The freezer consists of a stainless steel cabinet with easy removable side panels.

The removable panels provide easy access to the various components for cleaning, inspection and maintenance.

The following parts are housed in the cabinet:

- the vertical freezing barrel complete with dasher shaft and scraping blades; drive motor for the dasher.
- the refrigerating motorcompressor, semi-hermetic type and relevant connections.
- the control system for air-mix pump.

On the front of the cabinet the following parts are located:

- Air-mix pump (16) and relevant support
- Pump speed control handwheel (17).

The control panel (12) is fitted on the top of the unit and contains all the electric devices to operate the machine.

Above each switch, there is an indication light and below the symbol of the controlled component.

The following controls are installed to check the machine operation:

- the ammeter (10), indicating the power absorption of the dasher motor, and the corresponding product hardness into the freezing cylinder.
- the refrigeration-gauge (11), indicating at which rate che compressor is working.

The machine is supplied complete with a general wall-switch and with 3 metres of electric cable.

This switch should be installed by the customer.

		GM/80	GM/160	GM/300
Electric power	Kw.	3	6	9,2
Water condensation temperature +15° / +18°C. (59° / 64°F.) min. pressure 1,5 Atm (P.S.I. 21)	Lt/h	190	350	600
Dasher motor	Hp.	1,5	3	4
Motor-compressor	Hp.	2	4	7,5
Refrigerating fluid		R22	R22	R22
Refrigerating capacity -30° / 30°C.	Fr/h	2400	4300	7300
Refrigerating fluid charge	Kg.	3	7	10
Production up to	Lt/h	80	160	300
Mix pump motor	Hp.	0,5	1	1

Non-freezing lubricating oil "SUNISO 3G".

NOTE when water coming from a cooling tower is used, check that water flow control valve (3, fig. 2) be fully opened, take it off if necessary.

INSTALLATION AND CONNECTION – FIG. 1

- Install the freezer in the desired location and level it by adjusting feet (1).
- Fit the main switch (supplied with the freezer) to the wall and connect it to the mains.
- Check that the main voltage and the freezer are set to match.
- Remove the side panels and check the dasher motor for correct rotation. The dasher should rotate clockwise like the arrows.
- Remove the tape from the dasher blades.

ATTENTION! The freezer is shipped with all valves of the refrigerating system set in working position.
Therefore, they do not require any adjustment for the starting-up of the freezer.

Connect the main water hose to the "inlet" pipe (2, fig. 2).

INSTALLATION AND CONNECTION – FIG. 1

Connect the water drain hose to the "outlet" pipe (1, fig. 2).

The diameters of the connecting hoses shall not be smaller than those of the pipes installed on the machine and they shall not be throttled.

In any case, the inlet pipe is the one fitted with the water-flow control valve (3, fig. 2).

Never use mixes having a temperature above +4°/+5° C. (39°/41° F.).

If a mix with a higher temperature has to be used, reduce the pump speed to the minimum.

OPERATION – FIG. 1

Switch on the general wall switch and supply electricity to the machine at least 5/6 hours before starting the refrigerating compressor.

The heating element placed in the compressor shall slightly heat the oil, so ejecting the refrigerating gas accidentally contained.

For the same reason, electricity should never be switched off when finishing the daily production.

Before starting production, the machine (see "Daily cleaning of the machine") must be cleaned and disinfected.

Connect the inlet pipe (15) of the pump to the tank containing the mix.

Switch on the pump (9) then regulate the flow to the minimum by turning the handle-wheel (17) towards the mark "–".

Wait until the mix begins to pour out of the outlet pipe (5), and then stop the pump.

Subsequently switch on (8) the dasher and switch on (14) the refrigerating compressor.

The mix then begins to harden into the freezing barrel.

Check the consistency of the product on ammeter (10), as the motor stress is proportional to the product hardness.

When the mix has reached the desidered hardness, start the pump once again and adjust the flow of the air to be injected.

To set the air to be injected into the mix proceed as follows:

– On all Gelmark freezers the pump is supplied complete with a special valve (3) which allows to set the air quantity to be injected into the mix.

The regulation of this valve is obtained by turning the kurled nut (4) located between the two springs which are fitted on the valve.

By turning the nut (4) clockwise, the quantity of air introduced increases; to diminish, turn the nut anti-clockwise.

1) When the product begins to harden (the freezing barrel is full and the pump is stopped) close air-valve (3) by turning the nut (4) anti-clockwise.

2) When the pump is started again and ice-cream is continuously pouring from outlet pipe (5), open valve (3) by turning the nut (4) by 1/4 of a revolution at a time clockwise.

After each adjustment, wait a few minutes to allow the setting to distribute the air in the product.

Please note that when valve (3) is too open, the ice-cream could be delivered intermittently, with air bubbles.

When the pump fails to work, check:

1) That the pipeline does not leak.

2) That the O Rings are in good condition. Replace if necessary.

3) That ball valve does not leak.

4) Mechanical operations are correct.

Therefore, when the pump does not operate correctly, check:

A. That the sucking pipeline connected to the inlet (15), fig. 1, does not leak thus preventing the mix to come in.

B. That the gaskets are in good conditions, particularly the one inside the cylinder. If worn-out, replace it.

C. The valve placed on the pump's top closes and that its seat is in order. If necessary, regrind the seat and replace the ball.

D. That the belt of the variator and the pulley with variable diameter are in good conditions. If necessary replace the worn-out pieces.

Check the oil level in the pump at least every 200 working hours. If necessary, top up oil.

To assemble and disassemble pump and air valves, see fig. 5.

By tightening adjusting screw (6), the pressure in the freezing barrel increases, thus assisting the overrun formation.

AIR CONTROL – FIG. 1 AND FIG. 5

All machine operations can be followed through the controls installed on the control panel.
The ammeter (10) indicates the electrical consumption of the dasher motor, consequently the consistancy of the product.

The refrigerating system is fitted with a hot gas defrosting device. Such a device, is used:

A) Only in emergencies, i.e. in case of power failure or in any other case when the mix pump stops.
In such cases, the ice-cream remaining into the freezing barrel more than necessary, becomes so hard as to stop the dasher motor.
We must immediately switch off the dasher and the compressor motors and switch on the hot gas solenoid valve (13, fig. 1) and turn counter-clockwise the relevant knob (23, fig. 1).
Wait for about a minute, then switch off the solenoid valve (13) to stop the drfrosting process.
After that, turn the knob back (23, fig. 1) and the machine is ready to start production once again.

B) The hot gas device may be used to control the ice-cream hardness, particularly when partially hardened ice-cream is needed for stick ice-cream and for productions with a rather low flow rate.
To soften ice-cream, proceed as follows:
1) Start operation and set the pump speed for the required production rate.
2) Turn on the hot gas power switch (13, fig. 1) to open the valve.
3) Slowly open the adjusting knob (23, fig. 1) until the required consistency is obtained.

DAILY CLEANING – FIG. 1 AND FIG. 4

With the compressor stopped, pump 15/20 lts. (3/5 gallons) of hot water mixed with a neutral detergent.

Run the pump and dasher until the whole quantity of solution has been drawn in.

Subsequently pump clear water for rinsing.

Stop then the pump and the dasher and loosen connection (18, fig. 1), of the pump delivery pipe, to drain the residual water from the freezing barrel.

Periodically disassemble and clean all pump and freezer parts which have come in contact with the mix; replace worn out O Rings if necessary.

For reassembly refer to fig. 4 and fig. 5.

To simplify cleaning operations, the bottom housing of the freezing cylinder can be removed.

1) To disassemble the bottom housing proceed as follows: CAREFULLY LIFT THE DASHER ASSEMBLY FROM THE CYLINDER.

2) Remove the pipeline connecting the pump to the cylinder.

3) Seize firmly the pipe and turn it right as much as possible (see particular fig. 1).
   Push then the pipe and the bottom cover downward. At this point the cover will slide out from its seat.
   To reassemble the bottom cover, reverse the sequence of operations, taking care of not damaging the O Ring, as this should cause the leaking of mix from the bottom cover.

NOTE: The products used for washing disinfecting, must not be corrosive to the mechanical parts they come in contact with.

To disassemble the dasher (fig. 4) remove top cover (1), top support ring (3). By means of the relevant threaded eye bolt, lift dasher from the freezing barrel.

The blades must not stratch the barrel. Also remove O Rings (2-10-13) from their seats.

To obtain a rational cleaning, disassemble the dasher, as shown on plate 4.

After cleaning make sure that the seal ring (11) located on the dasher, slides freely and that the scraping blades (8) are locked in their holding pins. Carefully place the dasher assembly into the barrel and make sure that it fits well in its retaining seat.

Refit top flange (1) and relocate top support (3) into its relevant seat.

NOTE: WHEN INSTALLING THE DASHER ASSEMBLY ALWAYS USE THE PLASTIC RING SUPPLIED WITH THE MACHINE: WILL AVOID DAMAGING THE CHROMIUM PLATED TOP EDGE OF THE FREEZING BARREL.

MAINTENANCE – FIG. 2

A periodic inspection of the different parts of the machine is necessary, in particular after a shut down time. To avoid troubles or interruptions when maximum efficiency and output are required.

22, fig. 1).

b) If the motor or motors do not start, check the main circuit fuses and those contained in the fuses holder on the control panel.

c) When the compressor motor stops, check pressure-switch (22): it could be open or defective.

Effect these operations before checking the electrical system.

Refer carefully the electrical diagrams!

To simplify controls all terminals and connections fitted on the machine have been numbered to match the diagrams.

NOTE: Maintenance should be carried out by qualified trained personnel only.

REFRIGERATING SYSTEM – FIG. 2

Have the refrigerating system checked and if necessary repaired by a specialist.

Possible causes for defective operation could be:

1) Insufficient condensation.

2) Incorrectly set or faulty expansion valve (17).

3) Dirty or clogged circuit filter (19).

4) Hot gas solenoid valve (16) jammed or open.

5) Solenoid valve (20) jammed or closed.

6) Insufficient gas into the system.

Insufficient condensation may be due to:

a) Poor water supply from the mains.
Check whether all valves of the line supplying the water to the freezer are open and whether the water is supplied consistently.

b) Incorrectly set water flow control valve (3).
Set the valve (3) by means of the screw (or cap) located on the valve head.

If the valve is correctly set, the water temperature at the drain, with the compressor running, will be +30°/+35° C. (86°/95° F.).

If the expansion valve (17) is not set correctly, it weakens the performance

of the system.

The valve shall be set so that refrigeration gauge (11, fig. 1), indicates -26°/-30° C. (-14°/-22° F.), during the operation.

If circuit filter (19) is clogged, frost will appear on the outside: it should be replaced. In any case, it should be replaced whenever the refrigerating system is opened.

If hot gas solenoid valve (16) remains open it causes a considerable reduction of the refrigerating capacity and the refrigeration (11, fig. 1) indicates a temperature above +20° C. (68° F.). Check the solenoid and, if necessary, replace the part.

Solenoid valve (20) automatically shuts-off the liquid line when the compressor stops. If this valve does not open, the refrigerating system evacuates the refrigerant gas and the refrigeration-gauge (11, fig. 1) falls down to -35° C. (-31° F.). Check that electrical power is supplied to the solenoid valve and replace it, if necessary.

In the electrical system and all the above listed points are in good order, the poor efficiency is due to insufficient gas into the system. Insufficient gas generates a flow of bubbles through the sight glass (18, fig. 2).

Before adding gas, find out the fault originating the leakage and repair it.

NOTE: Periodically check the oil in the compressor through sight glass (33, fig. 2). Refer to the enclosed drawings and diagrams for any checks. When ordering spare parts, specify the part numbers, the drawing number and set the serial number of the freezer.

NOTE: DUE TO THE POSSIBLE TECHNICAL CHANGES THE INFORMATION GIVEN ON THIS MANUAL IS NOT BINDING AND MAY BE ALTERED WITHOUT NOTICE.

CAUTION

MARK freezers are made with chrome plated nickel cylinders, and hardened stainless steel blades. These metals require special care when cleaning; to avoid damaging the machine, please follow instructions in the manual regarding the points listed below.

MAINTENANCE

1 - Recondition blades regularly, remove burrs.
2 - Check regularly bearing and oil level of pump gearbox.

CLEANING AND SANITIZING

1 - Never use acid cleaning compound.
2 - Both acid and chlorine sanitizers should be used at minimum concentrations, with 38° C. maximum water temperature.
3 - If a cylinder is sanitized and is not to be used immediately it should be rinsed with clear water to remove the sanitizer.

CHLORINE PITS AND RUSTS DASHERS AND BLADES AND PITS CHROME

ACID ATTACKS CHROME

PLATE 4

1) Top flange
2) O-Rings
3) Dasher shaft top support
4) Retaining ring
5) Top bronze bush
6) Eccentric shaft
7) Shaft with holes
8) Scraping blades
9) Rotary packing pressure spring
10) O-Ring
11) Rotary packing ring
12) Low bronze bush
13) O-Ring

FIG. 4

1) Calotte supérieure
2) Anneau OR
3) Support supérieur
4) Anneau d'arrêt
5) Coussinet supérieur
6) Arbre batteur
7) Arbre vide
8) Lames râcleuses
9) Ressort pour garniture tournante
10) Anneau OR
11) Garniture étanche
12) Coussinet en bronze inférieur
13) Anneau OR

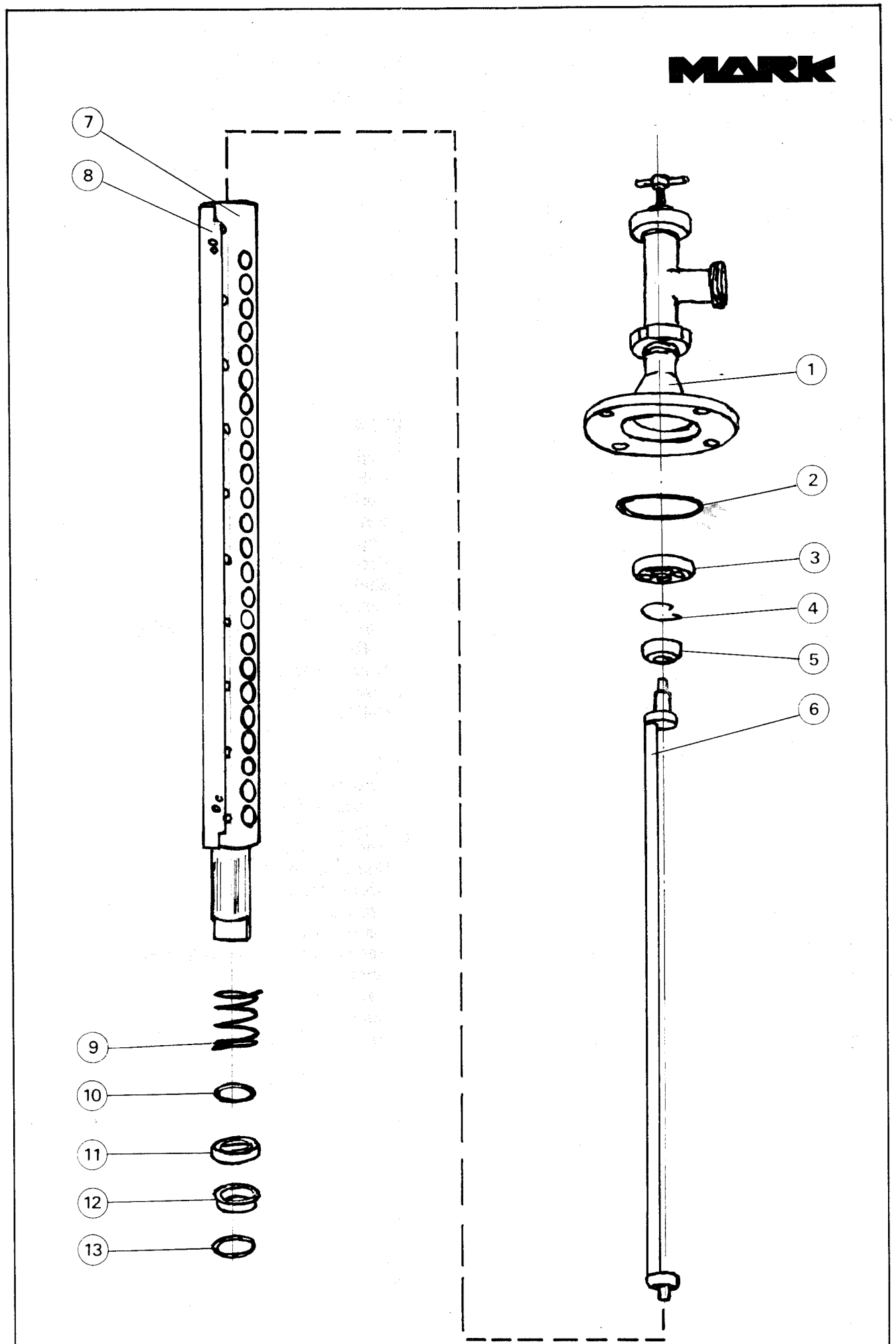


FIG. 4

PLATE 1

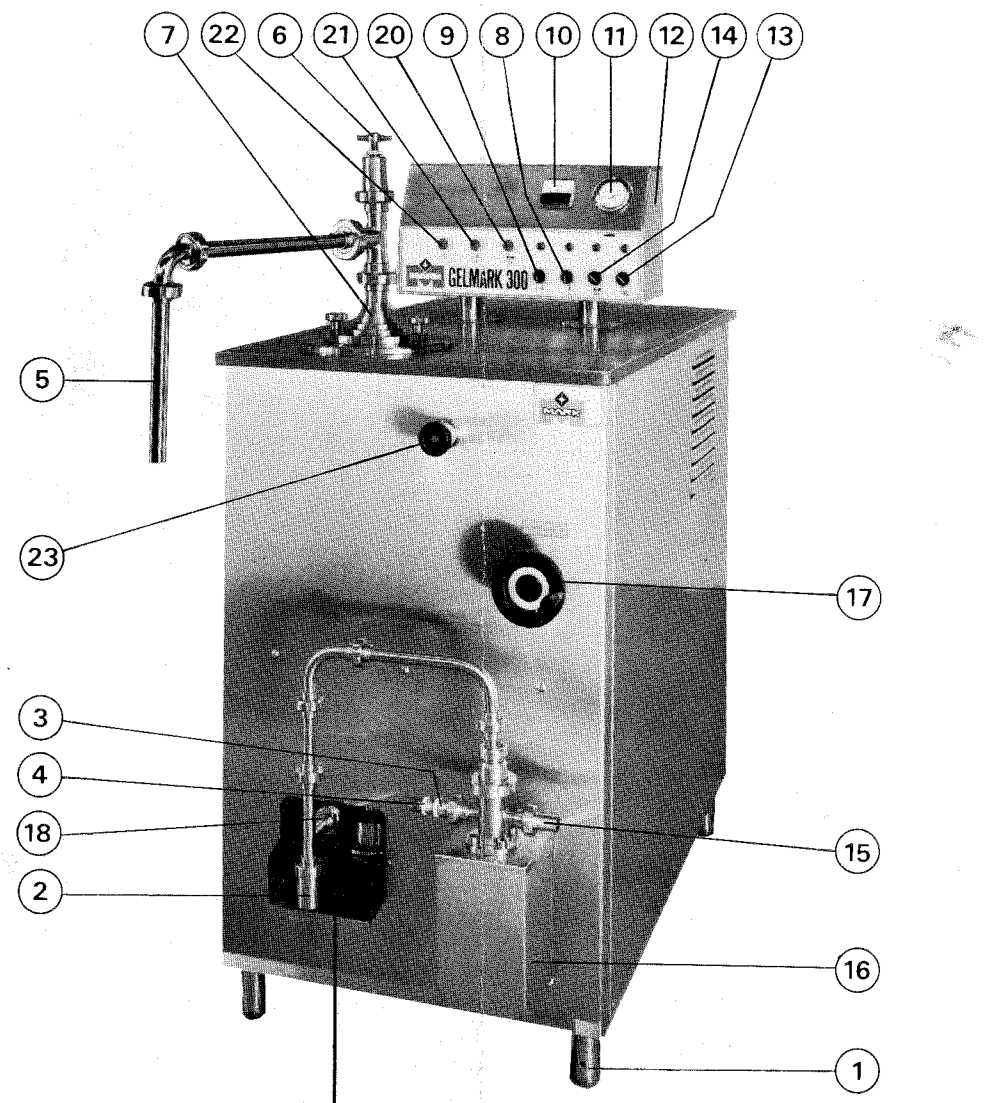
1) Adjustable feet
2) Safety valve
3) Air flow control valve
4) Air regulating nut
5) Ice-cream delivery tube
6) Adjusting screw
7) Outlet ice-cream top flange
8) Dasher switch
9) Mix pump switch
10) Ammeter
11) Thermovacuum gauge
12) Control panel
13) Hot gas solenoid valve switch
14) Compressor switch
15) Mix inlet tube
16) Mix pump
17) Pump stepless speed variator handwheel
18) Inlet union (for mix)
20) Push button for compressor relay reset
21) Push button for dasher thermal relay reset
22) Push button for pump thermal relay reset
23) Hot gas adjusting knob

FIG. 1

1) Pieds réglables
2) Valve de sécurité
3) Valve réglage air
4) Frette réglage valve air
5) Tube sortie crème glacée
6) Vis de réglage
7) Bride supérieure sortie crème glacée
8) Interrupteur moteur batteur
9) Interrupteur moteur pompe mélange
10) Ampéremètre
11) Mano-vacuomètre
12) Boite tableau de commande
13) Interrupteur valve gaz chaud
14) Interrupteur compresseur frigorifique
15) Tube entrée mélange
16) Pompe mélange
17) Volant réglage vitesse pompe
18) Raccord entrée mélange
20) Poussoir réenclenchement thermique du compresseur
21) Poussoir réenclenchement thermique arbre batteur
22) Poussoir réenclenchement thermique pompe
23) Robinet réglage gaz chaud

MARK

GM 80 - 160 - 300



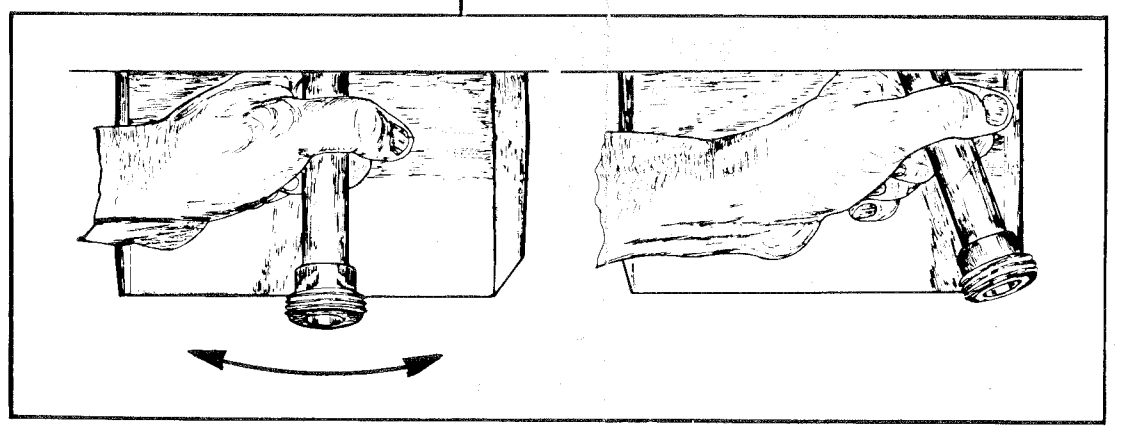
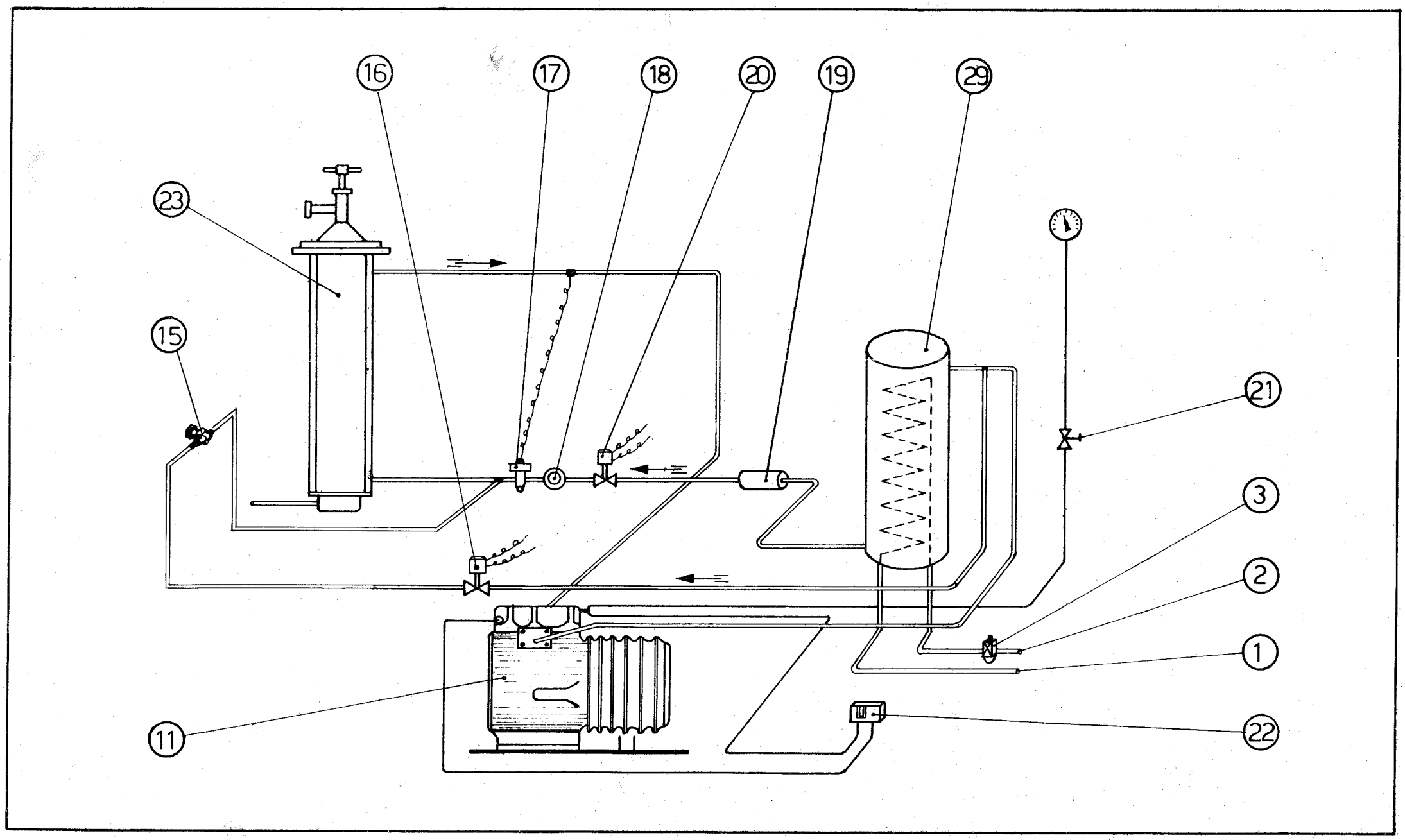
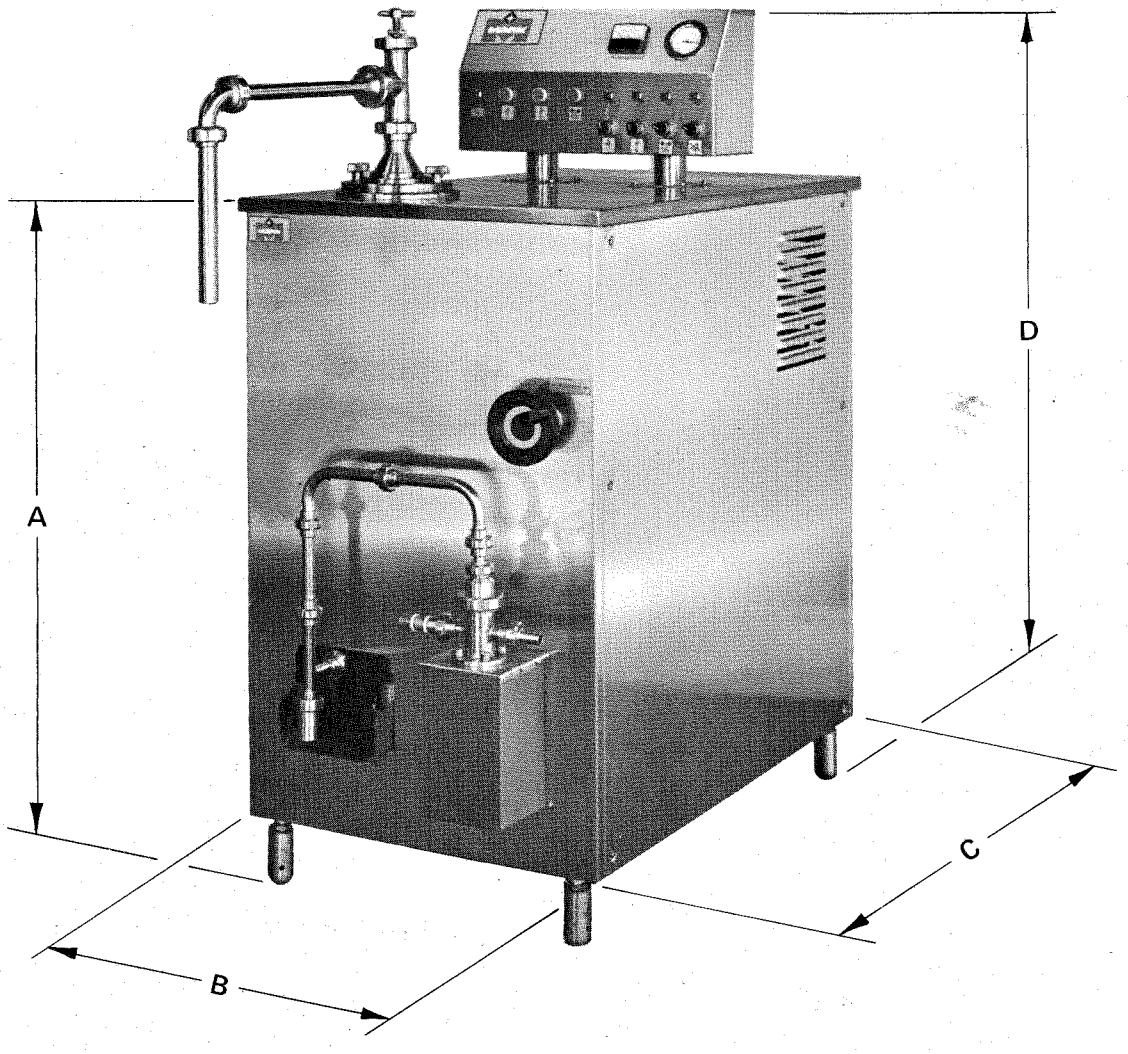


FIG. 1


16
17
18
20
19
29
23
15
21
3
2
1
11
22



	A		B		C		D		Kg.	lb.
GM/80	980	39″	580	23″	820	32″	1280	50″	210	462
GM/160	1070	42″	670	26″	930	37″	1410	56″	330	728
GM/300	1230	48″	750	30″	1150	45″	1570	62″	520	1146

PLATE 5

1) Eccentric shaft flange
2) Screw
3) Key
4) Supporting bracket
5) Fixing base
6) Centrering flange
7) Speed reducer shaft
8) Parallel pin
9) Rear cover
10) O-Ring
11) Air control valve closing needle
12) Air control valve rear spring
13) Air control valve setting nut
14) Air control valve front spring
15) Air control valve body
16) O-Ring
17) O-Rings
18) Pump body
19) O-Ring
20) Inox ball
21) Delivery hose nipple lock nut
22) Mix outlet union
23) Spring
24) Top body valve-holding
25) Top valve-body lock nut
26) Piston
27) Suction nipple lock nut
28) Suction mix union
29) Screws
30) Piston pin
31) Connecting rod
32) Screws
33) Ball bearings
34) Eccentric shaft
35) Front cover
36) Seeger ring for shaft

FIG. 5

1) Bride pour eccentrique
2) Vis
3) Clavette
4) Equerre de support
5) Base de fixage
6) Bride de centrage
7) Arbre réducteur vitesse
8) Gouhou cylindrique
9) Couvercle fermeture arrière
10) Anneau OR
11) Pointeau fermeture valve réglage air
12) Ressort arrière valve réglage air
13) Molette réglage valve air
14) Ressort avant valve air
15) Corps valve air
16) Anneau OR
17) Anneau OR
18) Corps de pompe
19) Anneau OR
20) Bille inox
21) Ecrou blocage raccord de sortie
22) Raccord de sortie
23) Ressort
24) Corps supérieur porte valve à bille
25) Ecrou blocage valve 24
26) Piston
27) Molette de blocage
28) Raccord aspiration mélange
29) Vis
30) Tourillon
31) Bielle
32) Vis
33) Roulement à billes
34) Pivot eccentrique
35) Couvercle avant
36) Anneau Seeger pour arbre

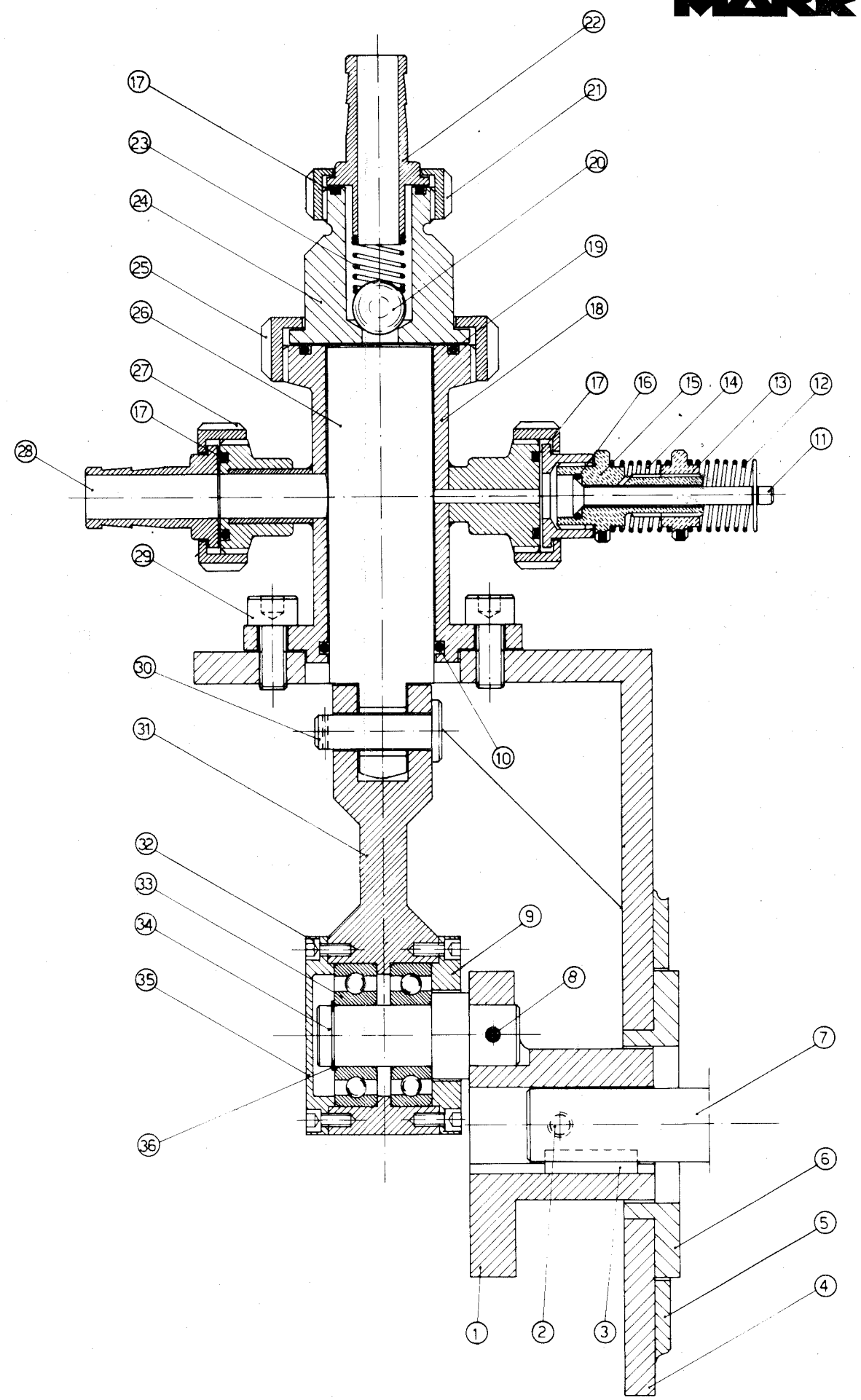


FIG. 5

PLATE 6

1) Freezing barrel pressure setting screw
2) Lock nut
4) Spring
6) "T" connector
7) Gasket
8) Threaded nut joint
9) Conical male
10) Shaft top bearing bronze bush
11) Bronze bush
12) Gasket
14) Freezing barrel
15) Scraping blades holding pins
16) Scraping blades giuding pins
17) Scraping blades
18) Hold-spring ring
19) Bronze bush
20) Gasket
21) Fixing screws for rear cover
22) Low cylinder support
23) Fixing motor gudgeon
24) Motor plate
25) T.E. Screw
26) Hexagonal nut
27) Motor shaft
28) Leading pulley
30) Pin
31) Washer
32) T.E. Screw
33) Bottom shaft
34) Tang UNI 92
35) Driven pulley
36) Trapezoidal belts
37) Seeger ring
38) Bearing
40) Bearing
41) Water drain
42) Cover
43) T.C.E.I. Screw
44) Gasket
45) Gasket
46) Stop device
47) Reinforcing nut
48) Threaded male
49) Inlet tube
50) Gasket
51) Hexagonal nut
52) Movable rear cover
53) Gasket
54) T.E. Screw
55) Spring
57) Bronze bushing
58) Outside cylinder body
59) Blades-holder shaft
60) Screw and stud bolt
61) Hexagonal nuts
62) Top cover
64) Hexagonale nut
65) Locking knob
66) Holding bronze bush hub
67) Retainer fing
68) Eccentric shaft
69) Top cover
70) Outlet tube
71) Gasket
72) Ring plug
73) Sliding vylinder housing
74) Sliding cylinder

FIG. 6

1) Volant réglage
2) Frette de blocage
4) Ressort
6) Raccord en "T"
7) Garniture
8) Ecrou de fermeture
9) Jonction conique
10) Support supérieur pour arbre
11) Coussinet
12) Garniture
14) Cylindre congélateur
15) Goujons fixage lames
16) Goujons de guide
17) Lames râcleuses
18) Anneau porte-ressort
19) Coussinet en bronze
20) Garniture
21) Vis fixage coulasse
22) Support inférieur cylindre
23) Pivot fixage moteur
24) Plaque moteur
25) Vis T.E.
26) Ecrou héxagonal
27) Moteur arbre
28) Poulie motrice
30) Tourillon
31) Rondelle
32) Vis T.E.
33) Arbre inférieur
34) Clavette UNI 92
35) Poulie entraînére
36) Courroies trapézoidales
37) Anneau Seeger
38) Coussinet
40) Coussinet
41) Ecoulement eau
42) Couvercle
43) Vis T.C.E.I.
44) Garniture
45) Garniture
46) Vis d'arrêt
47) Anneau moletté de renforcement
48) Mâle filété
49) Tube entrée
50) Garniture
51) Ecrou héxagonal
52) Culasse mouvable
53) Garniture
54) Vis T.E.
55) Ressort
57) Coussinet en bronze
58) Enveloppe extérieure cylindre
59) Arbre porte lames
60) Prisonnier
61) Ecrous héxagonals
62) Couvercle supérieur
64) Ecrou héxagonal
65) Volant de fermeture
66) Moyen porte coussinet
67) Anneau d'arrêt
68) Arbre excentrique
69) Couvercle supérieur
70) Tube sortie
71) Garniture
72) Bouchon ressort
73) Dôme
74) Cylindre glissant

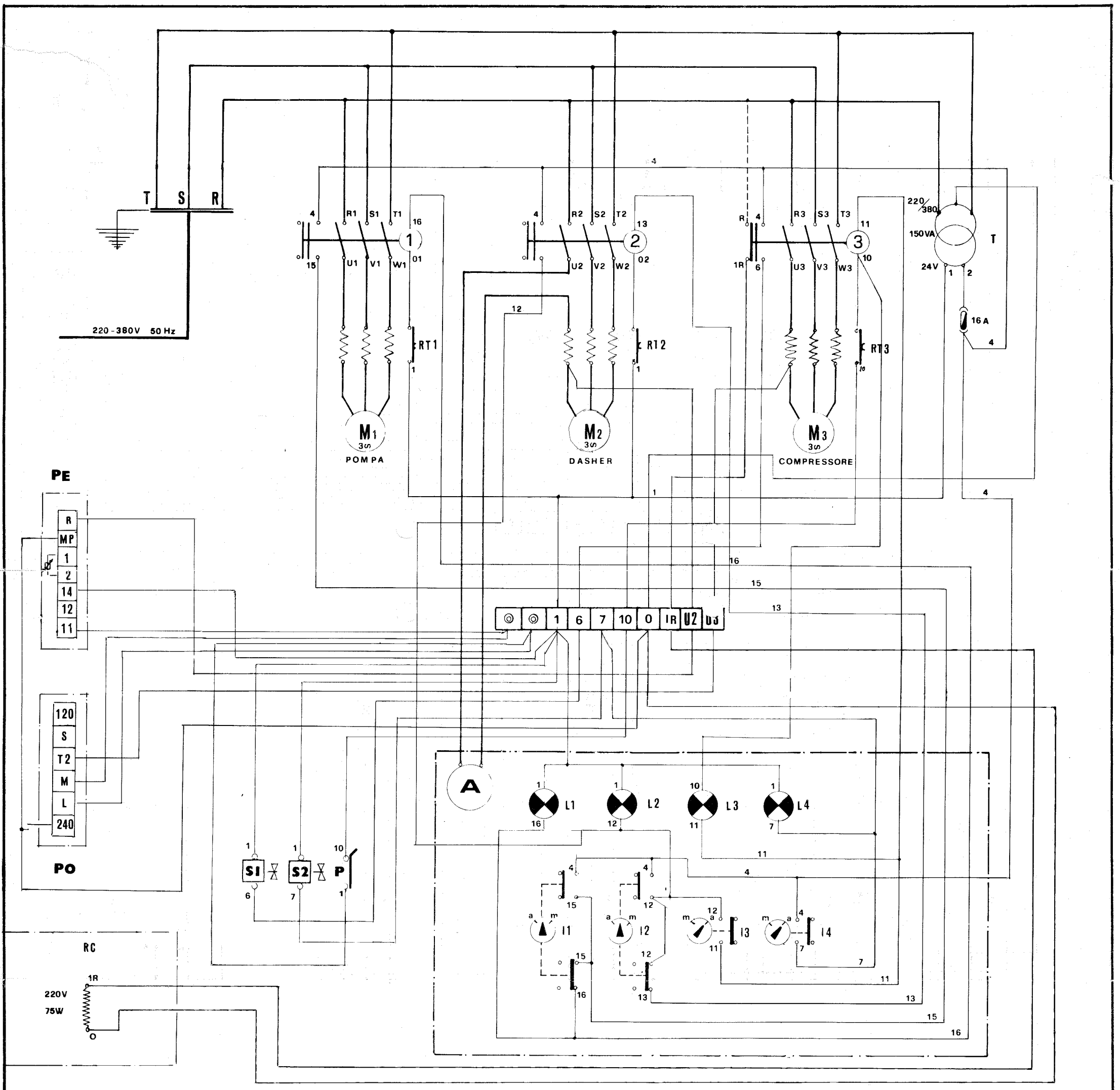


FIG. 3 A

LEGENDA

1 — Pump Contactor
2 — Dasher Contactor
3 — Compressor Contactor
RT — Overload thermal realys
T — Trasformer
A — Ammeter
L1 — Pump Signal Lamp
L2 — Dasher Signal Lamp
L3 — Compressor Signal Lamp
L4 — Hot Gas Solenoid Valve Signal Lamp
I1 — Push-button switch for pump
I2 — Push-button switch for dasher
I3 — Switch for compressor
I4 — Switch for Hot Gas Solenoid Valve
P — Pressure Switch
PE — Electronic Protection
PO — Oil Pressure Safety Switch
S1 — Liquid Shut-off Solenoid Valve
S2 — Hot Gas Solenoid Valve
RC — Heating Element for Compressor Pump

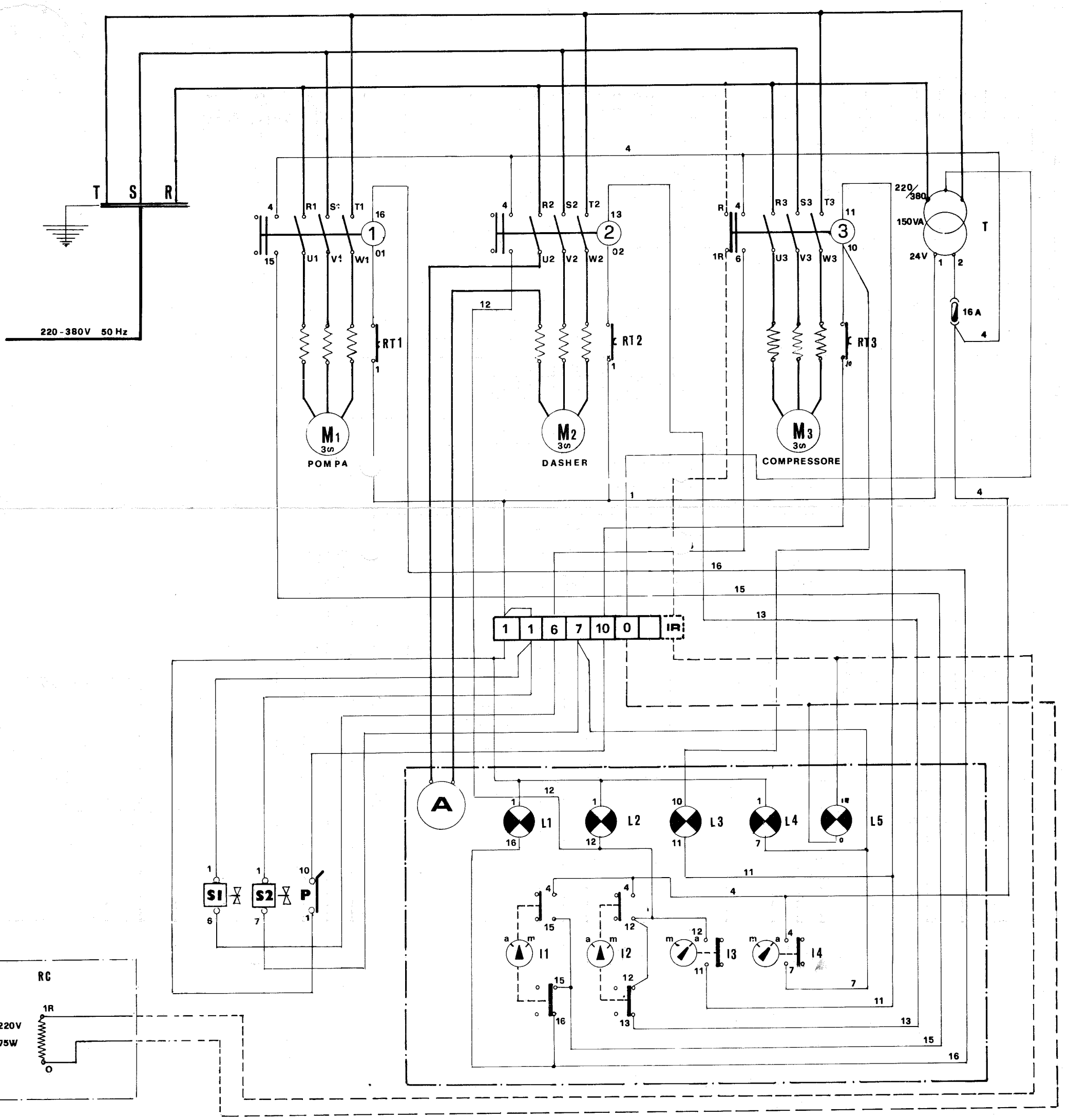
LEGENDE

1 — Contacteur pompe
2 — Contacteur arbre batteur
3 — Contacteur compresseur
RT — Relais thermique
T — Transformateur
A — Ampèremètre
L1 — Lampe témoin pompe
L2 — Lampe témoin arbre batteur
L3 — Lampe témoin compresseur
L4 — Lampe témoin vanne solénoïde gaz chaud
I1 — Interrupteur à poussoir pour pompe
I2 — Interrupteur à poussoir pour arbre batteur
I3 — Interrupteur pour compresseur
I4 — Interrupteur pour vanne solénoïde gaz chaud
P — Pressostat
PE — Protection éléctronique
PO — Pressostat de sécurite huile
S1 — Electrovalve arrête liquide
S2 — Vanne solénoïde gaz chaud
RC — Résistance pour huile compresseur

GM 300

	220V	380V
RT 1	2,7 ÷ 4A	1,8÷2,7A
RT 2	11÷16,5A	8 ÷ 12A
RT 3	15 ÷ 23A	11÷16,5A

MARK



GM 80	220 V	380 V
RT 1	1.8 ÷ 2.7 A	
RT 2	4 ÷ 6 A	2.7 ÷ 4 A
RT 3	5,5 ÷ 8 A	2,7 ÷ 4 A

GM 160	220 V	380 V
RT 1	2,7 ÷ 4 A	1,8 ÷ 2,7 A
RT 2	8 ÷ 12 A	5.4 ÷ 6 A
RT 3	11 ÷ 17 A	5,5 ÷ 8 A

FIG. 3

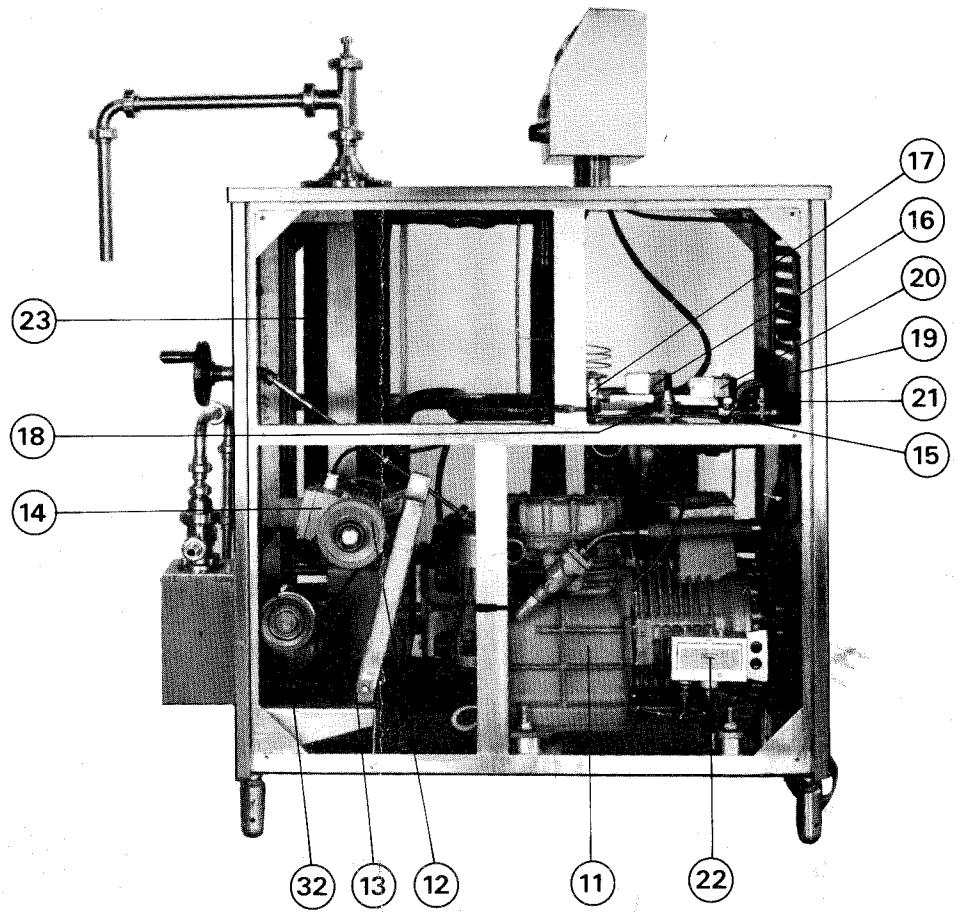
MARK

PLATE 2

1) Water outlet tube
2) Water inlet tube
3) Water flow control valve
4)
5)
6)
7)
8)
9)
10)
11) Compressor
12) Variable pulley for mix pump speed variator.
13) Speed variator belt
14) Pump motor
15) Hot gas shut-off cock
16) Hot gas solenoid valve
17) Expansion valve
18) Liquid flow sight galss
19) Line filter
20) Liquid shut-off solenoid valve
21) Pressure gauge shut-off cock
22) Pressure switch
23) Freezing barrel
24) Driven pulley
25) Dasher motor
26) Trapezoidal belts
27) Motor pulley
28) Compressor oil plug
29) Liquid receiver and condenser
30) Safety plug
31) Electric panel
32) Pump reduction unit
33) Oil compressor level

FIG. 2

1) Tube sortie eau
2) Tube entrée eau
3) Valve réglage débit eau
4)
5)
6)
7)
8)
9)
10)
11) Moto-compresseur frigorifique
12) Poulie variable pour variateur vitesse pompe
13) Courroie variateur vitesse pompe
14) Moteur pompe
15) Robinet ligne gaz chaud
16) Electrovalve gaz chaud
17) Valve d'expansion
18) Regard passage liquide
19) Filtre de ligne
20) Electrovalve arrêt liquide
21) Robinet isolement manovacuométre
22) Pressostat
23) Cylindre congélateur
24) Poulie entraïnée
25) Moteur arbre batteur
26) Courroies section trapézoidale
27) Poulie moteur
28) Vouchon huile du compresseur
29) Condenseur récepteur de liquide
30) Bouchon de sécurité
31) Tableau électrique
32) Réducteur pompe
33) Niveau huile compresseur



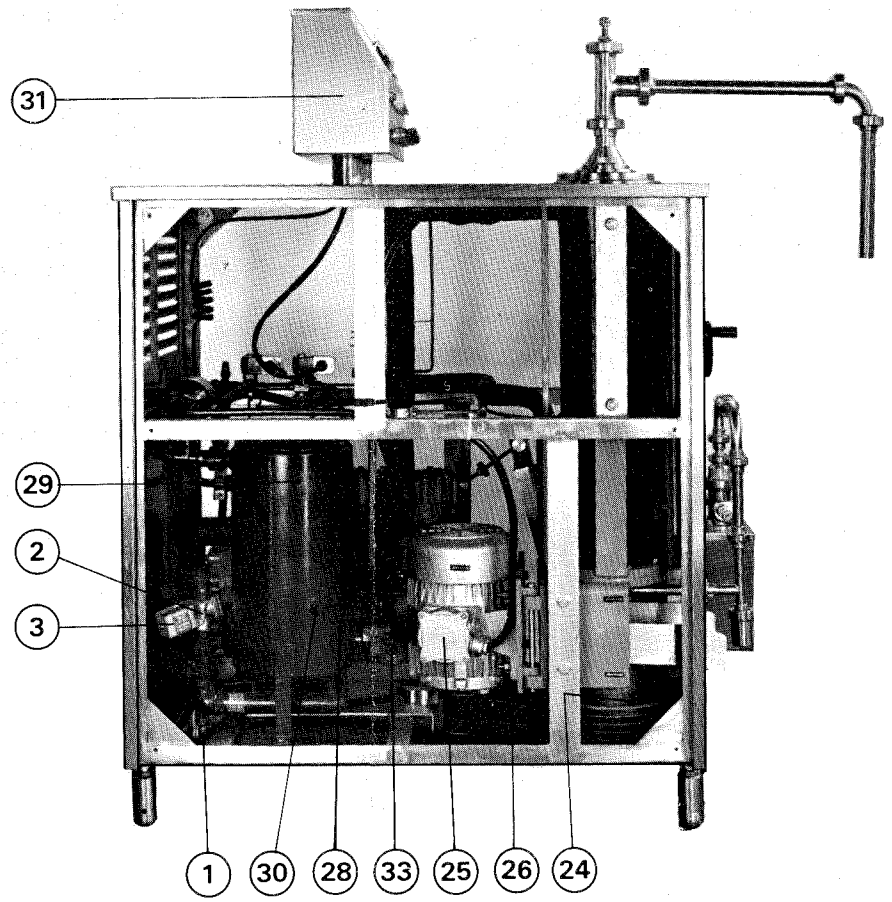


FIG. 2