Tetra Pak
Hoyer

EDITION 01

DECEMBER 1998

Manual Reference Number: 003-MAN-001

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MACHINERY WORLD

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FOREWORD

This manual provides technical information on **FRIGUS Continuous Freezer.**

Information herewith is updated until the date of publication; however, continuous research and improvement may bring about further minor changes to be performed later on.

We wish to express our acknowledgment for having preferred our equipment. You are welcome to our group of customers.

Our background in the field of continuous freezers enables us to manufacture state-of-the-art machinery.

We strongly recommend a careful reading of these instructions. This will ensure the correct and continuous operation of the equipment.

We ensure the use of first grade materials and a careful assembly, while at the same time we will provide you the best available service.

Good work!

Cordially,

TETRA PAK HOYER

Tetra Pak
Hoyer

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MACHINERY WORLD

1. Introduction

Thank you for having acquired a piece of equipment manufactured by Tetra Pak Hoyer.
We recommend a careful reading and understanding of this manual. This is essential in order to carry out the necessary installation, inspection and maintenance operations required to keep your freezer in perfect operating conditions.

This manual includes tables, drawings and diagrams that will help you to get familiar with the various parts of the equipment.

We will appreciate your eventual suggestions or any comment in case you consider that some explanation was omitted or was not complete enough. We will consider such inputs for further improvement of this manual.

2. Nameplate

For maintenance and service operations not covered by this manual and for the solution of technical problems, our Service Department will provide all the required information and take the necessary actions.
When contacting our Service Department, please report the data stated in the machine nameplate as shown in Figure 1

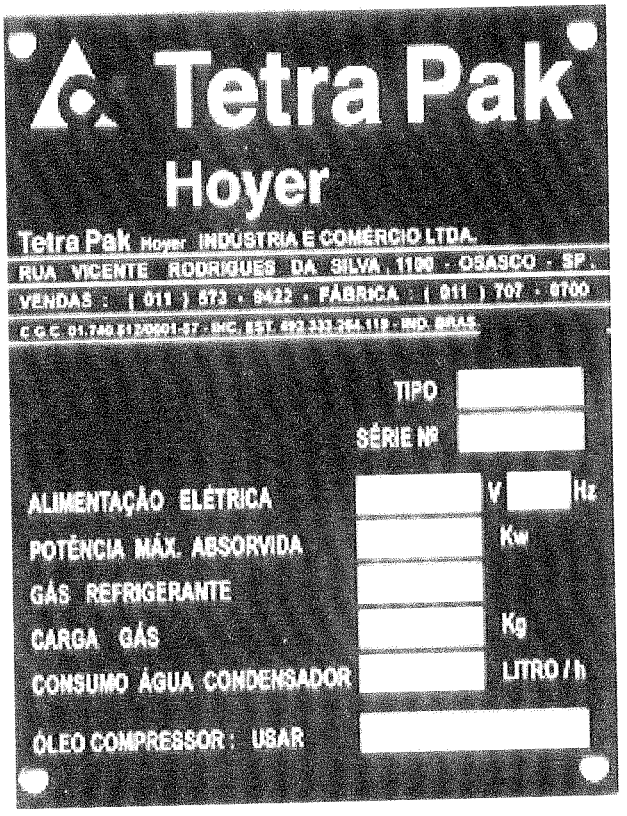


Fig.1

3. Machine Description

HOYER FRIGUS 200/400 is a continuous freezer specially designed for freezing, mixing and injecting air in ice cream mixes. The equipment includes a mix pump with simultaneous air injection, a freezing cylinder with scraper blades and a refrigerating unit. The top-quality components ensure maximum reliability and durability. Framework and enclosure panels are made of stainless steel.

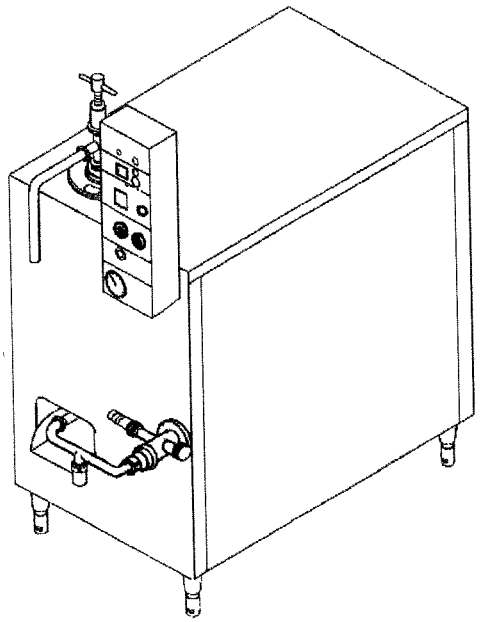


Fig. 2

3.1. Operation

A pump carries the mix from the maturing vats, (a centrifugal pump may be need to be installed between vats and freezer). The pump piston simultaneously admits a quantity of mix and air, and then it sends the mix and air combination to the freezer cylinder.
Within the cylinder the air is incorporated by means of the action of the mixing shaft

The stainless steel blades in the shaft continuously scrape the cylinder inside wall.
The produced ice cream is discharged through the outlet tube.
The mix is frozen in the freezer cylinder, by the flow of a refrigerant provided by the refrigerating unit.
From the control panel, the user may regulate the amount of produced ice cream and its hardness .

4. Technical specifications

	WEIGHT (Kg)	WIDTH (mm)	HEIGHT (mm)	LENGTH (mm)	RATED CAPACITY IN STANDARD CONDITIONS
FRIGUS 200	250	750	1200	1500	90 a220 l/h
FRIGUS 400	300	760	1600	1750	170 a400 l/h

Electrical specification

	GEAR MOTOR DASHER (HP)	GEAR MOTOR PUMP (HP)	COMPRESSOR (HP)	CONTROL CIRCUITS (KW)	INSTALLED POWER (KW)
FRIGUS 200	3	1	6	0.8	8.3
FRIGUS 400	4	1	10	0.8	12.1

Refrigerating unit

	REFRIGERANT	QUANTITY	REFRIGERATING CAPACITY (kw)	CONDENSING WATER				WATER INLET CONNECTOR (HOSE)	WATER OUTLET CONNECTOR (HOSE)
				MAINS		TOWER			
				INLET	OUTLET	INLET	OUTLET		
FRIGUS 200	R404A	3.0 Kg	6.6	18°	30°	28°	35°	¾	¾
FRIGUS 400	R404A		12.2	18°	30°	28°	35°	¾	¾

Standard conditions

	MIX INLET TEMPERATURE (°C)	OVERRUN	STD. MIX % SÓLIDS	EVAPORATION TEMP. (°C)	CONDENSATION TEMP. (°C)
FRIGUS 200	5 MÁX.	100%	38%	R404A-25	R404A+35
FRIGUS 400	5 MÁX.	100%	38%	R404A-25	R404A+35

5. Control panel

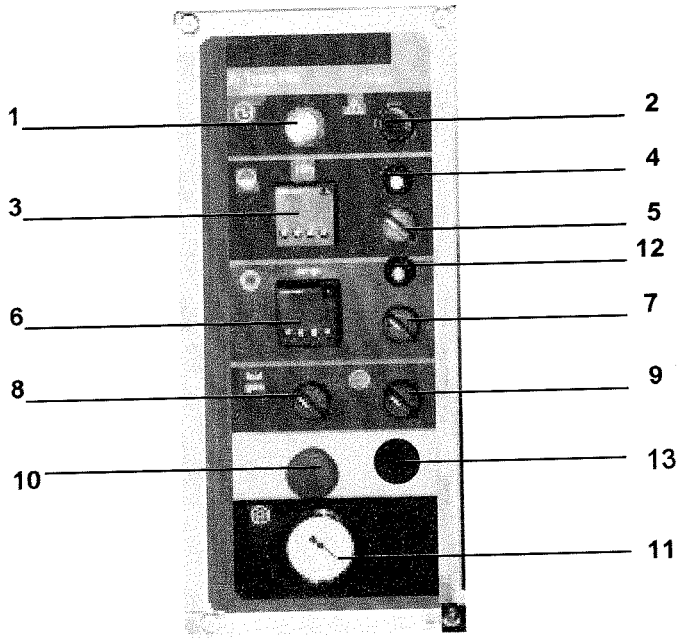
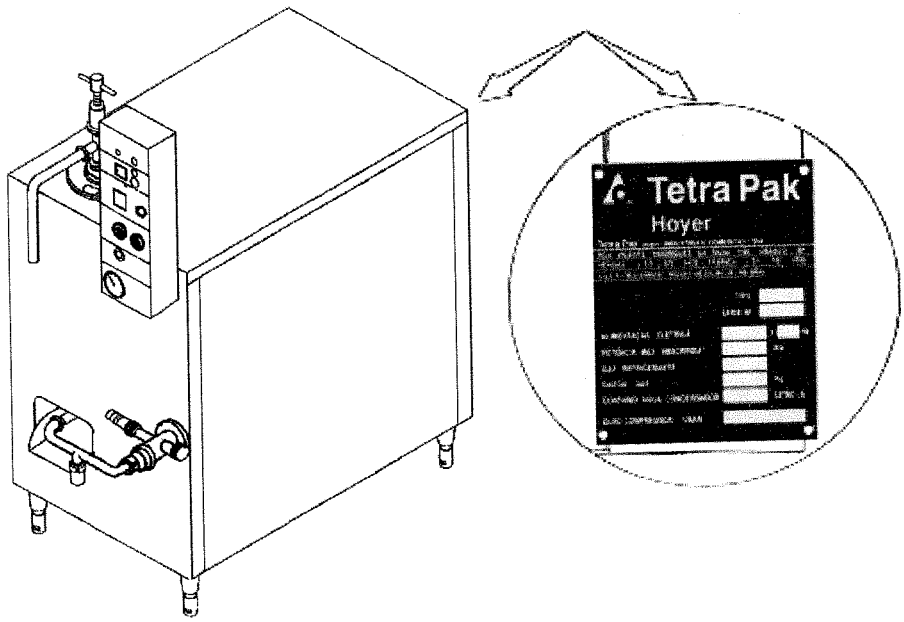


Fig.3

.1- Power available indicator light
.2- Emergency indicator light
.3- Liter counter
.4- Pump potentiometer
.5- Pump ON/OFF switch
.6- Dasher motor ammeter
.7- Dasher ON/OFF switch
.8- Defrost ON/OFF switch
.9- Compressor ON/OFF switch
.10- Emergency stop button
.11- Compressor pressure/vacuum gage
.12- Defrost potentiometer
.13- Reset button

6. Installation

Place the machine in its operating position and check if data on nameplate are compatible with local power supply.
With the help of a spirit level and using the adjustable feet, level the machine. Connect the mix inlet and the ice cream outlet to the production line.



6.1. Water supply connection

Connect the supply hose at the coupling point (hose connector) with the label "water inlet", couple the discharge or return hose to the outlet hose connection with the label "water outlet".
Coupling hoses shall not:

- have a smaller diameter than hoses entering/leaving the condenser.
- be pierced at any point.

WARNING:

- The machine is shipped with all the refrigerating circuit valves in its operating position. Therefore they do not need to be opening at the start up.
- We recommend installing a shutoff valve at the water inlet hose near the freezer.

6.2. Operational checkup

Before using the machine perform the following checkup procedure:

a. Check that the emergency push button is free.

b. Turn on the main switch at the machine rear side panel.

c. Press the reset button (fig. 3 item 13). Its signal lamp will go off.

d. Check the proper running of motors. Check the right sense of rotation, in order to prevent damages to the machine, in the following way:

1. **Pump**
   Operate the pump ON/OFF switch and turn on the potentiometer to start the pump and check the right sense of rotation of the crankshaft as indicated by the arrow. Turn the same switch in the reverse direction to stop the pump.

2. **Dasher**
   Operate the dasher ON/OFF switch to turn on the dasher and check that the shaft is rotating with the sense of the arrow. Turn the same switch in the reverse direction to stop the dasher.

7. Settings at the control panel

Description of controls

Reset button

To restart machine after an emergency stop, or when the machine is powered on.

Emergency

The machine makes na emergency stop when the emergency stop push button is depressed (fig. 6 item 10.)

Mix supply pump

When the pump ON/OFF switch is turned clockwise, the pump is started and its operation is indicated.When it is turned counterclockwise, the supply pump is stopped and the stop is indicated.

Dasher

When the dasher ON/OFF switch (fig. 6 item 7) is turned clockwise, the dasher is started and its operation is indicated. When it is turned counterclockwise the dasher is stopped and the stop is indicated.

The ammeter (item 6, fig. 6) indicates the current in the dasher motor, which is directly proportional to the ice cream hardness. When the maximum current is achieved, the hot gas device is activated at 100% until current being reduced to normal value. If the current continues increasing despite the hot gas activation, the continuous freezer compressor is stopped. This prevents the ice cream excessive hardening, which will in turn stop the shaft through the operation of the over current circuit breaker.

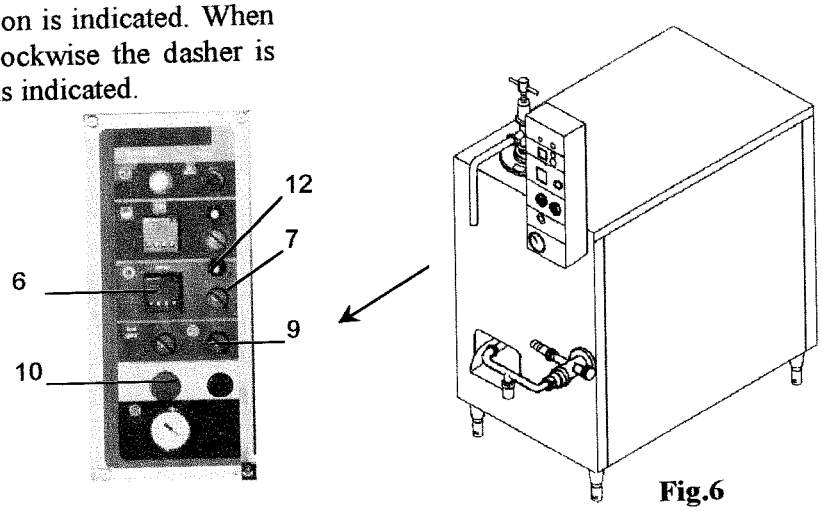


Fig.6

Refrigerating compressor

The compressor ON/OFF switch (fig.6 item 9), when turned clockwise activates the continuous freezer compressor and the operation is indicated.Being turned Counterclockwise the compressor is stopped and the stop indicated.
This switch is activated only when the dasher is operating .

Hot gas

As it was previously mentioned, the hot gas device is automatically activated when there is an excessive current. The hot gas device may be also manually activated with the switch in order to reduce the ice cream hardness (fig3 item 12).Excessive hot gas should not be injected since this my cauuse liquid return to the compressor damaging it.

Overrun control

Overrun is controlled by means of the regulating valve (fig.7 item15), once the equipment is at a steady-state condition, the higher the air injection, the higher will be the overrun, up to the mix capacity; over this limit no more air can be absorbed by the ice cream and it will be separately expelled.

Some mixes incorporate overruns within the maturing vat. This fact could influence the control of the ice cream pressure.

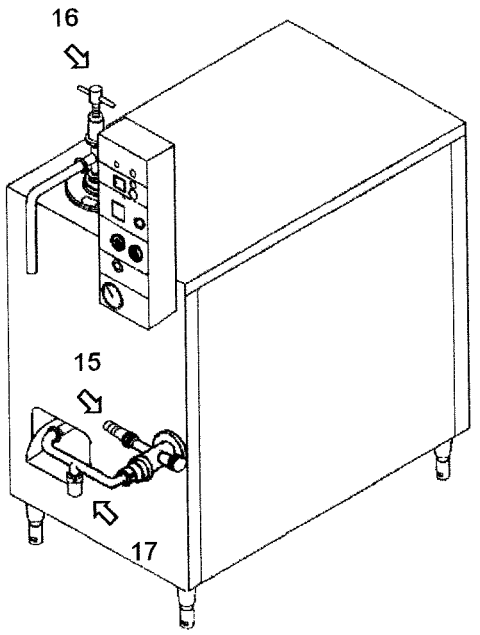


Fig.7

7.1.Settings of ice cream pressure

The ice cream pressure is regulated by means of a manual regulator(fig.7 item 16).
In order to get a good quality ice cream the pressure shall be set between 4 and 8 kgf/cm² .The safety valve (fig. 7 item 17) will open if the cylinder pressure exceeds 12kgf/cm², this will prevent damaging to the continuous freezer.

WARNING:
The parameters set according to item 7.1 need a certain time interval to turn into the operating parameters .

8. Settings at the refrigerating unit

WARNING:
The refrigerating unit shall only be maintained and inspected by qualified refrigeration technicians.

Refrigeration compressor

The unit compressor only will operate properly if the sense of rotation is correct; otherwise it will operate noisily without pumping the refrigerant. In order to check if the sense of rotation is the right one, verify the vacuum gage at the freezer front panel. With the compressor operating, the operating pressure indicated by the vacuum gage shall drop. If the reading does not drop invert two phases from the power supply in order to make the screw rotate in the right sense.

Condensation

The refrigerant is condensed after being compressed at the water-cooled shell and tube condenser. The water may be from the mains or from a well, but it is generally brought from a cooling tower. The FRIGUS 200/400 standard version is designed to be used with a cooling tower and condenser, therefore, it does not include a shutoff valve or a water-condensing monitor. The customer may decide to install a shutoff valve at the supply line near the freezer in order to stop the water flow when the freezer is not operating.

The cooling tower, if possible, shall be always kept at the same temperature (the cooling tower fan is controlled by a thermostat) in order to have a constant condensation pressure of 12 to 14 bar. This provides a uniform output from the refrigerating unit.

Thermostatic expansion valve

This valve is calibrated at the factory and it will reliably provide the best pressure/evaporation temperature at 1 bar/-25°C. DO NOT regulate the expansion valve if the evaporation pressure is not the desired one. Instead, all the parameters influencing the operating pressure, and therefore the freezer output, have to be verified. Verify the

the incoming mix temperature, the sense of rotation of the dasher , the wear at the scraper blades, the condensing pressure and the quantity of refrigerant in the circuit. It shall be the exact amount, no more and no less than required.

9. Emergency stop

When the emergency stop pushbutton is depressed (fig.8 item 10) all the machine operations are deactivated.

To reset the freezer after an emergency stop:

Reset

- Unlock the emergency pushbutton.
- Press the reset button (fig.3 item 13), its signal lamp will go off.
- Start again the freezer by restarting the pump, the dasher and the refrigeration compressor.
- Now normal production is reestablished.

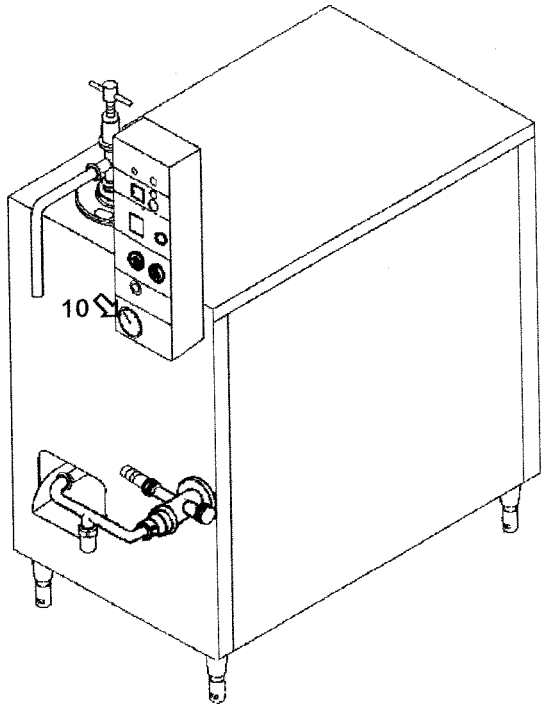
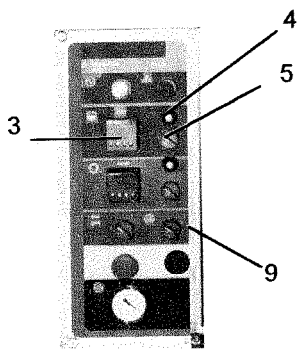


Fig.8

10. Production startup

1. Check if the power indicator lamp is on.
2. Check if the reset indicator lamp is off. Incase it is on press the button.
3. Connect the pump to the mix container.
4. Check if the potentiometer is set at zero (Fig.9 item 4).
5. Start the pump by means of the starter (Fig.3 item 5). The approximate mix flow rate (l/h) is indicated in the liter counter.
6. Turn off the pump.
7. Turn on the dasher with the starter. Make sure the dasher is rotating in the correct sense by means of the arrow at the equipment front side.
8. Turn on the compressor by means of the starter (Fig. 9 item 9).
9. Start the pump and by means of the potentiometer increase the speed until the ammeter reading indicates that the ice cream is hard enough. Then adjust the hourly output.
10. Using the air regulating valve set the rate of air to be injected in the mix. The regulation occurs some minutes after.
    The mix starts hardening inside the freezer cylinder when these operations are completed.
11. Adjust the ice cream pressure within the cylinder using the manual regulator that activates the lock adjusted on top of the cylinder. Check the value of the ice cream pressure inside the cylinder, which shall be approximately 4 to 8kgf/cm².
12. The manual or automatic defrosting system controls the ice cream hardness.



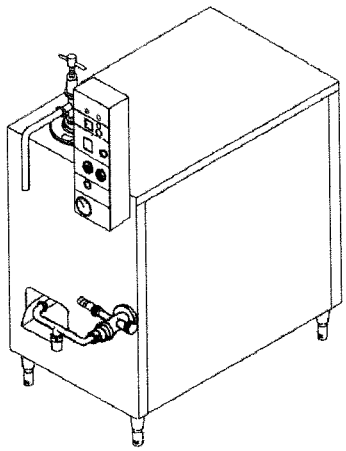


Fig.9

If the ice cream pressure drops below 4 kgf/cm^2, there could be an output of ice cream without consistency. Adjust the regulator in order to increase the reading in the pressure gage until getting a value between 4 and 8 kgf/cm^2 . If the ice cream does not get the required consistency, check the following:

- the air/mix pump speed shall not be too high,
- mix temperature at the vats shall not be too high,
- the scraper blades shall be properly positioned (with the sharp edges against the cylinder wall) and shall not be worn,
- the refrigerating unit shall operate without problems that could be affecting the production and causing the production of a not sufficiently hardened ice cream.

WARNING :
Some mixes incorporate a certain overrun inside the maturing vat. This fact could influence the control of the ice cream pressure.

Although the first three conditions may be readily corrected with production control parameters, the refrigerating unit has to be inspected by a qualified refrigeration technician observing the instructions of the **"MAINTENANCE"** Chapter.

Pressure shall not exceed 12 kgf/cm^2 and it can be reduced in the following way:

- reduce the pressure gage reading with the regulator.
- increase pump speed with the potentiometer
- check if the pump piston is not locked.

11. End of production

1. Turn off the refrigerating compressor by turning the switch (fig.3 item 9) counterclockwise.
2. Cut off the supply of mix from the maturing vat and feed pump with hot water (not above 50°C) and cleaner, washing and rinsing with only hot water.
3. Wait until the hot water leaving the cylinder is clean.
4. Stop the dasher by turning the switch (fig.3 item7) counterclockwise. Hot gas supply will automatically operate during 30 seconds.
5. Stop the supply pump by turning the switch (Fig.3 item 5) counterclockwise.
6. Remove connection between the pump outlet and the cylinder inlet in order to discharge de water.
7. Remove the cover by unscrewing the fixing knobs.

Care should be taken to ckeck the position of the blades. (The sharpened edge shall be against the cylinder wall)..

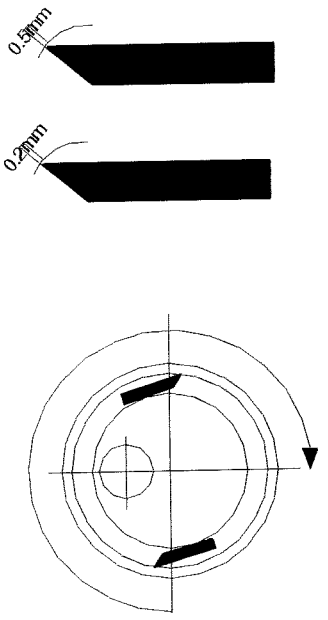


Fig.10

8. Remove the tubes and valve on the cover.
9. Place the cylinder guard (included in the replacement kit) according to figures 10.1 and 10.2
10. Extract the dasher by means of a special tool (supplied) and remove the blades.
11. Remove the cylinder lower cover.
12. Carefully wash all the components in a cleaning detergent solution with the recommended concentration.
13. Carefully rinse them in tap water.
14. Reinstall the parts exactly in their original position.

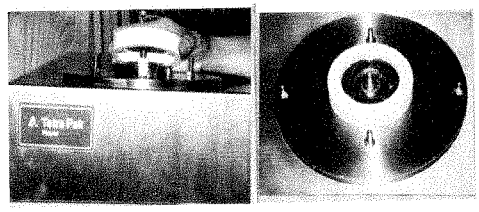


Fig.10.1 **Fig.10.2**

WARNING:

- Clean the continuous freezer by pumping a sterilized solution through it.
  After the cleaning and rinsing the solution has to be discharged.
- Before restarting production, it is recommended to circulate rinsing water for 2 or 3 minutes.
  Then discharge the water by uncoupling the connector between the pump and the cylinder.
- Now, the freezer is ready again for use.

12. Washing

The semi-automatic washing allows the machine cleaning without disassembling all parts in contact with the mix.

For this follow these steps:

1. Put a washing solution in an appropriate container (such as a Hoyer washing container with an incorporated pump) (Fig. 12 item 1) at an adequate temperature (see the washing program in page 21).

2. Dismount the safety valve, mount the "Y" connection (Fig. 12 item 2); connect the connection to the pump (Fig.12 item 3) and to the input mix tubing (Fig. 12 item 4)

3. Start the operation of the washing pump and loose completely the pressure valve. Start the continuous freezer pump and the dasher during 5-10 seconds every 2-3 minutes.

4. When you finished the washing program dismount the "Y". Mount again the safety valve.

5. After finishing the washing program, fill the machine with a disinfectant solution. Connect the mix input of the continuous producer to a container filled with disinfectant solution, start the pump and wait until the solution leaves the output ice cream tube; then stop the pump. Before starting again, discharge the solution and rinse with clean water.

WARNING
Do not use detergents containing acids or chlorine except those recommended. Chlorine attacks the dasher and blades. Acids attacks chromium

WARNING
Discharged liquids must be treated in accordance with the rules of the country where the installation is made.

Note:

After disinfecting, do not dismount any part of the machine to avoid the possibility of contamination. For washing and disinfecting do not use products that could attack mechanical parts in contact with these liquids.
It's very important to perform periodical checking on the components of the continuous producer, particularly after long inactivity periods, to avoid inconveniences when the machine is going to operate at full efficiency and productivity

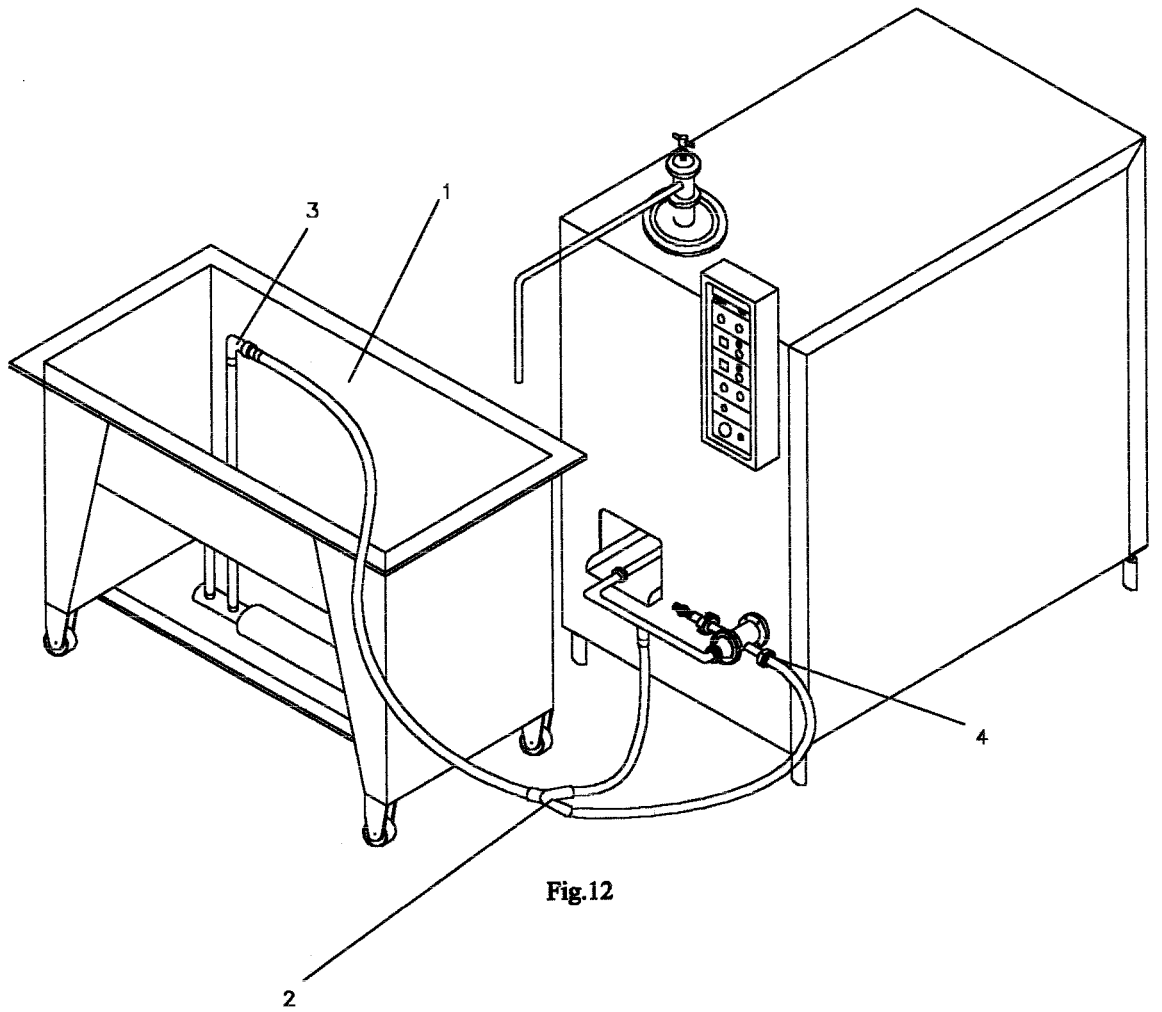


Fig.12

13. Washing program

WASHING STAGES	Concentration %	Washing temperature [C]	Washing period (Minutes)	Notes
1. PREVIOUS WASHING WITH WATER		50	5	Throw away
2. WASHING WITH DETERGENT (use alkaline detergent, not caustic, non-foam producer, with a mix of alkaline substances, insulating, anticorrosive and tension-active agents) pH 11,3 to 10. Recommended products: SU157 (Diversey Lever) P3-N421 (Henkel-Ecolab)	1,2 - 1,6	65/70	25	Re-circulate
3. RINSING WITH WATER		20	5	Throw away
6. DESCALING WASHING (use buffered phosphoric acid). Recommended products: SU475 (Diversey Lever) P3-PE4 Spezial A (Henkel-Ecolab)	0,5-1	60/70	10	Re-circulate
7. RINSING WITH WATER		20	5	Throw away
4. DISINFECTING WASHING (use a chlorine active disinfectant slightly alkaline) Recommended products: SU330 (Diversey Lever) P3-dix forte (Henkel-Ecolab)	1-1,2	20	10	Re-circulate
5. RINSING WITH WATER		20	5	Throw away NOTE: Washing in the daily procedure (1-2-3-4-5) ends in this stage. We recommend a complete washing following in sequence stages 1-2-3-6-7-4-5
When daily or weekly washing has ended fill the machine with an aldehyde type disinfectant (gluteraldehyde). Wash with water in the next morning.	0,5	20		

14. Maintenance

Mechanical maintenance

- **Rotary seal**

  Check the rotary seal assembled at the lower end of the dasher and coupled to the bushing fixed with the ring nut to the end piece. The rotary seal has a hard metal seat and under the spring pressure it rotates against the bushing face.
  Check for scratches and dirt at the seating surface, since this could impair the sealing properties.
  Both surfaces shall be polished with wet grinding. Use first a hard surface (glass), and then rub one surface against the other.
  Replace worn seals.

- **Dasher drive**

  If the dasher operates with noise, remove the cover and the lock and remove the low-speed shaft.
  Check lubricating level at the reduction gear and replenish if necessary.
  Disassemble the reduction gear and replace, if necessary.
  In the inverse sequence assemble again all the parts.

- **Dasher**

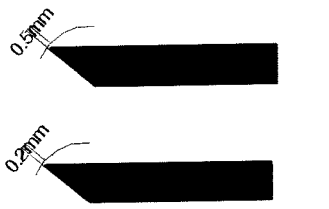
  Make sure the cam is rotating freely on the dasher. If it is not, remove the lock and remove the following parts from the dasher: the roller bearing and the cam. Check also the condition of the bushings.

- **Scraper blades**

  Check the scraper blades (fig. 13).
  Blades shall be mounted on their special pivots in order to have them tilted during the dasher rotation. If the scraper blade edge is uneven or worn, the blade shall be replaced.

NOTE :

Blades can be sharpened although this requires a special tool. Blades shall be sharpened whenever the edge width exceeds 0.5 mm (see fig. below). After sharpening edge width shall be around 0.2 /0.3 mm.



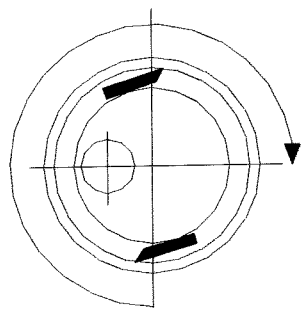


fig.13

14.1. Electric system maintenance

The electrical installation was designed and developed in order to provide the best possible protection to the continuous freezer components. A further overload trip after reset indicates that the fault/short circuit was not cleared and the electrical installation shall be verified or there is a blocked mechanical component.

If the refrigerating unit compressor was switched off, check the pressure switch. This operation shall be carried out before performing any work at the electrical installation. Carefully follow the electric diagram. The terminal block, as it is numbered in the diagram, is the one that was installed in the freezer, in order to make inspections easy. Only a qualified electrician shall carry out maintenance and repair work.

14.2. Refrigerating unit maintenance

WARNING:
Only a qualified refrigeration technician shall perform repair work and inspections.

- If the refrigerating unit is not operating properly, the causes may be:
  - Not enough or excessive condensation,
  - thermostatic valve failure,
  - dirty or clogged line filter,
  - blocked or open hot gas solenoid valve,
  - blocked or shut solenoid valve,
  - lack of refrigerant in the circuit,
  - excessive condensation / too low cooling tower temperature.

- Not enough condensation may be caused by:

  - not enough supply of water from the condenser cooling tower: check that all the shutoff valves (at the water line to the freezer) are opened and that the water flow properly reaches the freezer.

- If the line filter is clogged, it will freeze and block the refrigerant flow. Dismount and replace it.
  In any case, the line filter shall be replaced any time the refrigerating circuit is opened.

- If the hot gas solenoid valve remains open, the refrigerating performance is significantly reduced. Check the solenoid valve and replace if necessary.

- The liquid solenoid valve automatically closes the liquid line whenever the compressor is switched off.

- When the compressor is started, if the liquid solenoid valve does not open, the refrigerating unit goes to a decompression state. The vacuum gage reading will drop below 35°C.
  In these cases make sure that the solenoid valve coil is getting electric supply, if this is the case, replace the coil.

- If the electrical installation is operating properly and all the above points have been observed, a poor performance may be caused by lack of refrigerant in the refrigerating unit. This is evidenced by the occurrence of bubbles of refrigerant gas that can be seen through the liquid sight hole.
  If the lack of gas has been identified in the refrigerating circuit, try to locate a leakage before replenishing the circuit.

WARNING:
If it is not absolutely necessary, do not add refrigerant to the circuit: this will be a loss of time, money and energy.
The refrigerating unit does not operate properly with an excessive amount of gas.

14.3. Preventive maintenance

- **At every 3,000 hours**
- replace all the seals at the pump, the dasher and the pipelines
- sharpen the scraper blades or replace them if they are worn.

- **At every 6,000 hours**
- replace scraper blades
- replace dasher bushings
- replace the whole dasher rotary seal
- replace piston bushings and plugs

15. Lubrication

Reduction gears :

We recommend ISO VG 320 oil:

RECOMMENDED OIL ISO VG 320	PERIOD OF CHANGE (operating hours)
SHELL MACOMA 320 TEXACO MAROPA 320	First: 40 to 150 hours Second: 300 to 500 hours Third on : every 500hours

16. Troubleshooting

Problem	Cause	Remedy
Power indicator light off	• Power supply off	• Restore power supply.
	• Power lamp burnt	• Replace lamp.
	• Main switch in "0" position.	• Place switch in "1" position.
	• Main switch failure.	• Replace.
Poor or lacking mix flow.	• There is no mix.	• Refill mix.
	• Kinked or clogged mix supply hose.	• Remove clogging/kinks.
	• Air bubbles in the mix supply hose.	• Stop overrun, increase pump speed in order to bring the mix more quickly to the cylinder, reset the pump desired speed and restart the overrun.
	• pump has stopped.	• See problem "Pump stops or does not start".
	• The pump is not properly timed.	• Time the pump again.
Pump stops or does not start.	• Faulty switch.	• Replace switch.
	• Faulty main motor.	• Replace or repair.
	• Blocked bearings	• Replace according to "Mechanical maintenance" instructions.
	• Inverter thermal overload.	• Wait for 20 seconds and restart the pump.
	• Faulty inverter.	• Replace.
	• Inverter in emergency condition.	• Turn off main switch and then turn it on after some minutes.

16.1.Problem	Cause	Remedy
	• Tripped circuit breaker.	• Reset circuit breaker.
Dasher stops or does not start.	• Faulty switch	• Replace switch.
	• Faulty motor.	• Replace / repair.
	• Ice developed in the cylinder.	• Turn on hot gas.
	• Faulty reduction gear.	• Replace
	• Too hard ice cream.	• Turn on or increase hot gas supply.
	• Tripped circuit breaker	• Reset circuit breaker
Dasher malfunction.	• Faulty scraper blades	• Sharpen or replace taking care with correct installation procedure.
	• Faulty reduction gear.	• Replace.
	• Poor or lacking water supply to condenser.	• Check water supply.
Problems with mix cooling at the start	• Hot mix.	• Check mix temperature.
	• Faulty refrigerating unit.	• Call a qualified refrigeration technician.
	• Excessive hot gas.	• Reduce hot gas.
Too soft ice cream	• Too high ice cream producing speed.	• Reduce pump speed.
	• Too hot incoming mix.	• Make sure incoming mix is at +5°C.
	• Poor water supply to condenser	• Increase quantity of water supplied to condenser.
	• Too hot condenser cooling water.	• Check cooling tower water temperature.

16.2.Problem	Cause	Remedy
	• No refrigerant gas.	• Check for leakage at the refrigerating unit and reload gas.
Not enough overrun	• Too much opened ice cream outlet valve.	• Increase ice cream outlet pressure.
	• Clogged refrigerant gas filter.	• Replace filter.
	• Faulty refrigerating unit.	• Call a refrigeration technician.
	• Check valve worn or clogged.	• Replace as stated in the "Mechanical maintenance/ cleaning" section.
	• Faulty overrun regulator.	• Replace.
	• Worn pump piston and pump jacket O-ring.	• Replace.
The freezer compressor starts but immediately stops.	• Condenser water hoses with problems.	• Remove kinks.
	• Closed water supply to condenser	• Open the valves
	• Condenser water hoses have a smaller diameter.	• Replace hoses; they shall have at least the same diameter of machine couplings.
Freezer does not start	• Dasher switched off.	• Start dasher.

16.3. Problem	Cause	Remedy
	• Tripped circuit breaker.	• Reset circuit breaker.
	• Tripped electronic overload.	• Reset by switching off and on the main switch.
	• Faulty switch.	• Replace switch.
	• Tripped high-pressure protection.	• Check water temperature.
	• Tripped low-pressure protection.	• Turn on hot gas for 30 seconds.
Icing in the compressor	• Too cold condenser water.	• Check water temperature.
	• Worn scraper blades	• Replace
	• Faulty thermostatic valve.	• Replace.
	• Excessive amount of refrigerant gas.	• Unload gas and reload according to the amount stated in technical information.
Not all the pump speed range is available	• Faulty inverter.	• Replace.
	• Faulty potentiometer.	• Replace.
The hourly output is not modified even after having adjusted the potentiometer P1.	• Faulty inverter.	• Replace.
	• Faulty potentiometer.	• Replace.
Hot gas device is activated before the right time	• Uncalibrated instrument	• Calibrate instrument.
Hot gas device is not activated.	• Uncalibrated instrument	• Calibrate instrument.
	• Faulty instrument.	• Replace.
Hot gas device is activated but has no effect.	• Hot gas valve closed.	• Open valve.

17. Exploded view of the framework

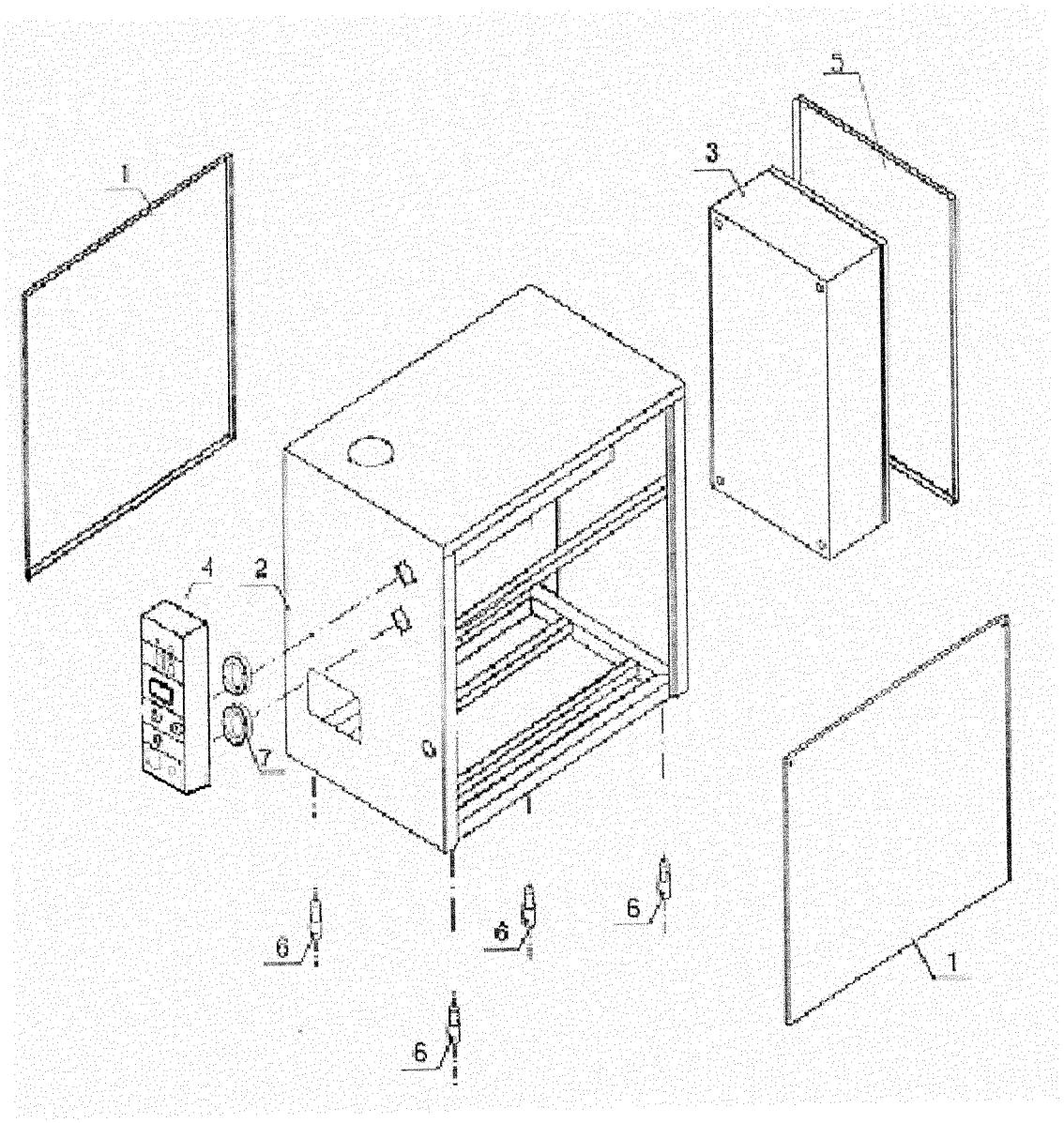
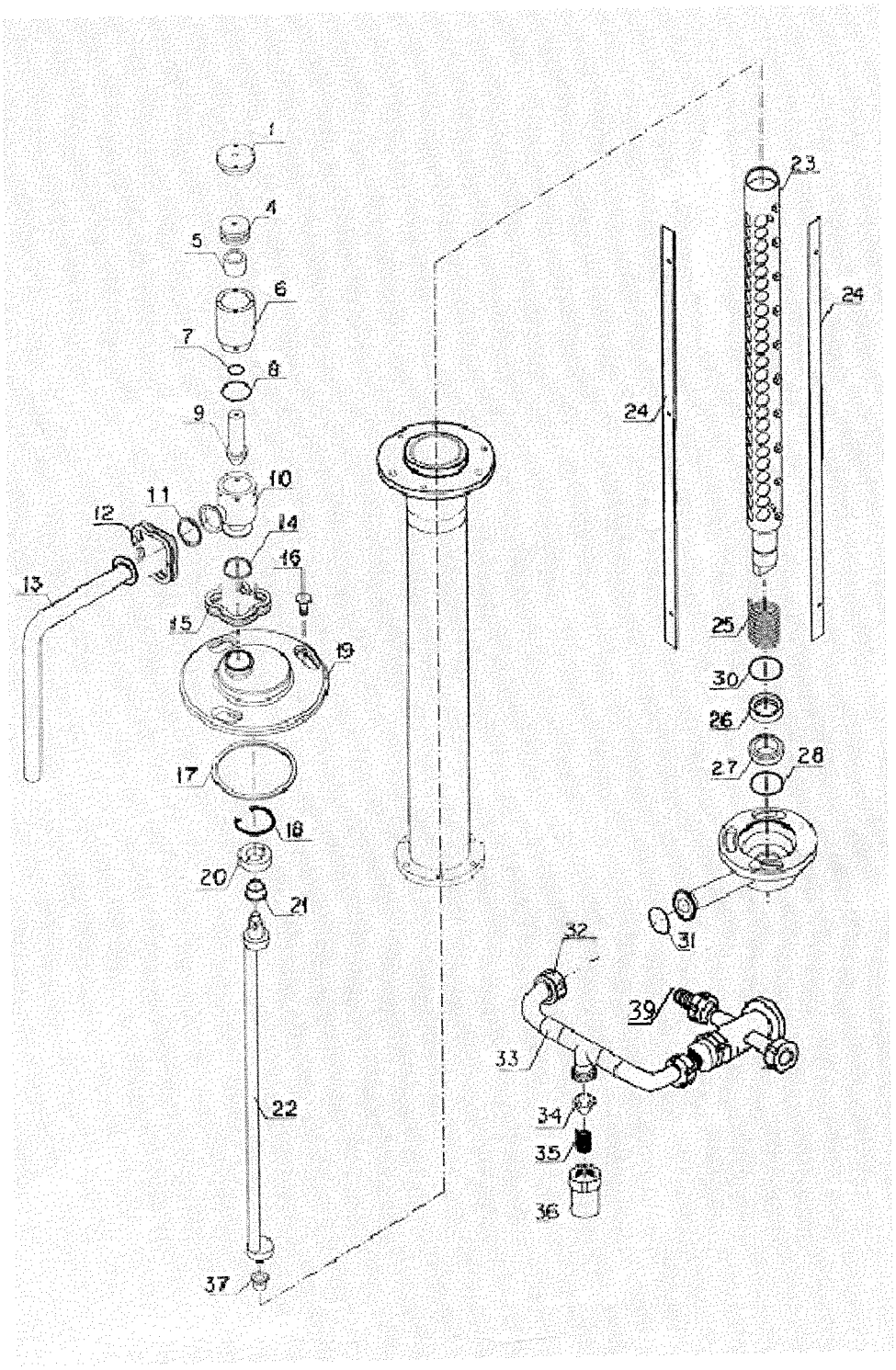


Fig. 12

POS.	CODE	DESCRIPTION	QTY.
1	D10080	Side panel	2
2	D10015	Framework	1
3	R05005	Power panel	1
4	D10080	Control panel	1
5	D10080	Rear panel	1
6	P36005	Adjustable foot	4
7	D10080	Control panel spacers	2

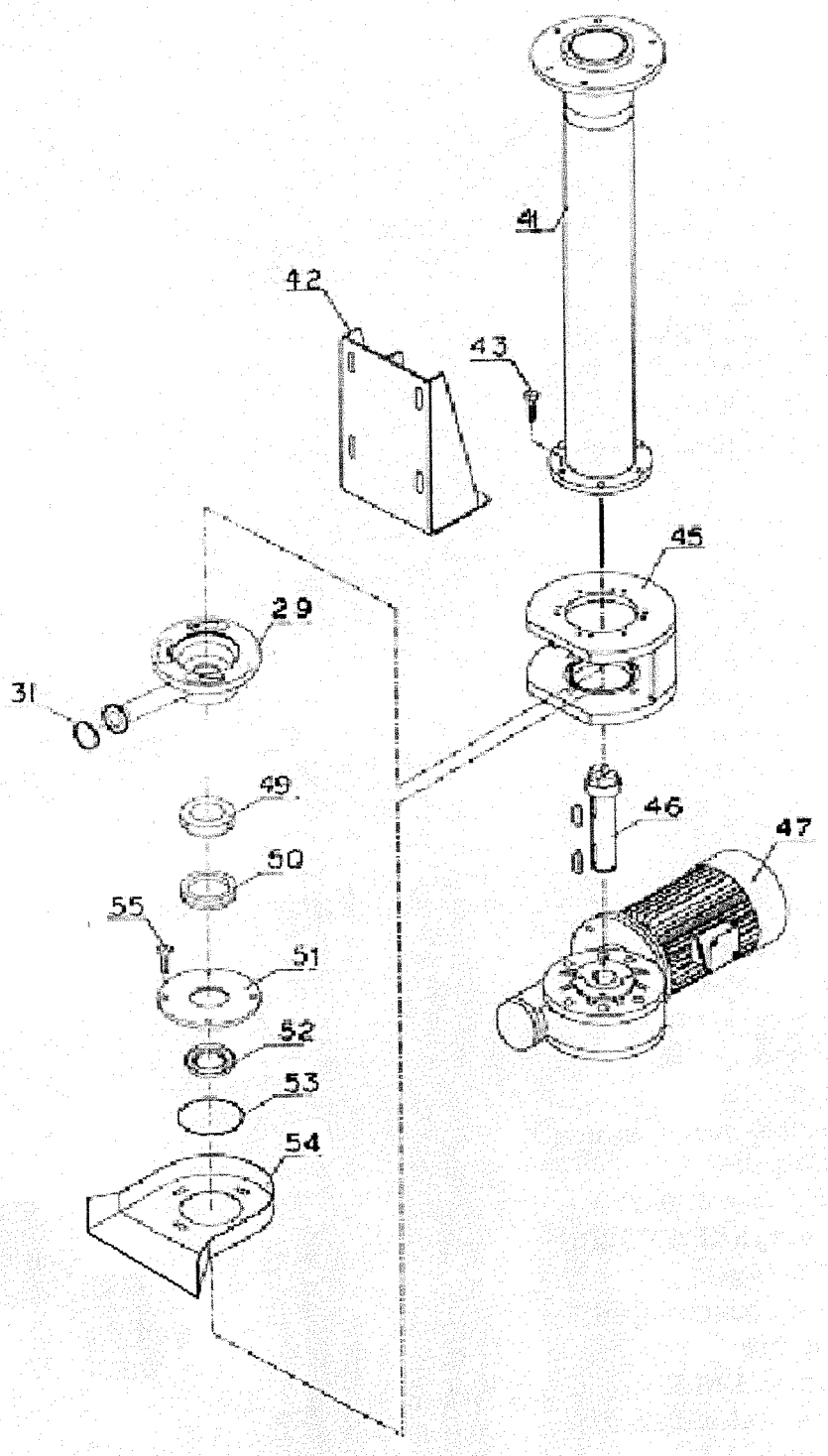
18.Exploded view of dasher unit - (Frigus 200)



Dasher unit (Frigus 200)

POS	CODE	DESCRIPTION	QTY.
1	N20996	Top cover (pressure valve)	1
4	N20515	Spring holder (pressure valve)	1
5	N20517	Bronze bushing (pressure valve)	1
6	N20514	Plug valve (pressure valve)	1
7	P00076	O-ring	1
8	P00042	O-ring	1
9	L01018	Piston (pressure valve)	1
10	N20513	Female valve (pressure valve)	1
11	P00041	O-ring	1
12	P37606	Clamp 1.1/2"	1
13	P37617	Mix outlet tube	1
14	P00041	O-ring	1
15	P37606	Clamp 1.1/2"	1
16	P38027	Cover closing screw	2
17	P00001	O-ring	1
18	M21001	Spring ring	1
19	N20849	Cylinder top cover	1
20	P15009	Cover stainless steel bushing	1
21	L03007	Bronze bushing	1
22	P15024	Eccentric shaft	1
23	N06510	Mixer shaft	1
24	L10005	Scraper blade	2
25	P30006	Mechanical seal spring	1
26	L01003	Mechanical seal	1
27	L03008	Lower cover bushing	1
28	P00203	Bushing O-ring	1
29	N20803	Cylinder lower cover	1
30	P00009	Mechanical seal O-ring	1
31	P00051	Plug O-ring	1
32	P37202	Nut SMS 1"	1
33	P37615	Mix inlet line	1
34	N20525	Spring holder for discharge valve	1
35	P30008	Spring for discharge valve	1
36	N20512	Discharge valve	1
37	N20615	Mixer lower bushing	1
38	L01012	Pump	1
39	D60018	Air valve	

19. Exploded view of Cylinder - (Frigus 200)



Cylinder components - (Frigus 200)

POS	CODE	DESCRIPTION	QTY.
41	M71080	Freezer cylinder	1
42	D10080	Bearing holder	1
43	M40550	Cylinder fastening screw	1
45	P29011	Bearing	1
46	L01022	Bearing shaft	1
47	P05021	Gearmotor	1
49	N30109	Bearing hub	1
50	P00015	Bearing hub ring	1
51	N30404	Bearing flange	1
52	P10103	Retainer	1
53	P00701	Rubber gasket	1
54	D10080	Mix outlet	1

Refrigerating unit -

ITEM	CODE	DESCRIPTION	QTY.
1	Q11101	High & low pressure-switch	1
3	Q16119	Thermostatic expansion valve	1
4	R38003	Pressure/vacuum gage	1
5	Q27003	Coil	2
6	Q20012	Liquid/hot gas solenoid valve	2
7	Q02311	Compressor	1
8	Q03012	Condenser	1
9	Q05003	Dryer filter	1
10	Q20029	Valve	1
11	Q20003	Solenoid valve EVR 10/1/2"	1
12	Q21002	Pressostatic valve WVF X15	1

20. Replacement kit

FRIGUS REPLACEMENT KIT	
KIT DESCRIPTION	**QUANTITY OF PIECES**
PUMP PISTON NICKEL-BRONZE Ø25mm	1
BRONZE BUSHING OF MEC. SEAL/ LOWER COVER	1
HOSE CONNECTOR 1" SMS	1
O'RING –UPPER COVER (2342)	1
O'RING MECHANICAL SEAL (2217)	1
O'RING LOWER COVER(2240)	1
O'RING AIR VALVE (2114)	1
O'RING AIR VALVE (11458)	1
SEAL RING 1"SMS	4
O'RING PUMP (2224)	1
O'RING LOWER BRONZE BUSHING (2219)	1
STAINLESS STEEL FOOT	4
TOOL	1
SPECIAL TOOL FOR DASHER EXTRACTION	1
CABLE (PP3X1.0mm.)	5MT
CABLE (PP4X 10.0mm)	5MT
GALVANIZED HOSE CLAMP 22-32	4
SS HOSE CLAMP 25-38	2
HOSE CONNECTOR ½"NPT X ¾"	2
NYLON HOSE 1"	4mt
NYLON HOSE ¾"	4mt
INSTRUCTION MANUAL	1
CYLINDER GUARD	1
NUT 1"SMS	1
TC RING 1.1/2"	2
TC RING 2"	2
SET OF SCRAPING BLADES	1

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19

Tetra Pak Hoyer

ELECTRICAL DIAGRAM

FRIGUS 200 380v 50 Hz

CUSTOMER: .....

ORDER: .....

REV	DESCRIÇÃO	ALTERADO POR	DATA
	REVISÕES		

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Denomination: ELECT. DIAG.PAGE 1 FOLLOW PAGE 2

Aplication: FRIGUS 200

Code | Drawing: 003-DIEL-001 | Rev.

ELECTRICAL PANEL

MAIN CHARACTERISTICS

CONSTRUCTION MATERIAL.....: CARBON STELL PAINTED

PROTECTION.....: IP-55

DIMENSIONS.....: 760 x 480 x 220mm

TYPE.....: CABINET

POWER SUPPLY

MAIN SUPPLY

VOLTAGE.....: 380V

FREQUENCY.....: 50Hz

INSTALLED POWER.....: 7.5 Kw

CABLES SIZE

SUPPLY CABLE

SECTION(MIN.).....: CABLE NUMBER 3x10mm²

GROUND CABLE

SECTION(MIN.).....: CABLE NUMBER 3x10mm²

MAIN SWITCH

VOLTAGE.....: 380V

CURRENT.....: 40A

TYPE.....: VCC-F3-THREE POLE SWITCH FOR EMERGENCY

CHARACTERISTICS OF WIRES AND CABLES

CONNECTION TO	VOLTAGE	COLOR
AC MOTOR	>=380V	BLACK
AC CONTROL CIRCUIT	---	BLACK
AC CONTROL CIRCUIT	24V	RED
DC CONTROL CIRCUIT	---	---
LOW VOLTAGE CONTROL	---	---
GENERAL CONNECTIONS	---	RED
NEUTRAL	---	---
GROUND	---	GREEN/YELLOW

SIGNAL ELEMENTS

FUNCTION	VOLTAGE	COLOR
RUNNING MOTOR	24V	GREEN
ALARM, STOP, DANGER	24V	RED
END OF CYCLE,	24V	YELLOW
OTHERS	24V	BLUE

CONTROL ELEMENTS

FUNCTION	COLOR
START	GREEN
STOP	RED
EMERGENCY STOP	RED
SELECTION/RESET	YELLOW
TEST	BLUE
OTHERS	BLACK

REV	DESCRIÇÃO	ALTERADO POR	DATA

REVISÕES

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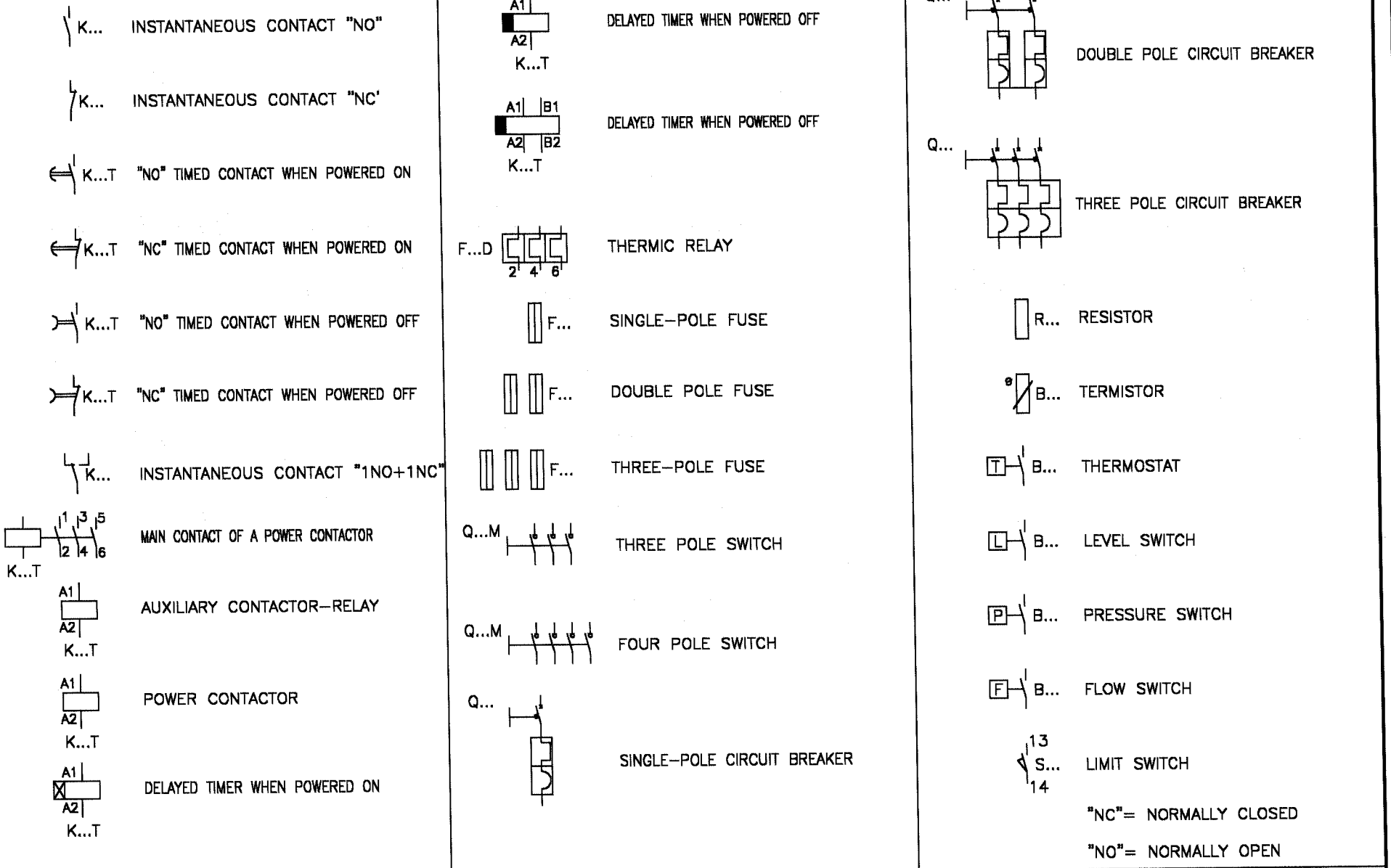
Aplicação: FRIGUS 200

Code | Drawing: 003-DIEL-001 | Rev.



REV	DESCRIÇÃO	ALTERADO POR	DATA
	REVISÕES		

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Denomination: ELECT. DIAG.PAGE 3 FOLLOW PAGE 4
Aplication: FRIGUS 200
Code
Drawing: 003–DIEL–001
Rev.

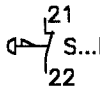
SA.

PROXIMITY SENSOR "NO"

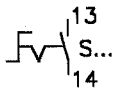
PROXIMITY SENSOR "NC"

SINGLE POLE "NO" PUSH BUTTON

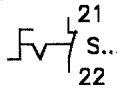
SINGLE POLE "NC" PUSH BUTTON



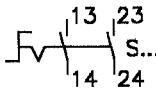
EMERGENCY STOP PUSH BUTTON



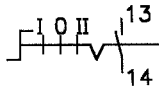
SINGLE POLE SWITCH "NO"



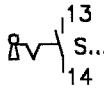
SINGLE POLE SWITCH "NC"



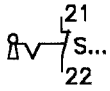
DOUBLE POLE SWITCH "NO"



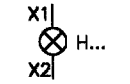
3 POSITIONS SWITCH



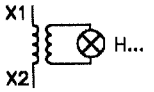
"NO" SINGLE POLE SWITCH WITH KEY



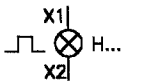
"NC" SINGLE POLE SWITCH WITH KEY



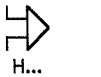
SIGNAL LAMP



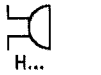
SIGNAL LAMP WITH TRANSFORMER



SIGNAL LAMP.....



SYREN



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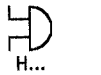

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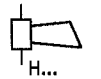
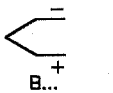
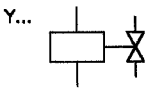


HORN



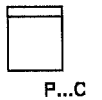
THERMOELEMENT



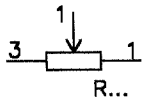
ELECTROVALVE

AMMETER

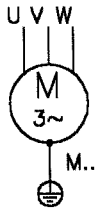
VOLTMETER



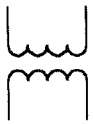
CONTACTOR



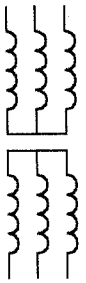
POTENTIOMETER



THREE PHASE MOTOR



SINGLE PHASE TRANSFORMER



THREE PHASE TRANSFORMER
(STAR-STAR)

"NC"= NORMALLY CLOSED
"NO"= NORMALLY OPEN

REV	DESCRIÇÃO	ALTERADO POR	DATA
	REVISÕES		

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Denomination: ELECT.DIAG. PAGE 4 FOLLOW PAGE 5
Aplication: FRIGUS 200
Code
Drawing: 003-DIEL-001
Rev.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19

1) COMPONENT LETTER

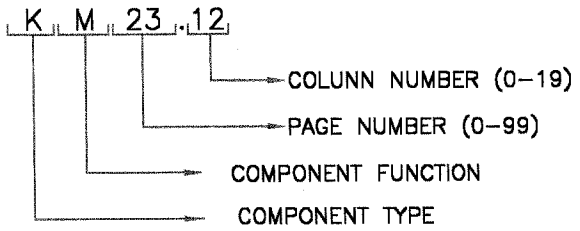
COMPONENT TYPE (I.E.C)

- A... COMPLEX COMPONENT
- B... TRANSDUCER (NON ELECTRIC)
- C... CONDENSER
- D... LOGICAL COMPONENT
- E... COMPONENT NOT LISTED
- F... PROTECTION (FUSE THERMIC RELAY)
- G... FEEDER, CONVERTER
- H... SIGNAL LAMP
- K... CONTACTOR AND RELAY
- L... INDUCTANCE
- M... MOTOR
- N... AMPLIFIER, ELECTRONIC REGULATOR
- P... INSTRUMENT FOR .....
- Q... AUTOMATIC INTERRUPTOR : BREAKER
- R... RESISTOR AND POTENTIOMETER
- S... CONTROL ELEMENT
- T... TRANSFORMER
- U... ELECTRICAL TRANSDUCER
- V... .....
- W... CABLE
- X... TERMINAL, CONECTOR
- Y... ELETRONIC COMPONENT
- Z... ARC SUPRESSOR

COMPONENT FUNCTION (IEC)

- A... STOP OR AUXILIARY
- B... RUNNING
- C... COUNTER
- D... DIFFERENTIAL
- E... START
- F... PROTECTION
- G... TEST
- H... SIGNAL
- I... INTEGRATION
- K... INCREMENTED MOVEMENT
- L... WIRE CODE
- M... MAIN
- N... .....
- P... PROPORTIONAL
- Q... SENSOR
- R... RESET
- S... REGISTER
- T... TIMED OPERATION
- V... SPEED
- W... ADDITION
- X... MULTIPLIER
- Y... ANALOGIC
- Z... DIGITAL

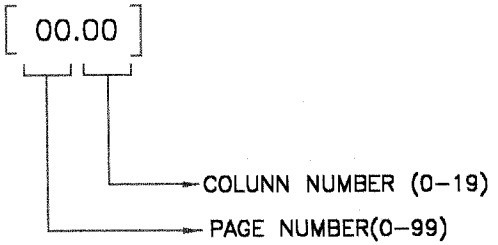
EXAMPLE



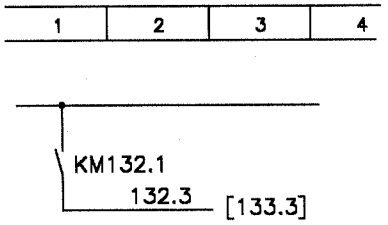
EXAMPLE

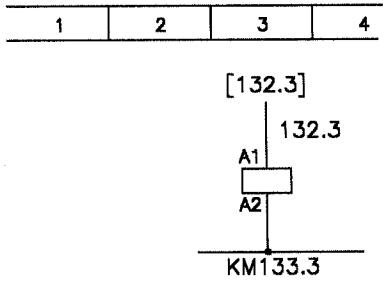
K M 132 . 5
K M 132 . 5/1

2) PAGE NUMBER



EXAMPLE





REV	DESCRIÇÃO	ALTERADO POR	DATA

REVISÕES

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	Name	Date
Des.	AILTON	14/03/00
Conf.	AILTON	14/03/00
Resp.	ADEMAR	114/03/00

Denomination: ELECT. DIAG. PAGE5 FOLLOW PAGE6
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1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19

PAG.	DESCRIPTION	PAGE	DESCRIPTION
1	COVER SHEET		
2	LEGEND		
3	ELECTRIC SYMBOL		
4	ELECTRIC SYMBOL		
5	NOTES FOR DIAGRAM READING		
6	INDEX		
10	POWER CIRCUIT		
11	POWER CIRCUIT		
12	POWER CIRCUIT		
13	AUXILIARY CIRCUIT		
15	AUXILIARY CIRCUIT		
16	AUXILIARY CIRCUIT		
17	AUXILIARY CIRCUIT		
18	AUXILIARY CIRCUIT		
19	AUXILIARY CIRCUIT		
20	AUXILIARY CIRCUIT		
25	TERMINALS BAR		
26	TERMINALS BAR		
27	CONTROL PANEL LAYOUT		
28	MOUNTING PLATE LAYOUT		
29	LABEL LIST		
30	COMPONENTS LIST		

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Des.	PAULO	14/03/00
Conf.	AILTON	14/03/00
Resp.	ADEMAR	14/03/00

Denomination: ELECT. DIAG. PAGE 6 FOLLOW PAGE 10

Aplication: FRIGUS 200

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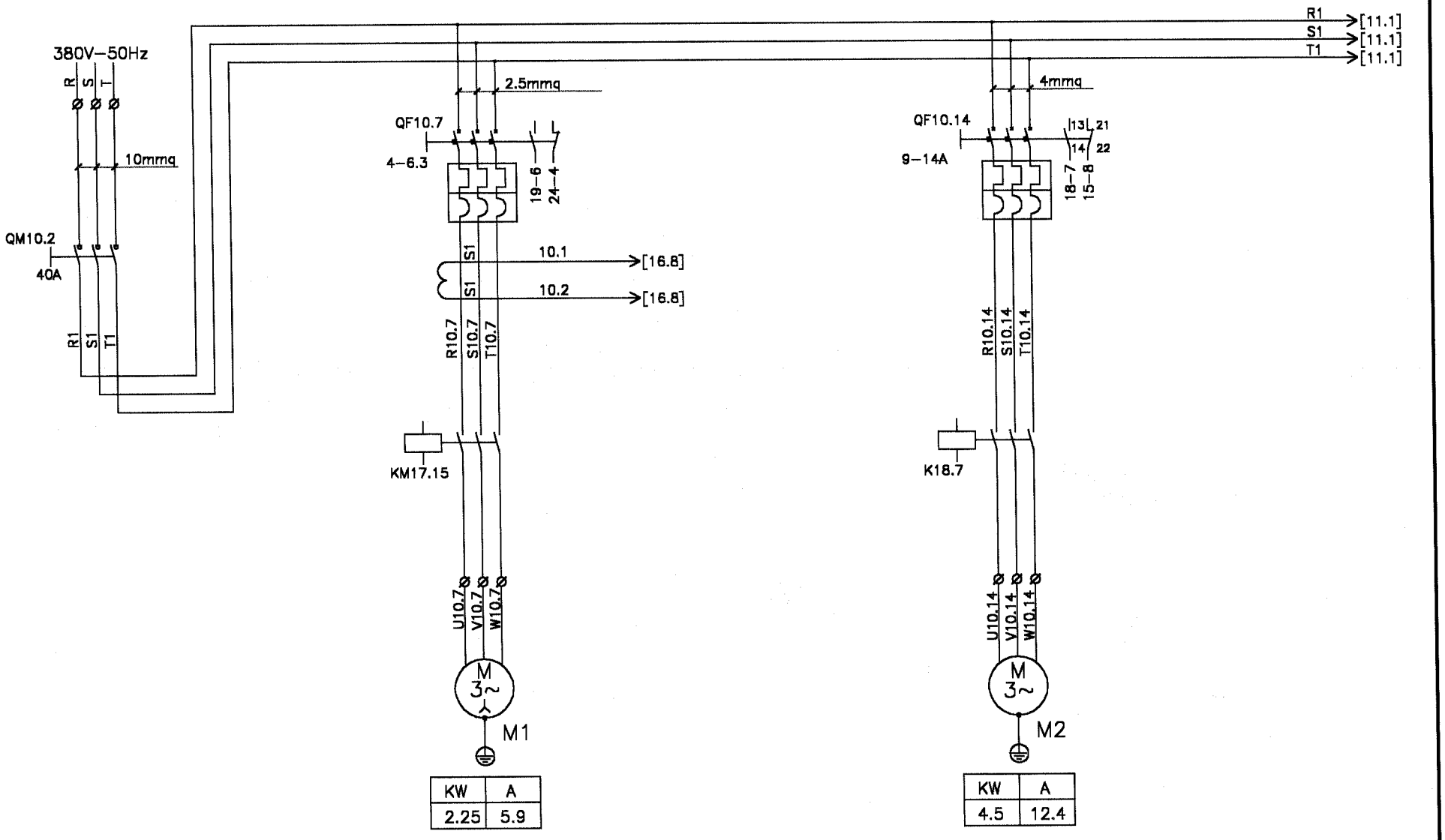

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	REVISÕES		

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Aplication: FRIGUS 200
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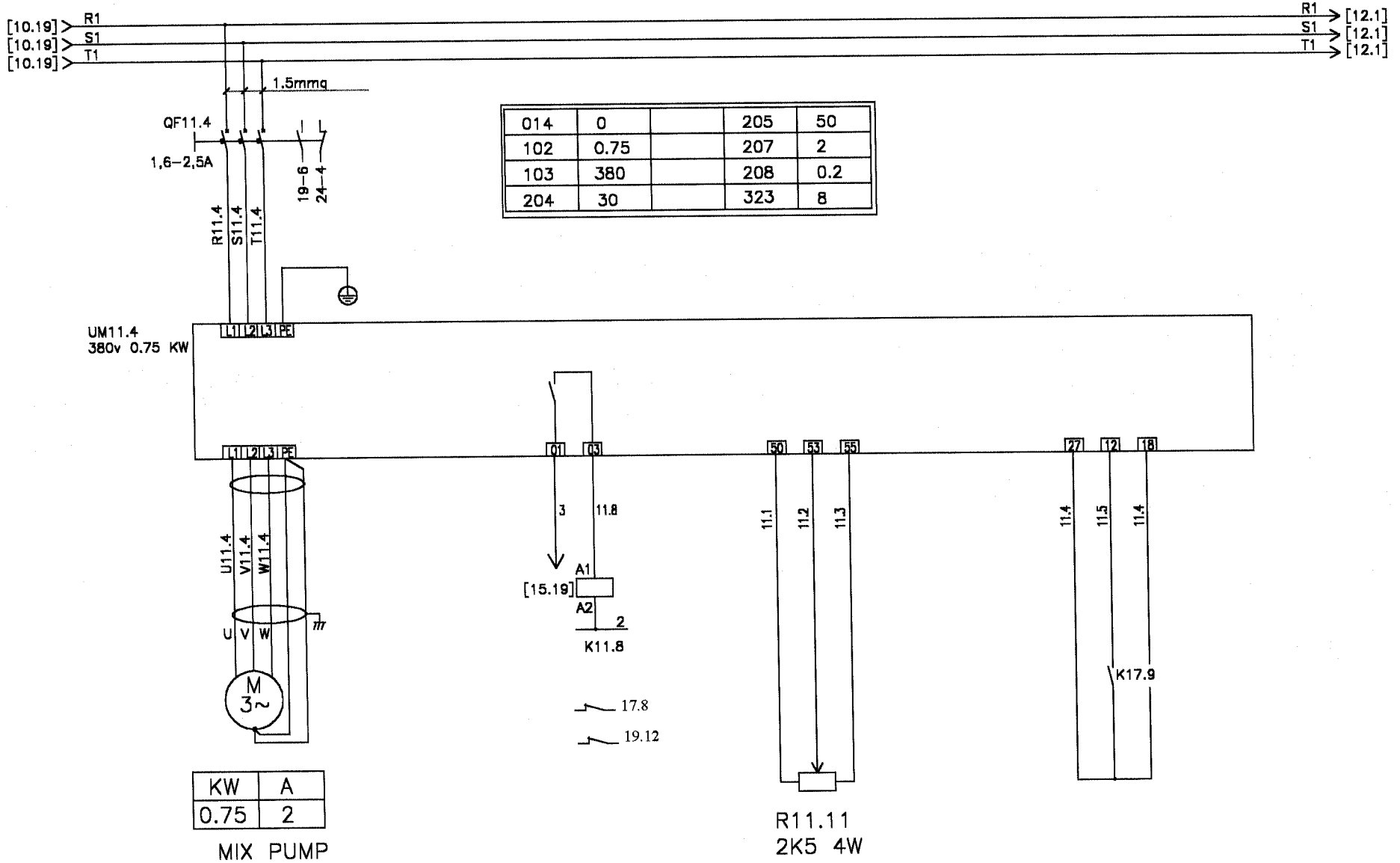

014	0		205	50
102	0.75		207	2
103	380		208	0.2
204	30		323	8

KW	A
0.75	2

MIX PUMP

REV	DESCRIÇÃO	ALTERADO POR	DATA
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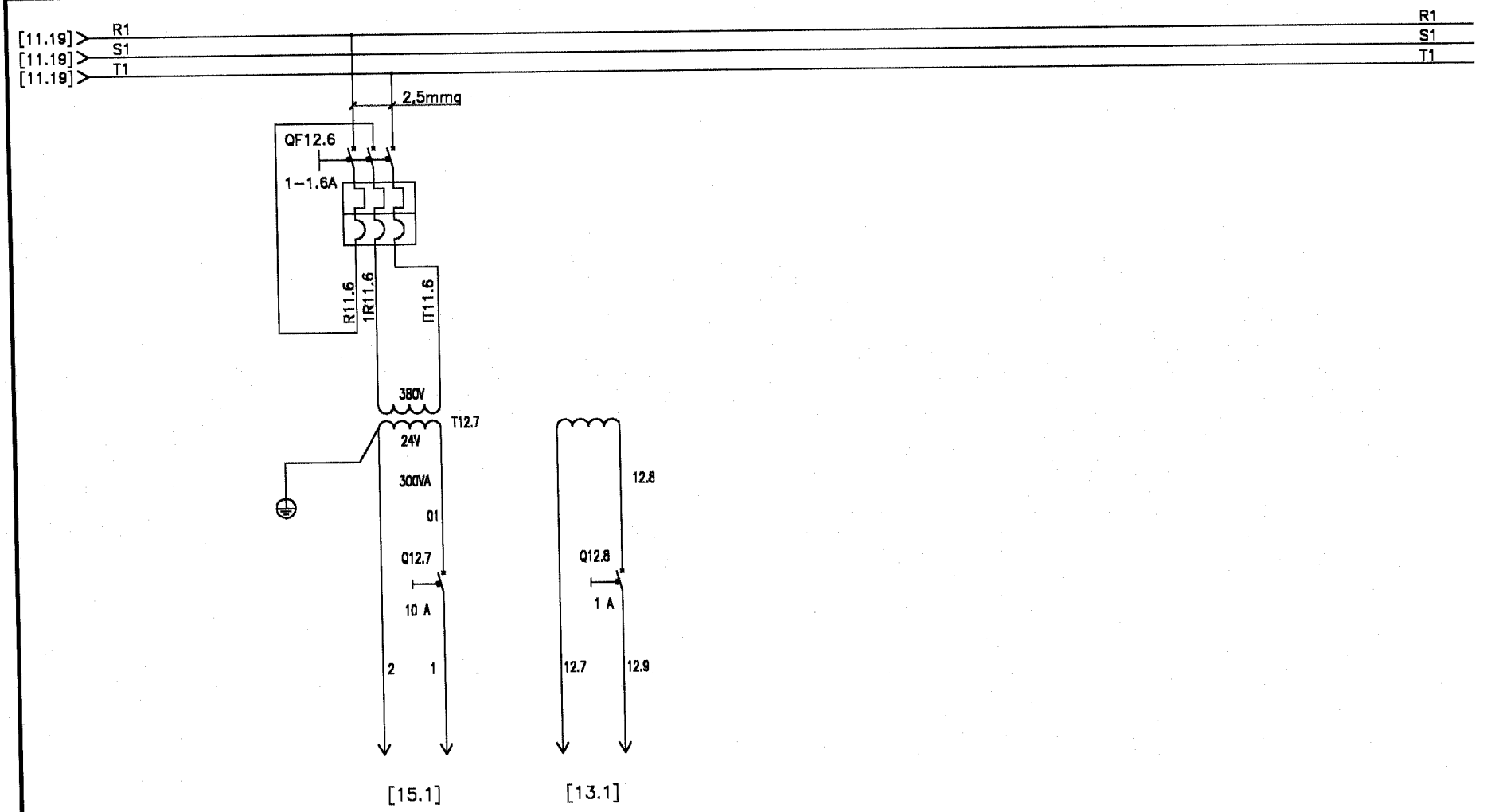
Denomination: ELECT.DIAG.PAGE11FOLLOW PAGE12
Aplication: FRIGUS 200
Code | Drawing: 003–DIEL–001 | Rev.



REV	DESCRIÇÃO	ALTERADO POR	DATA
	REVISÕES		

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1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19

COOLING–FAN

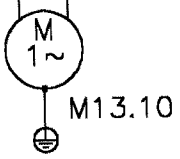
[12.7] > 12.7

[12.7] > 12.9

220v 50Hz

12.7

12.9



M13.10

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Resp.	ADEMAR	13/03/00

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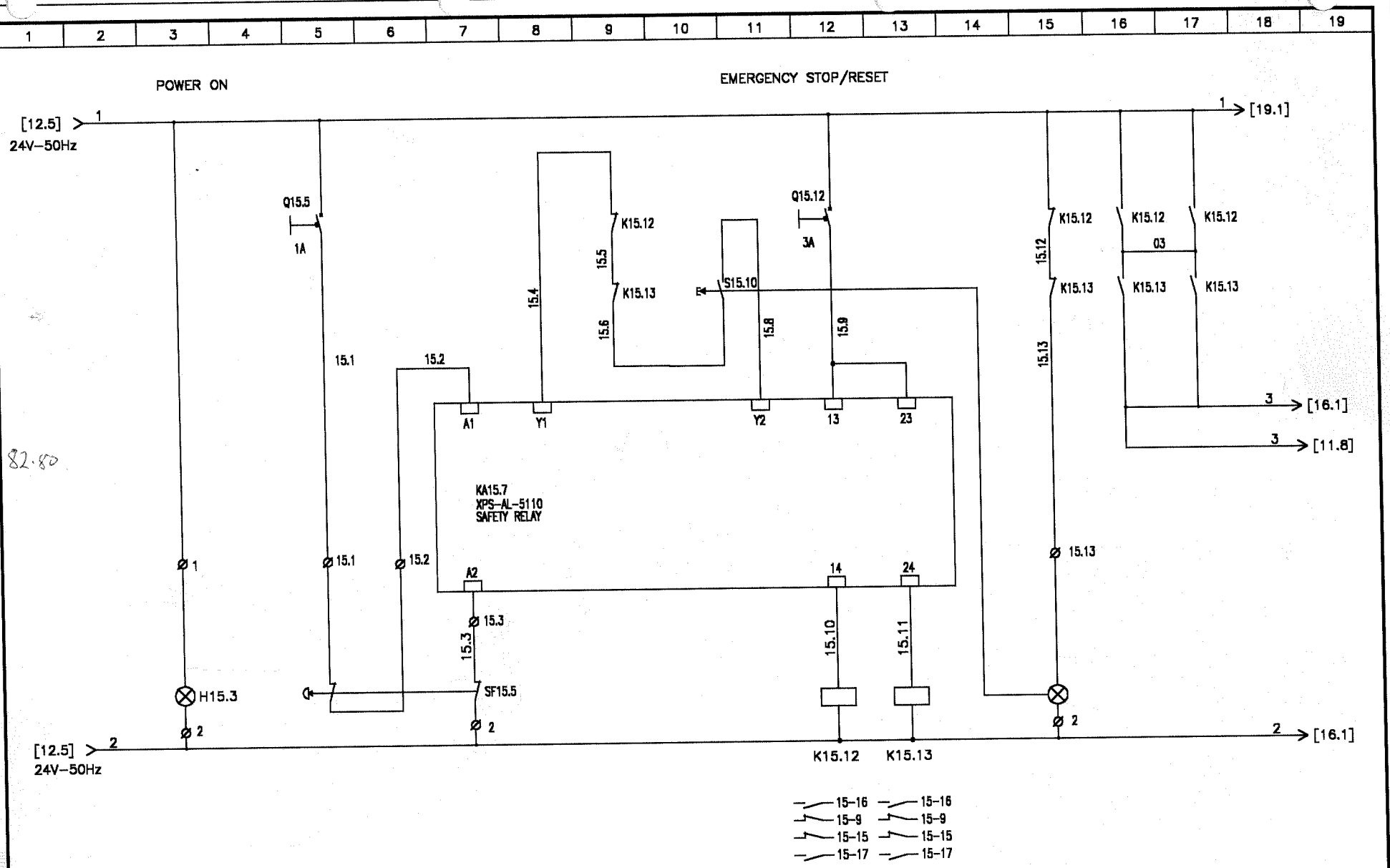
Aplication: FRIGUS 200

Code | Drawing: 003–DIEL–001 | Rev.



82.80

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Denomination: ELECT.DIAG. PAGE15 FOLLOW PAGE 18
Aplication: FRIGUS 200
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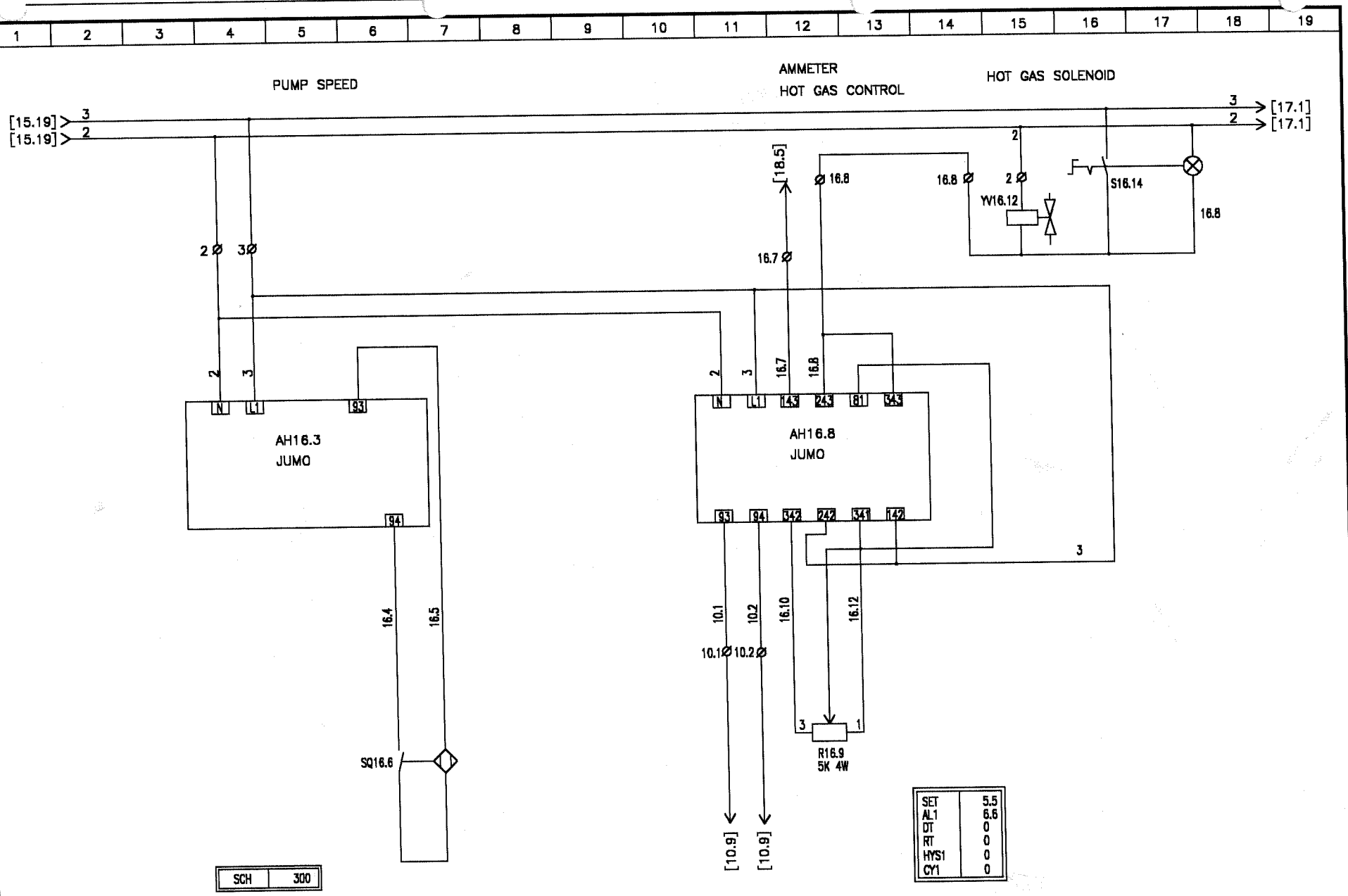

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Code:
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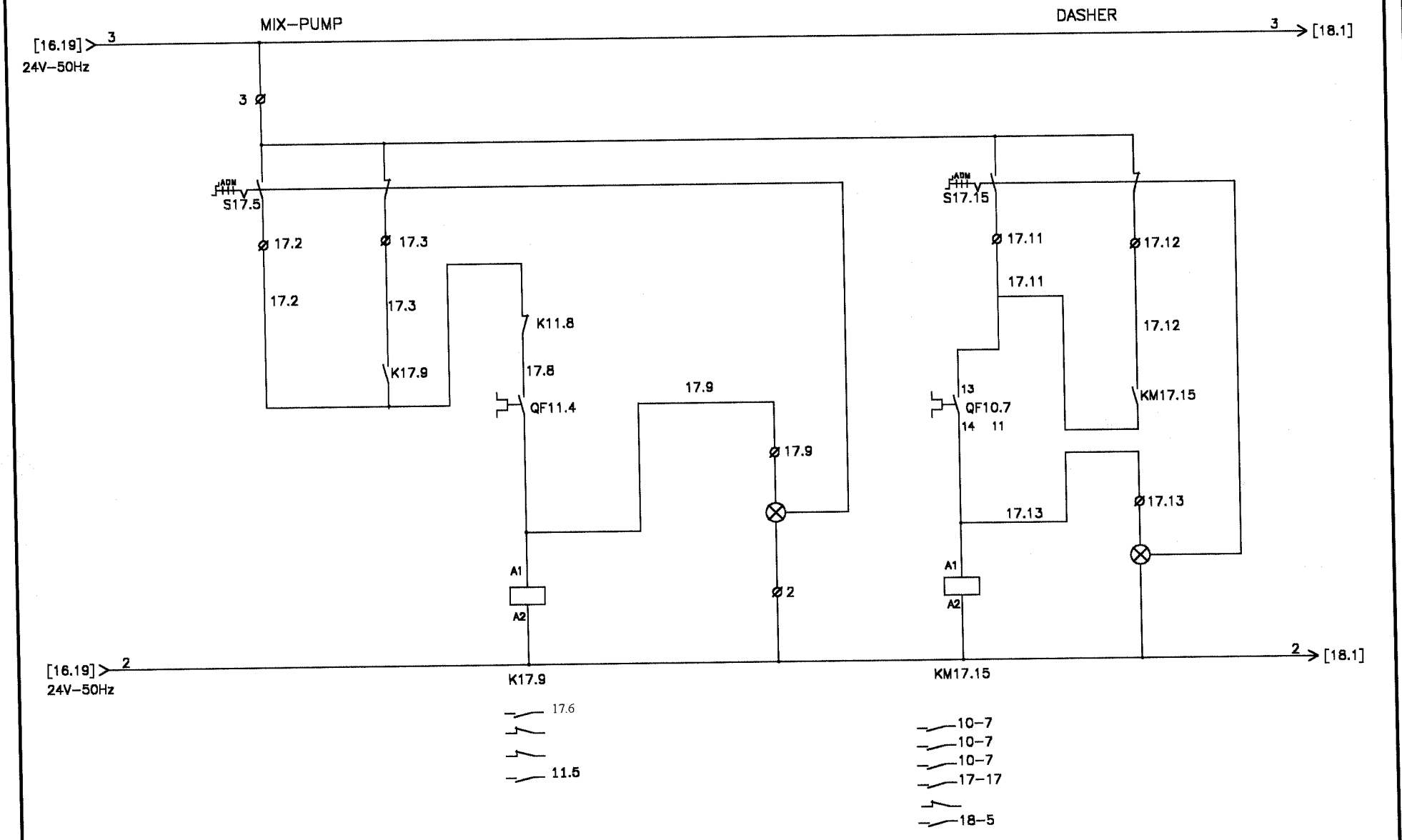

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Denomination: ELECT.DIAG. PAGE17 FOLLOW PAGE 18
Aplication: FRIGUS 200
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Drawing: 003–DIEL–001
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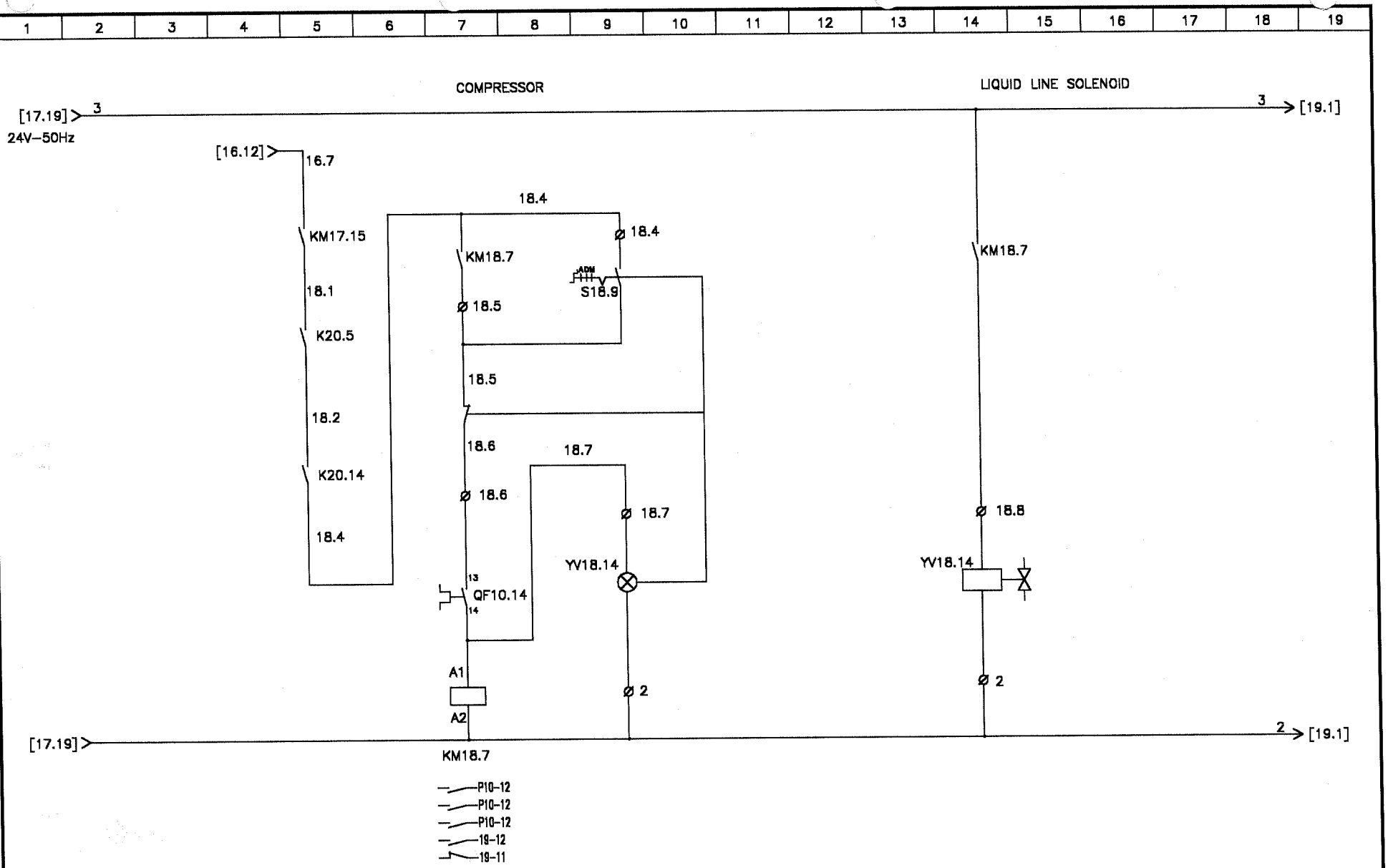

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Des.	AILTON	13/03/00
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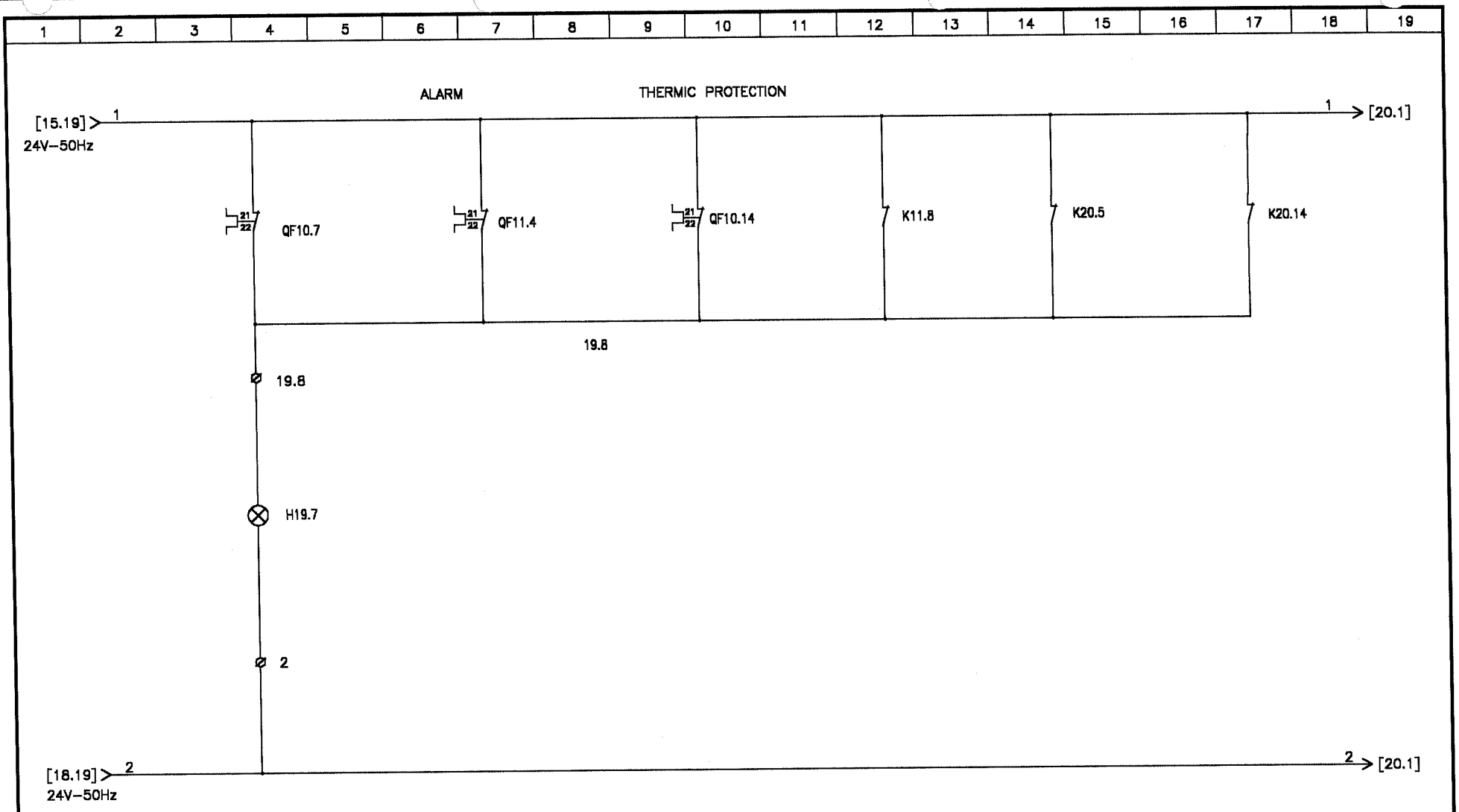

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Denomination: ELECT. DIAG. PAGE19 FOLLOW PAGE20
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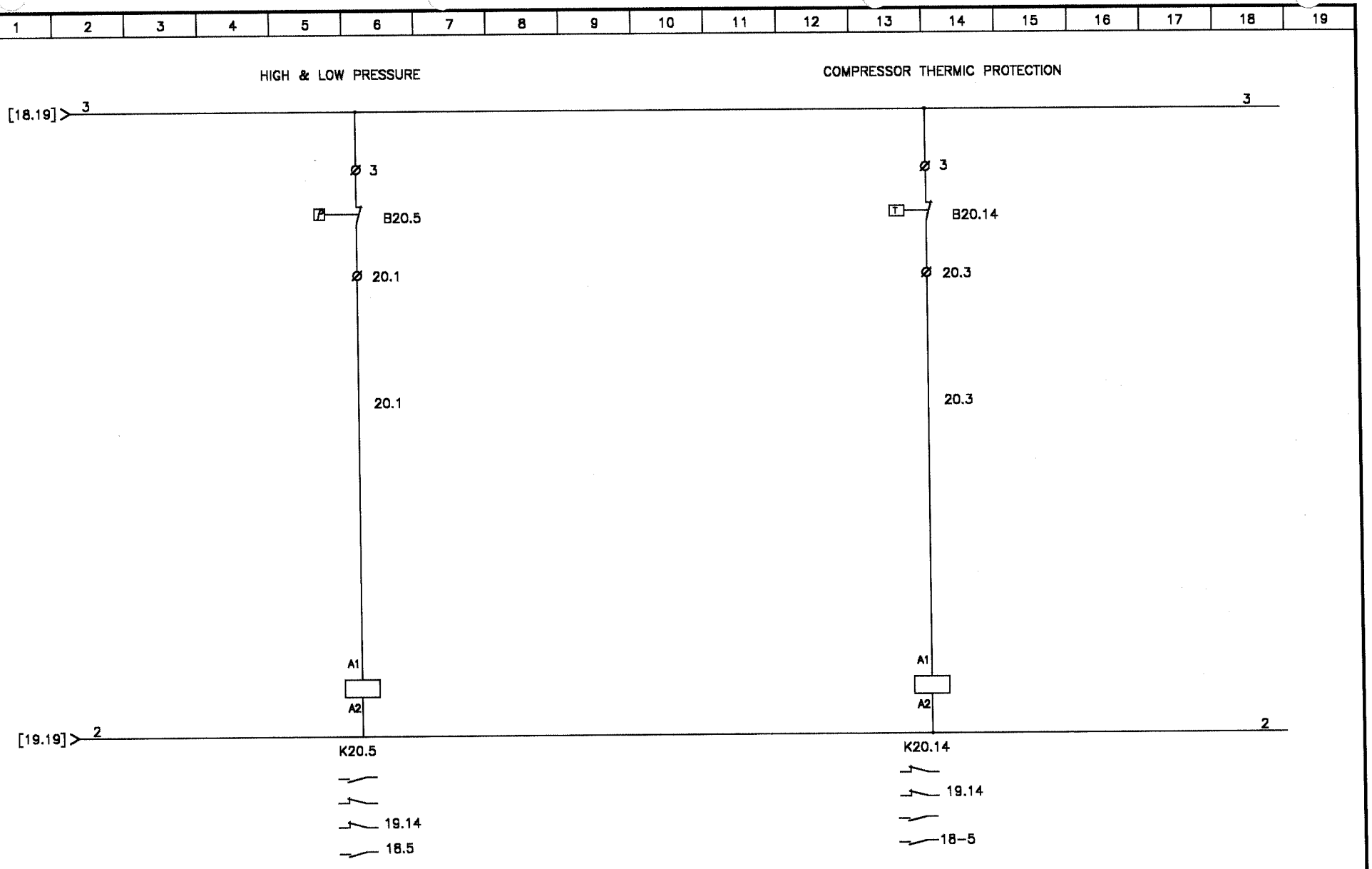
Code: Drawing: 003–DIEL–001 Rev.

S4.



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Des.	AILTON	13/03/00
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Resp.	ADEMAR	13/03/00

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NOTE	PART DESCRIPTION	PART IDENTIFICATION	X1 WIRE NUMBER	X1 TERMINAL NUMBER	X1 TERMINAL SECTION mm2	X1 TERMINAL COLOR
	DASHER	M1	U10.7		2.5	GRAY
		M1	V10.7		2.5	GRAY
		M1	W10.7		2.5	GRAY
		M1	GND		2.5	GREEN/YELLOW
	COMPRESSOR	M2	U10.14		4	GRAY
		M2	V10.14		4	GRAY
		M2	W10.14		4	GRAY
		M2	GND		4	GREEN/YELLOW
	CONTROL PANEL	S17.5	3		1	GRAY
	THERMIC PROTECTION	B20.14	3		1	GRAY
	CONTROL PANEL	H19.7	19.8		1	GRAY
		AH16.8	10.1		1	GRAY
		AH16.8	10.2		1	GRAY
		AH16.8	16.7		1	GRAY
		AH16.8	16.13		1	GRAY
		AH16.8	16.2		1	GRAY
	HOT GAS VALVE	YV18.12	16.8		1	GRAY
	CONTROL PANEL	AH16.3	16.5		1	GRAY
		AH16.3	16.4		1	GRAY
		S17.5	17.2		1	GRAY
		S17.5	17.3		1	GRAY
		S17.15	17.11		1	GRAY
		S17.15	17.12		1	GRAY
		S17.15	17.9		1	GRAY
		S17.15	17.13		1	GRAY
		S18.9	18.4		1	GRAY
		S18.9	18.5		1	GRAY
		S18.9	18.6		1	GRAY
		S18.9	18.7		1	GRAY
		S16.14	16.8		1	GRAY
	LIQUID LINE VALVE	YV18.14	18.8		1	GRAY
	LIQUID INJECTION VALVE	YV18.17	18.8		1	GRAY
	LIQUID LINE VALVE	KA15.7	15.3		1	GRAY
		KA15.7	15.2		1	GRAY
		KA15.7	15.8		1	GRAY
		KA15.7	15.6		1	GRAY
		KA15.7	15.13		1	GRAY
		KA15.7	15.1		1	GRAY
	HIGH & LOW PRESSURE SWITCH	B20.5	3		1	GRAY
	THERMIC PROTECTION	B20.14	20.3		1	GRAY
	HIGH & LOW PRESSURE SWITCH	B20.5	20.1		1	GRAY
	HIGH & LOW PRESSURE SWITCH	R11.11	11.1		1	GRAY
		R11.11	11.2		1	GRAY
		R11.11	11.3		1	GRAY

REV	DESCRIÇÃO REVISÕES	ALTERADO POR	DATA

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Des.	PAULO	13/03/00
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		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
X1	TERMINAL COLOR			GRAY	GRAY	GRAY	GRAY	GRAY												
	TERMINAL SECTION mm2			1	1	1	1	1												
	TERMINAL NUMBER																			
	WIRE NUMBER			2	2	2	2	2												
PART	PART IDENTIFICATION			SIGNAL LAMP	SIGNAL LAMP	YV16.12	YV18.14	YV18.17												
	DESCRIPTION			CONTROL PANEL		HOT GAS VALVE	LIQUID LINE VALVE	LIQUID INJECTION VALVE												
	NOTE																			

REV	DESCRIÇÃO	ALTERADO POR	DATA
	REVISÕES		

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Des.	PAULO	14/03/00
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Resp.	ADEMAR	14/03/00

Denomination: ELECT.DIAG.PAGE26 FOLLOW PAGE 27
Aplication: FRIGUS 200
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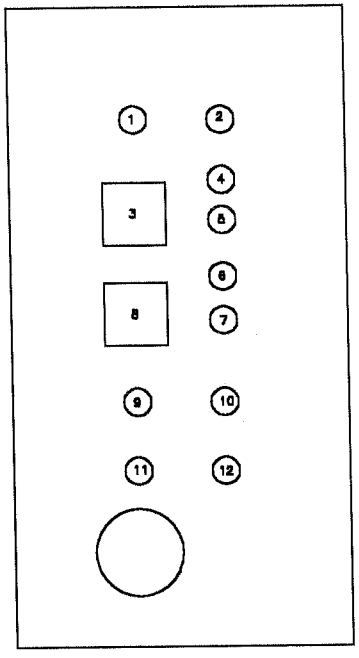

NUMBER	ITEM	NAME	DESCRIPTION
1	H15.13	WHITE SIGNAL LAMP	POWER ON
2	H19.7	RED SIGNAL LAMP	ALARM
3	AH16.3	DIGITAL INDICATOR	PUMP SPEED (LITER COUNTER)
4	R11.11	POTENTIOMETER 2K5 4W	PUMP SPEED VARIATION
5	S17.5	GREEN LIGHT SWITCH1–0–2	PUMP START/STOP
6	AH16.8	POTENTIOMETER 5K 4W	HOT GAS TIME VARIATION
7	S17.15	GREEN LIGHT SWITCH 1–0–2	DASHER –START/STOP
8	AH16.8	DIGITAL INDICATOR	AMMETER /HOT GAS
9	S16.14	GREEN LIGHT SWITCH 0–1	HOT GAS – START/STOP
10	S18.9	GREEN LIGHT SWITCH 1–0–2	COMPRESSOR– START/STOP
11	S15.5	RED PUSH BUTTON	EMERGENCY STOP
12	S15.10	BLUE LIGHT PUSH BUTTON	RESET

REV	DESCRIÇÃO	ALTERADO POR	DATA
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Denomination: ELECT.DIAG.PAGE27 FOLLOW PAGE28
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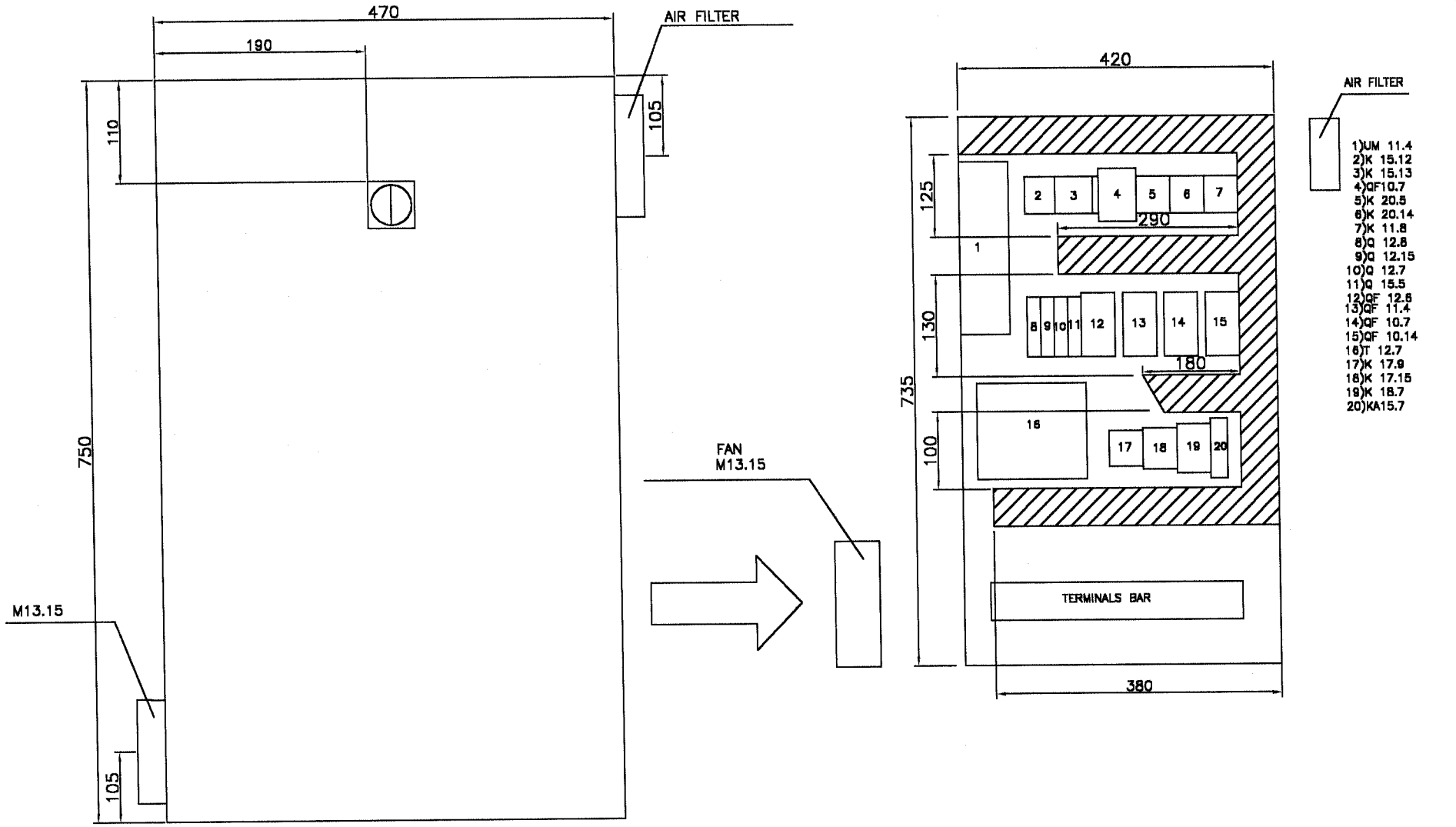

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Des.	AILTON	14/03/00
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ITEM	PAGE	C	R	QTY	DENOMINATION	TYPE/DATA		NOTE
KA15.7	15	7		1	SAFETY RELAY	XPS AL 5110	TELEMECANIQUE	
M13.10	13	10		1	GRID/FILTER/FAN-SET	96110	TASCO	
					GRID/FILTER-SET	96120	TASCO	
					ELECTRIC CABINET 760X480X220	RR070	TAUNUS	
T12.7					TRANSFORMER 380/220VX24V 300VA			
H15.3	15	3		1	WHITE SIGNAL LAMP	XB2BV67	TELEMECANIQUE	
H19.7	19	7		1	RED SIGNAL LAMP	XB2BV64	TELEMECANIQUE	
S17.5	17	5		1	THREE POSITIONS SWITCH (GREEN)	XA2BK15365	TELEMECANIQUE	
S17.15	17	15		1	THREE POSITIONS SWITCH (GREEN)	XA2BK15365	TELEMECANIQUE	
S18.9	18	9		1	THREE POSITIONS SWITCH (GREEN)	XA2BK15365	TELEMECANIQUE	
S16.14	16	14		1	TWO POSITIONS SWITCH (GREEN)	XA2BK12361	TELEMECANIQUE	
S15.10	15	10		1	BLUE LIGHT PUSH BUTTON NO/NC	XA2BW3665	TELEMECANIQUE	
R16.9	16	9		1	POTENTIOMETER 5K 4W	5K4W	FEAD	
R11.11	11	11		1	POTENTIOMETER 2K5 4W	2K5 4W	FEAD	
S15.10	15	10		1	BLUE LIGHT PUSH BUTTON NO/NC	XA2BW3665	TELEMECANIQUE	
AH16.3	16	3		1	DIGITAL INDICATOR	DTRON	JUMO	
SQ16.6	15	6		1	OPTIC SENSOR	DIGITROL	DIGITROL	
AH16.8	16	8		1	AMMETER -HOT GAS CONTROL	DTRON	JUMO	
TN10.7	10	7		1	CURRENT TRANSFORMER	DIGITROL	DIGITROL	
UM11.4	11	4		1	FREQUENCY CONVERTER VLT2807	PT4B20STR1DBF	DANFOSS	
K15.12	15	12		1	AUXILIARY CONTACTOR	CA2KN22B7	TELEMECANIQUE	
K15.13	15	13		1	AUXILIARY CONTACTOR	CA2KN22B7	TELEMECANIQUE	
K11.8	11	8		1	AUXILIARY CONTACTOR	CA2KN22B7	TELEMECANIQUE	
K20.5	20	5		1	AUXILIARY CONTACTOR	CA2KN22B7	TELEMECANIQUE	
K20.14	20	14		1	AUXILIARY CONTACTOR	CA2KN22B7	TELEMECANIQUE	
KM17.15	17	15		1	CONTACTOR -12A	LC1D1210B7	TELEMECANIQUE	
				1	ADDITIONAL BLOCK	LA1D11	TELEMECANIQUE	
KM18.7	18	7		1	CONTACTOR -18A	LC1D1810B7	TELEMECANIQUE	
				1	ADDITIONAL BLOCK	LA1D22	TELEMECANIQUE	
QM10.2	10	2		1	SWITCH 40A	VCCF3	TELEMECANIQUE	
Q15.12	15	12		1	SINGLE POLE CIRCUIT BREAKER 3A - C CLASS	C60NC3	MG	
Q12.7	12	7		1	SINGLE POLE CIRCUIT BREAKER 10A -C CLASS	C60NC10	MG	
Q15.5	15	5		1	SINGLE POLE CIRCUIT BREAKER 1A-C CLASS	C60NC1	MG	
QF12.6	12	6		1	CIRCUIT BREAKER-MOTOR-1-1.6A	GV2M06	TELEMECANIQUE	
QF11.4	11	4		1	CIRCUIT BREAKER-MOTOR-1.6-2.5A	GV2M07	TELEMECANIQUE	
QF10.7	10	7		1	CIRCUIT BREAKER-MOTOR-4-6.3A	GV2M10	TELEMECANIQUE	
QF10.14	10	14		1	CIRCUIT BREAKER-MOTOR-9-14A	GV2M16	TELEMECANIQUE	

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Denomination: ELECT.DIAG.PAGE 29
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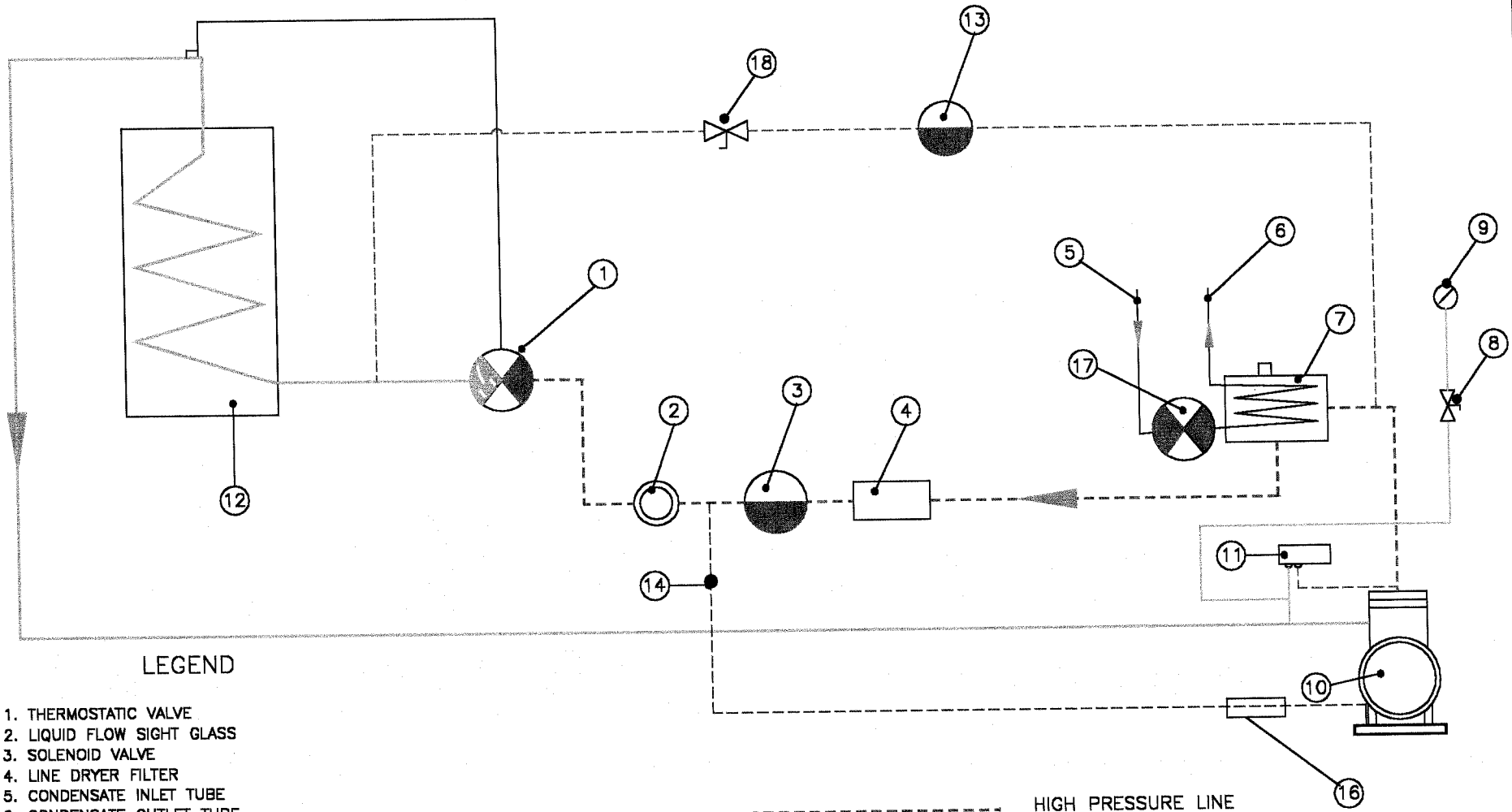

LEGEND

1. THERMOSTATIC VALVE
2. LIQUID FLOW SIGHT GLASS
3. SOLENOID VALVE
4. LINE DRYER FILTER
5. CONDENSATE INLET TUBE
6. CONDENSATE OUTLET TUBE
7. LIQUID COLECTOR CONDENSER
8. VALVE
9. VACUUM GAGE
10. REFRIGERATION COMPRESSOR
11. HIGH &LOW PRESSURE SWITCH
12. EVAPORATOR (CYLINDER)
13. SOLENOID VALVE DEFROST
14. FILTER
16. CAPILAR SET
17. FLOW CONTROL VALVE
18. NEEDLE VALVE

HIGH PRESSURE LINE

LOW PRESSURE LINE

HIGH LINE/REFRIGERATOR COMPRESSOR SCROLL

PROJ. ORTOGONAL	MACHINE	FRIGUS 80/200	ESC. S/E	S.A. 0155
DATA 28/03/96				
DES. PAULO	PART NAME	REFRIGERATION CIRCUIT DIAGRAM	No DO DESENHO	003-DIFR-001
CONF.				
RESP. OSWALDO				

TETRA PAK HOYER INDUSTRIA E COMERIO LTDA

24. Production specifications

CAPACITY MACHINE	FRIGUS 200	FRIGUS 400
MIN l/h	90	170
MAX. l/h	220	400

Capacities are based upon the following conditions:

- Mix inlet temp. +5°C
- Mix outlet temp. - 5°C

Rated capacity is based upon the following formulation:

INGREDIENTS	**%**
Fat	10.0
Skim milk	10.5
Sugar	12.0
Glucose	5.0
Stabilizers/emulsifiers	0.5
Total solids	38.0
Water	62.0
Total	100