INSTALLATION AND MAINTENANCE INSTRUCTIONS
FLO-CREEMATIC AND FC 500 ICE CREAM FREEZERS
READ INSTRUCTIONS FULLY BEFORE START-UP

These freezers follow the sturdy design and construction characteristic of all other equipment in the well-known 'GIUSTI' range. They do, however, incorporate special sophisticated features which render them indispensable to manufacturers requiring flow production and willing to exercise care in operation. The finished product is controlled and continuously delivered at the desired temperature and consistency.

Essentially the machines are designed for operation with a mix storage vessel standing adjacent to the machine itself. The mix temperature should be between 38° and 45°F. Storage below this temperature impairs overrun. Ageing is also important. If the pipe line between the mix vessel and the freezer is long, we recommend that this be of 1" diameter as the ½" supply line on the smaller freezer will cause too much resistance to the pump.

The Flo-Creematic requires balanced mixes to give best operating conditions. However, should you be using your own special recipe, which although balanced, may have a different consistency to that of the commonly accepted mixes, you may find it necessary to slightly modify your formula. Generally however the controls provided enable considerable variations and flexibility.

The patented dual feed pump which regulates the intake of mix and air, controls the required overrun. This specially designed pump mixes and injects the mixture into the cylinder where it is whipped and integrated with the air by the beaters and frozen.

Avoid aerating mix during storage. The capacity of the pump is calculated for use with a liquid and if this liquid is mixed with air the supply to the freezer will be erratic, insufficient and likely to cause a freeze-up. To overcome the lack of liquid the tendency is to run the pump at high speed, whereas under normal conditions this is not necessary.

All freezers are now fitted with a pump inlet capable of coupling to a 1" i/d plastic tube. Any machine in use having the inlet designed for ½" plastic tube should either be utilised with a cold storage tank or balance tank by the side of the freezer or, if a long mix line cannot be avoided, a special inlet valve for a 1" pipe line can be obtained from us.

IMPORTANT: THE PUMP IS PRECISION BUILT AND MUST BE HANDLED WITH CARE

It is designed as a positive integral pumping unit of the maximum simplicity.

The accurately machined parts of this pump require careful handling in order to preserve top efficiency during operation. These pumps must not be used to pump mixes containing solid particles nor to pump gritty unsoluble substances sometimes found in mixes with fruit pulps etc. Always filter mix.

When circulating water, detergent or steriliser having no fat to act as lubricant do not use the pump unnecessarily. Use only lukewarm solutions.

BACK GLAND SEAL: TO AVOID DAMAGE TO THIS SEAL THE BEATERS MUST NOT BE OPERATED UNLESS ICE CREAM MIX (OR WATER) HAS BEEN PUMPED INTO THE CYLINDER. (SEE ALSO ITEM F PAGE 11)

Electrically the machine is very simple. Four control switches are provided:-

One to switch on the beaters.
One to switch on the pump.
One to switch on the refrigeration.
One switch for "PUMP DOWN". Use this during cleaning process only.

When the "PUMP DOWN" switch is in the 'OFF' position, i.e. NORMAL RUNNING, the liquid solenoid refrigerant valve is opened and closed in conjunction with the starting and stopping of the refrigerating compressor. The low pressure cut-out is electrically by-passed and inoperative. The freezer will not function if this switch is not in the NORMAL RUNNING position.

When the "PUMP DOWN" switch is in the 'ON' position the liquid solenoid refrigerant valve is closed and the starting and stopping of the refrigerating compressor is controlled by the low pressure cut-out which is now in circuit and the cylinder is pumped down. BEATERS can be stopped or started but in the initial stages of pumping down should be kept running as some freezing still occurs.

SELECT "PUMP DOWN" POSITION ON COMPLETION OF PRODUCTION AND PRIOR TO COMMENCEMENT OF THE CLEANING OPERATION.

During normal running the switches are interlocked and the refrigerating compressor cannot freeze until the beaters are operating.

It is necessary to provide an isolating switch so that the whole unit can be isolated electrically before carrying out work inside the machine.

DISMANTLING BACK GLAND ASSEMBLY

SEE DRAWING FA 21

The Shaft Seal of the Flo-Creematic consists of a Gland Seal Part 52, rotating on a stainless steel lapped surface of rear plate Part No.34. The two faces must be perfectly smooth and unblemished. Any grit between these surfaces will destroy the seal.

TO DISMANTLE BACK GLAND ASSEMBLY (Items 2 and 3 below).

Remove driving belts. Remove 8 bolts Part No.53. The back plate will still be retained to the bearing housing Part No.40 by two nuts which retain the whole assembly in position and facilitate handling. To expose gland seal remove the two retaining nuts.

Before replacing new seal, clean meticulously all surfaces.

(1) Machines Nos.FC1-46 have a lip seal as per Drawing No.CF 100/108.

(2) Machines Nos.FC46-136 and FC-244 onwards, generally these machines are fitted with Monum or PTFE Seal with Rubber 'O' Ring, as Drawing No. FA 21.

(3) Machines Nos.FC137-243, generally these machines are fitted with carbon mechanical seals. As Drawing No.FA 21.

NOTE: A special service exchange system for Back Gland assemblies is in operation. There are numerous reasons why back seals can leak, i.e. worn bearings and shaft, damaged face plate etc. If there is any sign of side movement on the shaft denoting worn bearings or if by fitting a new seal the problem is not cured, it would be advisable to take advantage of the service exchange unit.

To assemble back gland reverse above procedure.

FLO-CREEMATIC AND FC.500 ICE CREAM FREEZERS

PRINCIPLE OF OPERATION

(SEE DRAWINGS CR.6F & CR.7B)

The Flo-Creematic Freezer consists of a specially designed Patented Freezing Barrel with all Stainless Steel semi-flooded expansion chamber, (M).

Scraper blades (N) if removed should be replaced in their correct position.

The beater assembly is supported by the shaft (P) at the back and centralised by studs (Q) at the front and back. The four scrapers are of aluminium bronze, an alloy softer than the cylinder, this material tends to tarnish if not cleaned.

The mix is pumped from a suitable reservoir or supply tank (preferably refrigerated). Air is incorporated and the mixture is fed to the Freezing Cylinder where it is frozen.

The desired operating pressure and discharge is achieved by synchronising the speed of the pump with the setting of discharge control valve.

The mix and air whipped and frozen, in the barrel, are discharged continuously through the specially designed outlet control valve (R) in a state permitting direct packaging.

FLO-CREEMATIC AND FC.500

GENERAL INSTRUCTIONS

1. Freezer must be installed on a firm, even floor to avoid rocking and vibration. If castors are provided use jacks or wedges to avoid movement.

2. Freezers supplied complete with refrigeration compressors should be checked by a competent refrigerating engineer when received. Valves opened and tests made for any refrigerant leak which might have occurred due to vibration and shock in transport.

   Charge with refrigerant if necessary.

   Water cooled condensing units are recommended and suitable water hoses connected to water inlet and outlet of condenser.

3. When customer supplies his own refrigeration, the unit is generally remotely installed and the refrigeration machanic should have no difficulty in carrying out connections.

4. Freezers supplied without refrigeration are provided with $\frac{3}{8}$" or $\frac{1}{2}$" S.A.E. liquid inlet connection and a $\frac{3}{4}$" S.A.E. or 1" ERMETO suction pipe depending on Condensing unit size.
   Also supplied:-

   Thermostatic refrigeration expansion valve.
   LIQUID Solenoid stop valve.
   Compound refrigerant suction pressure gauge.

5. The operating suction temperature of refrigerant should be at around $-23^{\circ}C$ to $-30^{\circ}C$ ($-10^{\circ}F$ to $-22^{\circ}F$) according to refrigerant being used (see later under "Advice on Refrigeration", Page 19).

6. All electric connections within machine are made and should not be interfered with. Make all external connections to terminal strips provided. Machine has been tested and any change may interfere with operation.

   Beater assembly should rotate clockwise when looking into the barrel. Once the correct rotation of beater has been checked and, if necessary, in the case of 3 phase, corrected by reversing wires at the terminal strip, all motors should run the right way.

7. Three motors are employed to drive components of Freezer:-

   A. Beater Motor of 3 h.p. (FC500 Model 5h.p.)
   B. Pump Motor of ¼ h.p. (FC500 Model ½ h.p.)
   C. Compressor Motor of 7½ h.p. or 10 h.p. (FC500 Model 10 h.p., 15 h.p. or 20 h.p.)

) ALL A.C. INDUCTION TYPE 400v/220v/ 3ph/50 cycles 4 wire circuit Star Delta Starting Available

8. Relay switches with pilot lights are provided The compressor can only be switched on when beaters are operating. (Except in 'PUMP DOWN' position). Freezing is only possible with Pump Down switch in 'OFF' position.

   The solenoid liquid valve opens only when refrigeration is switched on. An ampmeter indicates beater motor loading.

9. The mix pump has a variable speed control which enables feed and pressure in the cylinder to be maintained at a steady rate. The pump speed should only be adjusted while pump is in motion.

10. When adjusting the air control valve results are not immediate as Freezer requires some time to settle. Screw downwards or clockwise to reduce air intake, unscrew to increase air (see also para (d) page 26).

11. A discharge control valve(R) is provided at the Freezer Barrel outlet. Its use is to control the rate of discharge of frozen ice cream and to maintain a steady pressure in the Freezer Barrel.

The discharge valve must be screwed tight to close the Freezer or opened fully for complete discharge and washing.

Make sure valve is not sticking.

IMPORTANT WARNING!!

Panels are fitted to protect rotating parts. If these panels are removed the equipment should be immobilised by disconnecting from the electric supply.

FLO-CREEMATIC OPERATION
(SEE DRAWING FA 21)

STARTING

1) Open mix supply from storage vessel to pump and open discharge control valve (12R).
2) Start mix and air pump and operate until liquid mix flows from discharge control valve (12R).
3) Close discharge control valve (12R) and continue to pump mix into cylinder until pressure reaches 90 lbs per square inch
4) Stop pump
5) A pressure relief valve is provided in the body of the pressure gauge (Drg. No FA 7) This valve should open at 110 lbs per square inch (approximately 7 atmospheres). Place a receptacle under plastic tube discharging from this valve. Relief valve can be removed entirely for cleaning without disturbing setting (see item (c) Page 26)
6) Start beaters.
7) Start refrigeration
8) When ampmeter approaches operating load 4 to 5 amperes (Flo-Creematic) or 6 to 8 amperes(FC500) on 400 volt 3 phase electric supply, restart pump and open control valve (12R).
9) Setting of discharge control and speed of pump must be synchronised in order to maintain the desired barrel pressure and discharge of ice cream.
10) Adjust discharge control valve to give steady flow of ice cream. If pressure increases, slow pump. If pressure decreases, speed up pump by turning anti-clockwise. For slow turn clockwise.
    Should ice cream be too stiff and flow slowly, open valve and increase speed of pump. If too soft and discharging too fast, close valve and reduce speed of pump.
11) Refer to Page 28 for details of the overfreeze control.

SHUTTING DOWN

1. Shut off refrigeration switch.

2. Fully open discharge control valve (R).

3. When barrel is considered empty, switch off pump and allow pressure to subside.

4. Switch to -"PUMP DOWN"- position and allow compressor to stop by means of low pressure cut out.

5. Switch off beaters.

6. Start cleaning operation.

---

1. Ice cream discharged at a constant temperature, say 24°F (minus 4°C) will appear stiffer when more air is incorporated and softer if less air is incorporated.

2. When ice cream is discharged at a high rate and at a higher temperature, the overrun may be higher and some adjustment to the air valve necessary.

3. The machine will not function satisfactorily and a 'slush' of poor appearance will be delivered if the percentage of air is insufficient in relation to the composition of the mix used.

4. According to mix recipes and refrigeration selected the Freezer will handle 14 to 25 gallons (60 to 110 litres) of mix per hour, and output of finished ice cream of 30 to 50 gallons (120 to 220 litres) per hour based on the incorporation of an equal amount of air. Less air, i.e. lower overrun, will mean lower output.

FLO-CREEMATIC
CLEANING

The machine should be completely dismantled and washed in the conventional way. The pump too can be taken to pieces, with care - see separate instructions.

A. Remove mix inlet pipe from the pressure gauge and connect water mains using the existing hose nipple provided. The fast flow of water through cylinder quickly flushes cylinder and beaters. Run beaters for a few seconds to quicken preliminary wash.
B. Dismantle front door (T) and remove beater to clean. Handle carefully to avoid damage to scraper blades.
C. Remove and clean pressure relief valve.
D. Remove and clean the air intake control valve (C) BE SURE THAT THE 'O' RING AT THE BOTTOM OF THE AIR VALVE REMAINS IN POSITION.
E. Remove and clean the control valve (R) from front door (T).
F. Reassemble machine, immerse mix inlet pipe in detergent and steriliser, and pump throughout circuit. Run beaters for one or two minutes when pressure has built up in cylinder. Drain and leave until ready for use.

SPECIAL ROUTINE

When starting it is advisable to flush the machine without dismantling. To do this pump a little steriliser and finally fresh water through the circuit. Allow water to drain. Do not wipe.

Water and solutions should be discharged to waste.
Build up slight pressure, say 15 to 20 lbs per square inch and run beaters for one minute, this will help to force cleaning solution to every point.

CLEANING PRESSURE GAUGE
(SEE DRAWING NO. FA 7)

After each operation it is desirable to clean this gauge. Dismantle gauge from top coupling.

Care should be taken not to damage the small metal diaphragm.

IMPORTANT

The pressure relief valve assembly (Drg. FA 7) need not be disturbed but if dismantled should immediately be adjusted by tightening or releasing the spring to open at 110 lbs p.s.i. gauge pressure (maximum).

Later models are fitted with a pressure relief valve which has been pre-set at the Factory.

Clean regularly to ensure efficient operation.

DISMANTLING AND MAINTAINING PUMP

(SEE DRAWING FA 15)

1. Disconnect mix inlet (A) mix outlet (B) and remove air valve (C).

2. With-draw cylinder head by removing two nuts (D). This exposes top of piston and intermediary valve (E). This valve must always be screwed tightly, check regularly. If this loosens it will ram the top of the cylinder. Periodically check this valve and ensure that spring has not lost its tension and that ball is in good condition.

3. Loosen cap head screw (F) and unscrew the locking collar (K) until it is free from the piston. A plastic spherical washer (J) is located between the locking collar (K) and the ball end of the connecting link (L).

4. Piston will come out from front of cylinder. Grease well with vaseline when re-assembling.

5. To remove body unscrew four nuts (G) holding body to pillars. Always replace with air valve connecting (C) upwards.

6. If neoprene seal rings of piston need changing prise these out carefully and replace with new. Grease well with vaseline before replacing.

7. A stainless steel ball acts as non-return valve to the intake (A) and plastic balls to intermediary (E) and outlet (B) stainless steel valves. TAKE CARE that these are not lost, replace carefully as per diagram.

8. Nut (H) locks position of piston - piston should be adjusted clear of cylinder head when tightly bolted in position, this avoids the piston hitting the top of the cylinder.

   (a) Flo-Creematic ... ... Approx. ¾mm to 1mm
   (b) F.C. 500 ... ... " 1¼mm to 1½mm

9. A pressure gauge connected to cylinder (S) inserted in the delivery pipe will enable the operating pressure to be set and maintained at approximately 60 lbs. per square inch.

Red paint mark on conrod faces short shaft.

10. Variable speed mechanism of pump permits regulation of feed and pressure.

11. Mix intake is controlled by pump speed. Air intake is controlled by valve adjustment.

12. Keep pump well lubricated with vaseline. Pump vaseline into grease nipple provided every time freezer is started.

13. All pump parts are accurately machined and must not be damaged. Piston and cylinder faces are lapped. DO NOT LET COMPONENT PARTS FALL. ANY KNOCKS, DENTS OR SCRATCHES MAY CAUSE FAULTY OPERATION.

14. Although the pump will draw mix from a level below the pump inlet it is possible to gravity feed mix to the pump. Any solid particles, grit, fluff etc. can cause damage to pump and impede operation of ball valves.

IMPORTANT NOTES

MIX/AIR PUMP (DRG NO. FA 15)

THE PLASTIC BALLS IN THE MIX OUTLET VALVE AND PISTON WILL TEND TO DISTORT AND WEAR IN OPERATION. IT IS THEREFORE IMPORTANT TO CHECK AND REPLACE THESE BALLS AT REGULAR INTERVALS.

WHEN UNSCREWING THE VALVE IN THE CENTRE OF THE PISTON ITEM (E) DRAWING FA 15 (WHICH IS VISIBLE AFTER REMOVAL OF THE CYLINDER HEAD ITEM (D) - FA 15) AND WHEN REPLACING THIS VALVE ENSURE THAT IT IS TIGHTENED FULLY AND FLUSH WITH THE FACE OF THE PISTON.

IT IS POSSIBLE WHEN UNSCREWING VALVE (E) TO LOOSEN THE LOCKNUT (H) WHICH HOLDS THE CONNECTING LINK (L) TO THE CON-ROD. IF THIS LOCKNUT LOOSENS THE THREAD IN THE CON-ROD WILL SOON DESTROY ITSELF. WHEN ADJUSTING THIS ENSURE THAT DETAILS GIVEN IN ITEM 8, PAGE 13, ARE FOLLOWED.

FLO-CREEMATIC

POSSIBLE SOURCES OF TROUBLE

Description	Causes and Remedy
No pumping	Pipes blocked. "O" Rings worn. Ball valves not seating. Ball valves stuck. Plastic ball distorted by heat. Delivery and supply fittings exchanged.
No Over-run, or Insufficient Over-run	Air Inlet Blocked or stuck. Adjustment of air intake incorrect.
Over-run difficult to adjust	Air leak in pump. Air leak in suction connections.
Pressure loss, and Air Escape	Check joints, replace "O" rings. Make sure shaft gland seal does not leak.
Plastic tubing does not stay in position.	Detergent and Steriliser has a great penetrating property and is very slippery. When this creeps between plastic pipe and nipple only thorough washing with clean water will clear trouble.
No discharge from Control	Valve stuck, or frozen. Ice cream frozen too stiff. Take immediate action. Stop refrigeration and feed pump, keep Beater operating until discharge becomes normal.
Ice Cream discharged with blow holes and of poor appearance.	Explosive Ice Cream due to too high pressure. Too high over-run for mix. Pumps defective. Poor scraping. Air leak at intake.

TWIN CYLINDER

FLO-CREEMATIC OR FC.500

This machine consists of two complete single Flo-Creematics or FC.500 models, one left hand and one right hand operation enabling both machines to operate side by side and if necessary to a common outlet.

The refrigerating condensing units must be independent for each cylinder.

Special attachments are available with the TWIN FLO-CREEMATIC for filling two flavours or merely doubling the output.

FLO-CREEMATIC AND FC.500 MODELS

ADVICE ON REFRIGERATION

Suction piping is $\frac{3}{4}$" S.A.E. or 1" ERMETO.

Liquid line be in all cases $\frac{3}{8}$" or $\frac{1}{2}$" flare.

Reference

Flo-Creematic Single Model

One condensing unit of 32,000 btu/hr. evaporating at minus 22°F (R502). (8000 calories/hr. evaporating at minus 30°C).

FC.500 Single Model

One condensing unit of 42,000 btu/hr. evaporating at minus 22°F (R502). (10500 calories/hr. evaporating at minus 30°C).

Heat exchanger recommended if compressor suitable.
Thermostatic Expansion Valve to suit compressor.
Oil Separator not essential with any of the Freon range of gases.
$\frac{3}{8}$" or $\frac{1}{2}$" Solenoid liquid stop valve.

Not supplied with Freezer if compressor installed by customer:-

1. Heat Exchanger - Only if makers of Compressor agree

   Recommended - Dunham Bush HEAT-X Cast Aluminium Suction/Liquid Model 200XS
   (Amend connections to $\frac{3}{8}$" or $\frac{1}{2}$" liquid S.A.E. $\frac{3}{4}$" or 1" suction).

2. Preferably use independent high and low pressure cut-outs.

3. Dryer/Filter - RCL CME - 11

ADVICE ON REFRIGERATION

(1) Compressor starting and stopping frequently:
There are many reasons for this, and they can only be ascertained by elimination.

(a) The Zero Bock 7½ h.p. and over compressors are provided with an oil differential pressure control. This is a safety device, and cuts out the compressor should there be an oil shortage, should the oil become too cold and thick, or should the oil be pumped away into the evaporator and the crank case become flooded with liquid refrigerant. This does not apply to all makes of compressors.

(b) In cases where the Bock-Zero compressor persistently cuts out and has to be re-started by the re-setting button, the fault can be rectified by re-adjusting the oil differential pressure control. This may be set too fine, and a satisfactory working position found by adjusting the control screw. Before adjustment it is important to ascertain that the cutting out of the compressor is not due to other causes. The adjustment of the control screw must be within very small limits, and should be made by a competent individual to maker's instruction.

(c) Shortage of water, high water temperature or low water pressure can cause the compressor to cut out by tripping the high pressure switch.

(d) The compressor is wired in series with the beater motor, and if the beaters are switched off the compressor will stop. Equally, should the beater motor overload and cut out on its thermal overload, the compressor will also stop, but will start again when the beater contactor re-sets.

(2) Refrigeration Control:

(a) The system of operation consists of providing a hand-controlled liquid supply valve to the evaporator, and this valve, although operated from the front of the machine, is situated between the Solenoid liquid refrigerant valve and the thermostatic

expansion valve. If it is desired to reduce the refrigeration the freezer, the control valve can be closed by hand, and takes over from the thermostatic valve reducing the pressure in the evaporator at will. The efficiency of the compressor is reduced, and by adjusting the suction pressure by keeping an eye on the refrigerant gauge the temperature range can be controlled. In order to prevent drawing a vacuum in the evaporator, the low pressurestat is set to stop the compressor before a vacuum is drawn.

(b) Some freezers have been fitted with a suction pressure regulator, which is set to operate when producing mousse or high temperature ice cream. This back pressure regulator enables two fixed settings to be made. When the manual control valve is fully open, the machine will function normally, controlled by the thermostatic expansion valve. When the by-pass is closed the suction pressure is then controlled by the back pressure regulating valve. The pressure in the evaporator will be controlled at a high level, the compressor is starved, thus reducing its efficiency.

(3)

(a) The higher the evaporating temperature the higher is the capacity of the compressor, but a point is reached where the temperature differential is insufficient for efficient freezing. With a small compressor it may prove beneficial to raise the suction pressure until line freezes. With a larger compressor than necessary it may prove difficult to maintain the suction pressures recommended, without the body of compressor freezing and a lower suction pressure than recommended may be necessary.

(b) With the short and compact assembly of the freezer cylinder and compressor, it can be expected that the suction line will frost right up to the compressor, but the compressor body itself must not show frost.

(c) If the compressor shows frost and the suction pressure is correct, then there could be too much refrigerant in the circuit and the compressor is in danger.

(d) Freezers operate best at a suction evaporation pressure as follows:

Freon 502:	15 lbs. per square inch	$-22^{\circ}F$	$(-30^{\circ}C)$
Freon 22:	10 lbs. per square inch	$-21^{\circ}F$	$(-29^{\circ}C)$
Freon 12:	5 lbs. per square inch	$-10^{\circ}F$	$(-23^{\circ}C)$

Freon 502 is definitely best for our Flo-Creematic, although where this refrigerant is not available use of the others is possible, with progressively reduced outputs.

(e) The refrigerant gauge is liable to hunt if the thermostatic expansion valve is set too critically. The thermostatic bulb will induce the valve to open or close as it senses the temperature of the return gas and fluctuation of the suction pressure can generally be cured by slightly opening the expansion valve.

Adjustment should be made when freezer is under load, and allow the freezer to settle down for some reasonable time between each adjustment.

(g) If the suction pressure has to be kept below the recommended setting given above, in order to avoid frosting of the compressor, the reason could be an overcharge of gas, in which case the head pressure could be high or the compressor too large. Reduce the charge or the suction pressure until the compressor functions regularly with suction line frosted up to the body.

(4) <u>Charging circuit with refrigerant</u>:

Always make sure that the correct refrigerant is used.

NEVER, NEVER attempt to charge a compressor with 'refrigerant' unless a high pressure gauge is connected to the high pressure side of the circuit and the head pressure is under control.

The head or high pressure is relative to the water or air temperature and type of refrigerant used, and reference should be made to the appropriate tables.

High head pressure can be caused by:

(A) Air in the circuit.
(B) Lack of water or air.
(C) Overcharging.

If (A) and (B) are the cause, the compressor will get very hot and greatly impair efficiency, as the amount of refrigeration achieved equals the heat removed by the water or air.

Overcharging can cause liquid to reach the compressor and very serious damage can occur. Charge only small quantities of refrigerant at a time, and test. For safety it is preferable to be slightly under-charged than over-charged.

Avoid air entering circuit and purge charging pipe, etc., before drawing refrigerant into circuit.

If the correct suction pressure can be maintained with frost on the suction pipe up to compressor body, stop charging, as the optimum efficiency under the conditions available has been reached.

We recommend that a qualified refrigeration service engineer be employed to deal with this function, as there are many factors which can cause trouble and which cannot be explained to the inexperienced.

LIST OF REFERENCE DRAWINGS

FA 21	Back Gland Assembly, Freezer Cylinder Scraper and Beater Assembly, Outlet Control Valve.
FA 7	Pressure Gauge
FA 15	Air and Mix Pump Assembly
FA 34	Wiring Diagram
FA 35	Star Delta Wiring Diagram
FA 16	Refrigeration Control Assembly
FA 24 FA 25	Refrigeration Circuit
FA 17	Removal of Scrapers
FA 36	Star/Delta Wiring Diagram.
FA 8	Back Bearing Assembly.

OUTPUT TABLE

OUTPUT PER 1 GALLON (4.5 litres)

TIME:							
	36	seconds	=	100	gallon	per hour	(450 litre/hr)
	40	"	=	90	"	"	"
	45	"	=	80	"	"	"
	50	"	=	72	"	"	"
	55	"	=	65	"	"	"
	60	"	=	60	"	"	"
	65	"	=	55	"	"	"
	70	"	=	51	"	"	"
	72	"	=	50	"	"	"
	75	"	=	48	"	"	"
	80	"	=	45	"	"	"
	85	"	=	42	"	"	"
	90	"	=	40	"	"	"
	95	"	=	38	"	"	"
	100	"	=	36	"	"	"
	105	"	=	34	"	"	"
	110	"	=	33	"	"	"
	115	"	=	31	"	"	"
	120	"	=	30	"	"	"

CHECKING OVER-RUN

Weigh a container empty.
Weigh a container full of mix.
Deduct weight of empty container from the weight of the full.
THIS GIVES WEIGHT OF MIX

.....

Fill container level with frozen ice cream and weigh.
Deduct weight of empty container from the weight of the container filled with ice cream.
THIS WILL GIVE YOU THE WEIGHT OF THE ICE CREAM.

.....

When the weight of the mix is twice the weight of the ice cream you have 100% overrun.

RECOMMENDATIONS FOR SERVICING FLO-CREEMATIC CONTINUOUS ICE CREAM FREEZERS

Recommended Servicing Arrangements:-

1. Daily Service. Before commencing lubricate Air/Mix Pump with Vaseline.

2. (a) Weekly Service. Dismantle Air/Mix Pump and clean out old Vaseline. Re-grease with Vaseline before re-assembling.

   (b) Remove and check Scraper Blades. Any burrs should be removed with a smooth file maintaining the existing Chamfer and giving a sharp edge.

   (c) Remove and check plastic balls in Air/Mix Pump outlet and piston. Replace if signs of wear.

   (d) A few spots of oil on connecting pin on Air/Mix Pump drive. A hole for this purpose will be found. This applies to machine serial no. 313 and earlier.

   (e) Check 'O' Rings on Air/Mix Piston and replace as necessary.

3. (a) Monthly Service. Grease variable speed Pulley. CAUTION: Do not overgrease, one push only on the grease gun should be sufficient. Check vee belt, tighten if necessary.

   (b) Check Beater Centralising Studs and Front Studs and replace as necessary. Special attention should be paid to the Front Studs and these should not be allowed to wear down to the Stud Holder.

   (c) Check Vee Belts on Beater Drive. Tighten if necessary.

.. continued ..

4. Three Monthly Service. Grease back bearings.

IMPORTANT NOTES

(A) Do not run the Beaters dry as this will cause damage to the carbon faced Back Gland Seal. See instructions regarding this.

(B) The Relief Valve on the Pressure Gauge should be used and adjusted to divert the mix at approximately 80/90 lbs. per square inch and so avoid damage to the Gauge.

(C) The Air Valve on the Pump is fragile and should be treated carefully. Plastic Air Valves are vulnerable and must not be knocked. A damaged Air Valve causes overrun problems.

FLO CREEMATIC & FC 500 DATA

SPEED OF DASHERS

HP	3	FLO CREEMATIC	250 RPM
HP	5	FC 500	250 RPM

SPEED OF PUMP

MOTOR 1000 RPM 1/4 HP FLO CREEMATIC 5/8" STROKE 1 5/8" BORE
4" VARIABLE SPEED AND 8" PULLEY 250 / 500 RPM

MOTOR 1000 RPM 1/2 HP FC 500 1" STROKE 1 3/4" BORE
4" VARIABLE SPEED AND 8" PULLEY 250 / 500 RPM

COMPRESSORS

FLO CREEMATIC	F4/170 W T G	32800 BTU	@ - 22°F
FC 500	F4/230 W T G	46000 BTU	@ - 22°F

CYLINDER LENGTHS

STANDARD FLO CREEMATIC	36"
FC 500	48 3/4"

OVERFREEZE CONTROL - OPERATION AND ADJUSTMENTS (IF FITTED)

The Overfreeze Control is designed to stop the Compressor if there is danger of overfreezing and jamming the beater/dasher assembly.

The beater motor current at which the overfreeze control will operate can be adjusted by turning the adjusting knob clockwise to increase the load or anti-clockwise to decrease.

Different mix and temperatures could make a readjustment necessary. The overfreeze control has been set during the final testing to operate at what is considered an optimum amperage and assuming an average mix is used.

Adjustment when necessary can only be made by trial and error method.

If the overfreeze stops the compressor when the mix is too soft, make slight readjustments clockwise until the correct temperature is obtained without the overfreeze stopping the compressor or overloading the motor.

A light emitting diode is included in the control to assist in adjustments. This will emit a red light when the control comes into operation.

The control will operate and stop the compressor if the beater motor current as indicated by the ammeter on the front panel exceeds the current setting of the overfreeze control.

When the compressor is stopped by the overfreeze control the red warning light switches on. The compressor will remain switched off until the ice cream in the barrel softens and the beater current has dropped sufficiently to enable the compressor to be restarted by pressing the yellow reset button.

Reasons why and when the overfreeze control operates

1) The overfreeze control avoids "freeze up" on starting if the operator fails to control this.

2) Air/Mix pump is being starved of mix because:
   a) speed of pump is insufficient
   b) mix supply has run out
   c) pipeline blocked or connections loose on inlet pipe
   d) O rings or Ball Valves in pump faulty.

3) If the Ice Cream mix has been aerated in the Cold Storage Vat this would impede the flow of mix to the Freezer.

To avoid superfluous operations due to momentary peaks of current a time delay is also included which delays the operation of the overfreeze control by approximately 3 seconds.

The overfreeze control should not be set beyond 5 amps on the Flo-Creematic or 8 amps on the FC500 or overloading will occur. The amperage absorbed is not generally relative to the temperature of ice cream as different mixes may freeze faster.

IMPORTANT This unit is sealed at works and must not be opened.