPTION PER 24 h	Approx. 0.097 m ³ (Ambient temp. 10°C, Water temp. 10°C) Approx. 0.081 m ³ (Ambient temp. 21°C, Water temp. 15°C) Approx. 0.065 m ³ (Ambient temp. 32°C, Water temp. 21°C)	
SHAPE OF ICE FREEZE CYCLE TIME ICE PRODUCTION PER CYCLE STORAGE CAPACITY ICE DISPENSING RATE	Shuttle Approx. 12 min (Ambient temp. 21°C, Water temp. 15°C) Approx. 0.085 kg / 27 pcs. (Ambient temp. 21°C, Water temp. 15°C) Approx. 3 kg Approx. 700 g / min	
DIMENSIONS EXTERIOR INSULATION CONNECTION-ELECTRIC -WATER SUPPLY -DRAIN	180 mm(W) x 510 mm(D) x 695 mm(H) Acrylic Baked Steel (Cabinet), ABS Molding (Front Panel) Polyurethane Foam Y-Type Con. (with CONT. Plug) Inlet G3/4 (Connected at rear side) Outlet R1/2 (Connected at rear side)	
ICE MAKING SYSTEM HARVESTING SYSTEM ICE DISPENSING SYSTEM	Mandrel type, Water agitated by plate Hot Gas Defrost, Water Pan tilted by motor Auger driven by Push Switch	
COMPRESSOR CONDENSER HEAT REJECTION EVAPORATOR REFRIGERANT CONTROL REFRIGERANT CHARGE	Hermetic 125 W Model TL4F Air-cooled, Fin and Tube type 300 W { 258 kcal/h } (Ambient temp. 32°C, Water temp. 21°C) Tin-plated copper tube on sheet with copper mandrel Capillary Tube R134a 65 g	
ICE MAKING CONTROL HARVESTING CONTROL ICE STORAGE CONTROL WATER SUPPLY CONTROL ICE MAKING WATER CONTROL	Ice thickness measurement Thermostat Microswitch Water Pan's movement Overflow	AVERAGE SIZE OF ICE (mm) 
ELECTRICAL PROTECTION COMPRESSOR PROTECTION GEAR MOTOR PROTECTION	Class I 5A Fuse Auto-reset Overload Protector Thermostat on Evaporator (negative pressure protection) Auto-reset Thermal Protector	
WEIGHT PACKAGE	Net Weight 23 kg / Gross Weight 26 kg Carton 244 mm(W) x 584 mm(D) x 748 mm(H)	
ACCESSORIES	Mounting Brace, Installation Kit	
OPERATIONAL CONDITIONS AMBIENT TEMP. WATER SUPPLY TEMP. WATER SUPPLY PRESSURE	5 - 40°C 5 - 35°C 0.05 - 0.78 MPa (0.5 - 8 bar)	
We reserve the right to make changes in specifications and design without prior notice.		

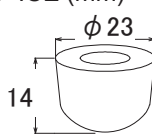
[b] DSM-12CE (UK) [Auxiliary code V-1 and earlier]

AC SUPPLY VOLTAGE AMPERAGE STARTING AMPERAGE ELECTRIC CONSUMPTION POWER FACTOR POWER SUPPLY CAPACITY	1PHASE 220-240 V 50 Hz 1.6 A (Ambient temp. 32°C, Water temp. 21°C) 7.5 A 260 W (Ambient temp. 32°C, Water temp. 21°C) 68 % 0.49 kVA (2.0 A)	
ICE PRODUCTION PER 24 h	Approx. 13 kg (Ambient temp. 10°C, Water temp. 10°C) Approx. 10 kg (Ambient temp. 21°C, Water temp. 15°C) Approx. 8 kg (Ambient temp. 32°C, Water temp. 21°C)	
WATER CONSUMPTION PER 24 h	Approx. 0.097 m ³ (Ambient temp. 10°C, Water temp. 10°C) Approx. 0.081 m ³ (Ambient temp. 21°C, Water temp. 15°C) Approx. 0.065 m ³ (Ambient temp. 32°C, Water temp. 21°C)	
SHAPE OF ICE FREEZE CYCLE TIME ICE PRODUCTION PER CYCLE STORAGE CAPACITY ICE DISPENSING RATE	Shuttle Approx. 12 min (Ambient temp. 21°C, Water temp. 15°C) Approx. 0.085 kg / 27 pcs. (Ambient temp. 21°C, Water temp. 15°C) Approx. 3 kg Approx. 700 g / min	
DIMENSIONS EXTERIOR INSULATION CONNECTION-ELECTRIC -WATER SUPPLY -DRAIN	180 mm(W) x 510 mm(D) x 695 mm(H) Acrylic Baked Steel (Cabinet), ABS Molding (Front Panel) Polyurethane Foam Y-Type Con. (with UK Plug) Inlet G3/4 (Connected at rear side) Outlet R1/2 (Connected at rear side)	
ICE MAKING SYSTEM HARVESTING SYSTEM ICE DISPENSING SYSTEM	Mandrel type, Water agitated by plate Hot Gas Defrost, Water Pan tilted by motor Auger driven by Push Switch	
COMPRESSOR CONDENSER HEAT REJECTION EVAPORATOR REFRIGERANT CONTROL REFRIGERANT CHARGE	Hermetic 125 W Model TL4F Air-cooled, Fin and Tube type 300 W { 258 kcal/h } (Ambient temp. 32°C, Water temp. 21°C) Tin-plated copper tube on sheet with copper mandrel Capillary Tube R134a 65 g	
ICE MAKING CONTROL HARVESTING CONTROL ICE STORAGE CONTROL WATER SUPPLY CONTROL ICE MAKING WATER CONTROL	Ice thickness measurement Thermostat Microswitch Water Pan's movement Overflow	AVERAGE SIZE OF ICE (mm) 
ELECTRICAL PROTECTION COMPRESSOR PROTECTION GEAR MOTOR PROTECTION	Class I 5A Fuse 13A Fuse built in UK Plug Auto-reset Overload Protector Thermostat on Evaporator (negative pressure protection) Auto-reset Thermal Protector	
WEIGHT PACKAGE	Net Weight 23 kg / Gross Weight 26 kg Carton 244 mm(W) x 584 mm(D) x 748 mm(H)	
ACCESSORIES	Mounting Brace, Installation Kit	
OPERATIONAL CONDITIONS AMBIENT TEMP. WATER SUPPLY TEMP. WATER SUPPLY PRESSURE	5 - 40°C 5 - 35°C 0.05 - 0.78 MPa (0.5 - 8 bar)	
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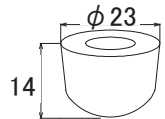
[c] DSM-12CE (CONT.) [Auxiliary code V-2 and later]
DSM-12DE (CONT.) [Auxiliary code E-0 and earlier]

AC SUPPLY VOLTAGE AMPERAGE STARTING AMPERAGE ELECTRICAL CONSUMPTION POWER FACTOR POWER SUPPLY CAPACITY	1 PHASE 220-240V 50Hz 1.6 A (Ambient temp. 32 °C, Water temp. 21°C) 7.5 A 260 W (Ambient temp. 32°C, Water temp. 21°C) 68% 0.49 kVA (2.0 A)	
ICE PRODUCTION PER 24h	Approx. 13 kg (Ambient temp. 10°C, Water temp. 10°C) Approx. 10 kg (Ambient temp. 21°C, Water temp. 15°C) Approx. 8 kg (Ambient temp. 32°C, Water temp. 21°C)	
WATER CONSUMPTION PER 24h	Approx. 0.097 m3 (Ambient temp. 10°C, Water temp. 10°C) Approx. 0.081 m3 (Ambient temp. 21°C, Water temp. 15°C) Approx. 0.065 m3 (Ambient temp. 32°C, Water temp. 21°C)	
SHAPE OF ICE FREEZE CYCLE TIME ICE PRODUCTION PER CYCLE STORAGE CAPACITY ICE DISPENSING RATE	Shuttle Approx. 12 min (Ambient temp. 21°C, Water temp. 15°C) Approx. 0.085 kg / 27 pcs. (Ambient temp. 21°C, Water temp. 15°C) Approx. 3 kg Approx. 700 g / min	
DIMENSIONS EXTERIOR INSULATION CONNECTIONS-ELECTRIC -WATER SUPPLY -DRAIN	180 mm(W) × 510 mm(D) × 695 mm(H) Acrylic Baked Steel (Cabinet), ABS Molding (Front Panel) Polyurethane Foam Y-Type Con. (with CONT. Plug) Inlet G3/4 (Connected at rear side) Outlet R1/2 (Connected at rear side)	
ICE MAKING SYSTEM HARVESTING SYSTEM ICE DISPENSING SYSTEM	Mandrel type, Water agitated by plate Hot Gas Defrost, Water Pan tilted by motor Auger driven by Push Switch	
COMPRESSOR CONDENSER HEAT REJECTION EVAPORATOR REFRIGERANT CONTROL REFRIGERANT CHARGE	Hermetic 125W Model TL4F Air-cooled, Fin and Tube type 300 W{258 kcal/h} (Ambient temp. 32°C, Water temp. 21°C) Tin-plated copper tube on sheet with copper mandrel Capillary Tube R134a 65g	
ICE MAKING CONTROL HARVESTING CONTROL ICE STORAGE CONTROL WATER SUPPLY CONTROL ICE MAKING WATER CONTROL	Ice thickness measurement Thermistor on Evaporator Outlet Microswitch Water Pan's movement Overflow	AVERAGE SIZE OF ICE (mm) 
ELECTRICAL PROTECTION P.C. BOARD CIRCUIT PROTECTION COMPRESSOR PROTECTION GEAR MOTOR PROTECTION	Class I Appliance, 5A Fuse High Voltage Cut-out (Internal) Auto-reset Overload Protector (Internal) Thermistor on Evaporator Outlet (negative pressure protection) Auto-reset Thermal Protector	
WEIGHT PACKAGE	Net Weight 23 kg / Gross Weight 26 kg Carton 244 mm(W) × 584 mm(D) × 748 mm(H)	
ACCESSORIES	Mounting Brace, Installation Kit	
OPERATION CONDITIONS VOLTAGE RANGE AMBIENT TEMP. WATER SUPPLY TEMP. WATER SUPPLY PRESS.	198-254V 5-40°C 5-35°C 0.05-0.78 MPa (0.5-8bar)	
We reserve the right to make changes in specifications and design without prior notice.		


**[d] DSM-12CE (UK) [Auxiliary code V-2 and later]
DSM-12DE (UK) [Auxiliary code E-0 and earlier]**

AC SUPPLY VOLTAGE AMPERAGE STARTING AMPERAGE ELECTRICAL CONSUMPTION POWER FACTOR POWER SUPPLY CAPACITY	1 PHASE 220-240V 50Hz 1.6 A (Ambient temp. 32 °C, Water temp. 21°C) 7.5 A 260 W (Ambient temp. 32°C, Water temp. 21°C) 68% 0.49 kVA (2.0 A)	
ICE PRODUCTION PER 24h	Approx. 13 kg (Ambient temp. 10°C, Water temp. 10°C) Approx. 10 kg (Ambient temp. 21°C, Water temp. 15°C) Approx. 8 kg (Ambient temp. 32°C, Water temp. 21°C)	
WATER CONSUMPTION PER 24h	Approx. 0.097 m3 (Ambient temp. 10°C, Water temp. 10°C) Approx. 0.081 m3 (Ambient temp. 21°C, Water temp. 15°C) Approx. 0.065 m3 (Ambient temp. 32°C, Water temp. 21°C)	
SHAPE OF ICE FREEZE CYCLE TIME ICE PRODUCTION PER CYCLE STORAGE CAPACITY ICE DISPENSING RATE	Shuttle Approx. 12 min (Ambient temp. 21°C, Water temp. 15°C) Approx. 0.085 kg / 27 pcs. (Ambient temp. 21°C, Water temp. 15°C) Approx. 3 kg Approx. 700 g / min	
DIMENSIONS EXTERIOR INSULATION CONNECTIONS-ELECTRIC -WATER SUPPLY -DRAIN	180 mm(W) × 510 mm(D) × 695 mm(H) Acrylic Baked Steel (Cabinet), ABS Molding (Front Panel) Polyurethane Foam Y-Type Con. (with UK Plug) Inlet G3/4 (Connected at rear side) Outlet R1/2 (Connected at rear side)	
ICE MAKING SYSTEM HARVESTING SYSTEM ICE DISPENSING SYSTEM	Mandrel type, Water agitated by plate Hot Gas Defrost, Water Pan tilted by motor Auger driven by Push Switch	
COMPRESSOR CONDENSER HEAT REJECTION EVAPORATOR REFRIGERANT CONTROL REFRIGERANT CHARGE	Hermetic 125W Model TL4F Air-cooled, Fin and Tube type 300 W{258 kcal/h} (Ambient temp. 32°C, Water temp. 21°C) Tin-plated copper tube on sheet with copper mandrel Capillary Tube R134a 65g	
ICE MAKING CONTROL HARVESTING CONTROL ICE STORAGE CONTROL WATER SUPPLY CONTROL ICE MAKING WATER CONTROL	Ice thickness measurement Thermistor on Evaporator Outlet Microswitch Water Pan's movement Overflow	AVERAGE SIZE OF ICE (mm) 
ELECTRICAL PROTECTION P.C. BOARD CIRCUIT PROTECTION COMPRESSOR PROTECTION GEAR MOTOR PROTECTION	Class I Appliance, 5A Fuse 13A Fuse built in UK Plug High Voltage Cut-out (Internal) Auto-reset Overload Protector (Internal) Thermistor on Evaporator Outlet (negative pressure protection) Auto-reset Thermal Protector	
WEIGHT PACKAGE	Net Weight 23 kg / Gross Weight 26 kg Carton 244 mm(W) × 584 mm(D) × 748 mm(H)	
ACCESSORIES	Mounting Brace, Installation Kit	
OPERATION CONDITIONS VOLTAGE RANGE AMBIENT TEMP. WATER SUPPLY TEMP. WATER SUPPLY PRESS.	198-254V 5-40°C 5-35°C 0.05-0.78 MPa (0.5-8bar)	
We reserve the right to make changes in specifications and design without prior notice.		

[e] DSM-12DE (CONT.) [Auxiliary code F-1 and later]

AC SUPPLY VOLTAGE AMPERAGE STARTING AMPERAGE ELECTRICAL CONSUMPTION POWER FACTOR POWER SUPPLY CAPACITY	1 PHASE 220-240V 50Hz 1.6 A (Ambient temp. 32 °C, Water temp. 21°C) 5.1 A 200 W (Ambient temp. 32°C, Water temp. 21°C) 51% 0.49 kVA (2.1 A)	
ICE PRODUCTION PER 24h	Approx. 13 kg (Ambient temp. 10°C, Water temp. 10°C) Approx. 11 kg (Ambient temp. 21°C, Water temp. 15°C) Approx. 9 kg (Ambient temp. 32°C, Water temp. 21°C)	
WATER CONSUMPTION PER 24h	Approx. 0.108 m3 (Ambient temp. 10°C, Water temp. 10°C) Approx. 0.088 m3 (Ambient temp. 21°C, Water temp. 15°C) Approx. 0.081 m3 (Ambient temp. 32°C, Water temp. 21°C)	
SHAPE OF ICE FREEZE CYCLE TIME ICE PRODUCTION PER CYCLE STORAGE CAPACITY ICE DISPENSING RATE	Shuttle Approx. 12 min (Ambient temp. 21°C, Water temp. 15°C) Approx. 0.085 kg / 27 pcs. (Ambient temp. 21°C, Water temp. 15°C) Approx. 3 kg Approx. 700 g / min	
DIMENSIONS EXTERIOR INSULATION CONNECTIONS-ELECTRIC -WATER SUPPLY -DRAIN	180 mm(W) × 510 mm(D) × 695 mm(H) Acrylic Baked Steel (Cabinet), ABS Molding (Front Panel) Polyurethane Foam Y-Type Con. (with CONT. Plug) Inlet G3/4 (Connected at rear side) Outlet R1/2 (Connected at rear side)	
ICE MAKING SYSTEM HARVESTING SYSTEM ICE DISPENSING SYSTEM	Mandrel type, Water agitated by plate Hot Gas Defrost, Water Pan tilted by motor Auger driven by Push Switch	
COMPRESSOR CONDENSER HEAT REJECTION EVAPORATOR REFRIGERANT CONTROL REFRIGERANT CHARGE	Hermetic, Model TL4G Air-cooled, Fin and Tube type 300 W{258 kcal/h} (Ambient temp. 32°C, Water temp. 21°C) Tin-plated copper tube on sheet with copper mandrel Capillary Tube R134a 80g	
ICE MAKING CONTROL HARVESTING CONTROL ICE STORAGE CONTROL WATER SUPPLY CONTROL ICE MAKING WATER CONTROL	Ice thickness measurement Thermistor on Evaporator Outlet Microswitch Water Pan's movement Overflow	AVERAGE SIZE OF ICE (mm) 
ELECTRICAL PROTECTION P.C. BOARD CIRCUIT PROTECTION COMPRESSOR PROTECTION GEAR MOTOR PROTECTION	Class I Appliance, 5A Fuse High Voltage Cut-out (Internal) Auto-reset Overload Protector (Internal) Thermistor on Evaporator Outlet (negative pressure protection) Auto-reset Thermal Protector	
WEIGHT PACKAGE	Net Weight 26 kg / Gross Weight 28 kg Carton 244 mm(W) × 584 mm(D) × 748 mm(H)	
ACCESSORIES	Mounting Brace, Installation Kit	
OPERATION CONDITIONS VOLTAGE RANGE AMBIENT TEMP. WATER SUPPLY TEMP. WATER SUPPLY PRESS.	Rated Voltage ±6% 5-40°C 5-35°C 0.05-0.78 MPa (0.5-8bar)	
We reserve the right to make changes in specifications and design without prior notice.		

[f] DSM-12DE (UK) [Auxiliary code F-1 and later]

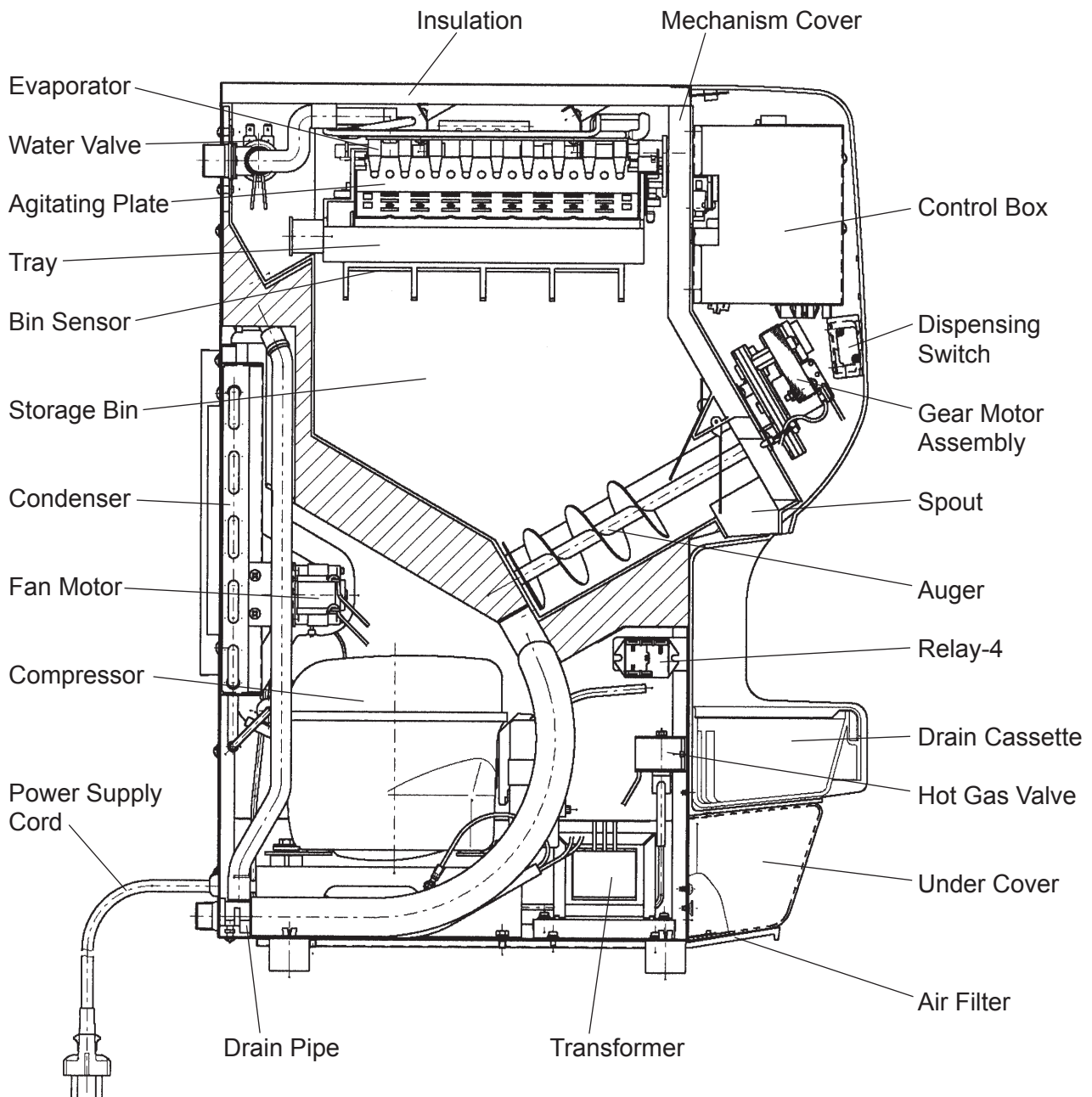
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ICE PRODUCTION PER 24h	Approx. 13 kg (Ambient temp. 10°C, Water temp. 10°C) Approx. 11 kg (Ambient temp. 21°C, Water temp. 15°C) Approx. 9 kg (Ambient temp. 32°C, Water temp. 21°C)	
WATER CONSUMPTION PER 24h	Approx. 0.108 m3 (Ambient temp. 10°C, Water temp. 10°C) Approx. 0.088 m3 (Ambient temp. 21°C, Water temp. 15°C) Approx. 0.081 m3 (Ambient temp. 32°C, Water temp. 21°C)	
SHAPE OF ICE FREEZE CYCLE TIME ICE PRODUCTION PER CYCLE STORAGE CAPACITY ICE DISPENSING RATE	Shuttle Approx. 12 min (Ambient temp. 21°C, Water temp. 15°C) Approx. 0.085 kg / 27 pcs. (Ambient temp. 21°C, Water temp. 15°C) Approx. 3 kg Approx. 700 g / min	
DIMENSIONS EXTERIOR INSULATION CONNECTIONS-ELECTRIC -WATER SUPPLY -DRAIN	180 mm(W) × 510 mm(D) × 695 mm(H) Acrylic Baked Steel (Cabinet), ABS Molding (Front Panel) Polyurethane Foam Y-Type Con. (with UK Plug) Inlet G3/4 (Connected at rear side) Outlet R1/2 (Connected at rear side)	
ICE MAKING SYSTEM HARVESTING SYSTEM ICE DISPENSING SYSTEM	Mandrel type, Water agitated by plate Hot Gas Defrost, Water Pan tilted by motor Auger driven by Push Switch	
COMPRESSOR CONDENSER HEAT REJECTION EVAPORATOR REFRIGERANT CONTROL REFRIGERANT CHARGE	Hermetic, Model TL4G Air-cooled, Fin and Tube type 300 W{258 kcal/h} (Ambient temp. 32°C, Water temp. 21°C) Tin-plated copper tube on sheet with copper mandrel Capillary Tube R134a 80g	
ICE MAKING CONTROL HARVESTING CONTROL ICE STORAGE CONTROL WATER SUPPLY CONTROL ICE MAKING WATER CONTROL	Ice thickness measurement Thermistor on Evaporator Outlet Microswitch Water Pan's movement Overflow	AVERAGE SIZE OF ICE (mm) 
ELECTRICAL PROTECTION P.C. BOARD CIRCUIT PROTECTION COMPRESSOR PROTECTION GEAR MOTOR PROTECTION	Class I Appliance, 5A Fuse 13A Fuse built in UK Plug High Voltage Cut-out (Internal) Auto-reset Overload Protector (Internal) Thermistor on Evaporator Outlet (negative pressure protection) Auto-reset Thermal Protector	
WEIGHT PACKAGE	Net Weight 26 kg / Gross Weight 28 kg Carton 244 mm(W) × 584 mm(D) × 748 mm(H)	
ACCESSORIES	Mounting Brace, Installation Kit	
OPERATION CONDITIONS VOLTAGE RANGE AMBIENT TEMP. WATER SUPPLY TEMP. WATER SUPPLY PRESS.	Rated Voltage ±6% 5-40°C 5-35°C 0.05-0.78 MPa (0.5-8bar)	
We reserve the right to make changes in specifications and design without prior notice.		

II. GENERAL INFORMATION

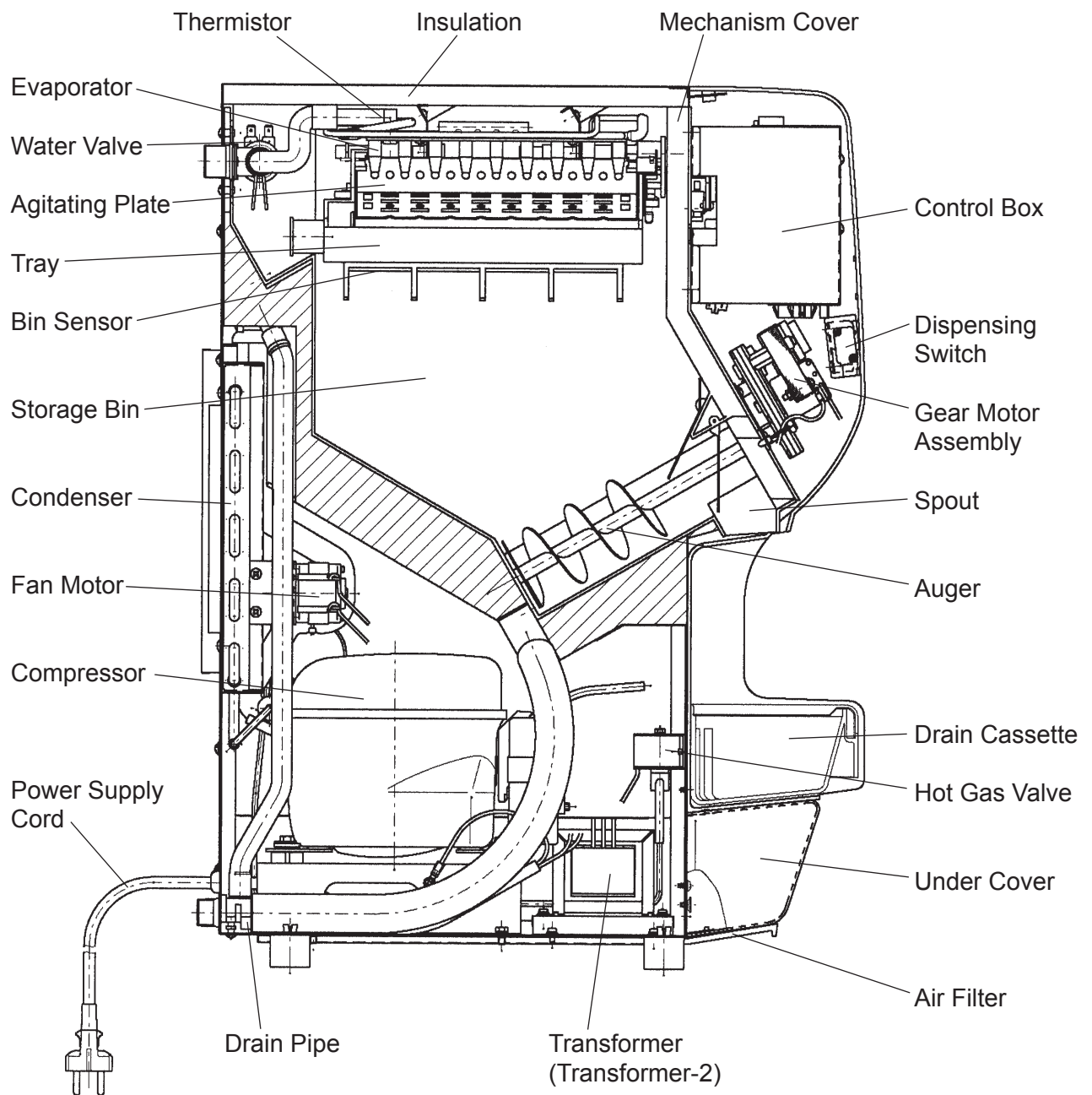
1. CONSTRUCTION

[a] LEFT SIDE VIEW WITH PANELS REMOVED

DSM-12CE [Auxiliary code V-1 and earlier]

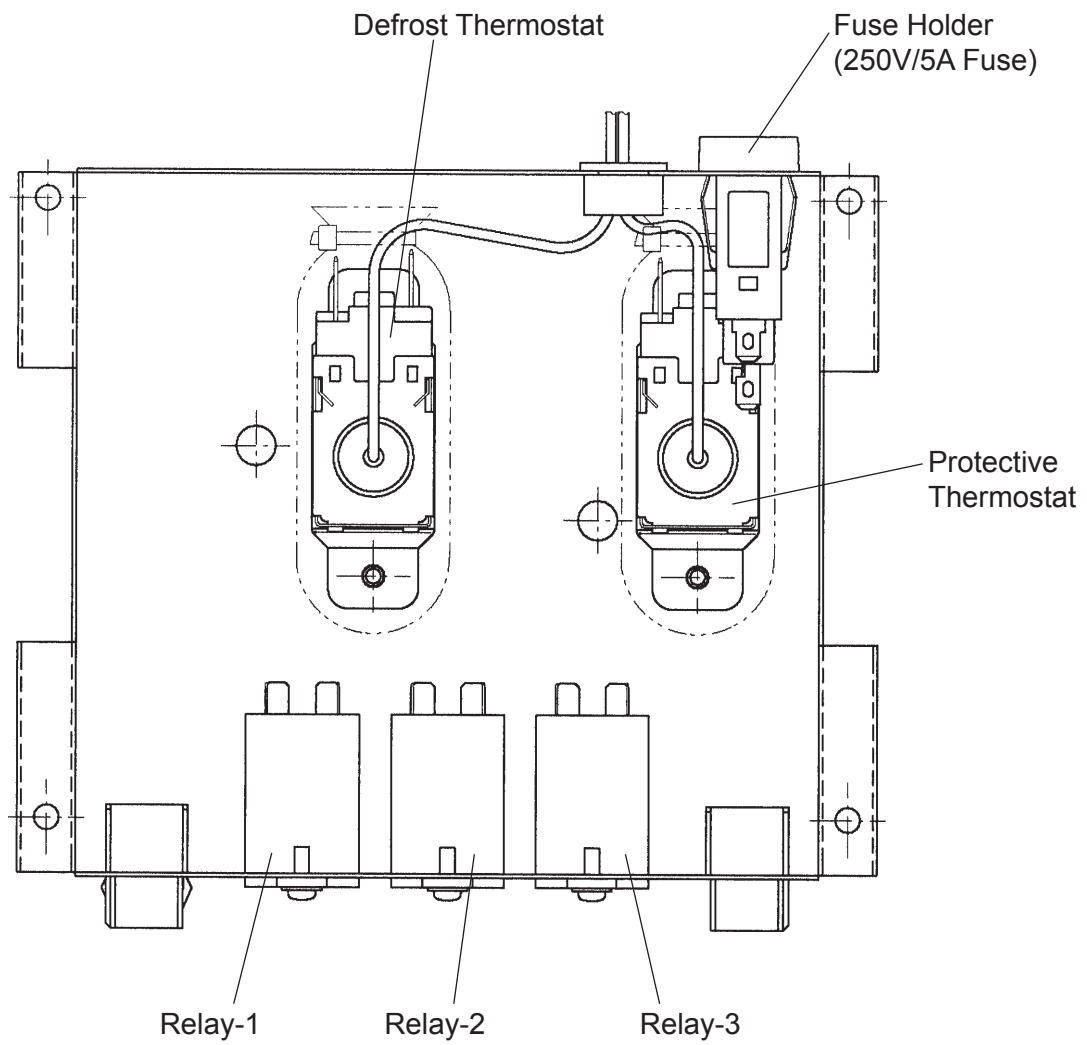


DSM-12CE [Auxiliary code V-2 and later], DSM-12DE

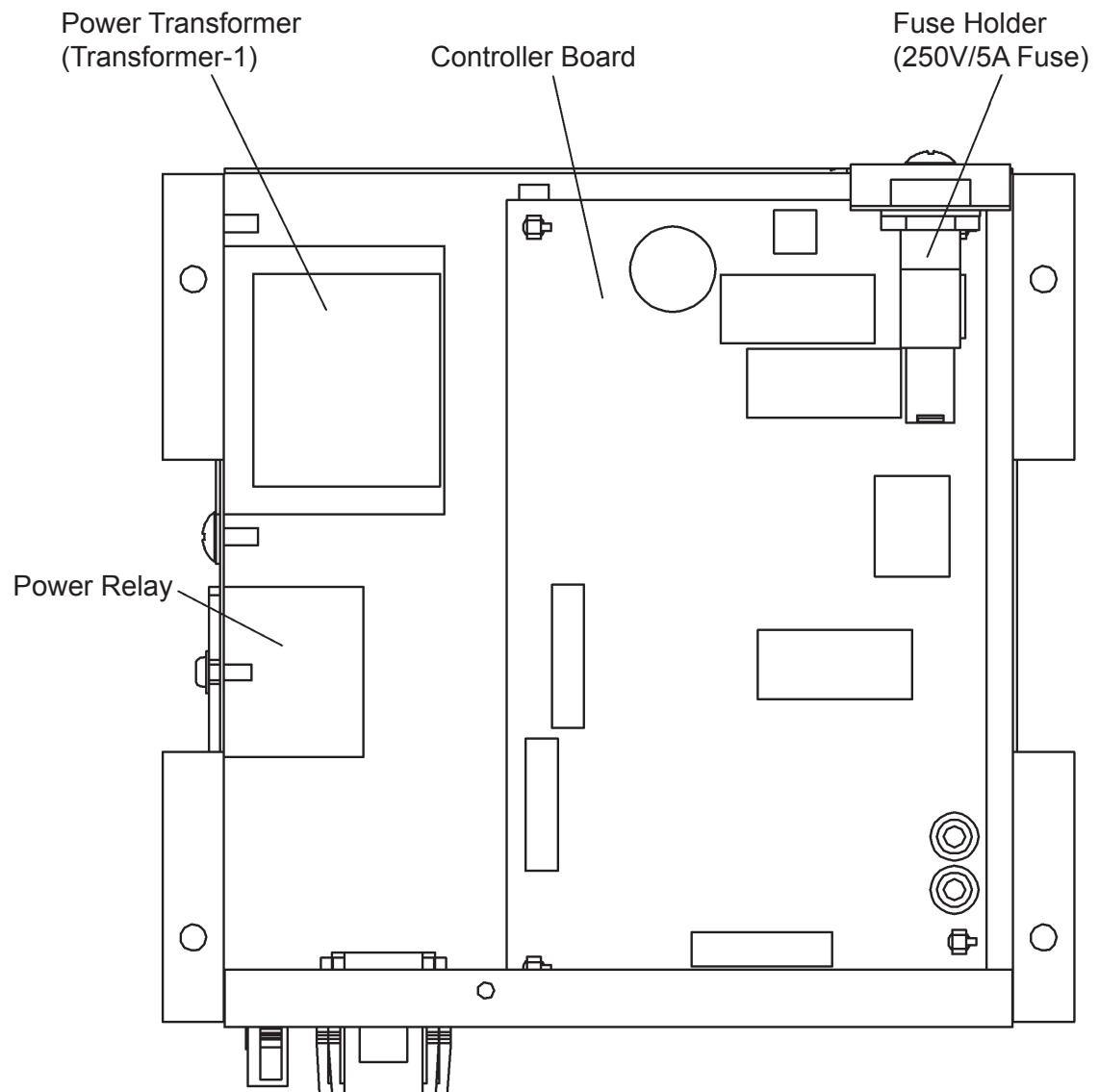


[b] CONTROL BOX

DSM-12CE [Auxiliary code V-1 and earlier]

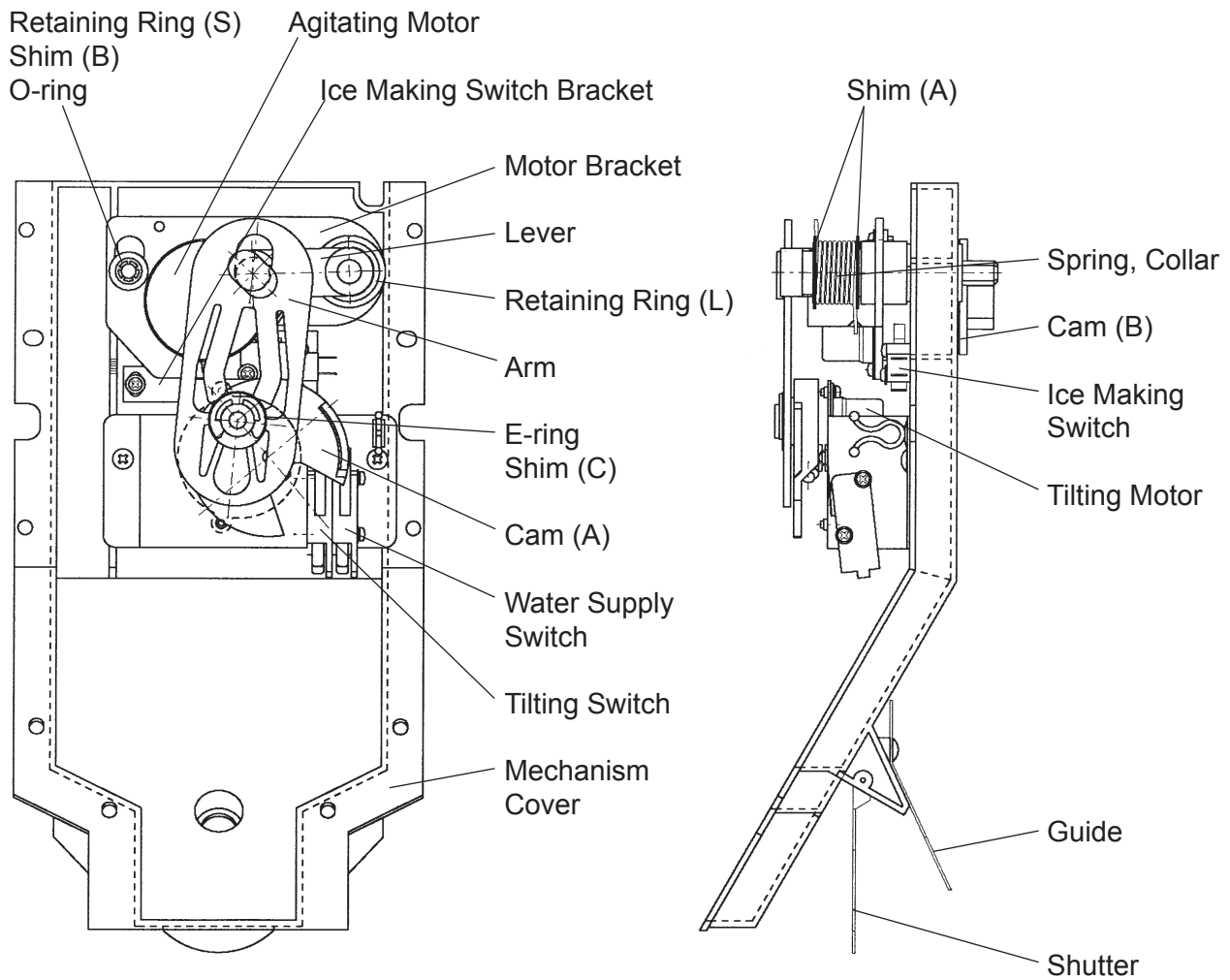


DSM-12CE [Auxiliary code V-2 and later], DSM-12DE

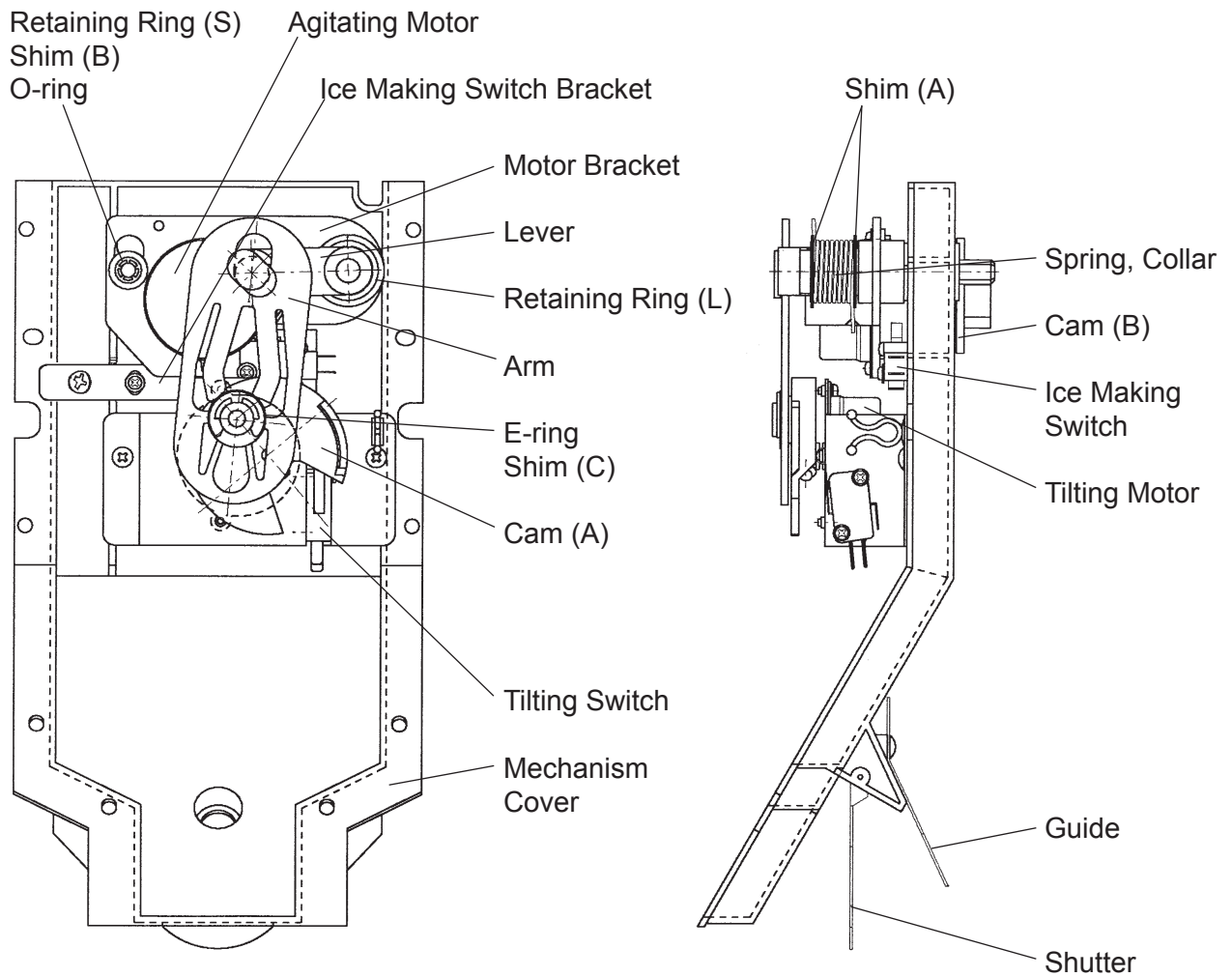


[c] MECHANISM ASSEMBLY

DSM-12CE [Auxiliary code V-1 and earlier]



DSM-12CE [Auxiliary code V-2 and later], DSM-12DE



III. INSTALLATION AND OPERATING INSTRUCTIONS

WARNING

1. The installation must be carried out by qualified personnel, in accordance with current regulations, according to the manufacturer's instructions.
2. Keep ventilation openings, in the appliance enclosure or in the built-in structure, clear of obstruction.

1. UNPACKING

WARNING

Children should not be allowed in reach of the packaging elements (plastic bags and expanded polystyrene) as they are potential sources of danger.

CAUTION

Remove shipping carton, tape(s) and packing. If packing material is left in the ice dispenser, it will not work properly.

- 1) After removing the packaging, make sure that the ice dispenser is in good condition. If in doubt, please do not use the equipment but apply to professionally qualified personnel.

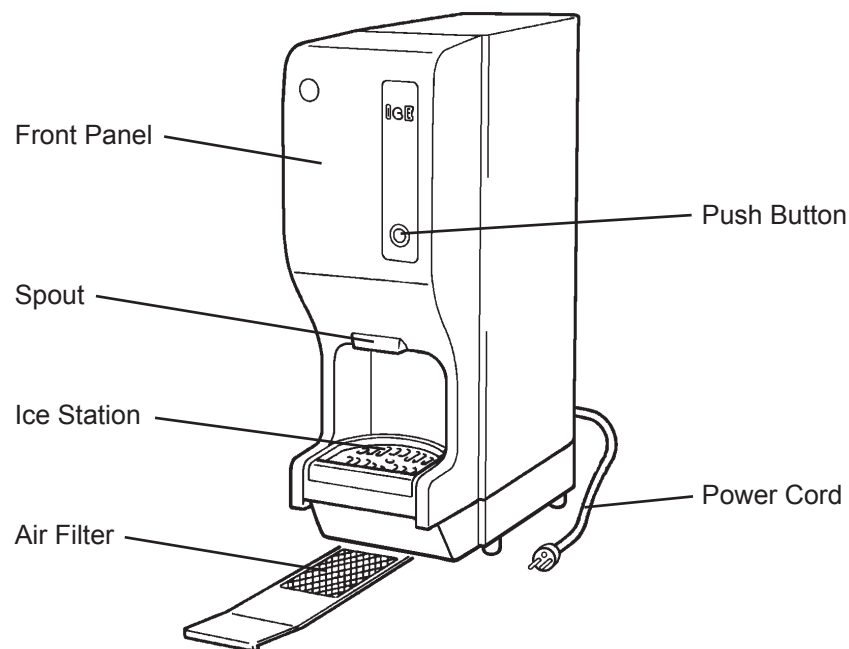


Fig. 1

2) Remove shipping tapes holding the package of accessories, and check the contents:

a) Installation Kit

Inlet Hose 1

Outlet Hose 1

Rc1/2-G3/4 Nipple 1

b) Brace 1

c) Machine Screw 2

d) Tapping Screw 2

3) Remove tapes holding the power cord.

2. LOCATION

IMPORTANT

1. This ice dispenser is not intended for outdoor use. Normal operating ambient temperature should be within 5°C to 40°C. Normal operating water temperature should be within 5°C to 35°C. Operation of the ice dispenser, for extended periods, outside of these normal temperature ranges may affect production capacity.
2. The ice dispenser should not be located next to ovens, grills or other high heat producing equipment.
3. The location should provide a firm and level foundation for the equipment at normal counter top height.
4. Allow 15 cm clearance at rear and top and 5 cm at sides for proper air circulation and ease of maintenance and/or service should they be required.
5. This appliance is not suitable for installation in an area where a water jet could be used and where dripping is not allowed.
6. Do not place anything on top of the ice dispenser or in front of the louver.
7. This ice dispenser will not work at subfreezing temperatures. To prevent damage to the water supply line, drain the ice dispenser when air temperature is below zero (see "IV. 2. PREPARING THE ICE DISPENSER FOR LONG STORAGE").

3. INSTALLATION [DSM-12CE (Auxiliary code V-2 and earlier)]

- * Incorrect installation can cause harm to people, animals or things, for which the manufacturer cannot be held responsible.
- * Secure the ice dispenser to the counter table by using the brace, machine screws and tapping screws (accessory). See Fig. 2.

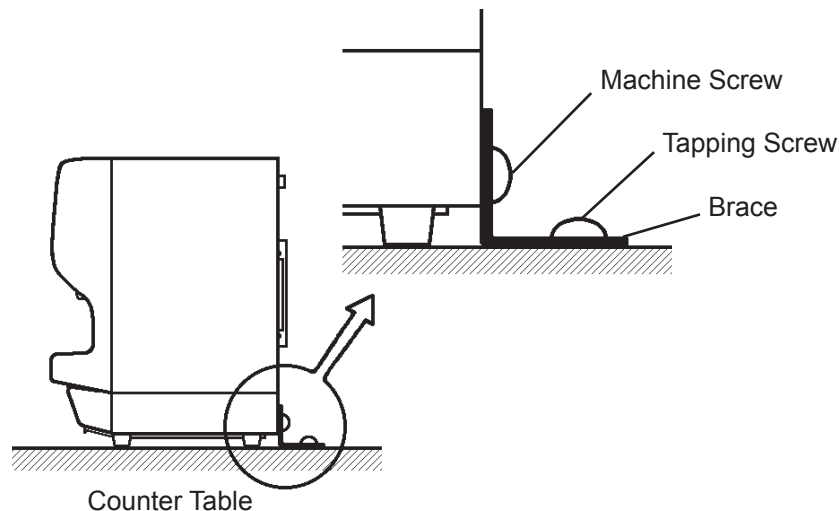


Fig. 2

4. ELECTRICAL CONNECTIONS

WARNING

THIS APPLIANCE MUST BE EARTHED

This ice dispenser requires an earth that meets the national and local electrical code requirements. To prevent possible severe electrical shock to individuals or extensive damage to equipment, install a proper earth wire to the ice dispenser. Remove the plug from the mains socket before any maintenance, repairs or cleaning is undertaken.

- * This appliance requires a separate 220 - 240VAC, 13A supply. The electrical supply must be protected by a suitable circuit breaker.
- * The main control box fuse is rated at 5A and should only be replaced by a qualified service engineer.
- * Usually an electrical permit and services of a licensed electrician are required.

For the U.K. and the Republic of Ireland only

- * The wires in the mains lead are coloured in accordance with the following code:

Green & Yellow = Earth
Blue = Neutral
Brown = Live

As the colours of the wire in the mains lead of this appliance may not correspond with the coloured markings identifying the terminals in your plug, proceed as follows:

The wire which is coloured Green-and-Yellow must be connected to the terminal in the plug which is marked with the letter E or by the symbol $\frac{1}{\equiv}$ or coloured Green or Green-and-Yellow. The wire which is coloured Blue must be connected to the terminal which is marked with the letter N or coloured Black. The wire which is coloured Brown must be connected to the terminal which is marked with the letter L or coloured Red.

- * Should the socket outlets in the installation site not be suitable for the plug supplied with your product, the plug must be removed (cut off if it is moulded on plug) and an appropriate plug fitted.

If the non-rewirable plug has been cut from the power supply cord, it must be disposed of. There should be no attempt to reuse it. Inserting such a plug into a socket elsewhere presents a serious risk of electrical shock.

- * The non-rewirable plug must never be used without a fuse cover being fitted.

The correct replacement for the detachable fuse cover is identifiable from the manufacturer's reference number stamped on the plug.

Supply of replacement fuse covers can be obtained from Hoshizaki Parts/Service Centres.

Fuses should be rated at 13A and approved to BS 1362.

- * If the supply cord and the plug should need to be replaced, it should only be done by a qualified service engineer.

5. WATER SUPPLY AND DRAIN CONNECTIONS

WARNING

Connect to potable water supply only.

- * The connections to the mains water supply must be made in accordance with the countries' current requirements of the Water Supply or Water Fittings Regulations.
- * Water supply pressure should be minimum 0.05 MPa (0.5 bar) and maximum 0.78 MPa (8 bar). If the pressure exceeds 0.78 MPa (8 bar), use a proper pressure reducing valve. Do **NOT** throttle back the supply tap.
- * A plumbing permit and services of a licensed plumber may be required in some areas.
- * The ice dispenser drain is gravity flow, so ensure drain pipe has an adequate pitch or fall.
- * Water should drain into an open trap.
- * Be sure to use the new hose-sets supplied with the appliance. Do not reuse any old hose-sets.

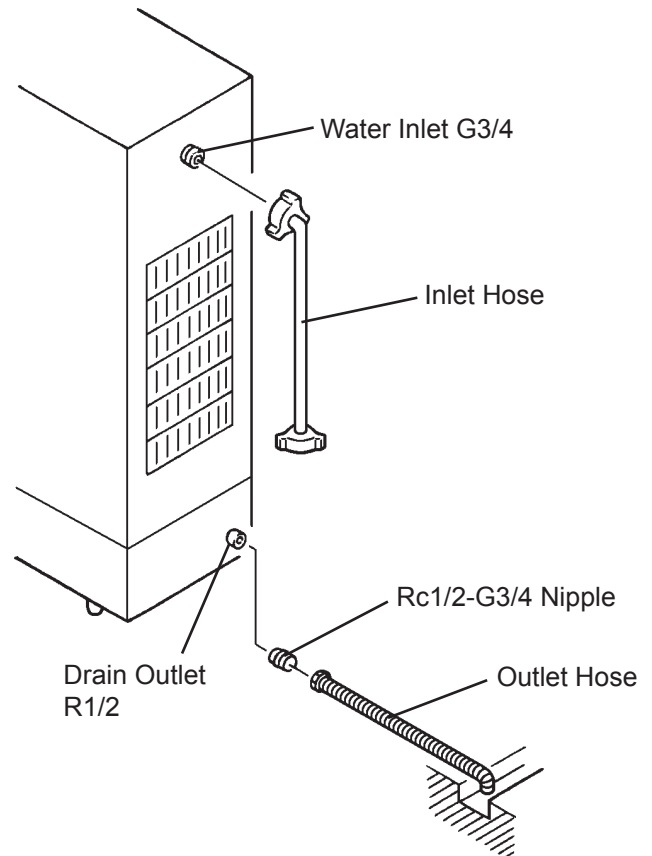


Fig. 3

- 1) Attach angled end of white inlet hose (accessory) to the G3/4 fitting on the rear of the ice dispenser as indicated ensuring rubber sealing washer is correctly positioned. Hand tighten sufficiently to provide leak free joint.
- 2) Attach the other end of inlet hose to the water tap, noting washer is correctly positioned before hand tightening as above.
- 3) By means of a suitable spanner or wrench, tighten the Rc1/2-G3/4 nipple (accessory) into the R1/2 fitting on the rear of the ice dispenser as indicated. P.T.F.E. tape and/or

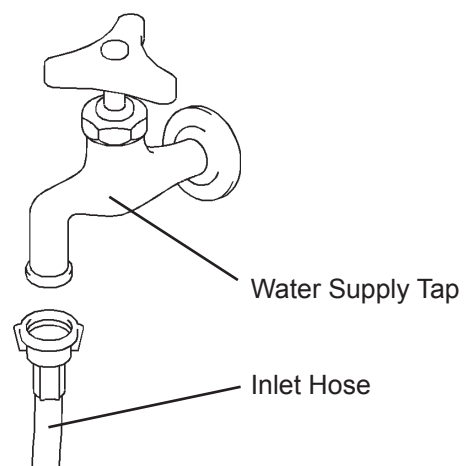


Fig. 4

a suitable sealing compound should be used to obtain a leak free joint.

Note: Jointing compounds should be approved and suitable for potable water use.

- 4) Attach grey flexible outlet hose (accessory) to free end of Rc1/2-G3/4 nipple as indicated, confirming fitment of rubber washer before finally hand tightening the joint. This pipe can be cut to length as necessary to suit position of main drain.

IV. OPERATING INSTRUCTIONS

WARNING

1. This ice dispenser is designed to produce and store edible ice. To keep the ice dispenser hygienic:
 - * Keep the grille clean. Clean it by using a neutral cleaner and rinse thoroughly.
2. The use of any electrical equipment involves the observance of some fundamental rules. In particular:
 - * Instances of high humidity and moisture increase the risk of electrical short circuits and potential electrical shocks. If in doubt, disconnect the ice dispenser.
 - * Do not pull the power cord in order to disconnect the ice dispenser from the feed network.
 - * This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.
 - * Young children should be supervised to ensure that they do not play with the appliance.
3. All parts are factory-adjusted. Improper adjustments may result in failure.
4. If the unit is turned off, wait for at least 3 minutes before restarting the ice dispenser to prevent damage to the compressor.

1. START UP

- 1) Open the water tap.
- 2) Plug in the ice dispenser to start the automatic and continuous icemaking process.
- 3) Press the push button and check for proper ice dispensing action after 30 - 60 minutes.

2. PREPARING THE ICE DISPENSER FOR LONG STORAGE

- 1) Dispense all ice from the storage bin.
- 2) Close the water tap. Remove the inlet hose from the water tap, and drain the hose.
- 3) Unplug the machine from power socket.
- 4) Replace plug in the power socket and after 30 seconds unplug it again. This will automatically drain the water inside the machine.

V. MAINTENANCE

WARNING

1. Before carrying out any cleaning or maintenance operations, unplug the ice dispenser from the electrical supply network.
2. This appliance must not be cleaned by use of a water jet.
3. To prevent possible damage, do not clean the plastic parts with water above 40°C or in a dishwasher.

[1] Exterior and Ice Station

Wipe the exterior and ice station at least once per week with a clean, soft cloth. Use a damp cloth containing a neutral cleaner to wipe off grease or dirt.

[2] Air Filter

Plastic mesh air filters remove dirt or dust from the air, and keep the condenser from getting clogged. If the filters get clogged, the ice dispenser's performance will be reduced.

Remove and clean the air filter at least twice per month by using a vacuum cleaner. When severely clogged, use warm water and a neutral cleaner to wash the air filter. Rinse and dry the air filter thoroughly, and place it in position.

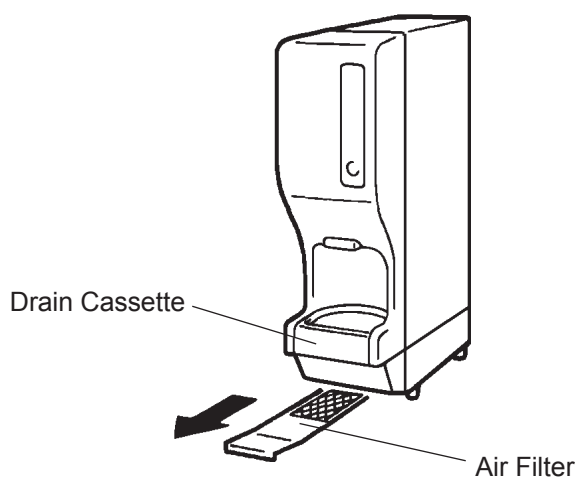


Fig. 5

[3] Drain Cassette

At least once a week, pull out the drain cassette and clean it with warm water and a neutral cleaner.

[4] Condenser

Check the condenser once a year, and clean if required by using a brush or vacuum cleaner. More frequent cleaning may be required depending on the location of the ice dispenser.

[5] Storage Bin Interior and Tray Cleaning/Sanitisation (as required)

IMPORTANT

Every time the mechanism cover or tray is removed, check the ice size after assembling the removed parts.

- 1) Dispense all ice, and empty the storage bin.
 - 2) Unplug the ice dispenser.
 - 3) Remove the front panel.
 - 4) Disconnect all the connectors from the control box. Remove the screws, and put the control box on top of the cabinet.
- Note: Be careful not to break the thermostat capillaries.
- 5) Unscrew and remove the gear motor assembly.
 - 6) Remove the E-ring and shim (C), and take the arm off the cam (A) and lever.
 - 7) Pull out the lever.
 - 8) Remove the mechanism cover.
 - 9) Remove the tray and auger.
 - 10) Wash the storage bin, tray, auger and mechanism cover liner with a neutral non-abrasive cleaner. Rinse thoroughly.

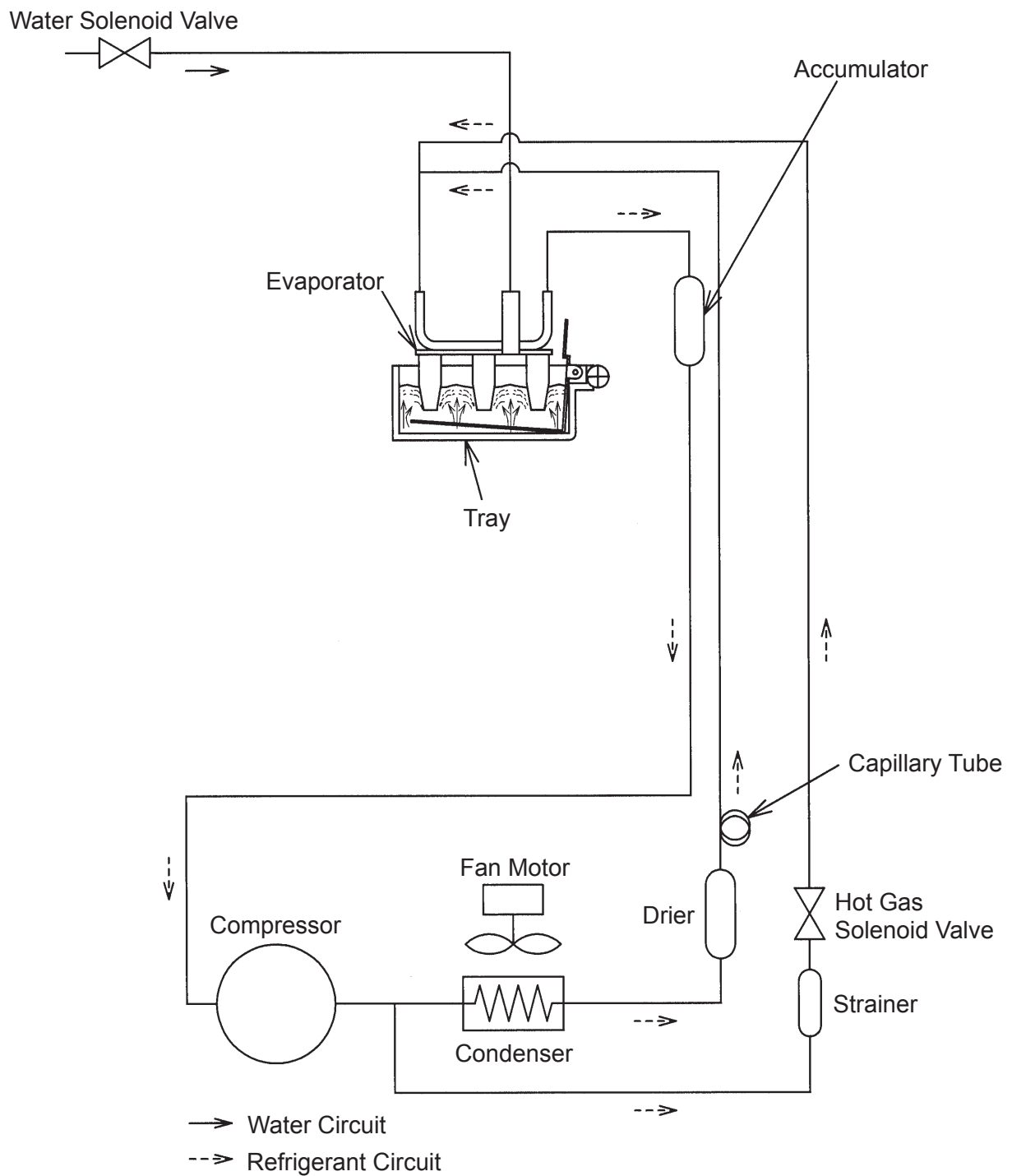
Note: Do not splash water on the electrical parts on the surface of the mechanism cover.

- 11) Mix 5 litres of water with 18 ml of 5.25% sodium hypochlorite solution in a suitable container.
- 12) Soak a clean sponge or cloth with the solution, and wipe the storage bin, tray, auger and mechanism cover liner.
- 13) Replace the removed parts in their correct position.
- 14) Plug in the ice dispenser.

Note: Do not wipe dry or rinse after sanitising, but allow to air dry.

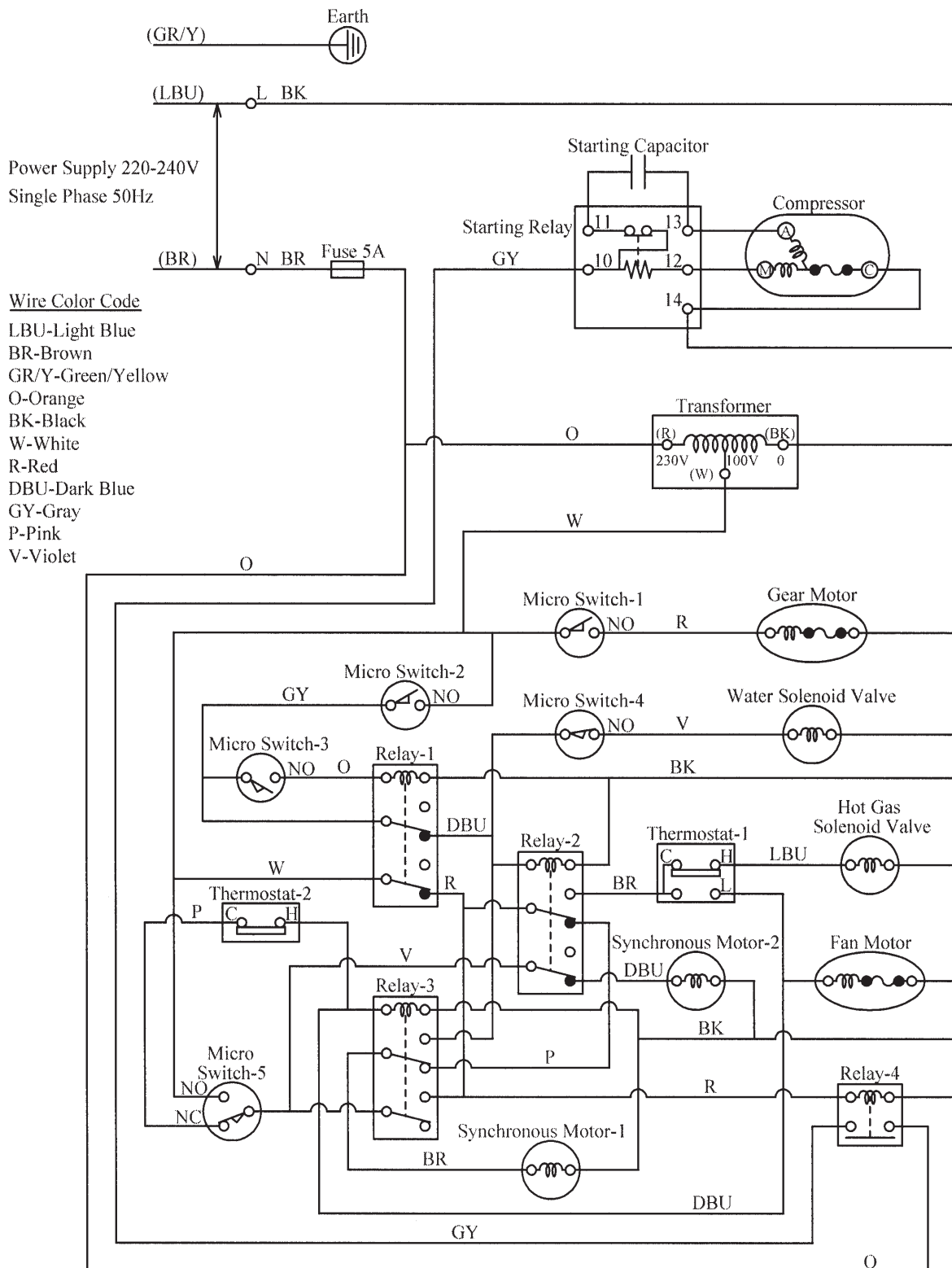
VI. TECHNICAL INFORMATION

1. WATER CIRCUIT AND REFRIGERANT CIRCUIT

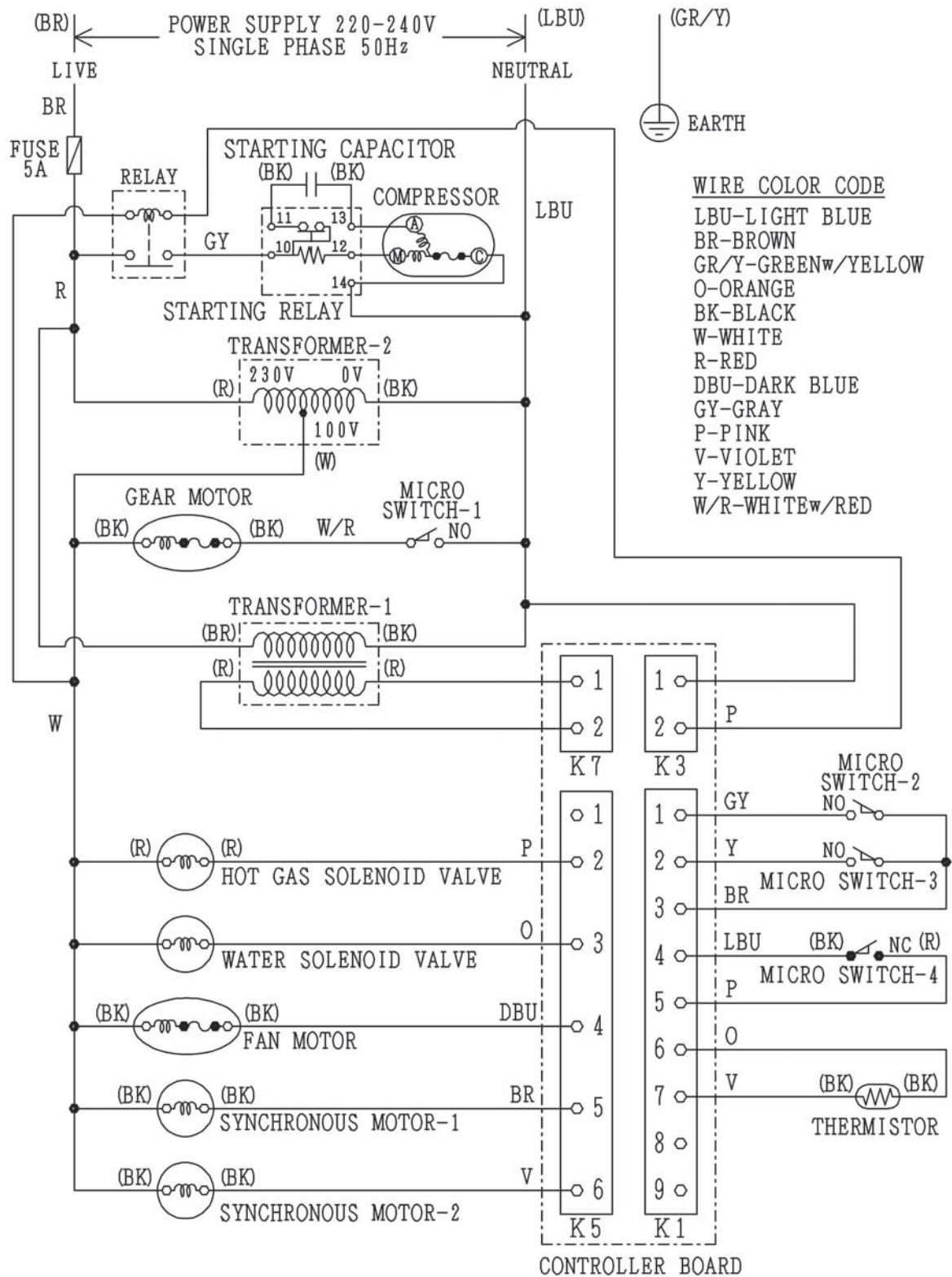


2. WIRING DIAGRAM

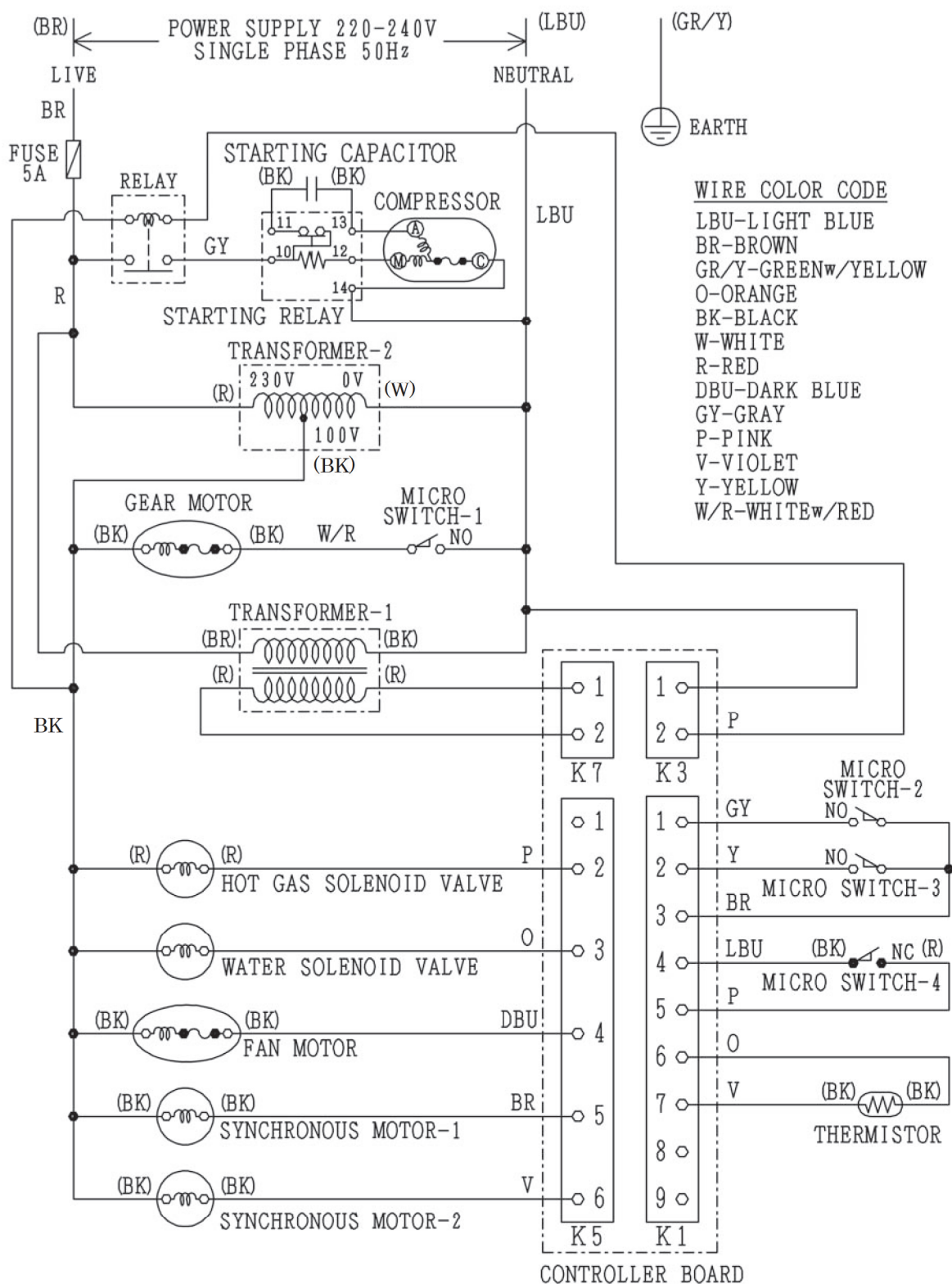
[a] DSM-12CE [Auxiliary code V-1 and earlier]



[b] DSM-12CE [Auxiliary code V-2 and later]

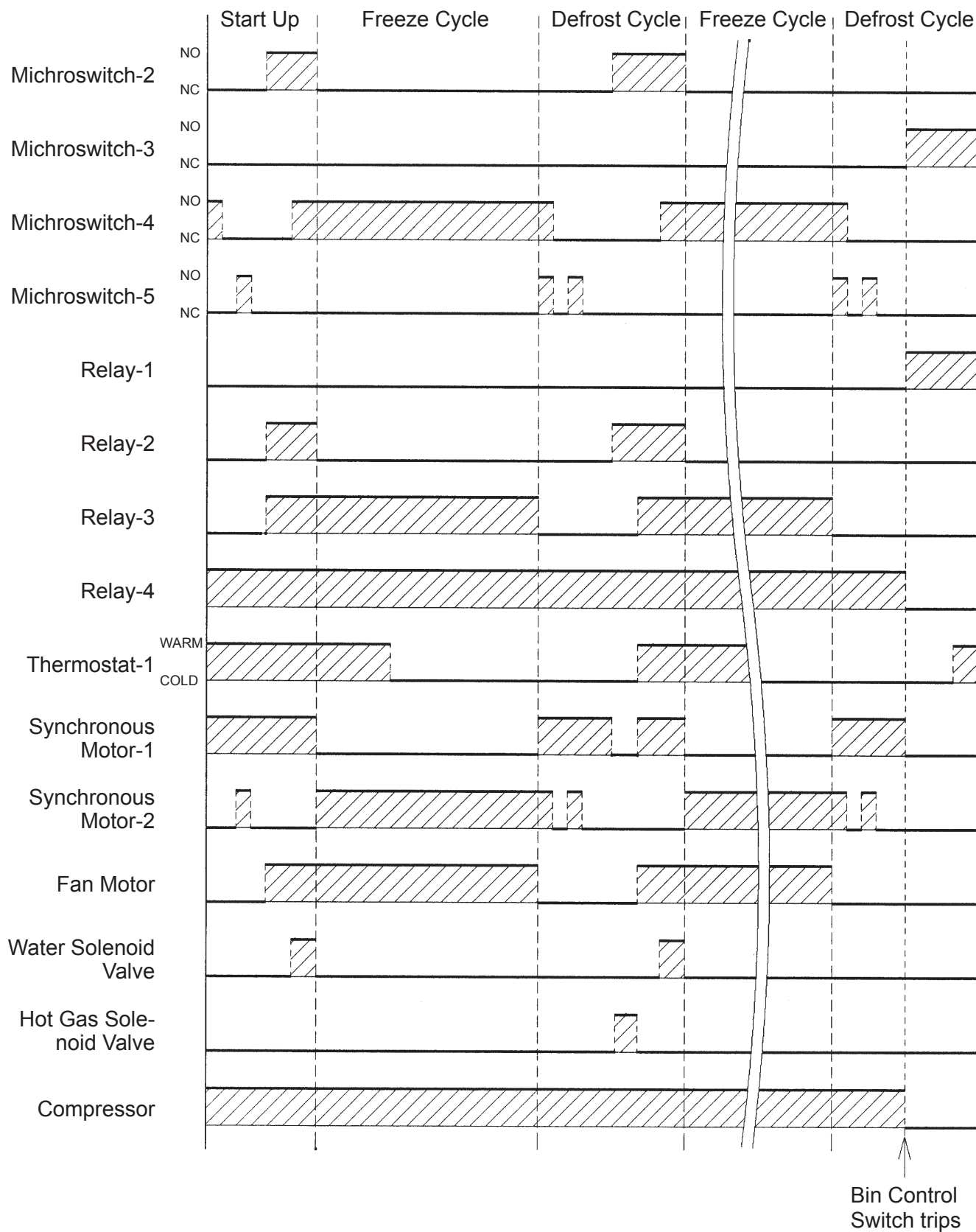


[c] DSM-12DE



3. TIMING CHART

[a] DSM-12CE [Auxiliary code V-1 and earlier]



[b] DSM-12CE [Auxiliary code V-2 and later], DSM-12DE

Part Name		Start Up	Freeze Cycle	Defrost Cycle	Freeze Cycle	Defrost Cycle	Bin Full
Thermistor	6°C						
	0°C						
Ice Making Switch (Micro Switch-3)	ON						
	OFF						
Compressor Power Relay	ON						
	OFF						
Hot Gas Solenoid Valve	ON						
	OFF						
Water Solenoid Valve	ON						
	OFF						
Fan Motor	ON						
	OFF						
Tilting Switch (Micro Switch-2)	ON						
	OFF						
Tilting Motor (Synchronous Motor-1)	ON						
	OFF						
Agitating Motor (Synchronous Motor-2)	ON						
	OFF						
Bin Control Switch (Micro Switch-4)	ON						
	OFF						
Controller Board	Relay: X1 (Compressor Power Relay)	ON					
	OFF						
	Relay: X2 (Hot Gas Solenoid Valve)	ON					
	OFF						
	Relay: X3 (Water Solenoid Valve)	ON					
	OFF						
	Relay: X4 (Fan Motor)	ON					
	OFF						
	Relay: X5 (Tilting Motor)	ON					
	OFF						
	Relay: X6 (Agitating Motor)	ON					
	OFF						

4. SEQUENCE

1) When the water supply tap is opened and the unit is energized, the compressor starts and the tilting motor (synchronous motor-1) operates to move the tray into the horizontal position. Meanwhile the water valve opens to supply ice making water into the tray. When the tray reaches the horizontal, the water valve closes to start a freeze cycle.

2) Rotation of the agitating motor (synchronous motor-2) cam moves the agitating plate up and down inside the tray to stir up the ice making water. As the evaporator temperature falls, ice forms on the surface of the projections immersed in the tray.

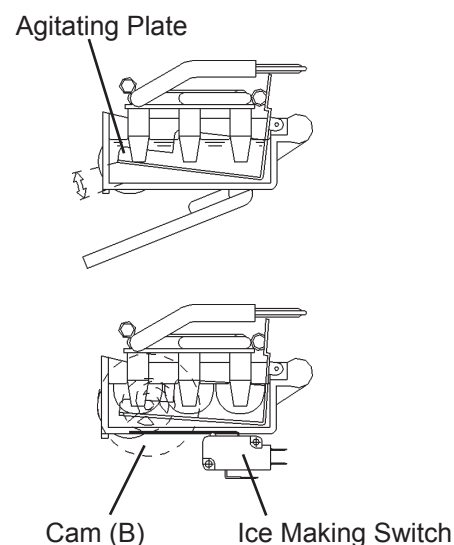
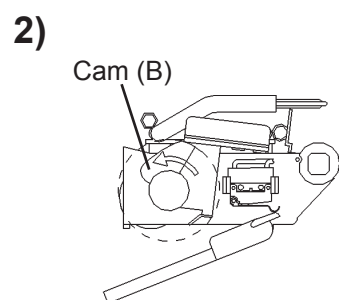
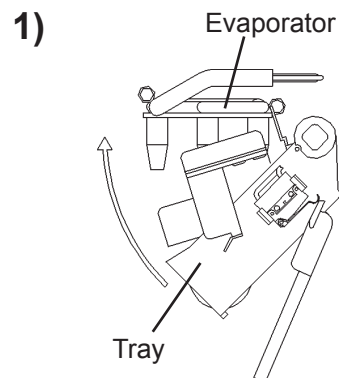
Growth of ice gradually obstructs the rise of the agitating plate, while the motor bracket starts to go down. When ice grows into a certain size, the motor bracket hits the ice making switch [*1] as it goes down. This will complete the freeze cycle and start a defrost cycle.

*1 Michroswitch-5 [DSM-12CE (Auxiliary code V-1 and earlier)]
Michroswitch-3 [DSM-12CE (Auxiliary code V-2 and later), DSM-12DE]

3) The tilting motor (synchronous motor-1) operates to tilt the horizontal tray. When the tilting switch (microswitch-2) operates, the tilting motor (synchronous motor-1) stops and the hot gas valve opens to flow hot gas for heating the evaporator. As the evaporator temperature rises and ice drops from the tray, the defrost thermostat (thermostat-1) [*2] or thermistor [*3] senses the temperature to close the hot gas valve and to operate the tilting motor (synchronous motor-1) so that the tray will move back into the horizontal position. Meanwhile the water valve opens to supply ice making water into the tray. When the tray reaches the horizontal, another freeze cycle starts.

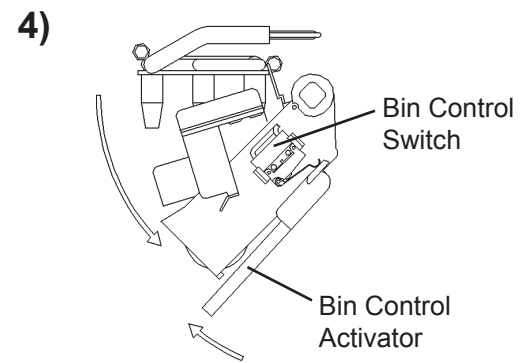
*2 DSM-12CE (Auxiliary code V-1 and earlier)

*3 DSM-12CE (Auxiliary code V-2 and later), DSM-12DE



4) As the unit repeats the above freeze and defrost cycles, the storage bin is gradually filled with ice. When ice reaches a certain level, a tilt of the tray moves the bin control activator at the bottom of the tray to operate the bin control switch [*4] so that the ice making mechanism will stop.

*4 Microswitch-3 [DSM-12CE (Auxiliary code V-1 and earlier)]
Microswitch-4 [DSM-12CE (Auxiliary code V-2 and later), DSM-12DE]

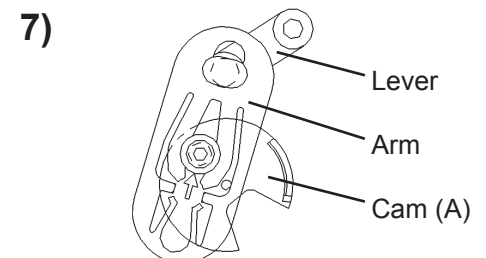


5) When the push button switch (microswitch-1) is pressed, the gear motor starts and ice is dispensed from the spout.

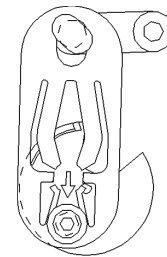
6) If the tray runs out of ice making water due to suspension of water supply, the evaporator temperature in a freeze cycle becomes lower than in normal operation. In this case, the protective thermostat (thermostat-2) [*5] or thermistor [*6] senses the temperature and discontinues the freeze cycle to start a defrost cycle. The unit repeats the same process until proper water supply is resumed.

*5 DSM-12CE (Auxiliary code V-1 and earlier)

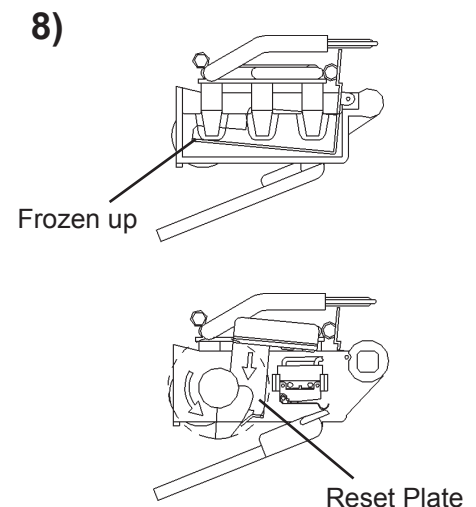
*6 DSM-12CE (Auxiliary code V-2 and later), DSM-12DE



7) If something obstructs the rise of tray and the tilting motor (synchronous motor-1) keeps running, the joint of cam (A) and arm comes off upward to prevent the tilting motor (synchronous motor-1) from being locked. If the descent of tray is obstructed, the joint comes off downward.



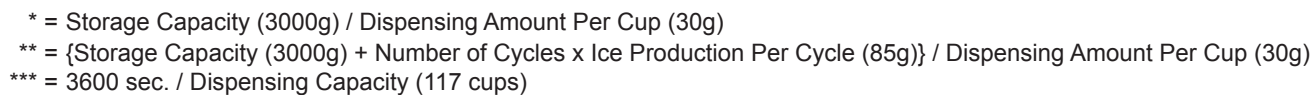
8) When the agitating plate is likely to be frozen up with ice and stuck in its upper position, the rotating cam (B) hits the reset plate to push down the agitating plate. Then the agitating plate comes apart from ice and resumes its normal movement.



5. PERFORMANCE DATA

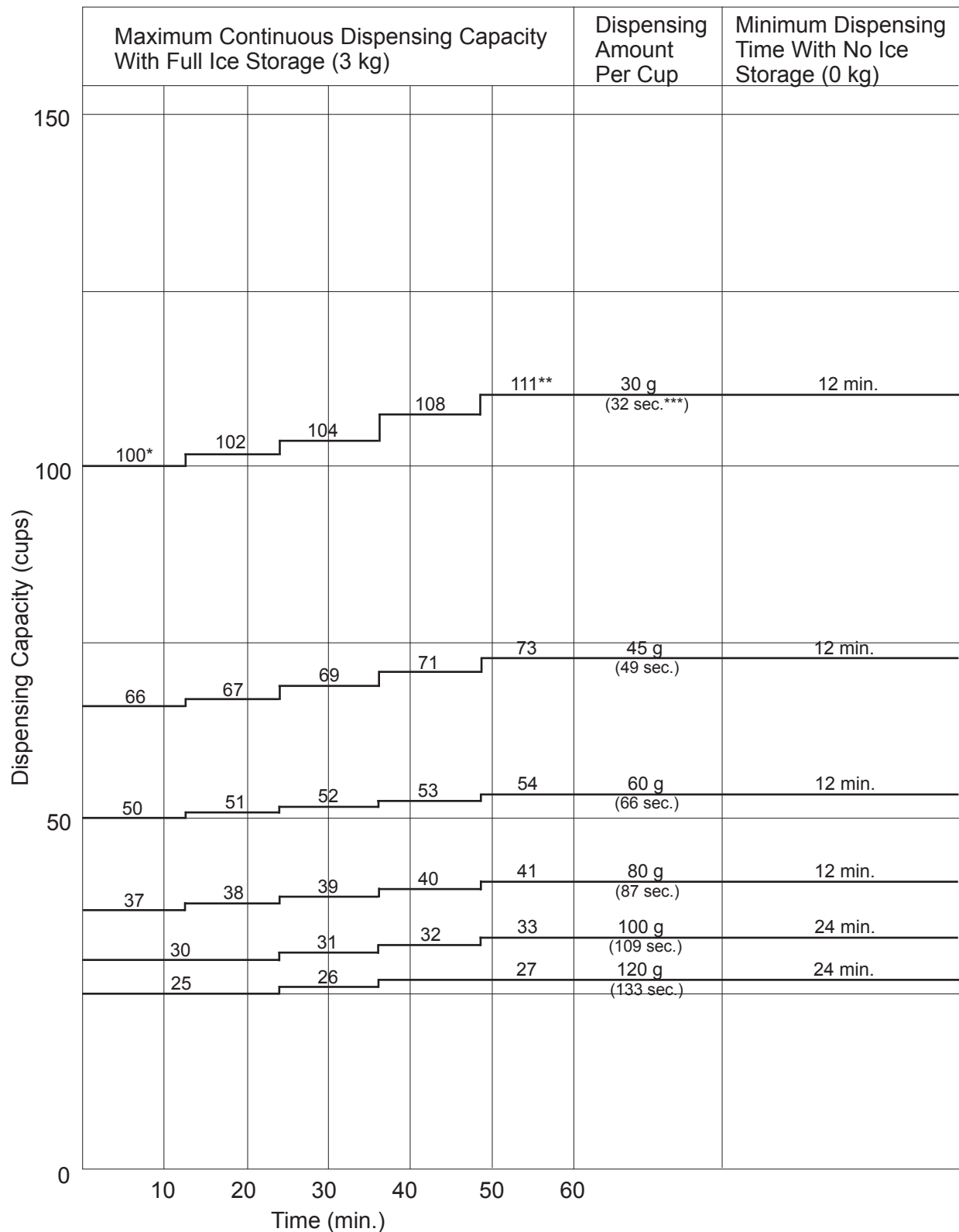
Ambient Temp. (°C)	5	10	21	32	38
Water Temp. (°C)	5	10	15	21	32
Ice Production (kg/d)	13.5	13	10	8	6.5
Freeze Cycle Time	6'57"	7'51"	10'16"	13'27"	16'41"
Defrost Cycle Time	2'56"	2'23"	1'58"	1'44"	1'37"
Head Pressure (bar)	6.2	6.5	9.8	13.4	15.5
Water Consumption (lit/d)	100	97	81	65	54
Electric Consumption (W)	125	126	130	136	146

Ice Production Per Day:	13 kg	Storage Capacity:	3 kg	
Ambient Temperature:	10°C	Water Temperature:	10°C	
Cycle Time:	9.5 min.	Ice Production Per Cycle:	85 g	50Hz



Ice Production Per Day: 10 kg
 Ambient Temperature: 21°C
 Cycle Time: 12 min.

Storage Capacity: 3 kg
 Water Temperature: 15°C
 Ice Production Per Cycle: 85 g
 50Hz



* = Storage Capacity (3000g) / Dispensing Amount Per Cup (30g)

** = {Storage Capacity (3000g) + Number of Cycles x Ice Production Per Cycle (85g)} / Dispensing Amount Per Cup (30g)

*** = 3600 sec. / Dispensing Capacity (111 cups)

VII. SERVICE DIAGNOSIS

1. DSM-12CE [Auxiliary code V-1 and earlier]

PROBLEM	POSSIBLE CAUSE		REMEDY
[1] The ice dispenser will not start.	a) Power supply cord	1. Open circuit.	1. Replace.
		2. Loose connection.	2. Reconnect.
		3. Unplugged.	3. Plug in.
	b) Fuse	1. Blown out.	1. Check for continuity and replace.
	c) Bin control switch	1. Microswitch-3 contacts fused.	1. Replace.
		2. Sensor damaged.	2. Replace.
		3. Sensor out of position.	3. Place in position.
[2] Compressor will not start.	d) Relay-1	1. Bad contacts.	1. Replace.
	a) Starting relay	1. Open circuit.	1. Replace.
		2. Bad contacts.	2. Replace.
	b) Start capacitor	1. Defective.	1. Replace.
	c) Compressor	1. Coil winding opened.	1. Replace.
[3] Compressor operates intermittently.	d) Relay-4	1. Bad contacts.	1. Check for continuity and replace.
	a) Supply voltage	1. Too high or too low.	1. Get recommended voltage.
	b) Starting relay	1. Defective.	1. Replace.
	c) Ambient temperature	1. Too high or too low.	1. Get recommended temperature.
	d) Installation	1. Vent (air inlet or outlet) blocked.	1. Unblock.
	e) Air filter, condenser	1. Clogged.	1. Clean.
[4] Fan will not turn.	f) Fan	1. Fan not rotating.	1. See [4].
		1. Fan blades blocked.	1. Unblock
		2. Fan out of position.	1. Place in position.
[5] Water supply is off or too little.	b) Fan motor	1. Coil winding opened.	1. Replace.
		1. Water supply line	1. Open.
		2. Water supply cut off.	1. Unplug the ice dispenser and wait for resumed water supply.
		3. Water supply pressure too high or too low.	3. Get recommended pressure.
		1. Water leaks from connections.	1. Repair.
		2. Clogged with foreign matter.	2. Clean.
	c) Water valve	1. Clogged filter.	1. Clean.
		2. Coil winding opened.	2. Check for proper voltage and replace.
	d) Microswitch-4	1. Inoperative with microswitch-4 or cam (A) not fixed securely.	1. Fix in place and check for proper switching action.
		2. Bad contacts.	2. Replace.

PROBLEM	POSSIBLE CAUSE		REMEDY
[6] Water supply never stops or is too much.	a) Water supply line	1. Water supply pressure too high or too low.	1. Get recommended pressure.
	b) Water valve	1. Clogged with foreign matter.	1. Replace.
	c) Microswitch-4	1. Inoperative with microswitch-4 or cam (A) not fixed securely.	1. Fix in place and check for proper switching action.
		2. Bad contacts.	2. Replace.
[7] Tray will not go down. (Freeze cycle never ends.)	a) Relay-2, relay-3	1. Bad contacts.	1. Replace.
	b) Microswitch-5	1. Fused contacts.	1. Replace.
		2. Fixed too low and cannot be switched on.	2. Fix in proper position.
	c) Synchronous Motor-1	1. Coil winding opened.	1. Check for proper voltage and replace.
	d) Synchronous Motor-2	1. Agitating motor not running.	1. See [12].
[8] Tray will not go up to the horizontal position. (Defrost cycle never ends.)	a) Relay-2, relay-3	1. Bad contacts.	1. Replace.
		2. Coil winding opened.	2. Replace.
	b) Thermostat-1	1. Bad contacts.	1. Replace.
		2. Gas leak from thermostat bulb.	2. Replace.
	c) Hot gas	1. Will not flow.	1. See [10].
	d) Synchronous motor-1	1. Coil winding opened.	1. Check for proper voltage and replace.
		2. Gear broken.	2. Replace.
[9] Tray keeps on going up and down.	a) Microswitch-5	1. Bad contacts.	1. Replace.
		2. Fixed too high and easily switched off.	2. Fix in proper position.
	b) Thermostat-2	1. Bad contacts.	1. Replace.
		2. Gas leak from thermostat bulb.	2. Replace.
	c) Relay-3	1. Bad contacts.	1. Replace.
	d) Icemaking water supply	1. Too little.	1. See [5].
	e) Agitating plate	1. Obstructed in rising action and microswitch-5 operates.	1. Keep away from surrounding parts (refrigerant lines and thermostat).
	f) Cam (B)	1. Obstructed in rotation and microswitch-5 operates.	1. Keep away from surrounding parts (refrigerant lines and thermostat).
	g) Microswitch-2	1. Inoperative with the switch itself or cam (A) not fixed securely.	1. Fix in place and check for proper switching action.
		2. Bad contacts.	2. Replace.
h) Synchronous motor-1	1. Gear broken.	1. Replace.	
[10] Hot gas will not flow or stop.	a) Hot gas valve	1. Coil winding opened.	1. Replace.
		2. Defective.	2. Replace.

PROBLEM	POSSIBLE CAUSE		REMEDY
[11] Tray starts to go up with remaining ice.	a) Thermostat-1	1. Fused contacts.	1. Replace.
		2. Thermostat bulb out of position.	2. Fix on evaporator.
	b) Relay-2	1. Fused contacts.	1. Replace.
		2. Coil winding opened.	2. Replace.
	c) Evaporator	1. Burrs or foreign matter.	1. Clean.
		2. Deformed.	2. Repair or replace.
	d) Tray, agitating plate	1. Deformed.	1. Repair or replace.
[12] Agitating motor will not run.	a) Synchronous motor-2	1. Cannot be switched on with the switch itself or cam (A) not fixed securely.	1. Fix in place and check for proper switching action.
		2. Fused contacts.	2. Replace.
	b) Relay-2	1. Not fixed securely, causing ice bridges.	1. Fix in place.
[13] Agitating motor stops in a wrong position.	a) Relay-3	1. Gear broken.	1. Replace.
	b) Microswitch-5	2. Coil winding opened.	2. Replace.
[14] Ice dispenser will not stop when bin is filled with ice.	a) Relay-2	1. Bad contacts.	1. Replace.
		1. Not fixed securely and inoperative.	1. Fix in place.
		2. Loose connection.	2. Reconnect.
	b) Relay-1	3. Open circuit.	3. Repair.
		1. Coil winding opened.	1. Replace.
[15] Defective ice	a) Tray	2. Fused contacts.	2. Replace.
		1. Deformed or damaged.	1. Replace.
	b) Refrigeration circuit	2. Obstructed from horizontal position.	2. Remove obstacles (capillary tubes or refrigerant lines).
		1. Undercharged or gas leaks	1. Check for leaks by leakage detector. Weld leaks and recharge. Gas leaks from low side require thorough evacuation.
	c) Icemaking water supply	1. Too little.	1. See [5].
[16] No ice is dispensed with push button pressed.	a) Microswitch-1	1. Loose connection.	1. Reconnect.
		2. Bad contacts.	2. Replace.
		3. Not fixed securely or fixed part deformed or damaged.	3. Repair or replace and check for proper switching action.
	b) Dispensing motor	1. Coil winding opened.	1. Replace.
		2. Gear broken.	2. Replace.
		3. Thermal protector operates.	3. Reset automatically when winding temperature goes down.
		4. Fails to start at low voltage.	4. Adjust voltage.

PROBLEM	POSSIBLE CAUSE		REMEDY
[16] (Continued)	c) Storage bin	1. Little ice storage.	1. A small amount of remaining ice cannot be dispensed. Wait for enough ice storage.
		2. Ice bridges.	2. Long suspension of ice dispensing may cause ice bridges. Instruct the user to dispense everyday.
	d) Screw	1. Deformed or damaged.	1. Repair or replace.
[17] Ice keeps on being dispensed.	a) Microswitch-1	1. Fused contacts.	1. Replace.
		2. Not fixed securely or fixed part deformed or damaged.	2. Repair or replace and check for proper switching action.
[18] Abnormal noise	a) Fan motor	1. Bearing worn out.	1. Replace.
	b) Dispensing motor	1. Bearing worn out.	1. Replace.
		2. Gear worn out or damaged.	2. Replace.
	c) Screw	1. Deformed or damaged.	1. Repair or replace.
[19] Low or no ice production	a) Refrigeration circuit	1. Undercharged or gas leaks	1. Check for leaks by leakage detector. Weld leaks and recharge. Gas leaks from low side require thorough evacuation.
	b) Drier, capillary tubes, strainer	1. Clogged with moisture or dirt.	1. Replace.

2. DSM-12CE [Auxiliary code V-2 and later], DSM-12DE

PROBLEM	POSSIBLE CAUSE		REMEDY
[1] The ice dispenser will not start.	a) Power supply cord	1. Open circuit.	1. Replace.
		2. Loose connection.	2. Reconnect.
		3. Unplugged.	3. Plug in.
	b) Fuse	1. Blown out.	1. Check for continuity and replace.
	c) Bin control switch (microswitch-4)	1. Microswitch-4 contacts fused or short circuit.	1. Replace.
		2. Sensor damaged.	2. Replace.
		3. Sensor out of position.	3. Place in position.
[2] Compressor will not start.	d) Transformer (transformer-2)	1. Open circuit (including built-in fuse operation).	1. Check for output (approx. 100V±15%) and replace.
	e) Power transformer (transformer-1)	1. Open circuit (including built-in fuse operation).	1. Check for output (approx. 11V±15%) and replace.
	f) Controller board	1. Defective (no output). Check input from power transformer.	1. Check for output to LED on board and replace.
	a) Starting relay	1. Open circuit.	1. Replace.
		2. Bad contacts.	2. Replace.
	b) Start capacitor	1. Defective.	1. Replace.
	c) Compressor	1. Coil winding opened. See [3].	1. Check for continuity and replace.
[3] Compressor operates intermittently.	d) Power relay	1. Bad contacts.	1. Check for continuity and replace.
	e) Controller board	1. Defective (no output). Check input from power transformer.	1. Check for output to LED on board and replace.
	a) Supply voltage	1. Too high or too low.	1. Get recommended voltage.
	b) Start capacitor	1. Defective.	1. Replace.
	c) Ambient temperature	1. Too high or too low.	1. Get recommended temperature.
	d) Installation	1. Vent (air inlet or outlet) blocked.	1. Unblock.
	e) Air filter, condenser	1. Clogged.	1. Clean.
[4] Fan will not turn.	f) Fan	1. Fan not rotating.	1. See [4].
	a) Fan	1. Fan blades blocked.	1. Unblock
		2. Fan out of position.	1. Place in position.
	b) Fan motor	1. Coil winding opened.	1. Check for proper voltage and replace.
	c) Controller board	1. Defective (no output). Check input from power transformer.	1. Check for output to LED on board and replace.
[5] Water supply is off or too little.	a) Water supply line	1. Water supply tap closed.	1. Open.
		2. Water supply cut off.	1. Unplug the ice dispenser and wait for resumed water supply.
		3. Water supply pressure too high or too low.	3. Get recommended pressure.

PROBLEM	POSSIBLE CAUSE		REMEDY
[5] (Continued)	b) Water circuit	1. Water leaks from connections.	1. Repair.
		2. Clogged with foreign matter.	2. Clean.
	c) Water valve	1. Clogged filter.	1. Clean.
		2. Coil winding opened.	2. Check for proper voltage and replace.
	d) Controller board	1. Defective (no output). Check input from power transformer.	1. Check for output to LED on board and replace.
[6] Water supply never stops or is too much.	a) Water supply line	1. Water supply pressure too high or too low.	1. Get recommended pressure.
	b) Water valve	1. Clogged with foreign matter.	1. Clean.
[7] Tray will not go down. (Freeze cycle never ends.)	a) Agitating motor (synchronous motor-2)	1. See [12].	
	b) Water supply	1. See [5].	
	c) Tilting motor (synchronous motor-1)	1. Coil winding opened.	1. Check for proper voltage and replace.
	d) Bin control switch (microswitch-4)	1. See [14].	
[8] Tray will not go up to the horizontal position.	a) Hot gas valve	1. See [10].	
	b) Tilting motor (synchronous motor-1)	1. Coil winding opened.	1. Check for proper voltage and replace.
		2. Gear broken. See [19].	2. Replace.
	c) Controller board	1. Defective (no output). Check input from power transformer.	1. Check for output to LED on board and replace.
[9] Tray keeps on going up and down.	a) Ice making switch (microswitch-3) *1	1. Fused contacts.	1. Replace.
		2. Not fixed securely and inoperative.	2. Fix in proper position.
	b) Connector (7P) *2	1. Disconnected (control box bottom).	1. Reconnect.
	c) Tilting switch (microswitch-2) *2	1. Switch terminal disconnected.	1. Reconnect.
		2. Switch or cam (A) not fixed securely and inoperative.	2. Fix securely and check for proper switching action.
		3. Bad contacts.	3. Replace.
		4. Fused contacts.	4. Replace.
	d) See [5].		
	e) Agitating plate	1. Obstructed.	1. Remove obstacles (capillary tubes or refrigerant lines).

- *1: (1) Agitating motor (synchronous motor-2) runs with tray down (banging sound).
 (2) Tray goes up after 1.5 minutes, and freeze cycle starts but ice making switch turns off soon.
 (3) Stays off for 5 minutes, then repeats from (1).
- *2: (1) Tray repeats going up and down (tilting motor: 1 turn or 2 turns).
 (2) Stops for 5 minutes, then repeats from (1).

PROBLEM	POSSIBLE CAUSE		REMEDY
[9] (Continued)	f) Cam (B)	1. Obstructed.	1. Remove obstacles (capillary tubes or refrigerant lines).
	g) Agitating motor (synchronous motor-2)	1. Gear broken. See [19].	1. Replace.
	h) See [11].		
[10] Hot gas will not flow or stop. (Defrost temperature is too high.)	a) Connector (7P) *3	1. Disconnected in freeze cycle (control box bottom).	1. Reconnect.
	b) Thermistor *4	1. Not fixed securely on evaporator outlet pipe.	1. Fix securely.
		2. Open or short circuit.	2. Replace.
	c) Hot gas valve	1. Coil winding opened.	1. Replace.
		2. Defective.	2. Replace.
	d) Controller board	1. Defective (no output). Check input from power transformer.	1. Check for output to LED on board and replace.
[11] Tray starts to go up with remaining ice, causing ice bridges.	e) See [11].		
	a) Ice making switch (midswitch-3)	1. Loose connection.	1. Reconnect.
		2. Open circuit.	2. Repair.
		3. Not fixed securely and inoperative.	3. Fix in proper position.
		4. Bad contacts.	4. Replace.
	b) Thermistor	1. Not fixed securely on evaporator outlet pipe.	1. Fix securely.
	c) Evaporator	1. Burrs or foreign matter.	1. Clean.
		2. Deformed.	2. Repair or replace.
	d) Tray, agitating plate	1. Deformed.	1. Repair or replace.
	e) Tilting switch (microswitch-2)	1. Switch or cam (A) not fixed securely and inoperative.	1. Fix securely and check for proper switching action.
		2. Fused contacts.	2. Replace.
[12] Agitating motor will not run.	f) See [13].		
	a) Agitating motor (synchronous motor-2)	1. Gear broken.	1. Replace.
		2. Coil winding opened.	2. Replace.
	b) Controller board	1. Defective (no output). Check input from power transformer.	1. Check for output to LED on board and replace.
[13] Agitating motor stops in a wrong position.	a) Ice making switch (midswitch-3)	1. Not fixed securely and inoperative.	1. Fix in proper position.
[14] Ice dispenser will not stop when bin is filled with ice.	a) Bin control switch (microswitch-4)	1. Not fixed securely on Tray.	1. Fix securely.
		2. Loose connection.	2. Reconnect.
		3. Open circuit.	3. Repair.
		4. Bad contacts.	4. Replace.

*3: (1) Hot gas valve opens, then closes after 10 minutes.

(2) Stays closed for 5 minutes, then repeats from (1).

*4: (1) Hot gas valve opens, then closes after 10 minutes.

(2) Starts freeze cycle, then repeats from (1).

PROBLEM	POSSIBLE CAUSE		REMEDY
[14] (Continued)	b) Bin sensor	1. Not fixed securely.	1. Fix securely.
		2. Broken.	2. Replace.
[15] Defective ice	a) Tray	1. Deformed or damaged.	1. Replace.
		2. Obstructed from horizontal position.	2. Remove obstacles (capillary tubes or refrigerant lines).
	b) Refrigeration circuit	1. Undercharged or gas leaks	1. Check for leaks by leakage detector. Weld leaks and recharge. Gas leaks from low side require thorough evacuation.
	c) See [5].		
[16] No ice is dispensed with push button pressed.	a) Dispensing switch (microswitch-1)	1. Loose connection.	1. Reconnect.
		2. Bad contacts.	2. Replace.
		3. Not fixed securely or fixed part deformed or damaged.	3. Repair or replace and check for proper switching action.
	b) Dispensing motor	1. Coil winding opened.	1. Replace.
		2. Gear broken.	2. Replace.
		3. Thermal protector operates.	3. Reset automatically when winding temperature goes down.
		4. Fails to start at low voltage.	4. Adjust voltage.
	c) Storage bin	1. Little ice storage.	1. A small amount of remaining ice cannot be dispensed. Wait for enough ice storage.
		2. Ice bridges.	2. Long suspension of ice dispensing may cause ice bridges. Instruct the user to dispense everyday.
	d) Screw	1. Deformed or damaged.	1. Repair or replace.
[17] Ice keeps on being dispensed.	a) Dispensing switch (microswitch-1)	1. Fused contacts.	1. Replace.
		2. Not fixed securely or fixed part deformed or damaged.	2. Repair or replace and check for proper switching action.
[18] Abnormal noise	a) Fan motor	1. Bearing worn out.	1. Replace.
	b) Dispensing motor	1. Bearing worn out.	1. Replace.
		2. Gear worn out or damaged.	2. Replace.
	c) Screw	1. Deformed or damaged.	1. Repair or replace.
[19] Low or no ice production	a) Refrigeration circuit	1. Undercharged or gas leaks	1. Check for leaks by leakage detector. Weld leaks and recharge. Gas leaks from low side require thorough evacuation.
	b) Drier, capillary tubes, strainer	1. Clogged with moisture or dust.	1. Replace.

VIII. REMOVAL AND REPLACEMENT OF COMPONENTS

1. PANELS

[a] FRONT PANEL

- 1) Unplug the ice dispenser.
- 2) Pull out the drain cassette.
- 3) Remove the screws behind the drain cassette.
- 4) Unhook the front panel by lifting it up, and pull it toward you.
- 5) Disconnect the connectors from the push button switch.

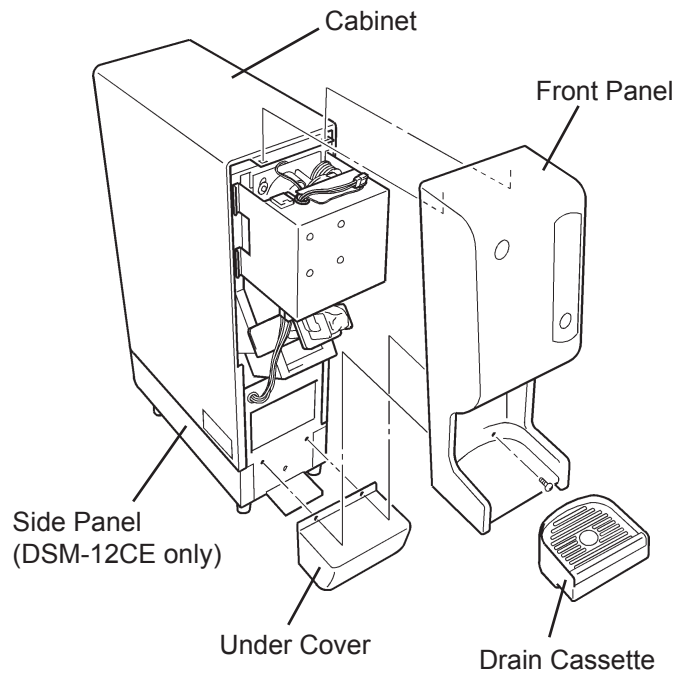


Fig. 6

[b] UNDER COVER

- 1) Remove the front panel. The upper part of the under cover is screwed with the front panel.
- 2) Unhook the under cover by lifting it up and pull it toward you.

[c] CABINET

- 1) Remove the front panel.
- 2) Remove the screws on the front and rear.

Note: Be careful not to lose the tooth washer provided on the screw at the right-hand side of the bottom front.

- 3) Slightly spread out the bottom, and lift off the cabinet.

[d] SIDE PANELS – DSM-12CE only

- 1) Remove the front panel.
- 2) Remove the under cover.

- 3) Remove the screws on the front and rear.

Note: Be careful not to lose the tooth washer provided on the screw at the front.

2. STORAGE BIN

- 1) Dispense all ice from the storage bin.
- 2) Unplug the ice dispenser.
- 3) Close the water supply tap.
- 4) Remove the front panel, under cover, cabinet and side panels (DSM-12CE only).
- 5) Plug in and run the ice dispenser. When it starts a defrost cycle, open the water valve to reduce the water supply pressure inside the inlet hose located downstream of the water supply tap.
- 6) Unplug the ice dispenser again when it starts a freeze cycle.
- 7) Disconnect the inlet hose from the unit.

Note: Do not spill water around the unit.

- 8) Disconnect all the connectors from the control box. Remove the screws, and put the control box on top of the cabinet.

Note: Be careful not to break the thermostat capillaries.

- 9) Unscrew and remove the gear motor assembly.
- 10) Remove the mechanism cover from the storage bin.
- 11) Pull out the thermostat bulbs from the evaporator attachment pipes, and remove the control box.
- 12) Remove the tray from the evaporator bracket openings. Dump out any remaining water into the storage bin before taking out the tray.
- 13) Remove the screws securing the two evaporator brackets.

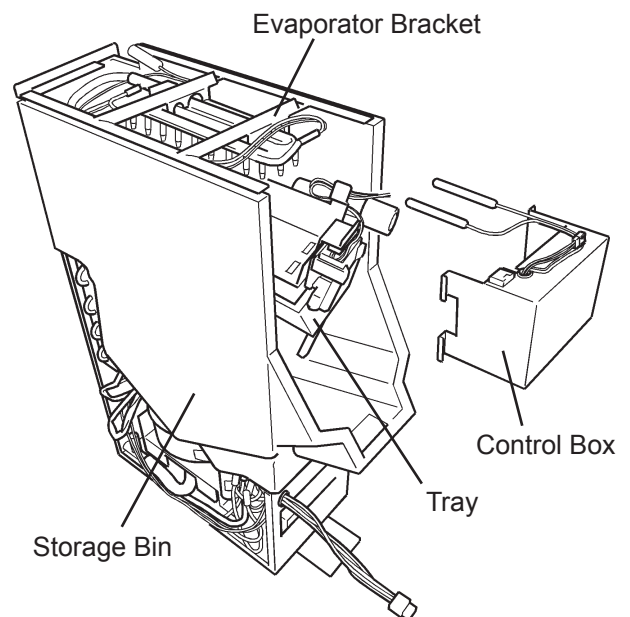


Fig. 7

- 14) Disconnect the hoses and terminals from the water valve.
- 15) Disconnect the hose from the drain pipe.
- 16) Slightly lift up the evaporator, and remove the storage bin.

3. SERVICE FOR REFRIGERANT LINES

[a] SERVICE INFORMATION

1) Allowable Compressor Opening Time and Prevention of Lubricant Mixture [R134a]

The compressor must not be opened more than 30 minutes in replacement or service. Do not mix lubricants of different compressors even if both are charged with R134a, except when they use the same lubricant.

2) Treatment for Refrigerant Leak [R134a]

If a refrigerant leak occurs in the low side of an ice maker charged with R134a, air may be drawn in. Even if the low side pressure is higher than the atmospheric pressure in normal operation, a continuous refrigerant leak will eventually lower the low side pressure below the atmospheric pressure and will cause air suction. Air contains a large amount of moisture, and ester easily absorbs a lot of moisture. If an ice maker charged with R134a has possibly drawn in air, the drier must be replaced. Be sure to use a drier designed for R134a.

3) Handling of Handy Flux [R134a]

Repair of the refrigerant circuit needs brazing. It is no problem to use the same handy flux that has been used for the current refrigerants. However, its entrance into the refrigerant circuit should be avoided as much as possible.

4) Oil for Processing of Copper Tubing [R134a]

When processing the copper tubing for service, wipe off oil, if any used, by using alcohol or the like. Do not use too much oil and let it into the tubing, or wax contained in the oil will clog the capillary tubing.

5) Service Parts for R134a

Some parts used for refrigerants other than R134a are similar to those for R134a. But never use any parts unless they are specified for R134a because their endurance against the refrigerant have not been evaluated. Also, for R134a, do not use any parts that have been used for other refrigerants. Otherwise, wax and chlorine remaining on the parts may adversely affect R134a.

6) Replacement Copper Tubing [R134a]

The copper tubes currently in use are available for R134a. But do not use them if oily inside. The residual oil in copper tubes should be as little as possible. (Low residual oil type copper tubes are used in the shipped units.)

7) Evacuation, Vacuum Pump and Refrigerant Charge [R134a]

Never allow the oil in the vacuum pump to flow backward. The vacuum level and vacuum pump may be the same as those for the current refrigerants. However, the rubber hose and gauge manifold to be used for evacuation and refrigerant charge should be exclusively for R134a.

8) Refrigerant Leak Check

Refrigerant leaks can be detected by charging the unit with a little refrigerant, raising the pressure with nitrogen and using an electronic detector. Do not use air or oxygen instead of nitrogen for this purpose, or rise in pressure as well as in temperature may cause R134a to suddenly react with oxygen and explode. Be sure to use nitrogen to prevent explosion.

[b] REFRIGERANT RECOVERY

The refrigerant must be recovered if required by an applicable law. No refrigerant access valve is provided in the unit. Install a proper access valve on the low-side line (ex. compressor process pipe). Recover the refrigerant from the access valve and store it in a proper container. Do not discharge the refrigerant into the atmosphere.

[c] EVACUATION AND RECHARGE

- 1) Attach charging hoses, a service manifold and a vacuum pump to the system.
- 2) Turn on the vacuum pump.
- 3) Allow the vacuum pump to pull down to a 760 mmHg vacuum. Evacuating period depends on pump capacity.
- 4) Close a low-side valve on the service manifold.
- 5) Disconnect the vacuum pump, and attach a refrigerant service can. Remember to loosen the connection, and purge the air from the hose. See the nameplate for the required refrigerant charge.
- 6) Open the low-side valve. Do not invert the service can. A liquid charge will damage the compressor.
- 7) Plug in the ice dispenser when charging speed gets slow. Unplug the ice dispenser when the low-side gauge shows approximately 0 bar (0 MPa). Do not run the ice dispenser at vacuum pressures. Close the low-side valve when the service can gets empty.
- 8) Repeat steps 4) through 7), if necessary, until the required amount of refrigerant has entered the system.
- 9) Close the refrigerant access valve, and disconnect the hoses and service manifold.
- 10) Cap the access valve to prevent a possible leak.

4. BRAZING

DANGER

1. Refrigerant R134a itself is not flammable, explosive and poisonous. However, when exposed to an open flame, R134a creates phosgene gas, hazardous in large amounts.
2. Always recover the refrigerant and store it in a proper container. Do not discharge the refrigerant into the atmosphere.
3. Do not use silver alloy or copper alloy containing arsenic.
4. In its liquid state, the refrigerant can cause frostbite because of the low temperature.
5. When repairing the refrigerant system, be careful not to let the burner flame contact the lead wires or insulation.

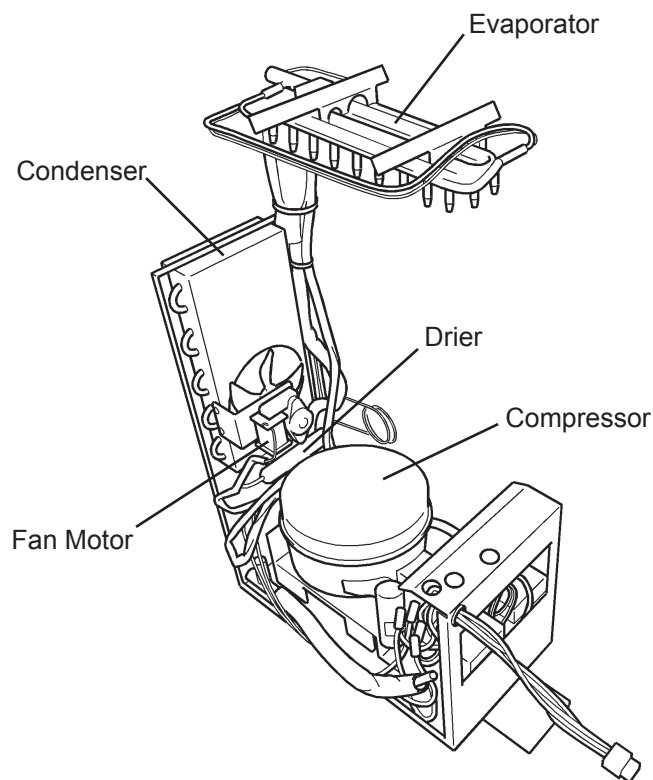


Fig. 8

5. DRIER

IMPORTANT

Always install a new drier every time the sealed refrigeration system is opened. Do not replace the drier until after all other repair or replacement has been made.

- 1) Unplug the ice dispenser.
- 2) Remove the panels.
- 3) Recover the refrigerant and store it in a proper container.
- 4) Remove the clamp securing the drier, and pull the drier toward you for easy service.
- 5) Remove the drier using brazing equipment.
- 6) Install the new drier in the direction of the refrigerant flow. Use nitrogen gas at the pressure of 0.2 - 0.3 bar (0.02 - 0.03 MPa) when brazing the tubings.
- 7) Check for leaks using nitrogen gas [10 bar (1 MPa)] and soap bubbles.
- 8) Secure the drier with the clamp.
- 9) Evacuate the system, and charge it with refrigerant. See the nameplate for the required refrigerant charge.
- 10) Replace the panels in their correct position.
- 11) Plug in the ice dispenser.

6. COMPRESSOR

- 1) Unplug the ice dispenser.
- 2) Remove the panels.
- 3) Remove the terminal cover on the compressor, and disconnect the compressor wiring.
- 4) Recover the refrigerant and store it in a proper container.
- 5) Unsolder and disconnect the discharge and suction pipes from the compressor.
- 6) Remove the hold-down bolts, washers and rubber grommets.
- 7) Slide and remove the compressor. Unpack the new compressor package. Install the new compressor.
- 8) Attach the rubber grommets of the previous compressor.
- 9) Sandpaper the suction, discharge and process pipes.
- 10) Place the compressor in position, and secure it using the bolts and washers.
- 11) Remove plugs from the suction, discharge and process pipes.
- 12) Braze the process, suction and discharge pipes (Do not change this order), with nitrogen gas flowing at the pressure of 0.2 - 0.3 bar (0.02 - 0.03 MPa).
- 13) Replace the drier.
- 14) Check for leaks using nitrogen gas [10 bar (1 MPa)] and soap bubbles.
- 15) Connect the compressor wiring to the compressor, and replace the terminal cover in its correct position.
- 16) Evacuate the system, and charge it with refrigerant. See the nameplate for the required refrigerant charge.
- 17) Replace the panels in their correct position.
- 18) Plug in the ice dispenser.

7. HOT GAS VALVE

- 1) Unplug the ice dispenser.
- 2) Remove the panels.
- 3) Remove the screw securing the hot gas valve.
- 4) Remove the screw securing the coil to the valve body, and pull off the coil.

If the coil does not require replacement, go to 7).

- 5) Cut the coil leads at the wire connectors.
- 6) Install the new coil.
- 7) Recover the refrigerant and store it in a proper container.
- 8) Remove the hot gas valve using brazing equipment.
- 9) Install the new hot gas valve in the direction of the refrigerant flow. Use nitrogen gas at the pressure of 0.2 - 0.3 bar (0.02 - 0.03 MPa) when brazing the tubings.

WARNING

Always protect the valve body by using a damp cloth to prevent the valve from overheating. Do not braze with the valve body exceeding 120°C.

- 10) Check for leaks using nitrogen gas [10 bar (1 MPa)] and soap bubbles.
- 11) Evacuate the system and charge it with refrigerant. See the nameplate for the required refrigerant charge.
- 12) Screw down the coil on the valve body, and secure it to the unit.
- 13) Replace the panels in their correct position.
- 14) Plug in the ice dispenser.

8. EVAPORATOR

- 1) Unplug the ice dispenser.
- 2) Remove the panels.
- 3) Remove the storage bin.
- 4) Recover the refrigerant and store it in a proper container.
- 5) Sandpaper and disconnect the brazing connection. Remove the evaporator using brazing equipment.
- 6) Detach the two brackets from the removed evaporator, and attach them to the new evaporator.
- 7) Install the new evaporator. Use nitrogen gas at the pressure of 0.2 - 0.3 bar (0.02 - 0.03 MPa) when brazing the tubings.

IMPORTANT

Always protect the evaporator pipe by using a damp cloth to prevent the plating from coming off.

- 8) Check for leaks using nitrogen gas [10 bar (1 MPa)] and soap bubbles.
- 9) Evacuate the system, and charge it with refrigerant. See the nameplate for the required refrigerant charge.
- 10) Replace the storage bin and panels in their correct position.
- 11) Plug in the ice dispenser.

9. FAN MOTOR

- 1) Unplug the ice dispenser.
- 2) Remove the front panel, cabinet, under cover and side panels (DSM-12CE only).
- 3) Cut the fan motor leads at the wire connectors.
- 4) Remove the fan motor assembly from the condenser, and detach the bracket and fan from the fan motor.
- 5) Install the new fan motor.

- 6) Assemble the removed parts in the reverse order of which they were removed.
- 7) Plug in the ice dispenser.

10. WATER VALVE

- 1) Unplug the ice dispenser.
- 2) Close the water supply tap.
- 3) Remove the front panel and cabinet.
- 4) Plug in and run the ice dispenser. When it starts a defrost cycle, open the water valve to reduce the water supply pressure inside the inlet hose located downstream of the water supply tap.
- 5) Unplug the ice dispenser again when it starts a freeze cycle.
- 6) Disconnect the inlet hose from the unit.

Note: Do not spill water around the unit.
- 7) Disconnect the hoses and terminals from the water valve.
- 8) Remove the two screws securing the water valve, and pull out the water valve from the storage bin opening.
- 9) Install the new water valve.
- 10) Assemble the removed parts in the reverse order of which they were removed.
- 11) Open the water supply tap.
- 12) Plug in the ice dispenser.
- 13) Check for water leaks.

11. GEAR MOTOR

IMPORTANT

Do not reuse the spring pin. To prevent excessive strain, fix the gear motor shaft when installing the spring pin.

- 1) Unplug the ice dispenser.
- 2) Remove the front panel.
- 3) Cut the gear motor leads at the wire connectors.
- 4) Remove the gear motor assembly from the mechanism cover.
- 5) Detach the spring pin from the gear motor shaft, and remove the gear motor bracket.
- 6) Attach the bracket to the new gear motor, and install a new spring pin on the gear motor shaft.
- 7) Insert the gear motor assembly so that the spring pin will fit the slit at the end of the auger.
- 8) Assemble the removed parts in the reverse order of which they were removed.
- 9) Plug in the ice dispenser.

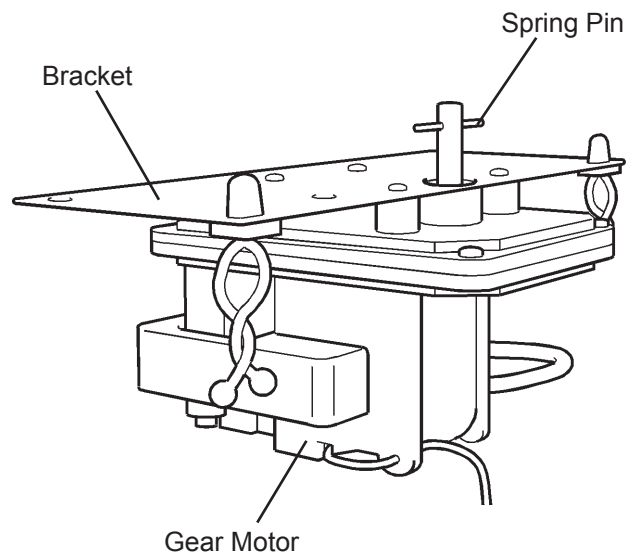


Fig. 9

12. CONTROL BOX

IMPORTANT

Every time the mechanism cover or tray is removed, check the ice size after assembling the removed parts.

[a] DSM-12CE [Auxiliary code V-1 and earlier]

- 1) Unplug the ice dispenser.
- 2) Remove the front panel.
- 3) Disconnect all the connectors from the control box.

If the thermostats require replacement, go to 6).

- 4) Remove the thermostats from the control box, and detach the control box from the mechanism cover.

- 5) Remove the vinyl covers and then the terminals from the thermostats.

If the thermostats do not require replacement, go to 9).

- 6) Remove the control box from the mechanism cover, and put it on top of the cabinet.

Note: Be careful not to break the thermostat capillaries. Give them a large bend.

- 7) Remove the gear motor, and detach the mechanism cover from the storage bin.
- 8) Pull out the thermostat bulbs from the evaporator attachment pipes.
- 9) Replace the applicable parts.
- 10) Assemble the removed parts in the reverse order of which they were removed.
- 11) Plug in the ice dispenser.

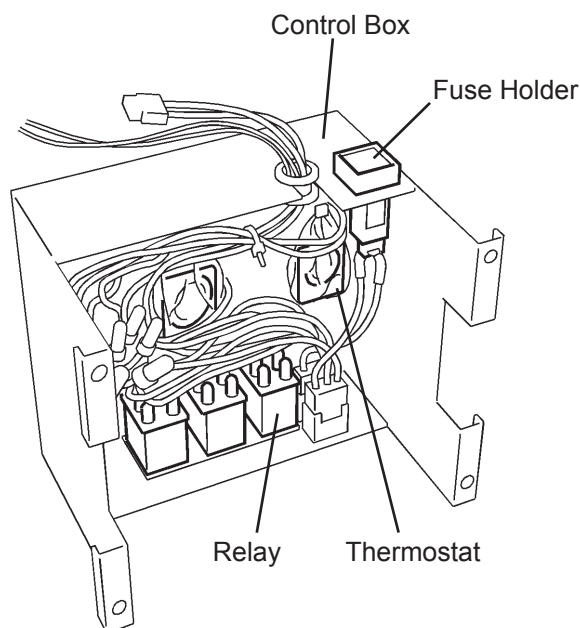


Fig. 10

[b] DSM-12CE [Auxiliary code V-2 and later], DSM-12DE

- 1) Unplug the ice dispenser.
- 2) Remove the front panel.
- 3) Disconnect the three connectors from the control box.
- 4) Remove the four screws securing the control box, and remove the control box.
- 5) Remove the two screws securing the cover.
- 6) Replace the applicable parts.
- 7) Assemble the removed parts in the reverse order of which they were removed.

Note: Check that the connectors are securely connected.

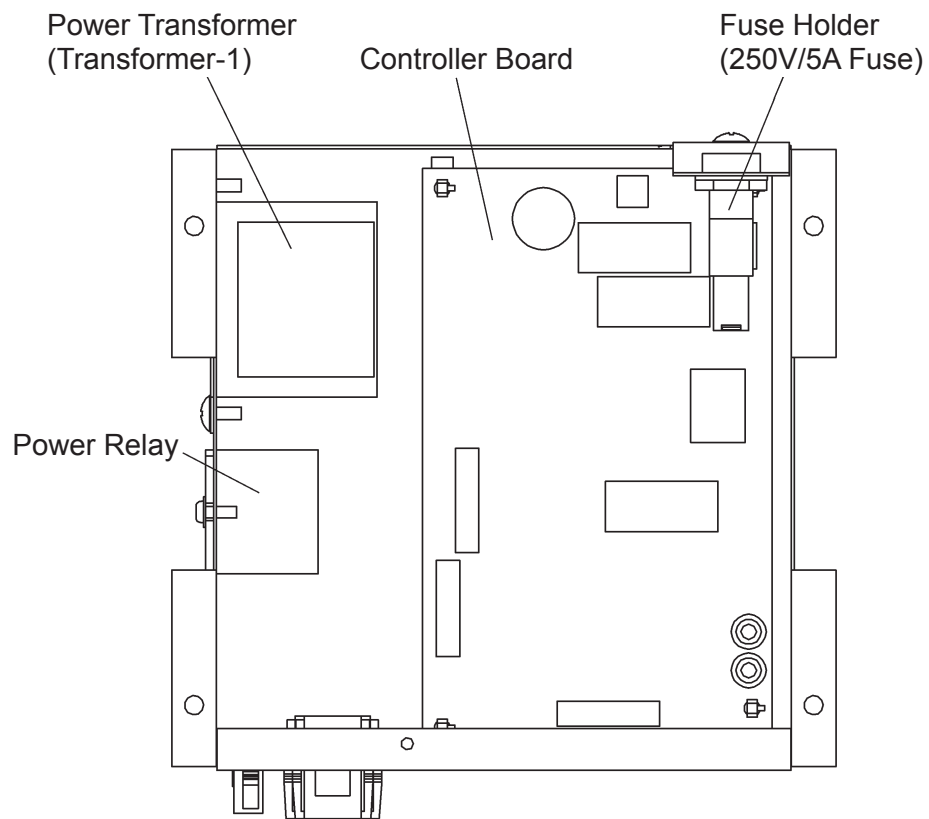
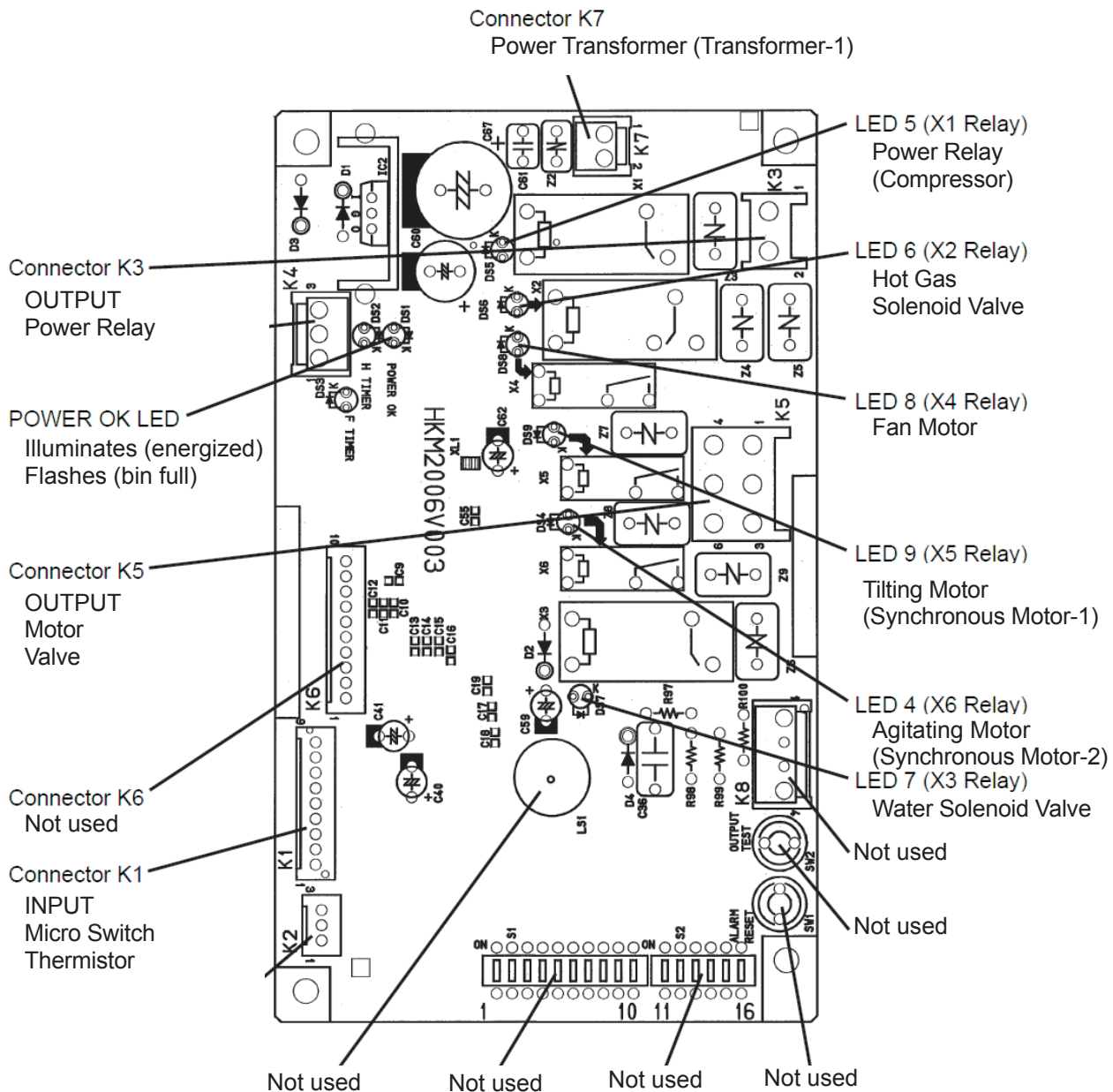


Fig. 11

13. CONTROLLER BOARD [DSM-12CE (Auxiliary code V-2 and later), DSM-12DE]

[a] CONTROLLER BOARD LAYOUT



[b] CHECKING CONTROLLER BOARD

- * While checking the controller board for proper operation, keep all the connectors in place, including those in the control box.
- * If the ice making switch needs to be pressed to manually end a freeze cycle, wait for at least 3 minutes after the freeze cycle begins (agitating motor starts). Otherwise, the compressor will stop for 5 minutes (considered as low water condition).
- * When the unit is unplugged, wait for 5 minutes before restarting the unit.

14. FUSE [DSM-12CE (Auxiliary code V-0 and earlier)]

- 1) Unplug the ice dispenser.
- 2) Remove the front panel.
- 3) Insert a flat blade screwdriver or the like into the square hole on the fuse holder (side or top). Push and unhook the fuse holder cap with the fuse.
- 4) Pull out the cap, and remove the fuse.
- 5) Install the new fuse.
- 6) Assemble the removed parts in the reverse order of which they were removed.
- 7) Plug in the ice dispenser.

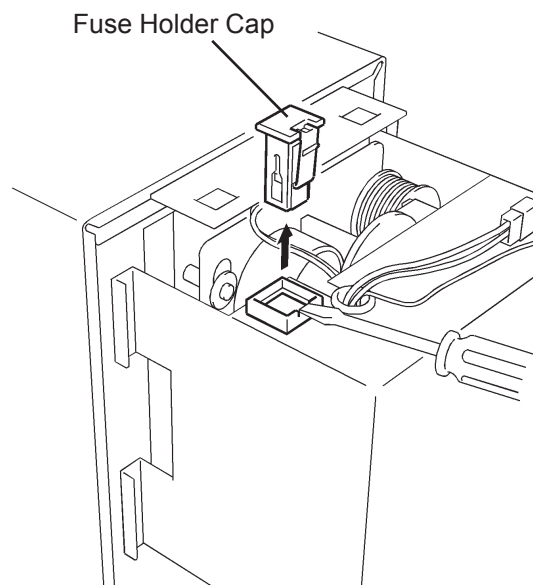


Fig. 12

15. MECHANISM ASSEMBLY

IMPORTANT

Every time the mechanism cover or tray is removed, check the ice size after assembling the removed parts.

[a] ARM

- 1) Unplug the ice dispenser.

Note: The mechanism assembly will be easily removable if the unit is stopped just after a defrost cycle starts.

- 2) Remove the front panel and control box.
- 3) Remove the E-ring and shim (C), and take the arm off the cam (A) and lever.
- 4) Install the new arm.
- 5) Assemble the removed parts in the reverse order of which they were removed.

[b] AGITATING MOTOR

- 1) Unplug the ice dispenser.

Note: The mechanism assembly will be easily removable if the unit is stopped just after a defrost cycle starts.

- 2) Remove the front panel, control box and arm.
- 3) Pull out the lever.

If the shims (A), spring and collar does not require replacement, go to 5).

- 4) Remove the retaining ring (L), and disassemble the above parts.
- 5) Remove the gear motor and mechanism cover.
- 6) Loosen the securing screw, and remove the cam (B) from the agitating motor (synchronous motor-2).
- 7) Cut the agitating motor (synchronous motor-2) leads at the wire connectors.

8) Remove the securing screw, and take off the agitating motor (synchronous motor-2).

If the shim (B) and O-rings do not require replacement, go to 10).

9) Remove the retaining ring (S), and disassemble the above parts.

10) Replace the parts as required.

11) Assemble the removed parts in the reverse order of which they were removed.

12) Plug in the ice dispenser.

[c] TILTING MOTOR

1) Unplug the ice dispenser.

Note: The mechanism assembly will be easily removable if the unit is stopped just after a defrost cycle starts.

2) Remove the front panel, control box and arm.

If the cam (A) and tilting motor (synchronous motor-1) do not require replacement, go to 7).

3) Loosen the securing screw, and remove the cam (A) from the tilting motor (synchronous motor-1).

4) Cut the tilting motor (synchronous motor-1) leads at the wire connectors.

5) Remove the motor bracket from the mechanism cover.

6) Remove the tilting motor (synchronous motor-1) from the motor bracket.

[DSM-12CE (Auxiliary code V-1 and earlier)]

If the tilting switch (microswitch-2) [left] and water supply switch (microswitch-4) [right] do not require replacement, go to 9).

[DSM-12CE (Auxiliary code V-2 and later), DSM-12DE]

If the tilting switch (microswitch-2) does not require replacement, go to 9).

7) Disconnect the terminals from the above switches.

8) Remove the switches from the motor bracket.

9) Replace the parts as required.

- 10) Assemble the removed parts in the reverse order of which they were removed.
- 11) Plug in the ice dispenser.

[d] ICE MAKING SWITCH [DSM-12CE (Auxiliary code V-1 and earlier)]

- 1) Unplug the ice dispenser.
- 2) Remove the front panel, control box, arm and lever.
- 3) Disconnect the connectors from the ice making switch (microswitch-5).
- 4) Remove the securing screw, and take off the ice making switch (microswitch-5).
- 5) Install the new ice making switch (microswitch-5).
- 6) Assemble the removed parts in the reverse order of which they were removed.
- 7) Plug in the ice dispenser.

[e] ICE MAKING SWITCH [DSM-12CE (Auxiliary code V-2 and later), DSM-12DE]

To remove:

- 1) Unplug the ice dispenser.
- 2) Remove the front panel and cabinet.
- 3) Disconnect all the connectors from the control box.
- 4) Unscrew and remove the control box.
- 5) Disconnect the connector from the ice making switch.
- 6) Check and remember the location of the ice making switch bracket. Remove the hexagon head screw and screw (A). Take out the ice making switch together with the bracket.
- 7) Remove the screw (B) and take the ice making switch off the bracket.

To replace:

- 8) Use the screw (B) to secure the ice making switch on the bracket.

- 9) Use the hexagon head screw and screw (A) to secure the ice making switch and the bracket on the cover. Position the ice making switch bracket around its original location.
- 10) Plug the connector into the ice making switch.
- 11) Screw the control box and plug in the connectors.
- 12) Turn on the power supply and check that:
 - The tray, agitating plate, lever and arm are not obstructed.
 - Ice of the proper size is produced.
- 13) Replace the cabinet and front panel.

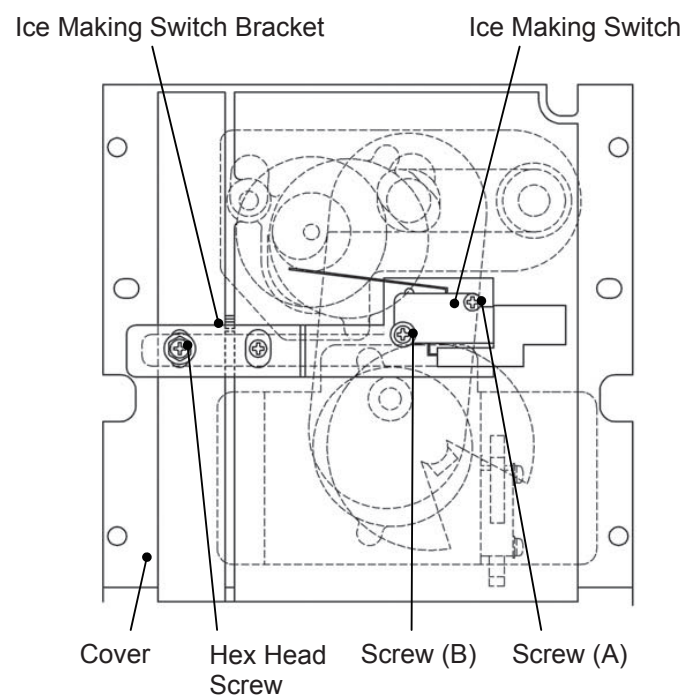


Fig. 13

16. TRAY

IMPORTANT

Every time the mechanism cover or tray is removed, check the ice size after assembling the removed parts.

- 1) Dispense all ice from the storage bin.
- 2) Unplug the ice dispenser.
- 3) Remove the front panel, gear motor, control box, arm, lever and mechanism cover.
- 4) Remove the tray from the evaporator bracket openings. Dump out any remaining water into the storage bin before taking out the tray.

If the bin control switch [*1] does not require replacement, go to 6).

- 5) Cut the nylon tie binding the bin control switch [*1] wiring with the tray shaft. Remove the bin control switch [*1] by spreading out the tabs on both sides.

Note: Do not put excessive strain and break the tabs or pins.

If the bin sensor does not require replacement, go to 7).

- 6) Remove the rear shaft of the bin sensor first and then the front shaft.

If the agitating plate does not require replacement, go to 8).

- 7) Pull out the pin, and remove the agitating plate.
- 8) Replace the parts as required.
- 9) Assemble the removed parts in the reverse order of which they were removed.
- 10) Plug in the ice dispenser.

*1 Michroswitch-3 [DSM-12CE (Auxiliary code V-1 and earlier)]
Michroswitch-4 [DSM-12CE (Auxiliary code V-2 and later), DSM-12DE]

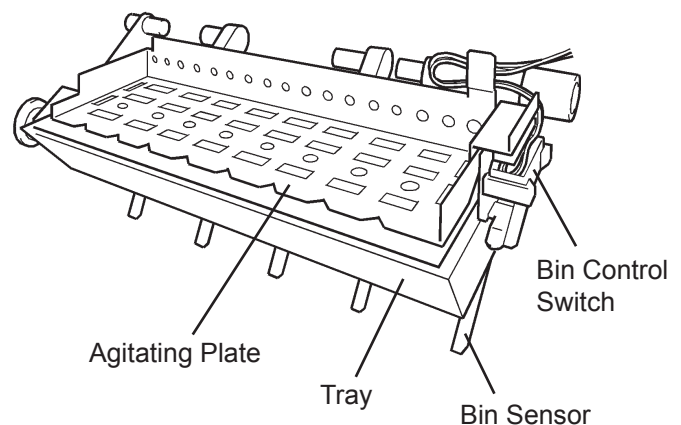


Fig. 14

17. RELAY-4 (COMPRESSOR) [DSM-12CE (Auxiliary code V-1 and earlier)]

- 1) Unplug the ice dispenser.
- 2) Remove the front panel, cabinet, under cover and left side panel.
- 3) Disconnect the terminals from the relay-4.
- 4) Remove the relay bracket from the base.
- 5) Remove the relay-4 from the relay bracket.
- 6) Install the new relay-4.
- 7) Assemble the removed parts in the reverse order of which they were removed.
- 8) Plug in the ice dispenser.

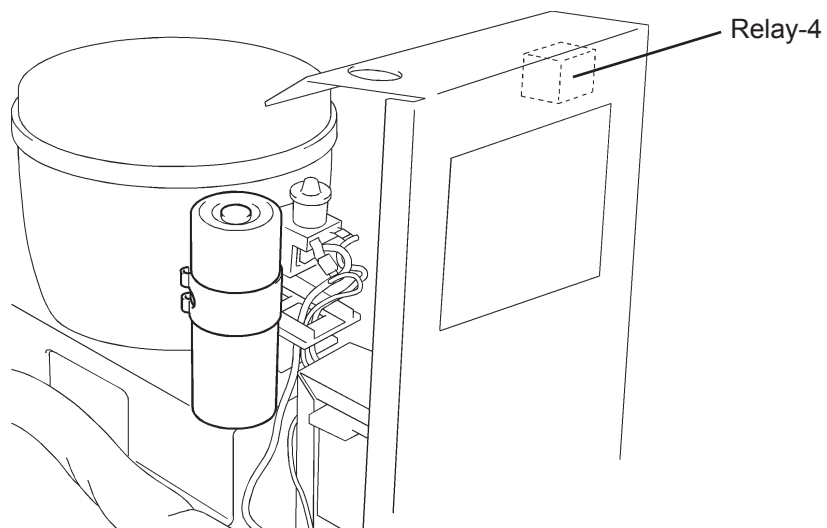


Fig. 15

18. THERMISTOR [DSM-12CE (Auxiliary code V-2 and later), DSM-12DE]

[a] REMOVAL AND REPLACEMENT

- 1) Unplug the ice dispenser.
- 2) Remove the front panel and cabinet.
- 3) Remove the control box.
- 4) Disconnect the two closed end connectors of the thermistor leads.
- 5) Remove the ties, insulation, thermistor holder and thermistor in this order.
- 6) Remove the old sealant from the thermistor holder and suction pipe.
- 7) Turn up the thermistor holder, and press a tube of the sealant KE4560RTV, manufactured by Shin-Etsu Silicones, to the recess of the thermistor holder. Slowly squeeze the sealant out of the tube and spread it smoothly in the recess.

Note: 1. Be careful not to let in air and make a hollow in the recess of the thermistor holder. Fill the recess with the sealant up to slightly above the top of the recess as shown below.

2. The above specified sealant is a special type of high thermal conductivity.
Do not use any sealant other than the above.

- 8) Attach the new thermistor in position on the suction pipe. Press down the thermistor holder over the thermistor and secure them with the ties.

Note: 3. Before attaching the thermistor, wipe off any moisture or condensation from the suction pipe surfaces.

4. Be careful not to damage the thermistor leads.

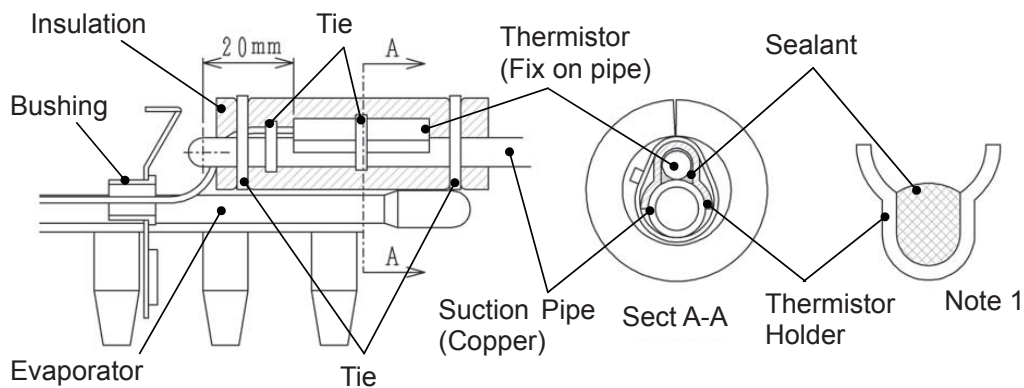


Fig. 16

9) Cover the parts with the insulation and secure them with the ties.

Note: 5. After the thermistor holder is fitted, do NOT pull the thermistor leads to move the thermistor.

10) Cut the new thermistor leads at the bottom of the connector and connect it with a closed end connector. Fix the closed end connector to keep it facing up.

11) If any removed part or sealant has dropped into the tank, clean it off thoroughly.

12) Replace the control box, cabinet and front panel.

13) Plug in the ice dispenser.

[b] DEFROST AND LOW WATER CONTROL

When ice grows into a certain size, the ice making switch (microswitch-3) trips and the tray starts to tilt. When the tray reaches an adequate position, the hot gas valve opens to start a defrost cycle.

The thermistor senses the evaporator outlet temperature and completes a defrost cycle when ice drops from the tray and the evaporator outlet rises above a specific temperature.

In case of low water, the evaporator temperature suddenly drops. To protect the compressor, the unit shifts from freeze cycle to defrost cycle if the evaporator outlet falls below a specific temperature. Although ice does not form in low water conditions, the unit continues to operate and repeats shifting from freeze cycle to defrost cycle.

[c] CHECKING THERMISTOR

If there is any doubt of trouble, first visually check if the thermistor is properly installed on the evaporator outlet pipe. Then, check the resistance between the thermistor leads as follows:

1) Remove the thermistor according to “[a] REMOVAL AND REPLACEMENT”.

2) Immerse the thermistor sensor in a glass of icy water for a few minutes.

3) Check the resistance between the thermistor leads. If it exceeds the normal range of 5 to 7k Ω , replace the thermistor.

Temperature (°C)	Resistance (kΩ)
-12	10.61
0	6.00
10	3.87
21	2.47

19. TRANSFORMER

- 1) Unplug the ice dispenser.
- 2) Remove the front panel, cabinet, under cover and side panels (DSM-12CE only).
- 3) Remove the terminal cover on the compressor, and disconnect the compressor wiring.
- 4) Remove the start capacitor and starter.
- 5) Cut the transformer leads at the wire connectors.
- 6) Remove the transformer bracket from the base.
- 7) Remove the transformer from the transformer bracket.
- 8) Install the new transformer.
- 9) Assemble the removed parts in the reverse order of which they were removed.
- 10) Plug in the ice dispenser.

20. POWER SUPPLY CORD

- 1) Unplug the ice dispenser.
- 2) Remove the front panel, cabinet, under cover and left side panel (DSM-12CE only).
- 3) Remove the bushing securing the power supply cord.
- 4) Cut the power supply cord leads at the wire connectors. Remove the earth screw.
- 5) Install the new power supply cord.
- 6) Assemble the removed parts in the reverse order of which they were removed.
- 7) Plug in the ice dispenser.

IX. ADJUSTMENT OF ICE SIZE

When a certain size of ice forms on the evaporator, ice obstructs the agitating plate located inside the tray and moved up and down by the agitating mechanism. The cam (B) rotates and pushes down itself to hit the ice making switch located below, which signals to end a freeze cycle.

This ice making switch is not affected by ambient temperatures and is set to automatically produce a fixed size of ice all the year round without any adjustment required. Do not touch the ice making switch unless adjustment is necessary.

As mentioned above, the positions of the evaporator, tray (including tilting mechanism), agitating mechanism and ice making switch affect the ice size. If any of these parts is removed or replaced, adjustment of the ice making switch will be required. Read and understand the following instructions thoroughly before adjusting the ice making switch.

1. PROPER ICE SIZE

The proper ice diameter is approx. 23 mm or less as shown below. This is because the evaporator's projections (mandrels) have a pitch of 24 mm and ice size exceeding 24 mm will cause ice bridges and defrost or tilting problems, resulting in failure.

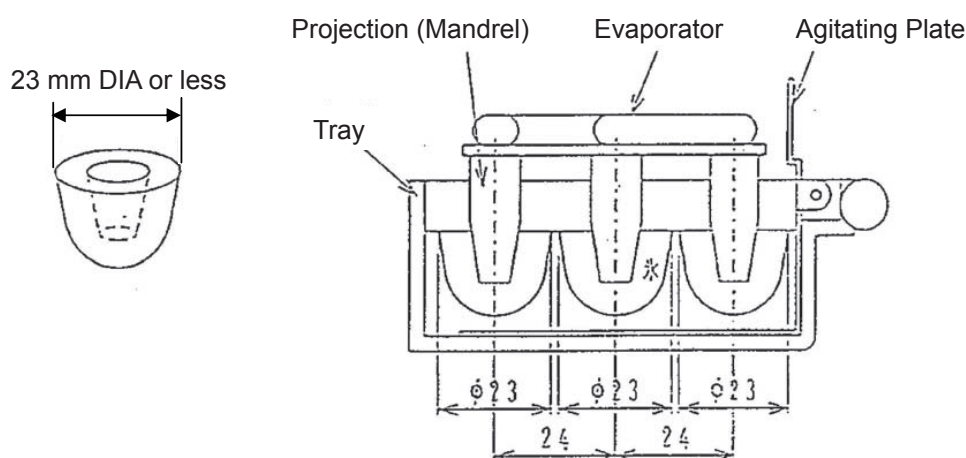


Fig. 17

2. ADJUSTMENT

[a] DSM-12CE [Auxiliary code V-1 and earlier]

Note: Adjustment exceeding the proper ice size range will cause ice bridges and result in a failure.

- 1) Check the current ice size before adjusting the ice making switch.
- 2) Unplug the ice dispenser.
- 3) Remove the front panel and cabinet.
- 4) Loosen the screw on the ice making switch bracket through the opening on the left side of the control box.
- 5) Lower the bracket for a larger ice size or raise the bracket for a smaller ice size. Adjustment of the bracket by 1 mm will change the ice size by around 2 mm.
- 6) Plug in the ice dispenser to start a freeze cycle.
- 7) Check the ice size.
- 8) Repeat the above steps 5) to 7) until the desired ice size will be obtained.

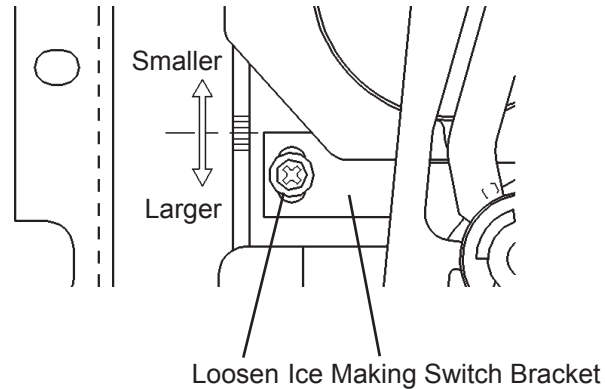


Fig. 18

[b] DSM-12CE [Auxiliary code V-2 and later], DSM-12DE

- 1) Unplug the ice dispenser.
- 2) Remove the front panel and cabinet.
- 3) Check and remember the location of the ice making switch bracket from the square hole in the left side of the control box.
- 4) Use a spanner (7 mm) from the square hole in the left side of the control box to loosen the hexagon head screw a little.
- 5) Slightly move up and down the left end of the ice making switch bracket to tighten the above screw. Move up the bracket to decrease the ice size. Move down the bracket to increase the ice size. Moving the bracket by 1 mm will change the ice diameter by approx. 2 mm.
- 6) Run the ice dispenser and check the ice size. If necessary, repeat steps 4) and 5) to readjust the ice size.
- 7) Replace the cabinet and front panel.

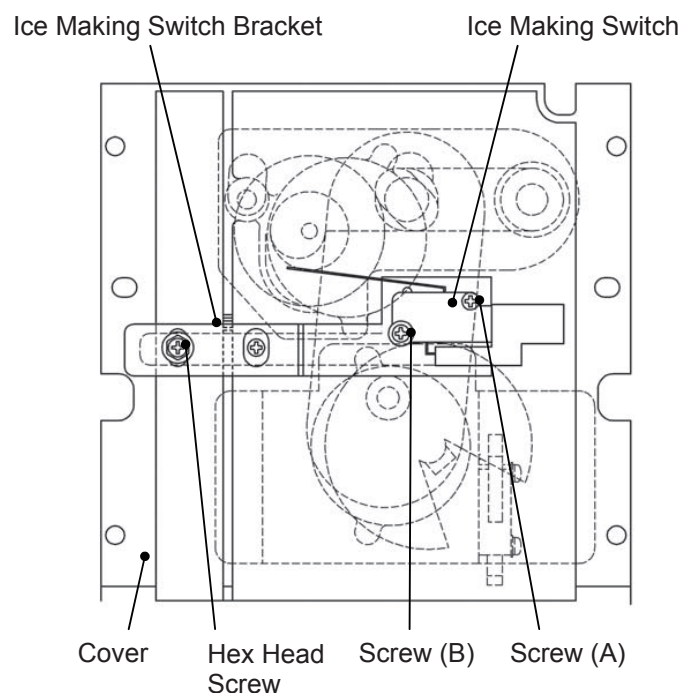


Fig. 19