

HOME ICE CREAM MAKER MODEL TS-009 REPAIR MANUAL



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1. Revision Status and Authority for Issue

Document Issue Level	Comments	Changed By	Date
01	First issue	Raised by CRP	08-04-05
02	Reviewed, Updated and Minor Errors Corrected.	CRP	23-05-05

Authority to release Issue 02:

S LLOYD	Managing Director	23-05-05
Name	Position	Date

2. Purpose

The purpose of this document is to provide a reference to facilitate the diagnosis and repair of faults to the TS-009 Home Ice Cream Maker.

3. Scope

This document covers versions of the **Home Ice Cream Maker** Model TS-009 supplied by Refrigeration Installations Limited. All versions are covered by these instructions, although most photographs show the TS-009AS, and there may be slight variations in functionality, such as the Control Panel Display and detailed internal layout, however the basics of machine dismantling, repair and reassembly are generally applicable. If in doubt contact Refrigeration Installations Limited.

4. Responsibilities

The responsibility for the preparation of and modifications to this document rests with RIL.

Repair to any Home Ice Cream Maker should only be carried out by competent qualified personnel and we recommend that any spare or replacement parts fitted be either supplied by, or approved by, RIL.

The use of spare or replacement parts from other sources may invalidate any guarantee or warranty on machines purchased in the UK from RIL or one of its approved distributors.

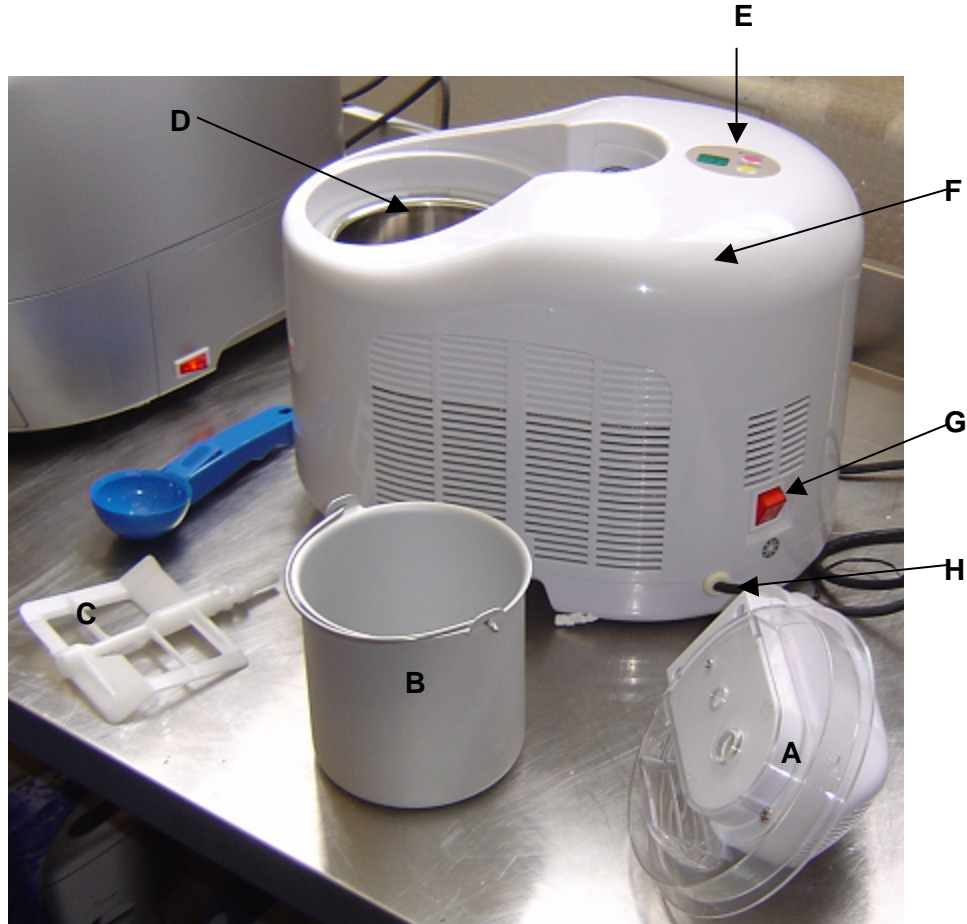
5. Health and Safety

The Home Ice Cream Maker is mains electricity powered and any checks or repairs must be carried out by qualified personnel and in full compliance with any relevant national or local legislation or codes of practice concerning the safety of personnel working with electrical equipment.

6. Abbreviations and Definitions

Front	The side of the unit nearest to the refrigeration barrel
Left	The left hand side of the unit when viewed from the Front
IC	Integrated Circuit (A complex semiconductor circuit)
PCB	Printed Circuit Board
Rear	The side of the unit nearest the Control Panel Display
Right	The right hand side of the unit when viewed from the Front
RIL	Refrigeration Installations Limited
SSD	Static Sensitive Device (An electronic component such as an IC or transistor which may be damaged if a build up of static electricity is discharged through the component)

7. Parts Overview



- | | | | |
|---|-----------------------|---|----------------------|
| A | Top Motor Assembly | B | Ice Cream Container |
| C | Paddle | D | Refrigeration Barrel |
| E | Control Panel Display | F | Appliance Body |
| G | On/Off Switch | H | Mains Entry Cable |

8. Fault Identification (Continued)

8.3 Plug the machine into the mains electrical supply and switch on the On/Off switch located in the rear of the right hand panel. The On/Off switch should illuminate.

8.4 If the Control Panel Display is type AS (with separate START/STOP button) the timer will show a setting between 0 and 60 minutes. Press the TIMER SET button and the display should count down to 0 from its initial value and then reset to 60. Reset to 10 minutes then press the START/STOP button. The paddle will start to turn and freezing of the Ice Cream Container will commence. Allow the machine to run for the setting time of 10 minutes and ensure it stops. During the running time confirm that the Ice Cream Container/Refrigeration Barrel are freezing.

8.5 If the Control Panel Display is of the A type (no separate START/STOP button) the timer will indicate a number of minutes, normally 25 but the value is not critical. Pressing the up and down buttons will increase and decrease the set time. Ensure that both work and then set the time to 10 minutes. Machine start up (the Paddle will begin to turn) is automatic after about 10 seconds from switch on or ten seconds after the last timer adjustment. As in 8.4 ensure the Ice Cream Container is freezing.

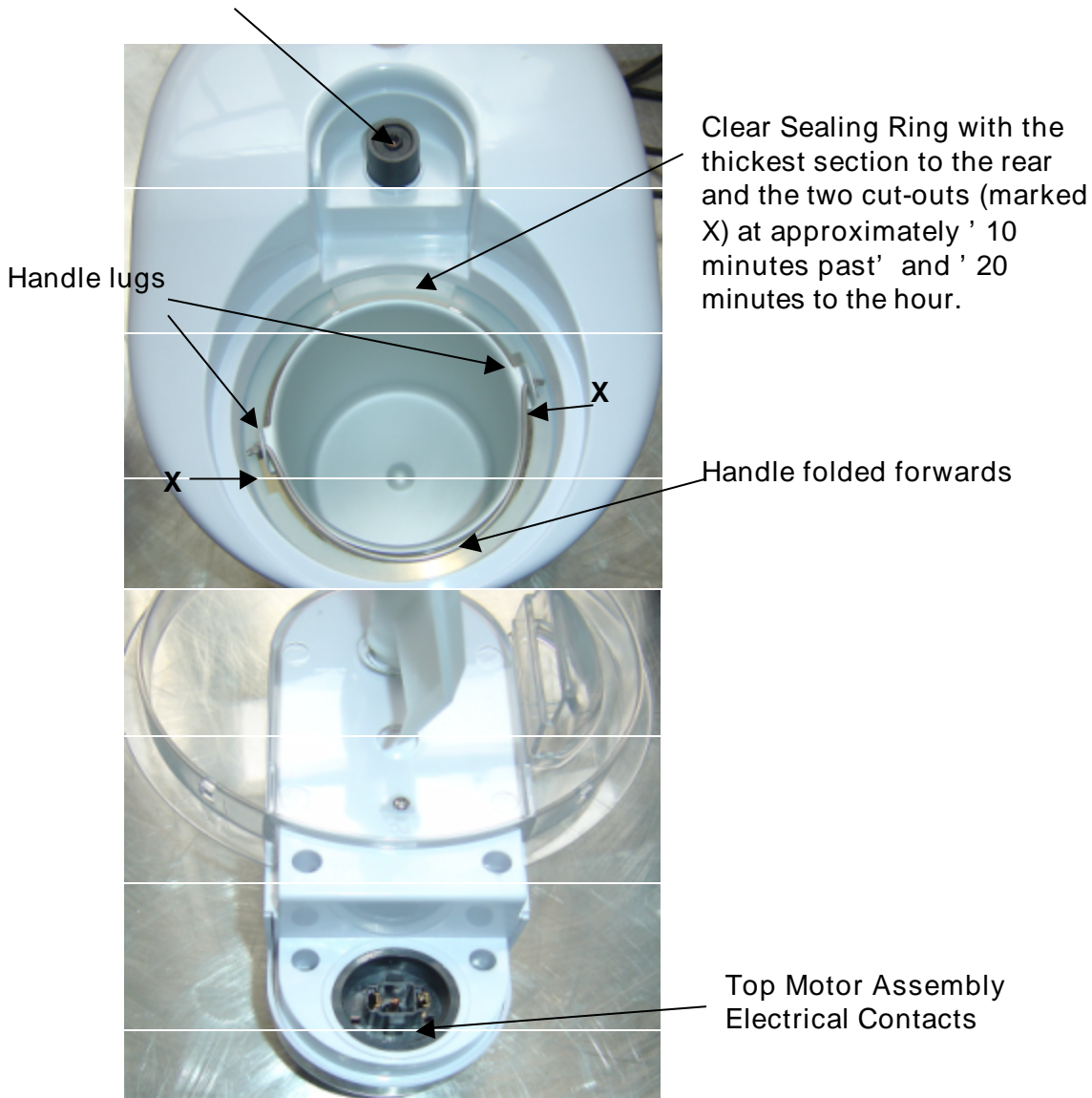
8.6 Lack of freezing could indicate a compressor fault, cooling system fault or cooling fan fault. See Section 9.

8.7 If the Paddle fails to turn a motor failure or connection problem may be the cause. One of the most common problems reported by users is the paddle not turning and this is normally due to a bad electrical connection or lack of electrical connection between the contacts in the Top Motor Assembly and the Appliance Body. If the Top Motor Assembly is not seated fully and correctly there is a high possibility of open circuits. The reasons for Top Motor Assembly seating problems are incorrect positioning of the seal and incorrect Ice Cream Container orientation and handle position.

8. Fault Identification (Continued)

8.8 The positioning of the Ice Cream Container and its handle, and the positioning of the clear sealing ring on the top of the Refrigeration Barrel are critical. The seal must be positioned as shown and the Ice Cream Container must be orientated with the handle lugs as shown and with the handle folded forwards.

Appliance Body
Motor Connector

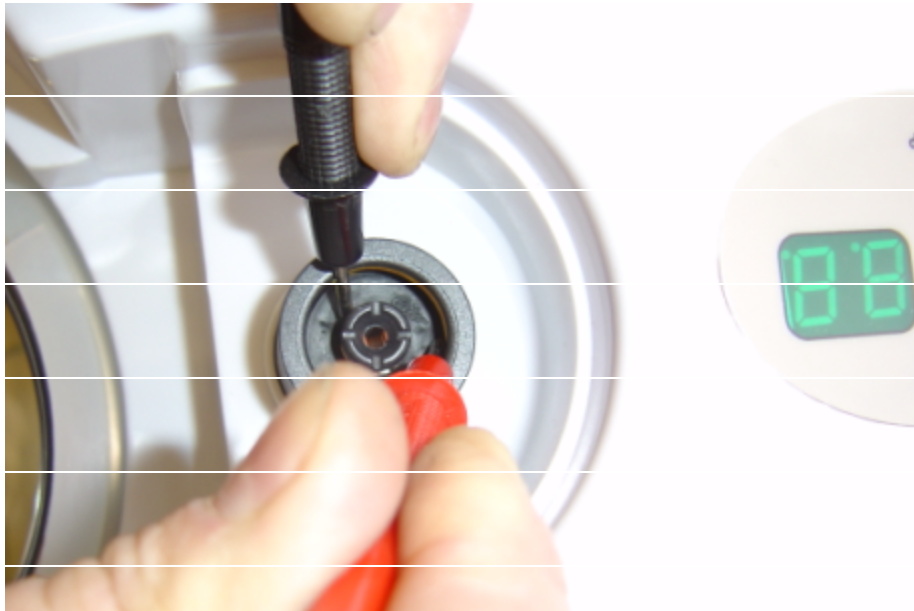


8. Fault Identification (Continued)

8.9 If the Paddle fails to turn and it is not due to the Top Motor Assembly seating incorrectly then, providing the motor is being supplied with power, the motor itself will need changing. See Section 10.

8.10 Confirm a suspected motor fault by checking the electrical supply to the motor. Remove the Top Motor Assembly and push down on the spring loaded section of the Appliance Body Motor Connector using (insulated) multimeter probes and confirming mains voltage between the outer metal contact and the inner metal contact.

Checking for mains supply to the motor



9. Unit Dismantling

IMPORTANT NOTE: The Home Ice Cream Maker has a combined mains distribution and logic control PCB that includes SSD' s. When handling PCB' s either in or out of the unit it is recommended that anti-static handling precautions be taken.

Ensure the unit is disconnected from the mains electricity and remove the Top Motor Assembly and the Ice Cream Container. Electric motor replacement does not require full unit dismantling.

The only special tools required to enable the unit to be dismantled are a bifurcated (two-pronged) screwdriver to release tamperproof screws used in a number of locations as detailed in the text. Otherwise standard types of tool are all that is required.

Screwdrivers for tamperproof screws



The blue handled screwdriver is a commercially available product. The black handled screwdriver is a filed-down standard slotted screwdriver – a cheaper alternative.

9.1 Remove three self adhesive screw covers and three tamperproof screws that secure the upper body moulding as shown in the following pictures.

9. Unit Dismantling (Continued)



Right hand side panel screw

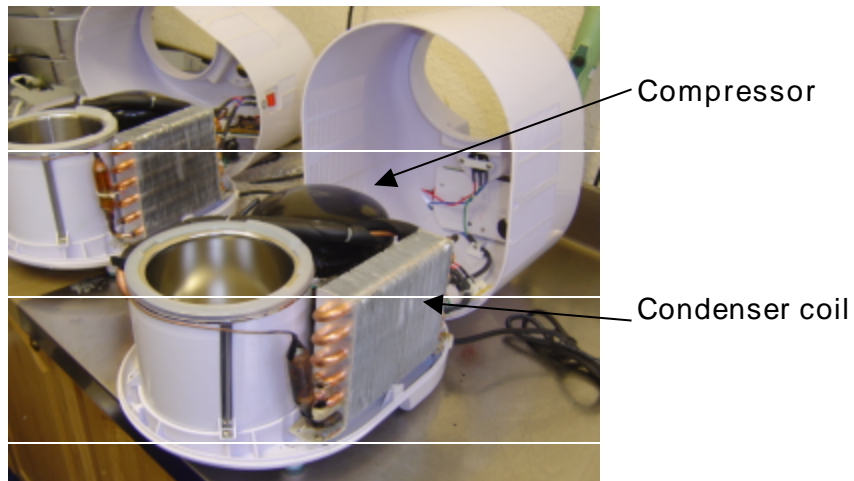


Rear panel screw



Front panel screw

9.2 Lift the appliance upper moulding from the unit by holding it low down on the right and left hand sides. Some degree of panel manoeuvring may be necessary as there is not a lot of slack in internal cables and wires. Place the upper moulding behind the unit and stabilise if necessary.

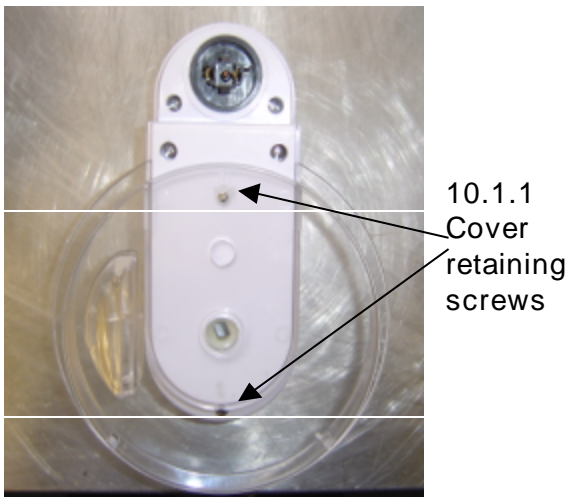


9.3 Access to internal parts is now possible.

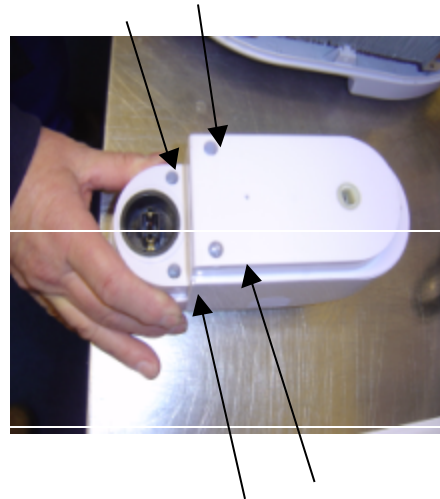
10. Repair

10.1 Motor Replacement

10.1.1 Remove the Top Motor Assembly from the appliance and pull the Paddle out of its seating. Remove the two Philips head cover retaining screws that attach the clear plastic cover to the motor housing and remove the cover.



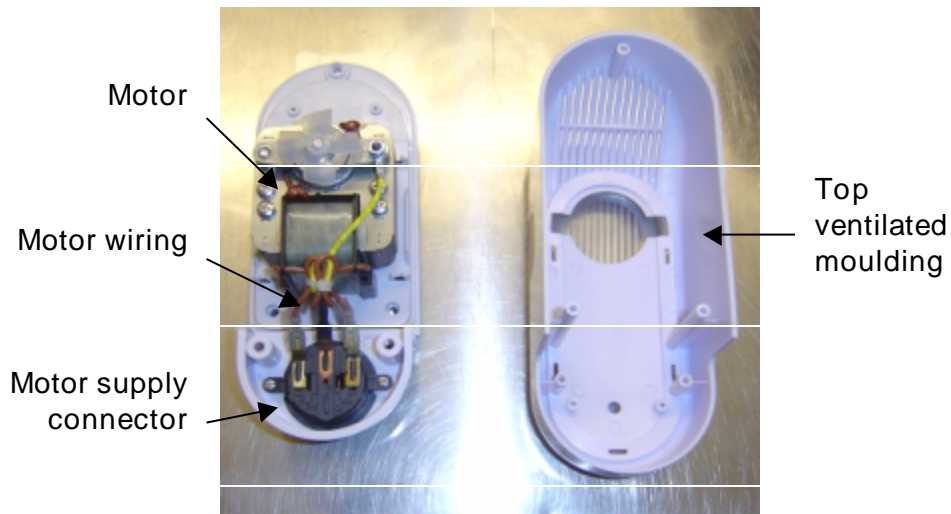
10.1.2 Tamperproof screws



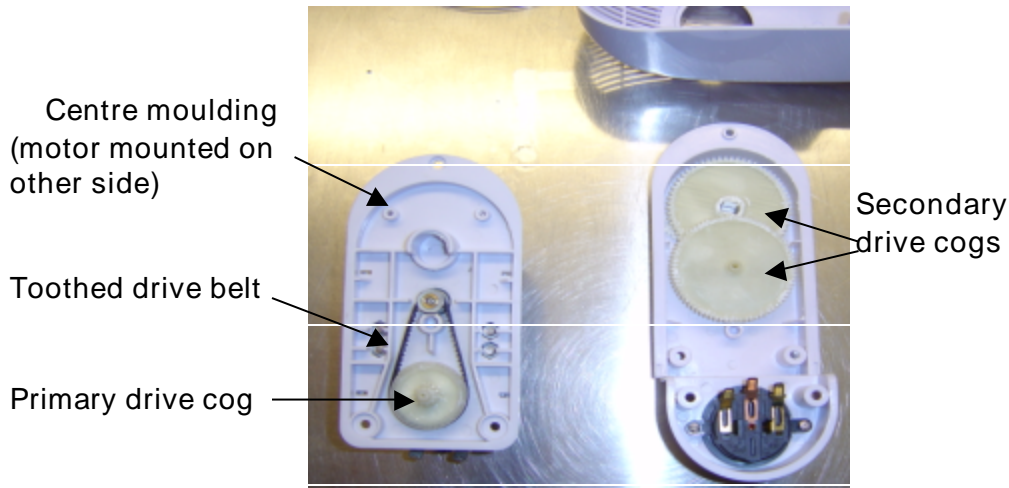
10.1.2 Remove the four tamperproof screws and, holding the assembly firmly to stop it falling apart, turn the assembly over so that it sits upright (in the same attitude as when it is on the appliance). There are three mouldings that form the Top Motor Assembly (apart from the clear cover). The top ventilated moulding, the centre moulding on which the motor is mounted, and the bottom moulding into which the Paddle drive cogs locate. If the unit is allowed to fall apart the drive cogs will fall loose and make re-assembly more difficult.

10.1 Motor Replacement (Continued)

10.1.3 Carefully lift the top ventilated moulding away to reveal the motor and its wiring. The centre moulding and bottom moulding should be kept in close contact.

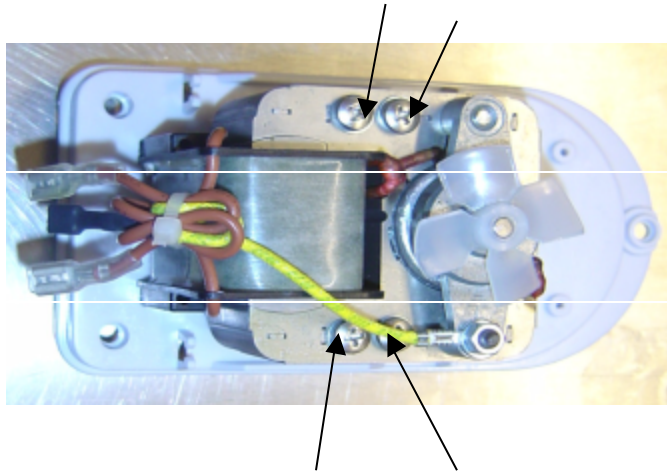


10.1.4 Disconnect the three wires from the spade terminals on the base of the motor supply connector and gently lift off the centre moulding complete with motor, toothed drive belt and the primary drive cog. The larger secondary drive cogs should remain in the bottom moulding.



10.1 Motor Replacement (Continued)

10.1.5 Remove the primary drive cog from its location socket and the toothed drive belt. Turn the assembly over and remove the four Philips head mounting screws complete with nut and shakeproof washer. It may be necessary to slacken off the motor earth lead to gain access to two of the screws.



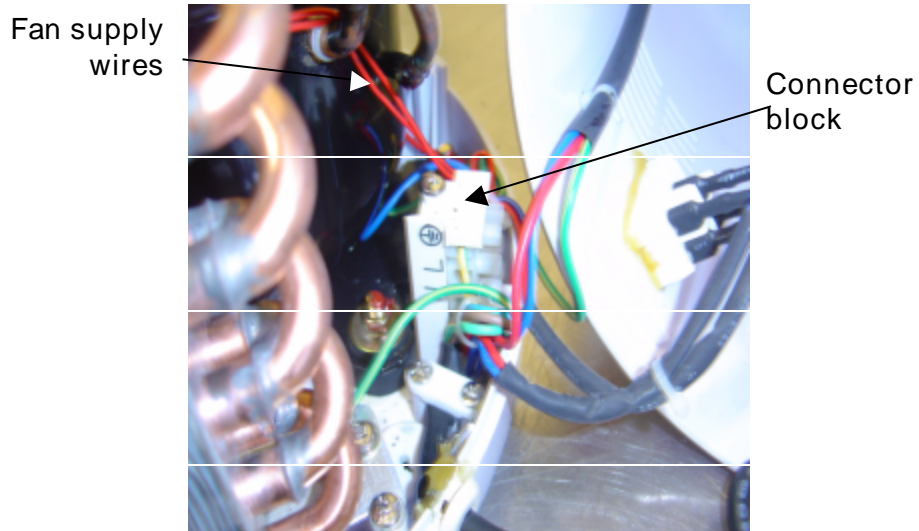
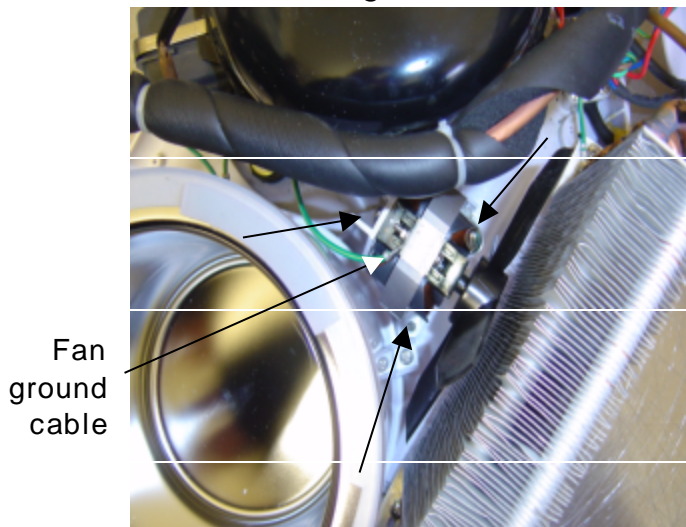
10.1.6 The motor can now be lifted away from the centre moulding.

10.1.7 Replacement is the reverse of removal. Care should be taken to ensure correct positioning and assembly of the drive cogs and toothed belt.

10.2 Cooling Fan Replacement

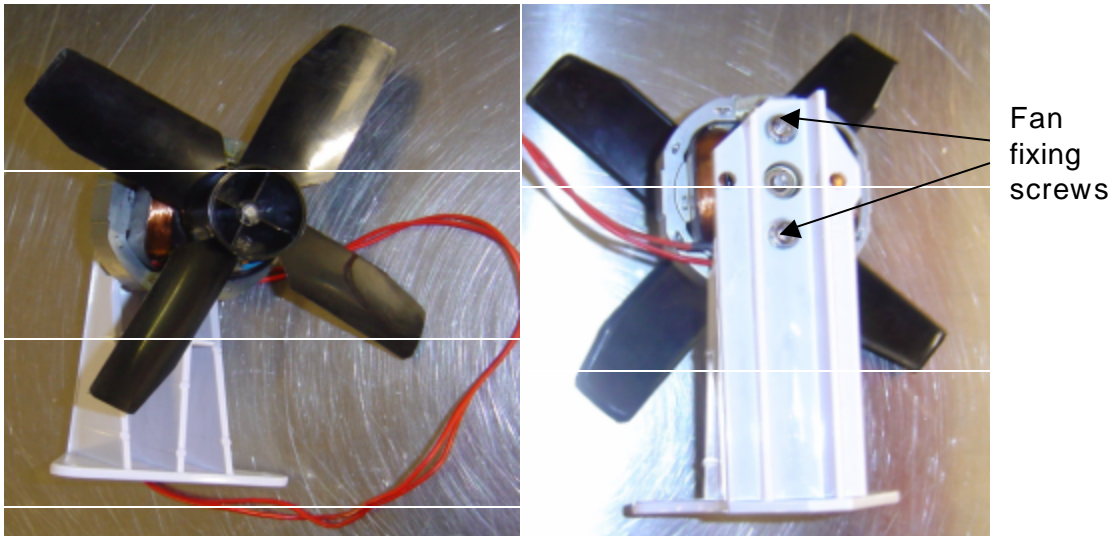
10.2.1 Remove the three Philips head screws that hold the fan mounting bracket to the base of the unit. Remove the cable ties from the wiring and lift the connector block out of its seating. Loosen the two screws clamping the two fan supply wires and release them from the connector block. Remove the screw, nut and shakeproof washer securing the fan ground cable to the fan laminations and withdraw the fan and mounting bracket.

Fan mounting bracket screws



10.2 Cooling Fan Replacement (Continued)

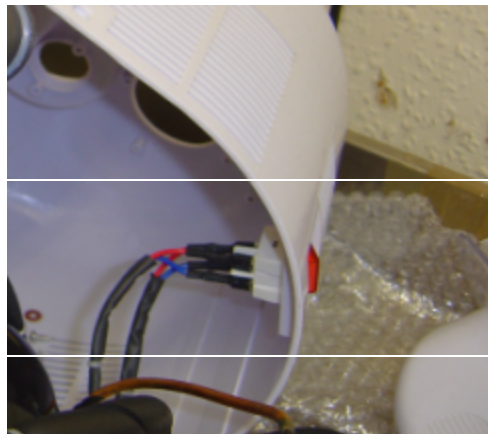
10.2.2 The fan can now be separated from the bracket by removing the two Philips head fan fixing screws.



10.2.3 Fan replacement is the reverse of the removal process.

10.3 On/Off Switch Replacement

10.3.1 Following unit dismantling the On/Off switch can be seen in the right hand rear panel. The switch is a push fit into the panel and is also glued in.



10.3 On/Off Switch Replacement (Continued)

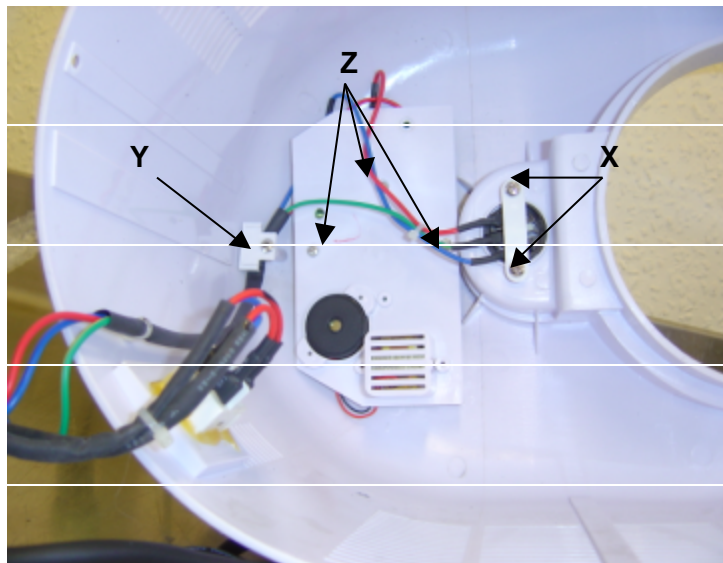
10.3.2 Note the position of the four wires on the back of the switch and remove them from the spade terminals. Cut away as much of the glue as possible and push the switch out of its recess from inside the panel.

10.3.3 Replacement of the switch is the reverse of the removal process.

10.4 Printed Circuit Board and Motor Connector Replacement

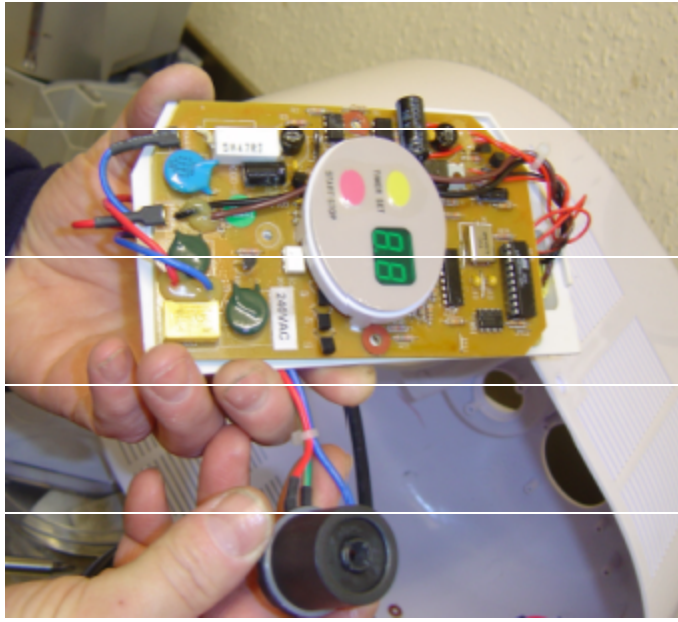
NOTE: As stated at the beginning of Section 9 anti-static handling precautions should be taken if the PCB is to be handled or removed.

10.4.1 If the Motor Connector only is to be replaced remove the two Philips head screws (X on the picture) and the retaining bracket. Disconnect the three wires and replace the connector.



10.4 PCB and Motor Connector Replacement (Continued)

10.4.1 If the PCB or other parts are to be replaced remove the two Philips head screws (X in the previous picture) and remove the motor connector retaining bracket. Remove the Philips head screw (Y) attaching the cable clamp and remove the clamp. Remove the three Philips head screws (Z) that hold the PCB and its plastic cover in place. Lift away the PCB, its cover and the Motor Connector.

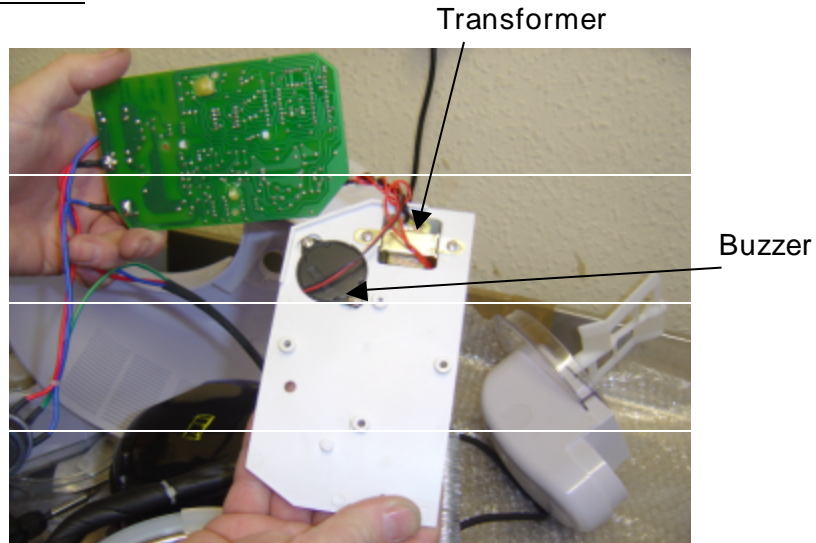


10.4.2 Only two of the wires on the PCB are attached with spade connectors. The remainder are soldered and will require de-soldering to replace the PCB. As with all PCB hand soldering care must be taken to avoid damage to the PCB, in particular in avoiding raised circuitry by applying too much heat.

10.4.2 The plastic PCB cover accommodates the transformer and the buzzer. If either of these requires replacement the method of attachment to the cover is clear and again they require soldering.

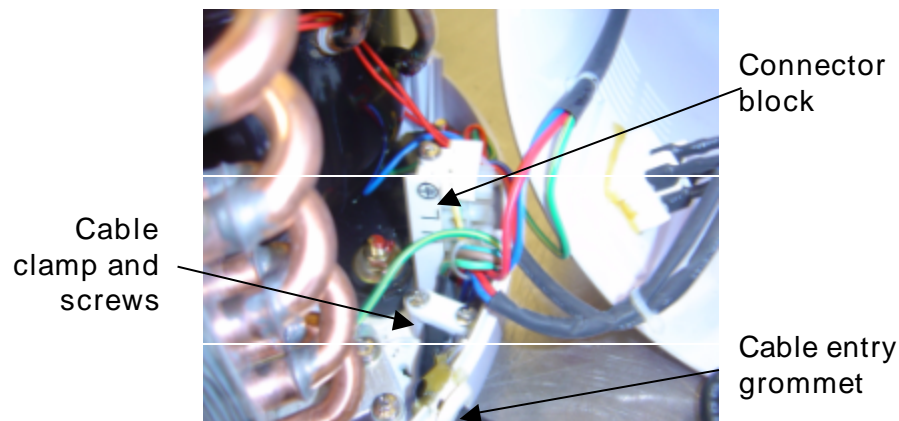
10.4 PCB and Motor Connector Replacement (Continued)

10.4.2 Continued



10.5 Mains Lead Replacement

10.5.1 Remove the two Philips head screws that attach the cable clamp and remove the clamp. Remove the glue from around the cable entry grommet and slide the grommet out of its slot. Remove any necessary cable ties to allow the connector block to be removed from its seating and release the three mains lead conductors from the block. Replacement is the reverse process.

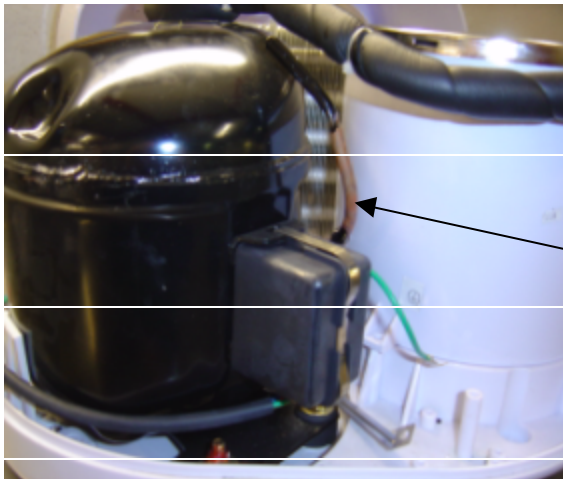


10.6 Compressor Replacement

10.6.1 When a compressor fault is suspected, as determined in Section 8.6, and replacement of the compressor is required the machine should be dismantled as described in Section 9.

10.6.2 Remove any cable ties that are holding wiring to any of the compressor parts or pipes and disconnect the compressor wiring from the connector block. Remove any insulation that could get damaged in subsequent brazing operations.

10.6.3 Pierce the suction pipe as shown in the picture with a pair of piercing pliers.

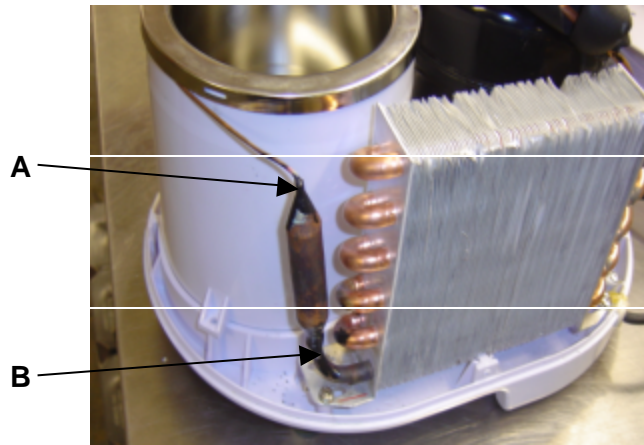


Suction pipe

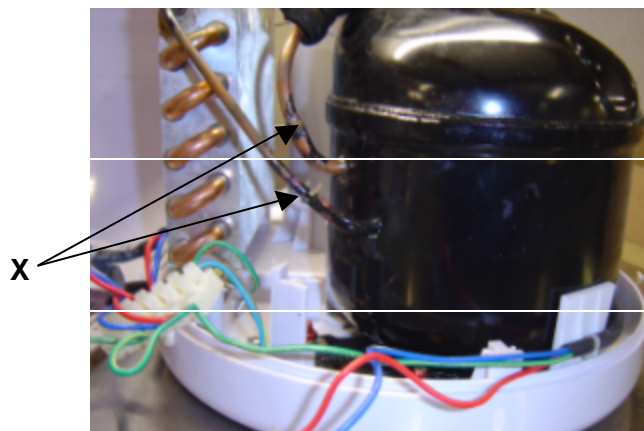
10.6.4 Connect the pierced suction pipe to an appropriate gas recovery system via a service hose and recover the refrigerant gas.

10.6 Compressor Replacement (Continued)

10.6.5 Cut through the capillary tubing above the drier (point A in the picture). Remove the drier by freeing the drier/condenser joint (B in the photograph)



10.6.6 Disconnect the second suction line and the discharge line at the joints nearest to the compressor body, X in the picture.



10.6.7 Remove the compressor from the appliance base moulding by removing the four (vibration proof) mounting screws and nuts.

10.6 Compressor Replacement (Continued)

10.6.8 Fit a new compressor complete with a Schrader valve on the suction pipe and re-connect the second suction pipe and the discharge pipe as originally fitted.

10.6.9 Connect an oxygen (O₂) free nitrogen (N₂) supply to the Schrader valve and force N₂ gas through the system and check that N₂ is released from the bottom of the condenser and the capillary.

10.6.10 Fit a new drier.

10.6.11 Strength and leak test with O₂ free N₂ to 175psi.

10.6.12 Visually check all joints for quality and leak test them using leak detector fluid. Remake any suspect or leaking joints and repeat the checking process.

10.6.13 If there are no leaks release the N₂ from the system, connect up to a vacuum pump and evacuate to 2 Torr.

10.6.14 Re-charge the system with 80gm. of R134a refrigerant.

11. Unit Re-assembly

Re-assembly of the unit is essentially the reverse of the dismantling procedure but the following points are important.

11.1 Thoroughly clean between the cooling fins of the condenser coil with compressed air, vacuum or a brush. This is particularly important for older machines where dust and other airborne contaminants may have lodged in the fins thereby reducing the cooling efficiency.

11.2 Replace all cable ties, grommets and screws.

11.3 Ensure that any glue used has set, that glued components are secure before continuing to assemble and that glue has not unintentionally contaminated or glued other components.

11.4 When replacing the top panel ensure that no wires or cables are trapped and could be damaged.

11.5 Ensure that the clear sealing ring that sits on the top edge of the Refrigeration Barrel is correctly orientated. See Section 8.8.

12. Test

It is recommended that the repaired unit is subjected to a functional check as described in Sections 8.3 through 8.5 as appropriate.

IMPORTANT ENVIRONMENTAL INFORMATION FOR REPAIRERS WITHIN THE EUROPEAN ECONOMIC AREA

The European Parliament will enforce new regulations in 2006 concerning the disposal of electrical and electronic equipment such as the Home Ice Cream Maker. The regulations, called Directives, place responsibilities on persons that may dispose of the appliance and as a repairer you may decide on disposal of an appliance that is beyond economic repair.

The appliance has been assessed in accordance with the European Parliament Directive 2002/96/EC on Waste Electrical and Electronic Equipment, usually referred to as the WEEE Directive.

The WEEE Directive requires that the appliance is disposed of at the end of its useful life in an environmentally responsible manner. Similar requirements have applied to refrigerators for some time.

Parts and materials that can be re-used and/or re-cycled have been identified in order that the use of new resources and the amount of waste going for landfill can be minimised.

The WEEE Directive requires that if the appliance is to be replaced with a new equivalent product from the original supplier then that supplier can collect the old item without cost to the purchaser. It is emphasised that this no-cost return option is only available when the purchaser buys a new product of equivalent type that fulfils the same function. The supplier must be informed that the old appliance is to be collected when ordering the replacement.

If the appliance is being disposed of without replacing it then the appliance must not be mixed with unsorted municipal waste. The crossed-out wheeled bin symbol on the unit label or unit packaging, and repeated below, indicates this requirement.



The appliance must be disposed of at an authorised treatment facility, details can be obtained from your local council.

Your rôle is critical and will help to ensure that the Earth' s resources are maintained and that as much re-usable and re-cyclable material as possible is processed. It will also ensure that landfill volume requirements are kept at a minimum and that hazardous materials are not buried thereby providing potential future problems for the environment and human health.

The WEEE Directive comes into force in January 2006.