We hope that the information will be of help to you. It is based on concrete data and on the best of our current knowledge.

Read the contents of the manual carefully, including the warnings and recommendations.

No part of this manual may be reproduced or transmitted to third parties without the prior written permission of Tetra Pak Hoyer.

# **Hoyer Frigus 400**

**Tetra Pak Hoyer S.p.A.** Via Monferrato, 54 20098 San Giuliano Milanese (Milano) Italy Telephone +39 2 98292.1 Telefax +39 2 9880171



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**3 Description of the machine and technical data** 

## 4 Installation

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## **HOYER FRIGUS 400**

## **1 - MACHINE IDENTIFICATION DATA**

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## **1.1 Introduction**

Thank you for having chosen a Tetra Pak Hoyer machine.

We recommend that you read this manual carefully as it contains essential information regarding the installation, checking and maintenance operations required to keep your macine in perfect condition. The manual contains tables, drawings and diagrams which will allow you to familiarise yourself with all parts of the machine.

Please let us know if any information is missing or is not sufficiently detailed. Your comments will be used to improve this manual.

## **1.2 Identification plate**

For maintenance and service operations not described in this manual or for any other problem of a technical nature, our Service Department is at your complete disposal for information or to arrange for the necessary measures to be taken.

When contacting our Service Department, please quote the data given on the identification plate affixed to the machine and shown in Fig. 1.1.

MODEL		
SERIAL N.:		
YEAR OF CONSTRUCTION:		
ELECTRICAL SUPPLY:		V
		kW
	ph	Hz
PNEUMATIC SUPPLY:	bar	Nlt/min.
REFRIGERANT:	Туре	Kg.
HEATING GAS:		
THERMAL CAPACITY:		Kcal/h
Via Monferrato, 52 - 20098 San ( (MI) Italia - Tel. 02-982921 - Fa	Giuliano Milanese ax 02-9880171	<b>CE</b> Made in Italy

Fig. 1.1 - Identification plate

## **1.3 Service centres**

If you have requirement or problem that requires our assistance, please contact one of the following service centres, which are authorised to perform maintenance and provide technical service for Tetra Pak Hoyer machines.

#### **EUMEA:**

#### NORTH AMERICA:

#### Tetra Pak Hoyer ApS

Soeren Nymarks Vej 13 DK-8270 Hoejbjerg Denmark Phone: +45 89 39 39 39 Fax: +45 86 29 22 00 Tlx: 6 87 70 alhoy dk

#### Tetra Pak Hoyer S.p.A.

Via Monferrato, 54 I - 20098 San Giuliano Milanese (Milan) Italy Phone: + 39 2 98 29 21 Fax: + 39 2 98 80 171 Tetra Pak Hoyer Inc.

7711 95th Street P.O. Box 0902 Pleasant Prairie, WI 53158-0902 USA Phone: +1 414 947 9100 Fax: +1 414 947 9190

#### **SOUTH AMERICA:**

#### Tetra Pak Hoyer Industria e Comércio Ltda.

Rua Napoleao de Barros, 1038 Cep04024-003 Sao Paulo-SP Brazil Phone: +55 11 573 9422 Fax: +55 11 549 5420

#### **SOUTH KOREA:**

#### Hoyer Ltd.

4fl. Dookyong Bldg. 66-1/9 Hannam-Dong Yong San-Ku 140-210 Seoul South Korea Phone: +82 2 796 0362 Fax: +82 2 796 0365

#### **THAILAND:**

#### Tetra Pak Hoyer (Thai) Ltd.

1042 Soi Poosin, Sukhumvit Soi 66/1 Bangchak, Prakanong Thailand Phone: +66 2 3611680 Fax: +66 2 3612310

#### **ASIA/PACIFIC:**

#### **Tetra Pak Hoyer France**

c/o Tetra Laval Service SARL R.C.S. Versailles B403 276 223 P.O. Box 56 F-78340 Les Clayes-Sous-Bois France Phone: +33 1 30818184 Fax: +33 1 30818120

## Tetra Pak Hoyer Shanghai

Shanghai Overseas Chinese Mansion Room 2105-2107 No. 129, Yan'an Xi Lu 200040 Shanghai P.R. China Phone: +86 21 6249 0860 Fax: +86 21 6249 9064

#### **Tetra Pak Hoyer Service**

3rd Floor, Molace Building 2231 Pasong Tamo Street Makati, Metro Manila Philippines Phone: +63 2 8132848 Fax: +63 2 8132866

#### **C.I.S.:**

#### Tetra Pak Hoyer A/O

4th Rostovsky peureulok Dom 1, stroenie 1 R-11921 Moscow C.I.S. Phone: +7 502 2242160 Fax: +7 502 2242162

## **HOYER FRIGUS 400**

## **2 - GENERAL INFORMATION**

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## 2.1 Declaration of conformity

This machine has been manufactured in accordance with international standards and hygiene and sanitary legislation applicable to food machinery.

In particular Tetra Pak Hoyer certifies, through the Declaration of Conformity supplied with the

machine, that the **HOYER FRIGUS 400** machine is designed and manufactured in accordance with the provisions of Directive 89/392/CE (Machinery Directive) and with the above-mentioned standards.



- The illustrations and drawings of the machine are intended for general reference only and are not necessarily accurate in every detail;
- The machine dimensions and specifications given in this manual are not binding and may be changed without prior notice;
- The drawings and all other documents provided as a part this machine remain the property of Tetra Pak Hoyer and must not be passed on to

## 2.3 General safety rules

- THESE SAFETY RULES HAVE BEEN DRAWN UP IN YOUR INTEREST. Strict observance will reduce the risk of accident to yourself ot to others.
- DO NOT attempt to move, install or operate the machine before reading and assimilating the contents of this manual. Ask your superior in case of doubt;
- make sure that all guards and safety covers are in place BEFORE starting the machine;
- NEVER leave tools, mechanical parts or other foreign materials on or inside the machine;
- in the event of a malfunction, press the emergency stop button.
- NEVER PUT YOUR HANDS INSIDE THE

third parties without the written permission of Tetra Pak Hoyer.

- The manual includes instructions for all accessories mounted on the standard machine.
- The machine is covered by warranty as laid down in the purchase contract. Any repair work not authorised by Tetra Pak Hoyer carried out during the warranty period will automatically invalidate the warranty.

#### MACHINE WHEN IT IS IN OPERATION;

- exercise caution even when the main switch located on the tunnel is in the "OFF" position, as the supply conductors will still be live;
- shut off the compressed air supply before disconnecting any pneumatic component;
- make sure that all guards and safety covers are correctly in place BEFORE restarting the production cycle subsequent to maintenance or repair operations;
- proceed with caution at all times. Remember that you are responsible for your own safety and for that of your colleagues;
- make sure that applicable regulations are observed when moving or lifting the machine.



## 2.4 Special warnings

- All personnel operating the machine must be familiar with the general safety rules and must observe them strictly. Failure to follow these rules may result in personal injury ordamage to machine components;
- maintenance work must be performed with the machine turned off. The main switch must be in the "OFF" position, the air valve closed and a "work in progress" sign affixed to the machine;
- the user must make sure that all the instructions given in the manual are scrupulously observed;
- users will be solely responsible for risks caused

by tampering with the safety system;

- The safety of machines used in conjunction with this machine, if not supplied directly by tetra Pak Hoyer, is the responsibility of the customer.
- The pressure, speed, temperature and voltage limits and all instructions given are indispensable for correct operation of the machine and must always be complied with by the customer.
- Ambient conditions must be taken into consideration during installation.
- National legislation governing this type of machine be observed.

## 2.5 Residual Risks

The Frigus 400 maker is used for combining icecream mixture with sanitary air in fixed quantities and, subsequently, for forming the ice-cream with the addition of cold generated by a refrigeration cycle.

The mixture of ice-cream and sanitary air is blended inside a manifold by means of the pressure of a rotating pump and the injection of compressed air which is then pushed to the cylindrical evaporator of a refrigerating system for the treatment of icecream.

Several issues arise when adapting the pre-printer

to suit the needs of man: more precisely, centralizing the controls on a single instrument panel for the functions of adjustment and control.

All the transmission parts, the kinematic motions and the refrigerating system are protected by fixed boards.

A signal of danger is placed on the flap of the electric box to indicate live equipment.

For additional safety, the remaining risk is recalled in paragraph **3.5 Instructions on ban and danger signals.** 

## 2.6 Ambient operating limits

The machine is suitable for operation in the following ambient conditions:

- Temperaturae : from  $4^{\circ}$ C to  $40^{\circ}$ C
- Humidity : from 20% to 95%.

## S NOTE:

Tetra Pak Hoyer will accept no responsibility for damage or injury caused by failure to comply with the above warnings.



## **HOYER FRIGUS 400**

## **3 - DESCRIPTION OF THE MACHINE AND TECHNICAL DATA**

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## 3.1 Description of the machine

The FRIGUS 6000 mixes sanitised air into ice cream mix to obtain the desired overrun, cools mix with air incorporated in it to create the viscous product known as ice cream, and supplies sufficient pressure to convey the ice cream to its destination through a pipe.

In order to carry out these functions the machine incorporates the following components:

- a set of filters which sanitise air coming from the compressed air supply;
- a pump which receives mix from ageing vats, adds sanitised air, and sends the product to the freezing cylinder;
- freezing cylinder with a dasher and blades, inside which air is uniformly blended into the mix and the product is cooled until it takes on a thick consistency;
- a refrigerating plant connected to the outside wall of the freezing cylinder to cool it down;
- an electrical system for command and control of all machine functions.

All these items of equipment are assembled on a strong, compact stainless steel frame.



Fig. 3.1

#### 3.1.1 Filter set

The compressed air supply (the machine does not include an air compressor) travels through a pressure reducer (1) and a mesh filter (2) which separates out any large particles; it then goes through a microfilter for removal of oil vapours (3) and an active carbon filter (4) which eliminates odours. Finally, the clean air goes through a sterilisable Teflon membrane filter (5) with microscopic pores specifically intended to stop the passage of bacteria.

The sanitised air thus obtained is let into the mix between the first and second stage of the mix pump, under a pressure which may be controlled by the operator with a command on the control panel; pressure may be adjusted to increase ice cream volume.







#### 3.1.2 Mix pump

This is a two stage pump constructed with two pistons of different sizes. The first stage (1) receives and meters the quantity of mix set by the operator in accordance with the hourly production required; the second stage (2) receives mix dispensed by the first with sanitised air let in between the two stages and sends it all to the freezing cylinder.

As the difference in volume between the first and the second stage (determined by piston size) does not change depending on cylinder pressure and pump speed, the quantity of air let in per unit of mix is constant and depends on air pressure. By adjusting the pressure of sanitised air, the operator therefore controls the increase in volume, which remains constant throughout the production cycle.

The pump is driven by an electric motor commanded by an inverter (for speed changes) and incorporates a pneumatically driven bypass(3) for CIP washing. It works properly at relatively high pressures, so

#### 3.1.3 Freezing cylinder

This is the most important part of the machine: an upright pipe with a chrome coating on its inside walls, surrounded by a jacket in which coolant gas flows to cool down the cylinder. A dasher (1) with three blades rotates inside it, scraping the chrome-plated inside surface to ensure that frozen ice cream does not build up on the walls. The top (2) and bottom (3) ends of the cylinder are closed by two covers, which incorporate the mix feed pipe (bottom) (3) and the ice cream exit valve (top) (4).

Mix blended with sanitary air coming from the pump flows into the bottom part of the cylinder (3); on its way to the top it is whisked by the dasher (1) and cooled by contact with the walls of the cylinder, kept cold by the refrigerating plant. The ice cream forms and then flows out of the ice cream outlet valve (4) , which is controlled pneumatically to regulate the pressure of ice cream in the cylinder.

In order to make sure the machine operates correctly, it is important to be very careful not to damage the cylinder, always making sure that the that no extraction pump is needed coming off the machine.



scraper blades are in perfect condition and have been assembled correctly.



#### 3.1.4 Refrigerating plant

Composed of the freezing cylinder (evaporator), a Copeland Scroll Compliant rotary compressor, a high efficiency condenser, an economiser, a thermostat valve and a number of minor accessories. All these components are designed specifically for operation at low temperatures using R22 or R404A coolant gases.

Cooling is carried out by steam compression: the compressor pumps gas into the condenser, where it is cooled and liquefied, and the liquid gas then passes through the thermostat valve and is vaporised in the freezer cylinder (transforming into gaseous state once more) before returning to the compressor and starting the cycle again. Vaporisation of gas in the freezing cylinder removes heat from the ice cream mix, which cools down; the heat is then disposed of in the condenser, where it is transferred to the water in the tower (or well), heating it.

A pressure switch valve assembled on the condenser water circuit keeps condensation pressure constant, independently of water temperature.

The system mounted on the Frigus 600 is a particularly efficient one which makes use of a dependable, low maintenance Scroll Copeland compressor which acts as a two-stage compressor with an economiser to obtain considerable cooling capacity and improved dependability.

#### 3.1.5 Electrical system

The electrical system consists of the operator panel and the electrical panel which covers all of the rear of the machine. The operator panel may be used to activate or deactivate all machine functions, adjust functions and indicate anomalies. The electrical box at the rear contains the main switch and all control and power devices.

### 3.1.6 Control panel

- 1 White power indicator lamp (L1)
- 2 Red thermal switch indicator light (L2)
- **3** Pump start/stop switch (SL1)
- 4 Litre counter (D1)
- **5** Pump potentiometer (P1)
- 6 Dash motor ammeter (D2)
- 7 Dasher start/stop selector (SL2)
- 8 Compressor start/stop switch (SL3)
- 9 Overrun air ON/OFF switch (SL4)
- 10 Hot gas control potentiometer (P2)
- 11 C.I.P. washing switch (SL5)
- 12 Emergency stop pushbutton
- 13 Overrun pressure gauge (M1)
- **14** Overrun pressure regulator (P3)
- 15 Cylinder outlet valve pressure indicator (M2)
- **16** Cylinder outlet valve pressure control (P3)
- 17 Coolant evaporation pressure gauge
- 18 Gauge for detection of ice cream pressure in cylinder







F40 03 CB 00

## **A** Tetra Pak

Hoyer

## 3.2 Technical data

#### **Dimensions and weights:**

Dimensions	A =	1330
mm		
	B =	755
mm		
	C =	$1665 \pm 25$
mm		
Net weight:		525
Kg		
Gross weight:	725	Kg
Volume (with packaging):	2.96	m <sup>3</sup>
(1.6 x 0.95 x 1.95 h metres)		
Rated capacity:		
from 100 to 400 litres/hour of i	ice cre	am at –5.5°C

#### **Standard conditions:**

Mix input temperature:	$+4^{\circ}C$
Overrun:	
100%	
Neutral mix with 38% solids content	



Fig. 3.6

#### Nominal capacity in standard conditions:

200 to 600 l/h ice cream at -5.5°C

### **Electrical specifications:**

Dasher motor :	4	kW
Pump motor:	0.75	kW
Refrigerator compressor:	6	kW
Auxiliaries:	0.85	kW
Total installed power:	11.6	kW

## Compressed air:

Operating pressure:	6÷10	bar
Consumption (max.):	10	Nl/min
Filtering degree	A0	
Connector:		1 / 2
female		

,,

### **Refrigerating plant:**

Coolant gas:	R404A
Quantity:	2.8 Kg

Condensation water:	
a) dwell water $@ + 5^{\circ}C$	600 l/h
b) mains water @ $+15^{\circ}C$	1100 l/h
c) tower water @ $+28^{\circ}C$	3300 l/h
Water inlet connector: 1" gas female	
Water outlet connector: 1" gas female	
Noise:	
A-weighted equivalent sound pressur	e level at 1
metre:	
Leq(A) = 69.	$9  \mathrm{dB}(\mathrm{A})$
Max. C-weighted instantaneous sour	d pressure
level at working positions:	
Less than 130	dB/20uPa
Max. non-weighted sound pressure level	l at working
positions:	
Less than 140	dB/20uPa

#### **Electromagnetic compatibility:**

Conforms to VDE 0843/IEC801; wiring in accordance with EN55011

## 3.3 Improper use

Though the machine is equipped with a number of safety systems, operators must be very careful to make sure that no situations arise which could potentionally put them or others in danger.

The machine is designed and built exclusively for the use described in chapter 3.1. Any other use must be considered improper and unreasonable. The

manufacturer shall not be held responsible for any damage caused by improper, erroneous or unreasonable use.

Everyone who works on the machine must be adequately trained in the correct working methods and informed of the nature and functioning of safety devices.

## 3.4 Demolition and disposal

Information of use for disposal of the machine and its components.

The machine must be demolished by specialised personnel wearing appropriate safety garments and working in compliance with safety and environmental legilation.

Construction materials:

- steel, stainless steel, aluminium, cast iron
- copper, silver in electrical components
- -rUbber, nylon, PVC, resins and fibres.

No component is toxic or harmful.

Dispose of reducting gears carefully as they are full of oil.

Do not abandon these components or dispose of them with regular waste.



and components, dispose of them in accordance with the laws in effect in your country.

## 3.5 Warnings, prohibition and danger signs

## WARNING:

The doors of the electric board can be opened using the tools supplied with the machine. The opening of the doors disconnects the components downstream from the main swutch. Some components may continue to be powered by residual current for a specific interval of time. After opening the machine, avoid touching the internal parts for at least 5 minutes. A sign indicating the presence of **powered parts** is placed on the door.

## **HOYER FRIGUS 400**

## **4 - INSTALLATION**

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4.3	Installation check	;

## 4.1 Unpacking, delivery checks and transport

The machine is packed in wooden crates. Unpacking must be done close to the installation position. The cases may be easily transported by a lift truck.

If the crate has been damaged during transport, notify the insurance company immediately and do not proceed with removal of packaging until authorised by the insurance company.

When the crate is positioned in the place of installation, proceed to remove the machine from its packaging as follows:

**a.** Unnail the top cover and remove it. Do the

same with the side panels. Take care with the wooden spacers between the walls of the crate.

- **b.** Remove the box containing spare parts and the other components from the crate.
- **c.** Unnail the wooden blocks that hold the machine in place during transport and remove the protective cellophane.
- **d.** Check that the content of the package corresponds to the shipping documents.
- e. Make sure that all covers and panels are correctly fastened in place and there are no loose parts.
- **f.** Visually inspect all electrical components to make sure they are in perfect condition.
- **g.** If any part or component is missing, notify Tetra Pak Hoyer immediately.



Fig. 4.1



**Fig. 4.2** 

The machine may be moved using a fork lift truck, taking care to position the forks so that the machine's weight is evenly distributed.

### 4.2 Installation

The machine is fully tested and regulated in the factory with about one hour of ice cream production prior to shipment to the customer. Installation simply involves connecting up the pipes for the condenser cooling water supply, ice cream mix intake and outlet, compressed air supply and electric power supply. There is no need for internal adjustments to the machine; we recommend that factory settings not be changed. Proceed with the installation procedure as follows:

**a.** Position the machine in its operating position and check the plate data to make sure that the machine is compatible with the site's

electrical power supply.

- **b.** Level the machine with a spirit level by means of the adjustable feet. The plates provided may be applied underneath the feet.
- **c.** Connect up the condenser cooling water pipes. (1) (2).
- **d.** Connect up the ice cream mix intake (3) and outlet (4\_pipes to the production line.
- e. Connect up the compressed air pipe (5).
- **f.** Connect the machine to the earth and to the electrical power supply (6).



**Fig. 4.3** 

#### 4.2.1 Cooling water connection

Connect up the supply of condenser cooling water, taking care to get the direction of water flow correct: water must flow in through the connection at the bottom (2) and out through the connection at the top (1). It is recommended that two on/off taps (3) (4) be installed close to the machine, as well as a small drain tap (5) close to the bottom connection; it is also a good idea to connect up these two taps with the machine through two pipe unions (three-piece connectors) to make it easy to separate the freezer from the installation.

The machine is fitted with a pressure valve which controls the flow of water in inverse proportion to its temperature to obtain constant cooling (constant condensation pressure on the coolant side); this makes it possible to use water supplies with widely varying temperatures for cooling the condenser. The water flow varies as a result, from about 600 litres/hour at 5°C to 3600 litres/hour at 28°C (average values for machine in operation at maximum production rate).

Pipe diameter depends on pipe length and the pumps available, and must never be less than the diameter of the connections, which is 1" gas. It is essential to wash out the pipes BEFORE connecting them to the machine by flushing them with water to eliminate any particles or dirt. If the water that flows out of the pipes continues to be dirty, it will be necessary to install a filter with a filtering capacity and size appropriate to the type and amount of dirt conveyed at the intake (1) (the bottom connection).



Fig. 4.4

#### 4.2.2 Ice cream intake and outlet connection

Connect the mix supply pipe to the mix pump inlet connection (24) on the front of the machine. The machine has a CIP washing programme permitting thorough, safe washing of the machine without dismantling its parts; it will therefore be necessary to prepare the required connections between the CIP washing pump and solutions and the mix pipe.

Make sure that the mix flows spontaneously to the machine connection (24), and does not need to be suctioned by the freezer pump; this may be done by simply positioning the aging vats higher than the freezer (check that the spontaneously flowing supply is sufficient even when the mix level in the containers is low), or by installing a suitable centrifugal pump close to the vats. Take care to ensure that there is no air getting into the pipes, which could pollute the product and result in fluctuation of ice cream overrun.



Pipes must be dismantled and washed thoroughly after completing this procedure to ensure that no hard solid particles are conveyed toward the freezer mix pump. This is very important as solid particles such as metal burr or welding residues could severely damage the freezer pump and will invalidate the guarantee.

Connect up the ice cream outlet to the utility. Use the shortest possible pipe, with as few curves as possible, and use a pipe which is shiny inside; the pipe does not need to be insulated. Make sure that ice cream pressure in the cylinders does not exceed 12 bar (the absolute maximum permitted value); if this should occur, move the freezer closer to the ice cream utility and/or use hot gas to produce softer ice cream.

#### 4.2.3 Compressed air connection

Connect the compressed air supply pipe to the connection on the rear of the machine; it is recommended that an easily removable tap and connection be assembled close to the machine connection.

The supply pressure measured on the machine

must never drop below 6 bar. It is strongly recommended that the compressed air supply in the place of installation be fitted with an air drying system and A0 filters to remove oil vapours and residual fine particles.

#### 4.2.4 Electrical connection



Electrical connection must be made exclusively by competent technicians who are familiar with safety legislation and authorised to perform and certify electrical installations.

Check the identification plate to make sure that the machine is compatible with the site's power supply. Connect the machine's power supply to the site's distribution panel and protect it with a suitable device, complying with all regulations for correct electrical installation in effect in the place of installation.

We recommend installing an automatic circuit breaker on the distribution panel, complying with local regulations. Great care must be taken to ensure correct connection with the earth, as incorrect connection could cause severe damage to the machine's electronic parts and injury or death to the operator.

The section of the power supply cable must be determined on the basis of its length and the grid

used during testing prior to shipment; if this cable is not long enough, it must be replaced in its entirety, without making any connections. The machine's electrical installation includes a

device for checking that phase sequence is

correct to ensure that the motors turn in the right direction; if the machine does not work after connection, but the power on indicator light (1) comes on, two of the three wires in the machine's cable must be reversed on the distribution panel which supplies the machine.

## 4.3 Installation check

Check that connections have been made correctly:

- **a.** Slowly open the cooling water intake tap and check that there are no leaks. Open the outlet tap and check that water can flow freely and that any air in the circuit has been expelled (this involves turning on the machine's cooling compressor because of the pressure valve which blocks the flow of water see below).
- **b.** Turn on the compressed air supply tap and check that there is no leakage and that

pressure is between 6 and 10 bar. If the installation does not have a drier, bleed condensation from the line before turning on the tap on the machine.

c. Turn the main switch on the machine's rear panel to the (I) position.
Release the emergency button (1). Check that the power on light and the indicators come on. If only the power on light comes on, change the direction of rotation of the phases by switching the positions of two wires in the machine's power supply cable on the distribution panel (refer to installation instructions); all motors will then turn correctly in the direction indicated by the arrows

in figure 4.5.



## **HOYER FRIGUS 400**

## **5 - SET-UP**

## Contents

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## 5.1 Control panel settings

### **Description of the controls – Figure 5.1**

#### Emergency

The machine shuts down completely if the emergency stop button (12) is pressed.

#### (Mix) feed pump

The illuminated switch (2) is turned clockwise to turn on the feed pump, and will light up. The display (3) indicates the rate of flow of the pump in l/h of mix. Speed may be controlled using the potentiometer (4).

#### Dasher

The illuminated switch (5) is turned clockwise to turn on the dasher, and will light up. The ammeter (6) displays the power consumption of the dasher and therefore the hardness of the ice cream – on reaching maximum consumption the hot gas device is activated at 100% until power consumption drops to normal levels. If power consumption continues to rise notwithstanding hot gas activation, the refrigerator compressor is shut off. This prevents excessive hardening of the ice cream, which could stop the dasher. When the dasher is stopped the hot gas device comes on for 30 seconds to prevent ice from forming in the cylinder.

#### **Refrigerator compressor**

Illuminated switch (5) is turned clockwise to turn on the refrigerator compressor, and will light up. Switch (5) is active only if the dasher is operating.

#### Hot gas

As mentioned earlier, the hot gas is activated automatically on excessive input or shut-off of the dasher; in the former case until power consumption is reduced, and in the latter case for a fixed time of 30 seconds. The hot gas device can also be activated manually with the potentiometer (8) to reduce ice cream hardness.

### **Overrun control**

The illuminated switch (1) is turned clockwise to turn on the compressed air intake to the supply pump and will light up to indicate activation. Pneumatic regulator (2) is used to set the pressure – read on



Fig. 5.1

pressure gauge (3) – and therefore the quantity of compressed air introduced into the supply pump to obtain the required overrun. The greater the pressure of the compressed air introduced, the greater the overrun obtained, up to the capacity of the mix. Over

this limit the compressed air cannot be absorbed by the ice cream, and is expelled separately. Switch (1) is active only if the pump and refrigerator compressor are operating.

#### 5.2 Ice cream pressure setting

Ice cream pressure is adjusted using the pneumatic pressure regulator (4). Pressure is indicated by the pressure gauge placed on the front of the machine, specifically on the pipe between the pump and the cylinder. For good ice cream quality, the pressure should normally be between 4 and 8 bar.

The safety valve opens automatically if the pressure in the cylinder, which appears on the pressure gauge, exceeds 12 bar; this prevents pressure from damaging the freezer.

The adjustment described above takes effect after an interval of time which varies according to the operating parameters set.

Wait for the gauge (6) reading to stabilise before proceeding with further adjustments.





## 5.3 Emergency stop

If danger should arise during production press the emergency button (1) to shut down the machine completely.

To reset the machine after an emergency stop:

- Release the emergency button.
- Activate the injection of hot gas by turning potentiometer (2) for about 30 seconds.
- Restart the freezer functions, including the pump, the dasher, the refrigerator compressor, and the sanitised air plant.
- Normal production now resumes.



Do not use the emergency button to stop the machine during regular operation.







## **HOYER FRIGUS 400**

## **6 - OPERATING PROCEDURES**

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6.4	End of production	6-5



## 6.1 Preliminary checks

Perform the following checks before starting production:

- a. Check that the machine is stable and has been levelled, and adjust feet if necessary.
- b. Check that the main switch is on.
- c. Check that the water and compressed air valves are open.
- d. Check that the emergency stop button (1) has been released.
- e. Check that the clamp fittings are tightly fitted.
- f. Check that the safety valve (2) is correctly fitted.
- g. Check that the mix intake (3) and ice cream outlet (4) pipes are fitted correctly.
- h. Check that the all panels are assembled and fitted.
- i. Check that the machine has been sterilised.





Fig. 6.1

## 6.2 Start of production

- a. Connect the pump intake to the mix container.
- b. Check that the power ON indicator (1) on the operator panel is on.
- c. Start the pump with the switch (2). Mix flow in litres/hour corresponding to pump speed will be shown on the indicator (3).
- d. Wait for mix to start coming out of the freezer outlet pipe.
- e. Reduce pump speed to its minimum with the potentiometer (4).
- f. Start the dasher with the switch (5) and check that the switch indicator light comes on.
- g. Start up the refrigerator compressor using the switch (6). Cooling will begin and the mix contained inside the freezer cylinder will begin to harden.
- h. Start up the sanitised air plant with the switch (7). Check that the switch light comes on.
- i. Use the regulator (8) to adjust the percentage of sanitised air to be injected into the mixtures. The regulation takes effect after a few minutes.
- j. The hardness of the ice cream can be monitored on the gauge (9) which measures the amount of current absorbed by the dasher motor, proportionate to the hardness of the ice cream.
- k. When the ice cream takes on the correct consistency, use the potentiometer (4) to increase pump speed slowly up to the desired rate of flow.





1. Set the pressure of the ice cream inside the cylinder with the regulator (10), which activates the pneumatic valve set above the cylinder. Check that the ice cream pressure inside the freezer cylinder is between 4 and 8 bar on the pressure gauge (11).

The pressure should not exceed 10 bar, and can be reduced as follows:

- check correct adjustment of (10);
- make sure that the ice cream outlet hose is not pinched and that it is no longer than 3 metres;
- adjust the hot gas regulator with the potentiometer (12) to soften the ice cream.

If excessive pressure is due to low production, it may be necessary to increase pump speed using the potentiometer (4).

## 6.3 Production changeover

If production of different flavours of ice cream is organised so as to produce lighter coloured flavours first and successively produce darker and darker flavours, product changeovers will be very quick and involve very little waste.

All that need be done in this case is switch the mix supply from one flavour to another; if the pipes from the containers are set up with switch taps all that need be done is close one tap and open another, without stopping the freezer.

If it takes more time to change the mix and the machine must be stopped, proceed as follows:

- a. Turn off the refrigerator compressor by turning the switch (1) anti-clockwise.
- b. Turn off the feed pump by turning the switch (2) anti-clockwise.
- c. Turn off the dasher by turning the switch (3) anti-clockwise.
- d. Disconnect the supply to the freezer (4) from the vat containing the mix for which production is to be stopped, and connect it up to the container containing the new (darker) mix to be produced.

To start production again:

- e. Turn the pump on at low speed using switch (2) and potentiometer (5).
- f. Start up the sanitised air plant using the switch (11).
- g. Wait until mix starts to come out (6).
- h. Turn on the dasher with the switch (3).
- i. Turn on the refrigerator compressor with the switch (1).
- j. Adjust the quantity of sanitised air let into the mix using the pneumatic regulator (7).
- k. Wait until the ammeter (8) indicates that the ice cream is sufficiently hardened.

- 1. Increase pump speed to obtain the desired ice cream production speed using the potentiometer (5).
- m. Set ice cream pressure using the regulator (9).
- n. If necessary, adjust the hardness of the ice cream with the potentiometer (10).





## 6.4 End of production

- a. Turn off the refrigerator compressor by turning the switch (1) anti-clockwise.
- b. Turn off the feed pump by turning the switch (2) anti-clockwise.
- c. Turn off the dasher by turning the switch (3) anticlockwise.
- d. Slowly release ice cream pressure in the cylinder until the pressure gauge (4) indicates zero using the regulator (5) and wait for remaining ice cream to come out of the cylinder.
- e. Connect up the pump intake and ice cream outlet to the CIP washing pipes.
- f. Start up the CIP washing cycle by turning on the CIP washing pumps (not included in the supply of Frigus 400) and turn on the freezer CIP cycle using the switch (6).

For additional washing instructions please refer to the section on CIP washing in this manual.

WARNING:

Do not carry out CIP washing without turning on the CIP cycle with switch (6): this would result in insufficient flow for washing.

Do not turn the pump or dasher onto continuous operation during washing: this could cause serious damage to mechanical parts due to the lack of lubricant.

g. Once the wash cycle has been completed (duration must be determined by experience, and depends on conditions of use) rinse the system with cold clean air. Never leave the machine full of aggressive cleaning solutions which could corrode metal parts and damage seals.

Turn off the main switch at the back of the machine to leave the freezer in safe condition disconnected from the electrical supply.

Check that all indicator lights are off.

Turn off compressed air and cooling water supply taps.





The CIP washing cycle described above is the best way of washing the machine with little need for labour. If the washing system is not available and the machine must be washed manually, it will be necessary to dismantle a number of parts and reassemble them very carefully after washing.

In this case, proceed as follows:

- a-d. Turn off the machine as described in points a through d above.
- Disconnect the mix supply from the vat and e. supply the freezer pump with warm water, no hotter than 60 to 65°C.
- f. Start up the dasher using the switch (3-6.3).
- g. Start up the pump using the switch (2-6.3).
- Let hot water flow through the machine until h. the water flowing out of it is fairly clean. Keep washing as short as possible to prevent damage to the pump.
- i. Stop the dasher and the pump by turning the switches (2-6.3) and (3-6.3) anti-clockwise.
- Disconnect the pump delivery from the cylinder j. intake (1) to let air out.

- k. Remove the cover (2) by unscrewing the knobs holding it in place.
- 1. Disconnect the pipes and the valve (5) on top of the cover.
- Remove the dasher (3) using the tool provided, m. and dismantle the blades (6). Wear strong nonslip gloves to protect against cuts from the blades.
- Dismantle the cylinder bottom (4). n.
- Wash all components thoroughly, immersing 0. them in a solution containing the recommended percentage of an appropriate detergent.



- p. Rinse well in running water.
- q. Reassemble the parts in precisely the same position as before.

Be very careful when positioning the blades (6); the sharp part must be facing the cylinder. The latch on the cover (2) of the cylinder between the knobs is connected with a safety system; when closing the cylinder again, tighten up the knobs (by hand) to enable machine operation.

## WARNING:

To prevent blows that could damage the freezer cylinder, a "shaft raiser ring" is supplied. The ring must be positioned on the cylinder as shown in the figure below. Then assemble the shaft (3), being very careful not to hit and damage the ring on the mechanical seal at the bottom (4). Finally, remove the ring and continue assembling all parts.

- r. Sanitise the freezer by pumping a sterilising solution. Rinse and then drain the solution.
- s. Before beginning production, it is recommended that rinse water be pumped through the system for 2 to 3 minutes. Drain the water by disconnecting the pump from the cylinder.
- t. The freezer is now ready for use again.

## Tetra Pak

Hoyer

## HOYER FRIGUS 400

## 7 - CLEANING AND MAINTENANCE

## Contents

7.1	Washing
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7.3	Preventive maintenance
7.4	Lubrication

## 7.1 Washing

Washing of a machine used to process foodstuffs normally involves the following operations:

- Prewash with hot water to remove most of the dirt.
- Basic wash to remove grease residues.
- Acidic wash to remove limestone deposits
- Disinfecting to remove bacteria.
- Rinse with cold water.

Limestone deposit formation is reduced considerably at the low temperatures of freezers; this means that it is not necessary to carry out an acidic wash every day, provided that the conditions of operation and the hardness of the water used permit. It may be sufficient to carry out an acidic wash only once a week.

In any case, the effectiveness of the washing procedure must be tested by experimentation and adapted to suit the machine's specific conditions of use.

When selecting a detergent solution, it is important to consider ease of use and safety of use for operators and for the materials out of which the machine is made. In order to assist users in the choice, a number of examples of suitable products (which are equivalent to one another) made by well-known manufacturers distributed all over the world are listed below. It is very important to comply with the precise concentrations specified.

## WARNING:

The instructions given below represent general guidelines for washing. It may be necessary to adapt the procedure to the specific conditions of operation, and the actual effectiveness of the method must be systematically verified periodically using appropriate instruments. Tetra Pak Hoyer shall not accept liability for damage resulting from inadequate sanitation of the machine.

#### 7.1.1 CIP washing.

CIP (Cleaning In Place) washing permits cleaning of the internal parts of the machine which come into contact with the product with no need to dismantle the machine.

If you have no centralised washing system, you will at least need a container and a pump, as shown in the illustration:

- 1. Prepare washing solution at the correct temperature for the stage in the washing cycle to be performed (refer to table of wash stages and conditions) in an appropriate recipient. Fig. 7.1 illustrates the Hoyer wash tank (1) with built-in pump (2).
- 2. Start the CIP wash cycle using the switch (refer to the end of production instructions in section 6.4 of this manual). In this condition the pump by-pass valve and the ice cream output valve are open at all times to maximise flow of cleaning solutions, while the dasher pump works intermittently. The dasher and pump work for 5 seconds per minute throughout the duration of the wash cycle, so that they can be washed without causing excessive wear or severe damage to mechanical parts due to lack of lubrication.
- 3. Start up the wash tank pump. The wash cycle will be carried out as follows:
- **a** a Prewash with hot water.
- b Detergent wash. Use an alkaline detergent which is non-caustic and does not form foam (containing a mixture of alkaline, sequestering, anti-corrosive and surfactant agents) with a pH of approximately 11 at a concentration of 1%. Use a concentration of 1.2% to 1.6%, depending on how dirty the machine is and how hard the water supply is.
- **c** Rinse with cold water.
- **d** Descaling wash. Use buffered phosphoric acid in a concentration of 0.5% to 1%.
- e Rinse with cold water.
- f Disinfectant wash. Use a moderately alkaline active disinfectant in a concentration of 1% to 1.2%.
- g Rinse with cold water.



Fig.7.1

The appropriate flow rate for good CIP washing is about 1, 5 m/s in the waterspout of the frigus. This implies that a waterspout of 1 1/2" has a flow rate of 5000l/h. In such flow conditions, the pressure drop is of about 2 bar. The CIP washing pump (2) thus has to be able to ensure these features of head discharge.

Wash stage	Recommended products	%in water	°C	Minutes	Notes
Prewash	Water	100	50	5	drain away
Detergent wash	SU157 (Diversey Lever) P3-N421 (Henkel Ecolab)	1,2-1,6	max. 70	15	recycle
Rinse	Water	100	20	5	drain away
Descaling wash	SU475 (Diversey Lever) P3-PE4 Spezial a (Henkel Ecolab)	0,5-1	max. 70	10	recycle
Rinse	Water	100	20	5	drain away
Disinfectant wash	SU330 (Diversey Lever) P3-Dix forte (Henkel Ecolab)	1 - 1.2	20	10	recycle
Rinse	Water	100	20	10	drain away

- 4. Upon completion of the wash programme, stop the tank pump and disconnect the pipe connecting the pump with the cylinder. Wait until all water has flowed out, then turn switch (11) anti-clockwise to end the CIP washing cycle and reassemble the pipe.
- 5. After the washing programme, fill the machine with disinfectant solution.

Connect the freezer mix inlet (27) to a container filled with disinfectant solution; start up the freezer pump and wait until solution flows out of the ice cream outlet pipe (28), then stop the pump. Drain the solution and rinse with clean water before starting production again.

## WARNING:

Do not use any acidic cleaning solutions or solutions containing chlorine other than those indicated. Chlorine will corrode and rust the dasher and blades and corrode chrome. Some acids will corrode chrome.

## **NOTE:**

After sanitising the machine, do not dismantle any components, to ensure that it is kept clean.

## WARNING:

Liquid wastes must be disposed of as required by the legislation in the place of installation of the machine.

### 7.1.2 Washing the outside of the machine

Proceed as follows to wash the outside of the machine:

- **a** Prewash with hot water ( $50^{\circ}$ C).
- **b** Detergent wash.

Use an alkaline foaming detergent or a gel with high grease emulsifying power in a concentration of 2% to 10%, depending on how dirty the machine is and how hard the water supply is. Leave to act for 10 minutes.

- **c** Rinse with water. Remove all soapy, emulsified dirt.
- **d** Descaling wash.

Use an acidic descaler with low viscosity containing a mixture of wetting and emulsifying agents in a concentration of 2% to 3%. The minimum recommended contact time is 15 - 20 minutes.

- e Rinse with water.
- f Disinfectant wash.

Use a suitable disinfectant diluted in water in a concentration of 1% to 1.2%. The minimum recommended contact time is 15 - 20 minutes.

**g** - Rinse with water.



Do not use high pressure jets of water.

#### **Recommended products:**

Detergent	Descaler	Disinfectant
SU928 (Diversey Lever)	P3-topax 99 (60°C) (Henkel Ecolab)	P3-topax 99 (60°C) (Henkel Ecolab)
SU616 (Diversey Lever)		


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### 7.2 Maintenance

#### 7.2.1 Mechanical maintenance

#### • Transmission belt

Proceed as follows to replace the belt connecting the main motor with the dasher:

Slacken the lock nut(1) and the nut(2) so that the belt is no longer under tension.

Remove and replace the belt.

Tighten up the belt using the nut(2).

While tightening up the belt, check that it is completely inside the driven pulley and tighten up the lock nut (1).

Start up the dasher again, and check that the belt stays in position and does not tend to ride up and down on the driven pulley.

#### • Rotating seal (Fig. 7.4)

Check the rotating seal (5) assembled on the lower end of the dasher and coupled to the bush (6) fastened to the bottom (11) by the ring nut (12).

The rotating seal has a housing made of hard metal which, under pressure from the spring (7), rotates against the face of the bush (6).

Check that the surface of the housing has no scratches which could affect its hold.

Use fine emery paper to polish the two surfaces. Rub them first against a very hard surface (glass), then against one another.

Replace the ring gaskets (48) if they are worn.

#### • Dasher (Fig. 7.4)

Check that the eccentric (13) turns freely inside the dasher. If this is not the case, dismantle the elastic ring (14) and remove the dasher (15) and the eccentric (13) from the support (16) and check the condition of the bushings. Lubricate the bushings before reassembling the dasher.

#### • Scraper blades

Inspect the scraper blades (1).

They must be assembled in their pins so that they can tilt when the dasher rotates.

If the edge of the blade is not in perfect condition, the blade should be replaced.













## **NOTE:**

The blade may be sharpened, but this requires use of a special machine. The blade needs sharpening if the width of the cutting end exceeds 0.5 mm (Fig. 7.2).

After sharpening the thickness of the cutting edge must be about 0.2 - 0.3 mm (Fig. 7.3).

## CAUTION:

It is important to assemble the blades as shown in Fig. 7.3

#### • **Dasher motor drive (Fig. 7.4)** If the dasher is noisy during operation, dismantle the support (1) and pull out the shaft (2). Disassemble the bearings (3) and gaskets (4), check their efficiency and replace them if necessary. Peassemble carefully in inverse order

Reassemble carefully in inverse order.

- Cylinder bottom (Fig. 7.4) Inspect the rotating seal sliding bush (6). Check for wear on the gasket (5), spring (7), and lip seals (8) and replace if necessary.
- Cylinder lid (Fig. 7.4) Check for wear on the gasket (9) and replace if necessary.
- Ice cream mix pipe connection seals (10) Check for wear and replace if necessary.



Fig. 7.4

#### Mix feed Pump (Figure 7.5)

Take out the rotor (6) and check the state of wear of the surface.



The correct functioning envisages 0,05 mm backlash between the rotor and the jacket, therefore avoid polishing the rotor with a cloth.

### Non-return valve Inspection (Figure 7.5)

Check the integrity of the air inlet non-return valve (1) into the pump.

In case it is necessary, replace the gasket (2).

#### Pump timing Inspection (Figure 7.6)

Place the piston (1) in the bottom dead centre. Make sure that the reference notches of the driving pulley (2) and of the driven pulley (3) are both turned up in the upright position.

If the position of the notches is wrong, proceed with timing.



**Fig. 7.5** 



#### **Pump Timing (Figure 7.7)**

Following disassembly for replacement or inspection of a mechanical component, it is necessary to time the fuel pump again.

Place the piston in the bottom dead centre.

Loosen the backstand (1), unscrew the pulleys blocking screws (2) and (3) take out the two pulleys and the belt at the same time.

Reinsert the pulley (3) on the centre shaft and continue with the timing manually, by turning the pulley (3) until the notch on the pulley is turned up in the upright position.

Take out the pulley again (3), taking care not to change the rotor's position. Reassemble the two pulleys and the belt at the same time. Check the alignment of the two notches and stop the pulleys with the proper screws.

If it were difficult to maintain the two notches aligned, loosen the four bolts (4) on the driving pulley (2) and rotate the pulley manually (3) by using a setscrew wrench until the reference notch is perfectly vertical. Screw the four bolts again (4).

#### **Belt inspection (Figure 7.7)**

Check the belt's tension (5) and eventually tension it by loosening the screw coupling (1).

Once the belt is tensioned, tighten the screw again.

#### Pistons repacking (Figure 7.8)

Take out the piston pin (1) connecting the pistonconnecting rod.

Rotate the connecting rod (3), disassemble the gasket holder plate (2), and remove the gasket (4). Reassemble the new gasket (4) paying attention not to pinch it.

Reassemble everything in reverse sequence.





Fig. 7.8

## Replacement of gaskets and backstand gear bearings

Unscrew the screw and release it from the screw coupling. Take off the snap ring (1), withdraw the pulley (2), and remove the gaskets (3) and the bearings (4). Reassemble all in reverse sequence.

## Replacement of gaskets and rotor drive bearings

Disassemble the flange (5), take out the gaskets (6) and remove the snap ring (7). Extract the bearings (8). Reassemble all in reverse sequence.

## Replacement of crankshaft bearings and gaskets

Disassemble the ratio motor (9), the flange (10) on the motor side, the opposite flange (11) and extract the gaskets (12) and the bearings (13).

Take out the crankshaft, disassemble the two semishafts (14 and 15) constrained by the clamp (16) and by the keys.

Disassemble the snap rings (17 and 18).

Disassemble the connecting rods (19) and take out the bearings (20) and the gaskets (21).

Reassemble in reverse sequence, paying attention to the alignment of the crankshaft that is achieved with the appropriate assembly of the keys.



Fig. 7.9

#### 7.2.2 Maintenance of the electrical system

The electrical system is conceived, designed and developed to provide maximum protection for the continuous freezer components.

When a motor stops due to overload, a red light comes on to indicate that a thermal switch has been tripped.

If the thermal is tripped again when it is reset, the problem or short circuit persists and it will be necessary to inspect the electrical system and possibly block mechanical components.

#### 7.2.3 Maintenance of the refrigerating plant

# CAUTION:

All repairs and inspections of the refrigerating plant must be performed exclusively by a qualified refrigerator technician.

#### Condensation

Coolant exiting the refrigerator compressor is condensed in the plate condenser by water, which may come from the water supply (or a well, or a circuit with a cooling tower). The Frigus 600 has a series of condensers with pressure valves which are factory set and keep condensation pressure at the optimal value (12 - 13 bar). If water from a water tower is used, it should be kept at the same temperature at all seasons, if possible (with a fan in the tower controlled by a thermostat) so as to keep the performance of the refrigerating plant uniform.

The condenser must be kept clean to ensure correct, efficient operation of the machine. All heat taken out of the ice cream mix and all energy consumed by the compressor to transfer this heat are transferred out of the system (in the cooling water) through the condenser. If the condenser is dirty, it will be difficult to get rid of the heat, and the freezer may not cool down sufficiently and may consume excess energy. Decreased efficiency of the condenser is normally due to the combined action of particles of dirt in the flow of water and substances which have separated from the water (present even in very clean water). Dirt particles, if large, will obstruct the passage of water; substances which separate from water and deposit on the exchange surfaces will obstruct the passage of heat.

If the motor compressor on the refrigerating plant shuts down, check the pressure switch and electronic protection (located in the terminal board above the motor compressor). This must be done before working on the electrical system. Pay careful attention to the wiring diagram.

The numbered terminal board appearing in the diagram mirrors the board installed on the freezer to make it easy to control it. Maintenance and repair operations should be performed by a qualified electrician.

#### Preventing soiling of the condenser

Prevent problems caused by dirt by keeping dirt out of the condenser. If cooling water comes from a circuit in which it is impossible to prevent entry of foreign particles (such as leaves, blades of grass or tiny insects in water from a tower or sand in well water), it will be necessary to decant and separate out these particles.

As specific protection for the freezer, one or more filters may be installed at the water intake to stop all particles over 1 mm (largest dimension). The size and type of filter must be determined according to the amount and type of dirt in the water.

To prevent efficiency from being decreased by substances separating out of the water, first analyse the water to determine what treatment would be best. All waters tend to corrode or scale the surfaces with which they come into contact; it is very difficult to achieve and maintain a balanced condition in which there is neither corrosion nor scaling.

The trend to corrode or scale depends on the type and amount of substances dissolved in water, the acidity of the water and the temperature at which it is used. It is recommended that users contact a specialist firm capable of recommending and supplying batching devices, substances, and procedures suited to the specific cooling water system in use.

This is particularly important in the case of water towers, where temperature, evaporation and continual ventilation with air in the environment can generate waters which are particularly polluted (by solid particles, algae, mineral salts, micro-organisms, gases, etc.) and damaging for the entire plant and the condenser in particular.

#### Keeping the condenser clean

When condensation temperature is excessive for the conditions of operation in effect, it is time to clean the condenser.

On a machine with an R22 condensation temperature should be between  $33^{\circ}$ C and  $42^{\circ}$ C if the water temperature is less than or equal to  $29^{\circ}$ C; about 3500 litres/hour of water will be required at a temperature of  $29^{\circ}$ C.

Check that these conditions are met and that all the rest is working properly before deciding that the condenser needs cleaning.

If the condenser does need cleaning, contact a qualified refrigerator technician who has the equipment required to carry out chemical cleaning.

## WARNING:

## Do not disassemble the condenser and disconnect it from the coolant pipes for cleaning.

The Frigus 600 is fitted with two connections for cleaning the condenser: one inside the machine, at the top of the condenser next to the coolant gas pipe (washing solution intake) and one on the outside halfway between the water intake and outlet (washing solution outlet). Both these connections are normally closed off.

Turn off the cooling water intake and outlet taps.

Use a closed washing circuit consisting of a container and a centrifugal pump as shown in the figure; connect the pump delivery to the washing solution intake (top inside) through a plastic hose. Connect another plastic hose to the washing solution outlet (halfway on the outside) to return solution to the container.

First let water run through to get rid of any solid particles in the condenser.

Then prepare a suitable buffered solution (such as Henkel P3 T 288) according to the manufacturer's instructions and put it in the container. Flush it through, following the instructions for use, until the solution's indicator (colour change, pH, etc.) indicates that scale has been removed. This may take a few hours.



Under no circumstances should strong inorganic acids such as hydrochloric acid, nitric acid, or sulphuric acid be used for any reason. These acids are very dangerous and could cause irreparable damage to the condenser in only a few minutes.

Passivate and rinse according to the instructions; remove pipes and close connections up again. Open the cooling water intake and outlet taps again, and check that water is circulating normally with no leakage.

#### Thermostatic expansion valve

This value is factory set during final testing to optimise the dependability and performance of the refrigerating plant.

The factory setting should not be changed for any reason. If the machine is not working properly, all parameters affecting performance should be checked, such as the temperature of incoming mix, wear on the scraper blades, and correct circulation of condensation water.

- If the refrigerating plant is not working as well as it should do, the reason may be:
  - insufficient condensation
  - inefficient thermostat valve;
  - dirty or blocked up filter on the line;
  - hot gas solenoid valve blocked up or open;
  - solenoid valve blocked up or closed;
  - low coolant level.
- Insufficient condensation may be caused by:

   insufficient water coming from water supply:
   check that all taps (on the line that conveys water to the freezer) are open and water is flowing to the freezer properly.

- optional pressure valve setting needs adjustment: adjust using the knob on its top.

- if the optional water value is set correctly, the temperature of the water (flowing out of the outlet with the system in operation) should have a temperature of 30 to  $35^{\circ}$ C.



- If the thermostat valve is faulty, it will stay closed, stopping the flow of coolant.
- If the line filter is blocked up, it will get covered with frost which will block the flow of coolant. Dismantle and replace it. It must always be replaced whenever the cooling circuit is opened.
- If the solenoid valve which controls the flow of hot gas stays open, it will compromise the performance of the refrigerating plant considerably. Check the solenoid valve and replace if necessary.
- The liquid solenoid valve automatically closes the liquid line every time the refrigerator compressor stops.
- If the valve does not open, the refrigerating plant will tend to idle, and the vacuum pressure gauge will drop below -35°C. If this occurs, check that the power is on to the solenoid valve coil. If so, replace the coil.
- If the electrical system is working properly and you have checked all the above, poor performance may be due to low coolant level in the refrigerating plant. This will result in formation of gas bubbles which may be detected by the indicator. When the coolant level is low in the refrigerating plant, identify the cause of the leakage before adding more coolant.

#### 7.2.4 Maintenance of the pneumatic system

- Periodically check the efficiency of the pneumatic system and check whether the filters are obstructed.
- Check that no mix is flowing back from the pump.
- Check the efficiency of the valves.
- If air flow is insufficient, replace filter cartridges; if not, refer to the table of work listed in the section on preventive maintenance.

## CAUTION:

Do not open filters, especially the sterilised filter, unless there are problems with the pump's air supply.



Do not add coolant to the refrigerator circuit unless absolutely necessary.

The refrigerating plant will not work properly with too much gas in it.

### 7.3 Preventive maintenance

#### • Every 6 months

- Replace the sterilising filter.

## CAUTION:

Do not open the filter cartridge package until ready to replace the filter. Handle with care.

- Replace the seal on the air intake check valve according to the instructions provided in the 'Mechanical maintenance' section.
- Every 12 months
- Replace the high yield filter (located at the bottom of the dual filter).
- Replace the active carbon filters (located at the top of the dual filter).

# CAUTION:

Do not open the filter cartridge package until ready to replace the filter. Handle with care.

#### • Every 3000 hours of operation

- check chain tension and lubricate chain
- replace all seals on pump, dasher and pipes
- sharpen scraper blades, or replace if very worn

#### • Every 6000 hours of operation

- replace scraper blades
- replace all dasher brasses
- replace entire dasher rotating seal
- replace piston pins and brasses

### 7.4 Lubrication

#### **Refrigerator compressor:**

Polyester type oil:

Mobil EAL Arctic 22 CC ICI Emkarate RL 32 CF

Quantity: 4 litres Life-long lubrication.

## **NOTE:**

The compressor guarantee will remain valid only if one of the two oils specified above is used.

The compressor works only with these two specific oils. Ester oils must never be mixed with mineral oils and/or alcohol-benzene oils.

Do not use mineral oils on cooling circuit compo

#### **Piston slide bearings:**

Bearing grease.

### **NOTE:**

Apply grease with a grease gun every 500 hours of operation.

#### Slide bearings:

Bearing grease.



Whenever parts are dismantled.



### **HOYER FRIGUS 400**

## 8 - TROUBLESHOOTING

## Contents

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## 8.1 Troubleshooting

Problem	Cause	Remedy
Power light off	<ul> <li>Power failure.</li> <li>Broken power light</li> <li>General switch in "0" position.</li> <li>General switch fault.</li> </ul>	<ul> <li>Restore voltage supply.</li> <li>Replace light.</li> <li>Turn general switch to"1".</li> <li>Replace.</li> </ul>
No flow or insufficient flow of mix.	<ul> <li>No mix supply</li> <li>Mix supply hose crimped or blocked.</li> <li>Air bubbles in the supply hose.</li> <li>The pump has stopped</li> <li>The pump is badly timed</li> </ul>	<ul> <li>Restore supply</li> <li>Remove blockage/crimp.</li> <li>Stop overrun, increase pump speed to recall mix rapidly into the cylinder, reset desired pump speed and restart overrun.</li> <li>See problem "The pump stops, or does not start".</li> <li>Retime the pump</li> </ul>
The pump stops, or does not start.	<ul> <li>Switch fault.</li> <li>Main motor fault.</li> <li>Pump rotor seized.</li> <li>Bearings blocked.</li> <li>Inverter thermal cutout</li> <li>Inverter foult.</li> <li>Inverter in emergency state.</li> <li>No compressed air</li> </ul>	<ul> <li>Replace switch.</li> <li>Replace/repair.</li> <li>Remove rotor, check condition and if necessary replace.</li> <li>Replace following instructions in "Mechanical maintenance" section.</li> <li>Wait 20 seconds, then restart the pump</li> <li>Replace.</li> <li>Turn of the general switch and turn back on after a few minutes.</li> <li>Ceck compressed air pressure</li> </ul>
• Mixer shaft stops or does not start.	<ul> <li>Thermal cuteout tripped.</li> <li>Switch foult.</li> <li>Motor fault.</li> <li>Build up of ice in the cylinder</li> <li>Reduction gear fault</li> </ul>	<ul> <li>Reset thermal cuteout</li> <li>Replace switch.</li> <li>Replace/repair.</li> <li>Turn on hot gas.</li> <li>Replace.</li> </ul>

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Hoyer

Problem	Cause	Remedy
• The mixer shaft is malfunctioning.	• Ice cream too hard	• Turn on or increase hot gas supply.
	<ul><li>Scrape blades worn</li><li>Reduction gear broken.</li></ul>	<ul><li>Sharpen or replace, following correct fitting procedure.</li><li>Replace</li></ul>
Mix cooling problematic start-up	<ul> <li>Condenser out of or low on water.</li> <li>Hot water</li> <li>Refrigerator unit fault</li> </ul>	<ul> <li>Check water supply</li> <li>Check water temperature.</li> <li>Call qualified refrigerator technician</li> </ul>
Ice-cream too soft	<ul> <li>Excessive hot gas.</li> <li>Excessive ice-cream production rate</li> <li>Imput mix too hot</li> </ul>	<ul> <li>Reduce hot gas supply</li> <li>Reduce pump speed</li> <li>Check that mix is at 4°C.</li> </ul>
	• Water supply to condenser insufficient	• Check water supply. Adjust pressure valve(if present) as explained in the"Refrigerator unit maintenance" section.
	• Condenser cooling water too hot.	• Check temperature of tower water
	• Ice cream outlet valve too open.	• Increase pressure on ice- cream outlet pad.
	• No coolant gas.	• Check for leaks in refrigerator unit and reset gas charge.
	• Coolant gas filter blocked.	Replace filter
	• Refrigerator unit fault	Call refrigerator techniccian

Problem	Cause	Remedy
Overrun insufficient.	• Loss of pressure in compressed air system.	• Check compressed air system for leaks check solenoid valve operation.
	Clogged filters	• Replace as described in the "Compressed air system maintenance" section.
	• Non return valve seal worn or dirty.	• Replace as described in the "Mechanical maintenance/ cleaning" section.
	• Water or mix in compressed air system	• Replace the O-ring as in point above and clean system.
	Compressed air supply failure	• Reset
	• Overrun regulator fault.	Replace
	Wrong pump timing	• Time pump
	Pump rotor worn	Replace

Refrigerator compressor starts but shuts down immediately		Condenser water supply closed	•	Turn on faucets
	•	Condenser water supply hoses pinched.	•	Remove crimps.
	•	Condenser water supply hoses of insufficient diameter	•	Replace with hoses of diameter at least as that of the hose connections on the machine.

Problem	Cause	Remedy
The refrigerator compressor will not start up.	<ul> <li>Dasher off.</li> <li>Thermal cuteout tripped.</li> <li>Electronic overload tripped.</li> <li>Switch foult</li> <li>High-pressure cutoff switch tripped.</li> <li>Low pressure cutoff tripped</li> </ul>	<ul> <li>Restart dasher</li> <li>Reset.</li> <li>Reset by switching general switch off then on again.</li> <li>Replace switch.</li> <li>Check water temperature.</li> <li>Turn on hot gas for abort 30 seconds</li> </ul>
The compressor ices up.	<ul> <li>Condenser water too cold</li> <li>Blades worn.</li> <li>Thermostat valve fault.</li> <li>Excessive quantity of coolant gas.</li> </ul>	<ul> <li>Check water temperature.</li> <li>Replace.</li> <li>Replace.</li> <li>Unload gas and reload observing value in technical data.</li> </ul>
Whole pump speed range not avalible.	<ul><li> Inverter foult</li><li> Potentiometer fault</li></ul>	<ul><li>Replace.</li><li>Replace</li></ul>
Hourly ice-cream production rate remains unchanged even after adjusting potentiometer P1.	<ul><li>Inverter foult</li><li>Potentiometer fault</li></ul>	<ul><li>Replace.</li><li>Replace</li></ul>
Hot gas activates before correct time.	• Instrument decalibrated.	Calibrate instrument
Hot gas does not activate.	<ul><li>Instrument decalibrated.</li><li>Instrument foult.</li></ul>	<ul><li>Calibrated instrument.</li><li>Replace instrument</li></ul>
Hot gas activates but with no effect.	• Hot gas faucet closed.	Open faucet

## **HOYER Frigus400**

### N.COMMESSA 13210152

## 9 - PARTI DI RICAMBIO - LIST OF SPARE PARTS - PIECES DE RECHANGE

## Indice - Contents - Sommaire

13020355 - 1/1	Telaio - Frame - Châssis
13020349 - 1/1	Cilindro congelatore- Freezer cylinder - Cylindre congélateur
13020113 - 1/1	Gruppo micro di sicurezza - Safety microswitch - Micro de sécurité
13020348 - 1/1	Albero sbattitore - Dasher unit - Groupe dasher
13020025 - 1/1	Gruppo uscita miscela - Mix outlet unit - Groupe sortie mélange
13020350 - 1/1	Gruppo trazione - Drive - Traction
13020366 - 1/1	Pompa a 2 stadi - Pump - Pompe
13020362 - 1/1	Gruppo distributori - Distributors - Distributeurs
13020105 - 1/1	Cilindro By-pass - Bypass cylinder - Cylindre by-pass
13020363 - 1/1	Rotella tendicinghia- Weel tightener - Roue de tendeur
13020096 - 1/1	Impianto pneumatico - Pneumatic plant - Installation pneumatique
13020117 - 1/1	Attrezzi dotazione standard- Standard equipment - Equipement standard

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#### Telaio

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Frame - Châssis

12020094

12020098

12020318

12000002

336067137

540501038

POS.	COD.	Q.TA'	DESCRIZIONE
1	13020182	1	Carpenteria

-	
1	Cassetta Q.E.
1	Cassetta Q.E.
1	Targhetta
4	Piede
4	Guarnizione
2	Distanziale

DESCRIPTION

Carpentry Electrical cabinet Electrical cabinet Data plate Foot O-ring Spacer

#### DESCRIPTION

1/1

Charpenterie Armoire électrique Armoire électrique Plaquette frigus Pied Joint Entretoise



1/1 - 13020355

### Cilindro congelatore

Freezer cylinder - Cylindre congélateur

POS.	COD.	Q.TA'	DESCRIZIONE	DESCRIPTION	DESCRIPTION
1	12020368	1	Cilindro	Cylinder	Cylindre
2	12020081	1	Coperchio	Cover	Couvercle
3	12020147	1	Culatta	Bottom	Culasse
4	141035120	3	Pomolo	Handgrip	Manople
5	141015458	4	Perno	Pin	Axe
6	12020058	1	Anello	Ring	Anneau
7	141015473	1	Ghiera	Ring nut	Bague
8	141040365	1	Tubo	Hose	Tube
9	12020348	1	Tubo collettore	Hose	Tube
10	12020347	1	Squadra	Bracket	Equerre
11	336067069	1	Guarnizione	O-ring	Joint
12	336067184	1	Guarnizione	O-ring	Joint
13	336067141	1	Guarnizione	O-ring	Joint
14	336067145	1	Guarnizione	O-ring	Joint
16	016060219	1	Chiusura clamp 2"	Clamp lockup	Fermeture clamp
17	018020583	1	Guarnizione 2"	O-ring	Joint
18	016060218	5	Chiusura clamp 1"	Clamp lockup	Fermeture clamp
19	018020581	3	Guarnizione clamp	Clamp gasket with edge	Garniture clamp avec bord
20	018020582	2	Guarnizione clamp	Clamp gasket with edge	Garniture clamp avec bord
21	016960007	1	Portagomma clamp	Hose-holder clamp	Porte-tuyau clamp
22	015075615	1	Manometro	Manometer	Manomètre
23	146000020	1	Molla	Spring	Ressort
24	146000015	1	Tappo	Cap	Bouchon
25	146000010	1	Bicchierino	Cup	Godet



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Gruppo micro di sicurezza

17020090

326024270

Safety microswitch - Micro de sécurité

#### 1/1 13020113

PO	S. COD.	Q.TA'	DESCRIZIONE	DESC
1	13020113	1	Micro di sicurezza	Safety
2	017035938	1	Micro	Micros
3	12020282	1	Vite	Screw
4	12020283	1	Supporto micro	Micro

Molla

Spina

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#### CRIPTION

microswitch switch Micro support Spring Pin

#### DESCRIPTION

Micro de sécurité Micro Vis Support micro Ressort Goupille



1/1 - 13020113

# ▲ Tetra Pak

#### Albero sbattitore

Dasher unit - Groupe dasher

POS	S. COD.	Q.TA'	DESCRIZIONE	DESCRIPTION	DESCRIPTIO
1	141015477	1	Albero sbattitore	Shaft	Arbre
2	141025220	1	Eccentrico	Eccentric cam	Excentrique
3	12020057	1	Bronzina	Bushing	Douille
4	12020056	1	Bronzina	Bushing	Douille
5	141015446	1	Ghiera	Ring nut	Bague
6	141025250	1	Molla	Spring	Ressort
7	145500029	1	Molla	Spring	Ressort
8	145500026	1	Ghiera	Ring nut	Bague
9	141025215	3	Lama	Blade (*)	Lame (*)
10	336067170	1	Guarnizione OR	Seal	Joint torique OR

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Hoyer



1/1 - 13020348

Gruppo uscita miscela

Mix outlet unit - Groupe sortie mélange

POS.	COD.	Q.TA'	DESCRIZIONE	DESCRIPTION	DESCRIPTION
1	12020120	1	Tappo	Сар	Bouchon
2	336067054	2	Guarnizione OR	Seal	Joint torique OR
3	12020119	1	Pistone	Piston	Piston
4	12020121	1	Molla	Spring	Ressort
5	12020123	1	Boccola	Bush	Bague
6	12020122	1	Corpo superiore	Upper body	Corps supérieur
7	336066008	1	Guarnizione OR	Seal	Joint torique OR
8	336067048	1	Guarnizione OR	Seal	Joint torique OR
9	12020100	1	Otturatore	Plug	Obturateur
10	12020101	1	Corpo inferiore	Lower body	Corps inférieur



1/1 - 13020025

### Gruppo trazione

Drive - Traction

POS.	COD.	Q.TA'	DESCRIZIONE	DESCRIPTION	DESCRIPTION
1	13020302	1	Perno	Pin	Axe
2	12020304	2	Tirante	Tie rod	Entretoise
3	141015451	1	Anello	Ring	Anneau
4	336069034	1	Guarnizione	O-ring	Joint
5	12020289	1	Anello	Ring	Anneau
6	014045732	1	Motore	Motor	Moteur
7	12020293	1	Scivolo	Chute	Goulotte
8	12020295	1	Puleggia	Pulley	Poulie
9	17020127	1	Cuscinetto	Bearing	Roulement
10	326019040	1	Seeger	Seeger	Seeger
11	326007051	1	Rondella	Washer	Rondelle
12	326013124	1	Chiavetta	Key	Clavette
13	12020344	1	Albero	Shaft	Arbre
14	12020345	1	Flangia	Flange	Bride
15	12020343	1	Distanziale	Spacer	Entretoise
16	336001720	1	Cuscinetto	Bearing	Roulement
17	17000867	1	Guarnizione OR	Seal	Joint torique OR
18	336071382	1	Corteco seal	Corteco	Corteco
19	336067069	1	Guarnizione	O-ring	Joint
20	12020299	1	Fusione supporto	Support casting	Support coulé
21	12020300	1	Puleggia	Pulley	Poulie
22	17020186	1	Cinghia	Belt	Courroie
23	12020303	2	Perno	Pin	Axe
24	12020342	1	Piastra supporto	Support plate	Jumelle

### 13020350



1/1 - 13020350

### Pompa a 2 stadi

Pump - Pompe

1/1	13020366
1/1	1002000

POS.	COD.	Q.TA'	DESCRIZIONE	DESCRIPTION	DESCRIPTION
1	13020362	1	Gruppo distributore		
2	13020363	1	Rotella tendicinghia		
3	12020353	1	Corpo supporto pompa	Supporting body	Support pompe
4	12020241	1	Protezione	Protection	Protection
5	12020209	1	Flangia	Flange	Bride
6	12020354	1	Distanziale	Spacer	Entretoise
7	12020355	2	Flangia	Flange	Bride
8	12020356	1	Albero a gomito	Shaft	Arbre
9	12020357	1	Albero a gomito	Shaft	Arbre
10	12020214	1	Piastra	Plate	Plaque
11	12020215	1	Chiavetta	Key	Clavette
12	12020275	1	Biella	Connecting rod	Bielle
13	12020379	1	Pistone	Piston	Piston
14	12020380	1	Pistone	Piston	Piston
15	12020381	2	Spinotto	Piston pin	Branche
16	12020227	1	Flangia	Flange	Bride
17	12020228	1	Flangia	Flange	Bride
18	12020223	1	Cilindro	Cylinder	Cylindre
19	12020224	1	Cilindro	Cylinder	Cylindre
20	12020375	1	Puleggia	Pulley	Poulie
21	12020376	1	Flangia	Flange	Bride
22	12020377	1	Anello bloccaggio	Ring	Anneau
23	12020365	1	Rondella	Washer	Rondelle
24	12020245	1	Piattello di chiusura	Plate	Plateau
25	12020278	1	Piastrina	Plate	Plaquette
26	17020231	1	Riduttore	Reduction gear	Réducteur
27	17020234	1	Motore	Motor	Moteur
28	17020233	1	Cinghia dentata	Belt	Courroie
29	336002405	2	Cuscinetto	Bearing	Roulement
30	336009906	2	Cuscinetto	Bearing	Roulement
31	17020080	2	Cuscinetto	Bearing	Roulement
32	326019656	2	Coppiglia		
33	17020076	2	Anello	Ring	Anneau
34	336071235	2	Corteco	Corteco seal	Corteco
35	17000739	2	Anello	Ring	Anneau
36	336071190	2	Anello	Ring	Anneau
37	336067533	1	Guarnizione	O-ring	Joint
38	336067534	1	Guarnizione	O-ring	Joint
39	336067088	1	Guarnizione	O-ring	Joint
40	336067092	1	Guarnizione	O-ring	Joint
42	326013105	2	Chiavetta	Key	Clavette
43	326013075	1	Chiavetta	Key	Clavette
44	326019025	2	Seeger	Seeger	Seeger
45	326019152	2	Seeger	Seeger	Seeger
46	017035929	1	Proximity	Proximity sensor	Capteur de proximité



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Gruppo distributori

Distributors - Distributeurs

POS.	COD.	Q.TA'	DESCRIZIONE	DESCRIPTION	DESCRIPTION
1	12020358	1	Corpo distributore	Dispenser body	Corps distributeur
2	12020359	1	Distributore	Distributor	Distributeur
3	12020360	1	Flangia	Flange	Bride
4	12020361	1	Albero	Shaft	Arbre
5	12020363	1	Puleggia	Pulley	Poulie
6	12020365	1	Rondella	Washer	Rondelle
7	12020366	1	Distanziale	Spacer	Entretoise
8	12020378	1	Piatto	Plate	Plateau
9	12020240	2	Chiusura	Closing system	Fermeture
10	12020238	1	Blocchetto	Block	Bloc
11	13020105	1	Cilindro	Cylinder	Cylindre
12	GM50E54001	1	Valvola di non ritornc	Check valve	Soupape de tenue
13	016060218	1	Chiusura clamp 1"	Clamp lockup	Fermeture clamp
14	336001443	2	Cuscinetto	Bearing	Roulement
15	17000735	1	Anello	Ring	Anneau
16	17000736	1	Anello	Ring	Anneau
17	336067088	1	Guarnizione	O-ring	Joint
18	336067092	1	Guarnizione	O-ring	Joint
19	336067045	3	Guarnizione	O-ring	Joint
20	336067532	1	Guarnizione	O-ring	Joint
21	018020581	1	Guarnizione clamp	Clamp gasket with edge	Garniture clamp avec bord
22	326013075	1	Chiavetta	Key	Clavette
23	326019147	1	Anello elastico	Seeger	Anneau élastique



13020362

1/1 - 13020362

## Tetra Pak

Hoyer

### Cilindro By-pass

Bypass cylinder - Cylindre by-pass

POS	. COD.	Q.TA'	DESCRIZIONE	DESCRIPTION	DESCRIPTION
1	12020242	1	Tampone di chiusura	Buffer	Tampon
2	12020243	1	Stelo cilindro	Cylinder stem	Tige cylindrique
3	336067030	2	Guarnizione OR	Seal	Joint torique OR
4	336067042	1	Guarnizione	O-ring	Joint
5	12020203	1	Testata anteriore cilindro	Front cylinder head	Culasse avant cylindre
6	12020204	1	Cilindro pompa	Pump cylinder	Cylindre
7	12020244	1	Pistone	Piston	Piston
8	17020064	1	Guarnizione OR	Seal	Joint torique OR
9	336067020	1	Guarnizione	O-ring	Joint
10	12020202	1	Testata posteriore cilindro	Rear cylinder head	Culasse arrière cylindre
11	326002236	1	Vite	Screw	Vis



1/1 - 13020105

### Rotella tendicinghia

Weel tightener - Roue de tendeur

POS	. COD.	Q.TA'	DESCRIZIONE	DESCRIPTION	DESCRIPTION
1	12020364	1	Rotella	Wheel	Roue
2	12020362	1	Leva	Lever	Levier
3	12020206	1	Vite per tendicatena	Screw	Vis
4	17000743	2	Cuscinetto	Bearing	Roulement
5	17000742	1	Corteco	Corteco seal	Corteco
6	17000741	1	Corteco	Corteco seal	Corteco
7	326019015	1	Seeger	Seeger	Seeger



1/1 - 13020363

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### Impianto pneumatico

Pneumatic plant - Installation pneumatique

POS.	COD.	Q.TA'	DESCRIZIONE	DESCRIPTION	DESCRIPTION
1	12020080	1	Filtro	Filter	Filtre
2	333012027	1	Cartuccia aria alimentare	Cartridge	Cartouche
3	17000092	2	Connettore	Connector	Connecteur
4	17000087	2	Valvola	Valve	Vanne
5	17000095	2	Тарро	Сар	Bouchon
6	17000233	1	Gruppo riduttore	Reducer group	Réducteur
7	333012022	1	Filtro alta efficienza	High-performance filter	Filtre
8	333012025	1	Cartuccia olio	Oil cartridge	Cartouche
9	333012026	1	Cartuccia carboni attivi	Cartridge	Cartouche
10	17000207	1	Pressostato	Pressure switch	Pressostat
11	17000168	2	Riduttore	Reduction gear	Réducteur
12	015975050	1	Manometro	Manometer	Manomètre
13	015975051	1	Manometro	Manometer	Manomètre
14	12020145	1	Supporto	Support	Support
12a	015975052	1	Squadretta	Bracket	Equerre
13a	015975052	1	Squadretta	Bracket	Equerre


1/1 - 13020096

# ▲ Tetra Pak

Hoyer

POS. COD.

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2

Attrezzi dotazione standard

12020124

12020106

Standard equipment - Equipement standard

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1

### DESCRIPTION

Attrezzo estrazione albero Shaft removal tool Shaft raiser ring nut

### **DESCRIPTION**

Equipement extraction arbre Bague invitation arbre

Q.TA' DESCRIZIONE

Ghiera invito albero

1/1 13020117



1/1 - 13020117

## 53-T Multifunctional digital device.

### (Revolution counter + thermostat, Ammeter + hot gas regulator, Pressure gauge)

#### Configurable in the following modes:

-	CG:	Revolution counter-impulse/minute counter-litre/hour counter-input temperature thermosta
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- GM: Ammeter with 2 programmable thresholds (gas and comp), hot gas control, defrosting.
- BAR: Pressure gauge with 2 programmable thresholds.

General features	
Display	: 3 green displays, 1 red LED, 1 green LED.
Outputs	: 2 24 V AC 4 A UNPROTECTED with static relays for hot gas and compressor enabling
Proximity sensor input (Px)	: for NPN proximity sensor, supplied at 15 DC
Pressure input (Pr)	: for 16 bar fs 4 – 20 mA self-powered sensor
Amp. input	: for current transformer with 500 turns
Temperature input	: for Pt 100 (2 wires)
Power supply	: 16 – 28 V AC (19 – 40 V DC) – max. 0.5 A
Dimensions	: 49 x 48 x 140 mm
Degree of protection	: IP 65 (frontal)
CG: Revolution counter -	Operates on the principle of measuring mean period and subsequently converting it to frequency using the selected ratio. Display updated every second.
-	Digitally set temperature threshold protects pump.

- When temperature threshold is exceeded, the "comp" outlet opens and the "gas" outlet closes.
- Green LED indicates "comp" outlet on (= temperature < 68°C)
- Red LED for proximity sensor signal monitor
- Indicates absorption from 1.0 to 50.0 A with a resolution of 0.2 A.
- Digitally set threshold triggers intervention of hot gas at 2.0 to 50.0 A.
- Digitally set threshold turns off compressor at 2.0 to 50.0 A.
- Hot gas is turned on and the compressor stopped when the thresholds are exceeded.
- Timing from 0% to 100% for hot gas solenoid valve, with 6 second period and control by external potentiometer.
- Automatic activation of hot gas with defrosting function when appliance is switched on and whenever the dasher stops; the function can be timed to run from 5 to 30 seconds.
- 3 second delay in restarting the compressor when it is stopped due to overabsorption.
- Green LED: compressor-enabling monitor.
- Red LED: hot gas-enabling monitor.
- Blinking display: indicates that the threshold for turning on hot gas has been exceeded.
- BAR: Pressure gauge - Displays cylinder outlet pressure between 0 and 16 bar, resolution 0.1 bar. - 2 digitally set alarm thresholds.
  - "Gas" outlet turned on when first threshold is exceeded.
  - "Comp" outlet is turned off when second threshold is exceeded.
  - Green LED: "comp" outlet monitor.
  - Red LED: "gas" outlet monitor.
    - Flashing display: at least one threshold has been exceeded.



GM: Ammeter





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#### Programming

- To access the programming mode, keep the D button pressed until the message **PrG** appears (10 seconds – or 2 seconds if the button is held down before the power to the device is switched on). Release the D button.
- To select a function, press  $\Box$  and release, then press  $\Delta$  or  $\nabla$ .
- Hold down O to display parameter name.
- Release O to display parameter value.
- To select a parameter, hold down O and press  $\Delta$  or  $\nabla$ .
- To set the selected parameter, release O and press  $\Delta$  or  $\nabla$ .

#### IMPORTANT: When finished programming, press and O at the same time to store data in memory and return to operating mode.

#### Functions and parameters

Function	Parameter	Values	Description
CG	cnt.	15	1 = ratio 1:1 (CG1); 2 = ratio 1:10.33 (CG10);
			3 = ratio 1:15 (CG15); 4 = l/h (1 imp. = 0.0282 l);
			5 = l/h (1 imp. = 0.0577 l)
	°C	5090	Threshold for turning off refrigerator compressor.
GM	GAS	2.050.0	Threshold for turning on hot gas (amperes).
	СМР	2.050.0	Threshold for turning off refrigerator compressor.
	dEF	530	Duration of defrosting (seconds).
	Α		Calibration of ammeter (must first be enabled)
bAr	oFS		Calibration and resetting of pressure sensor.
	SPn		Calibration of pressure sensor gain.
	Pr1		Threshold 1 – enables "gas" outlet.
	Pr2		Threshold 2 – disables "compressor" outlet.
ISt	Pot		Reads potentiometer input $(0 - 30)$ for diagnostic purposes.
	°C		Reads temperature input for diagnostic purposes.

Press  $\Delta$  or  $\nabla$  for more than 1 second to go from slow to rapid repetition. Press  $\Delta$  and  $\nabla$  together for more than 1 second to set the default value.

Connect terminals 5 and 7 with a jumper to permit control of ammeter readings. If settings are stored in memory when the device is in *ISt* mode, it will return to programming mode again.

#### Further information

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li	:	Reading exceeds permitted limit (for instance, short circuit in pressure sensor).
.0	:	Reading falls below permitted minimum limit (for instance, no pressure to sensor).

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
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**A** Tetra Pak Hoyer S.p.A.

MACHINE: FRIGUS 400M 400V, 50/60 Hz
CUSTUMER: .
ORDER
N° DRAW: 13020368 Rev.01 del 09/01/03
DESIGNED; CEP M.D.
СНЕСК
DATE
SCALE

<b>A</b>	Tetra	<b>a Pak</b>
	Hoyer	S.p.A.

MACCHINA : FRIGUS	6 400M 400V,	50/60 Hz	FOGLIO
			1
	42020	2250 Dev 04 Jel 00 (04 (02	SEGUE
ORDINE : .	DISEGNO N.:13020	1368 REV.01 del 09/01/03	2
DISEGNATO: CEP MD	VISTO:	DATA : 09 GEN 2003 SCALA : //	

	11 12	<u>13   14   15   16</u>		18 19				
SPECIFICATION		WIRE COLOR						
		CONNECTION TO:	VOLTAGE:	COLOR:				
CENEDAL SDECTEICATION		AC MOTOR	380V 50Hz	black				
GLIYERAE SPECIFICATION		AC CONTROL CIRCUIT	220V 50Hz	red				
BOXBOX		AC CONTROL CIRCUIT	24V 50Hz	red				
CARRY OUT		DC CONTROL CIRCUIT	24VDC	blue				
DIMENSIO		IN TENSION ALSO WITH MAIN SWITCH OPENED		orange				
		NEUTRAL		blue				
MAIN POWER SUPPLY SPECIFICATIO	Ν	GROUND		yellow∕green				
		LIGH	T COLOR	-				
FREQUENCY		FUNCTION:	COLOR:					
POWER 15.5KW 36A		MOTOR RUNNING	green					
		ALARM,FOULT,WARNING,ETC.	red					
CABLE SUPPLY SPECIFICATIO	N	CYCLE END, ABILITATION	yellow					
CARLE		OTHER	Ьlue					
CABLE 4 X 25 mmq		PUSHBUT	TON COLOR					
		FUNCTION:	COLOR:					
		START	green					
SECTION (1114.)		STOP	red					
		EMERGENCY STOP	mushroomhead	red				
VOLTAGE		SELECTION, RESET	yellow					
CURRENT		TEST	Ыле					
CIRCUIT BREAKER		OTHER	black					
TYPE/DATA UC4								
	MACCHINA : FRI	GUS 400M 400V, 50/60	Hz	FOGLIO				
▲ Tetra Pak	CLIENTE : .							
Hoyer S.p.A.	ORDINE : .	DISEGNO N.:13020368 RE	.01 del 09/01/03 SEGUE					
	DISEGNATO: CEP	MD VISTO: DATA : 09	GEN 2003 SCALA	N 2003 SCALA : // 3				

1	2	З	4	5	6	7	8	9	10	11		12	13	14	15	16	17	18	19		
	\]K	Ins!	antaneous NO	contact			FD	Thermal ov	verload re	elay			R Resistor								
	<u>Г</u> К 1	Ins!	antaneous NC	contact			2 4	F	One pole H	fuse				f	Эв	Thermistor •					
	(Ң кт.	• •	delayed NU	contact - on	delay		_	-							-						
	і (—Кт.	Time ••	delayed NC	contact - on	delay			F						]́₿	Temperature switch 						
	)⇒∫K⊺.	Time	delayed NO	contact - of	f delay			F	Three pole	e fuse				θ	Ъ_∕в	switch					
	)−−−−−−−−−−−−−−−−−−−−−−−−−−−−−−−−−−−−	Time ••	delayed NC	contact - of	f delay		QM	f <sup>7</sup> f	Three pole	e mains di	isconne	ect switch		Float switch no contact							
	 κ	Ins:	antaneous ch	ange-over co	ntact		QM, <u>1</u> , .	т <sup>т</sup> т т ј ј						Ð							
KM.	$\begin{array}{c} \begin{array}{c} & & & \\ & & & \\ & & & \\ \end{array} \end{array} \xrightarrow{\begin{array}{c}} & & & \\ & & & \\ \end{array} \xrightarrow{\begin{array}{c}} & & & \\ & & & \\ \end{array} \xrightarrow{\begin{array}{c}} & & \\ & & & \\ \end{array} \xrightarrow{\begin{array}{c}} & & \\ & & \\ & & \\ \end{array} \xrightarrow{\begin{array}{c}} & & \\ \end{array} \xrightarrow{\begin{array}{c}} & & \\ & & \\ \end{array} \xrightarrow{\begin{array}{c}} & & \\ & & \\ \end{array} \xrightarrow{\begin{array}{c}} & \\ \end{array} \xrightarrow{\begin{array}{c}} & & \\ \end{array} \xrightarrow{\begin{array}{c}} & & \\ \end{array} $	Mair	contacts of	contactor					Four pole	mains dis	sconnec	ct switch		P	B Pressure switch no contact						
		Aux	control rel	ay coil				*	One pole (	circuit br	reaker			P	,   /в	Pressure swi	tch nc conta	ct			
	K A1	Min	contactor co	il			Q	₽ →	Two pole circuit		reaker			۵							
	A2 KM A1	On d	lelay timer c	oil			ß	F F						B Flow switch nc contact							
	A2 KT								Three pole	e circuit	breake	er		$\begin{array}{c} S\\ 14 \end{array}$ NC limit switch							
	A2	110	delay timer	coil											22]						
	КТ																				
											MACCH	HINA : F	RIGUS	400M 40	30V, !	50/60 Hz			FOGLIO		
				A, TA	ra Dal	6				ŀ		NTF ·							3		
			4			N				-	CLIENTE : ,										
				поус	я э.р.а.					ŀ	DIOT				10020			<u> </u>	4		
											DISEC	SNHIU: LI	בר ווט	V1210;		DULH : NR PEL	I ZOOD   SUHL	_⊓ ; //			

1 2	3		4	5	6			8	3	9	10	11		12		<u>13</u>	1	4	15		16	17	18		19
$\left( \oplus \right)^{l}$ s.	<sup>NO</sup>	l proxi	imity swit	ch					×1] ×2]	)н	Pild	ot light					F	PC		Hours	counter				
·⊕⊄ s	NC	: proxi	imity swit	ch					Х1 Л (Х Х2]	)н	Flas	shing light					2 ,3	/ R		POTENT	TIOMETER				
[⊲→] <sup>1</sup> 13 S	On	e pole	e NO push	button					L L	H	Sire	en						⊎ 1		Three	phase AC	motor			
$E_{ZZ}^{Z1L} S$	On	e pole	e NC push	button					L L		Ala	rm buzzer						∽ m							
$\frac{1}{22} = \frac{21}{22} \text{SF} \dots$	. Em	nergend	cy stop mu	shroom head	push button	ı			L T		Ala	rm bell								Single	e-phase A	C motor			
_F√S	Ûn	e pole	e NO selec	tor switch					۲ ۲	н							Ę	→ m							
$f_{\sqrt{22}}^{21}$ $f_{\sqrt{22}}^{\sqrt{5}}$	Ûn	e pole	e NC selec	tor switch					Ļ	H	Ala	nnone no mu	iator	horn				Ϋ́,	• • •	Single	e phase t	ransformer			
	Tw	o pole	e NO selec	tor switch					В	+	Th	ermocouple						}		Three	phase tr	ansformer (	star-star (		tion
$ \vdash \stackrel{1 \text{ o II}}{\vdash} \stackrel{1 \text{ o II}}{\downarrow} \stackrel{1 \text{ o III}}{\downarrow} \stackrel{1 \text{ o IIII}}{\downarrow} \stackrel{1 \text{ o IIIII}}{\downarrow} \stackrel{1 \text{ o IIII}}{\downarrow} \stackrel{1 \text{ o IIII}}{\downarrow} \stackrel{1 \text{ o IIII}}{\downarrow} \stackrel{1 \text{ o IIII}}{\downarrow} \stackrel{1 \text{ o IIIIII}}{\downarrow} \stackrel{1 \text{ o IIIIII}}{\downarrow} \stackrel{1 \text{ o IIIIIIIIII}}{\downarrow} 1 \text{ o IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII$	 Th	iree po	osition se	lector swit	ch			,	Y		So	lenoid valve	2					}							
$\begin{array}{c} \begin{array}{c} & \\ & \\ \end{array} \end{array} \\ \begin{array}{c} \\ \\ \\ \\ \\ \\ \\ \\ \end{array} \\ \begin{array}{c} \\ \\ \\ \\ \\ \\ \\ \\ \end{array} \end{array} \\ \begin{array}{c} \\ \\ \\ \\ \\ \\ \\ \\ \\ \end{array} \\ \begin{array}{c} \\ \\ \\ \\ \\ \\ \\ \\ \end{array} \\ \begin{array}{c} \\ \\ \\ \\ \\ \\ \\ \\ \end{array} \\ \begin{array}{c} \\ \\ \\ \\ \\ \\ \\ \end{array} \\ \begin{array}{c} \\ \\ \\ \\ \\ \\ \end{array} \\ \begin{array}{c} \\ \\ \\ \\ \\ \\ \end{array} \\ \begin{array}{c} \\ \\ \\ \\ \\ \\ \end{array} \\ \begin{array}{c} \\ \\ \\ \\ \\ \\ \end{array} \\ \begin{array}{c} \\ \\ \\ \\ \\ \\ \end{array} \\ \begin{array}{c} \\ \\ \\ \\ \\ \\ \end{array} \\ \begin{array}{c} \\ \\ \end{array} \\ \begin{array}{c} \\ \\ \\ \end{array} \\ \begin{array}{c} \\ \\ \end{array} \\ \begin{array}{c} \\ \\ \end{array} \\ \begin{array}{c} \\ \\ \end{array} \\ \end{array} \\ \begin{array}{c} \\ \\ \end{array} \\ \begin{array}{c} \\ \\ \end{array} \\ \begin{array}{c} \\ \\ \end{array} \\ \end{array} \\ \begin{array}{c} \\ \\ \end{array} \\ \begin{array}{c} \\ \\ \end{array} \\ \end{array} \\ \end{array} \\ \begin{array}{c} \\ \\ \end{array} \\ \end{array} \\ \begin{array}{c} \\ \\ \end{array} \\ \end{array} \\ \end{array} \\ \end{array} \\ \begin{array}{c} \\ \end{array} \\ $	On	e pole	e NO selec	tor switch	- key operat	te			mA	ΩВ	۵/	mA TRASDUCEF	5				G €	) U	0-0- v v	U4 U4	₩4	Power supp	ly		
$21 \downarrow$ $\sqrt{22}$ /S	On	e pole	e NC selec	tor switch	- key operat	te			-(A									+24U -	-9U -9U	, <sub>А</sub>	B 				
$H \dots \bigotimes_{\substack{X2 \\ X2 \end{bmatrix}}}^{X1} = \underbrace{\stackrel{21 L}{22 \\ 22 \\ 22 \\ 22 \\ 22 \\ 22 \\ 5 \\ \dots$	. Li	ght pu	Jshbutton							́Рн ) Рн	Am Vo	pmeter ltmeter					Ļ	Diode Connect	tor (plu	r∰ wg and r	LED receptacl	e) O	Grou Ø Term	nd inals	
													MAC	CHINA	: FR	IGUS	4001	1 400	av. 5	50/60	a Hz				FOGLI
				<b>6-</b> Te	tra P	ak	-						CLI	IENTE	:										4
				Hoy	ver S.p.A	∽a∎∛ ↓.	2						ORE	DINE	• •		DISEGN	о м.:13	3020	368	Rev.0	1 del	09/01/	′Ø3	SEGU
					•									SEGNATO	: CEI	PMD	VISTO:			DATA :	09 GEN	2003 SCA	LA : //		5

2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19				
				_																	
REFERE	NCE LEII	IERS FOR	2 DEVICES	5																	
	COME	TONENT TYPE																			
	( DI	IN 10719 2 1				COMPONE	NT FUNCTION					PEEE	RENCE A	r Ponss T	HE SHEET	rs					
	( )	111 407 13.12 7																			
A	complex dev	ices			A	stop or	auxiliary fu	unction				In order to easily find connections or components									
В	not electri	cal transduce	ers		B	movemen	t					drawn part on one sneet and part on others, near a connection end or near a component.									
С	capacitors				C	counter						near a connection end or near a component , are placed a couple of numbers enclosed in square brakets									
D	logic eleme	nts			D	differe	ntiation					are placed a couple of numbers enclosed in square brakets									
Ε	components	not in this :	list		E	start						that indicate wenre you can find the other part									
F	protections	(e.g. fuses)	)		F	protect	ion														
6	power suppl	les, convert	ters		6	test						[ ∠	4.8	]							
н v	signaling e	lements			H	indicat	10N					L									
	inductors	anu rerays			I K	inchino	dutu														
M	motors				L	conduct	or mark														
N	amplifiers	, electronic	requlators		M	main								colu	umn number (	1 to 9 )					
Ρ	measuring i	nstruments	-		N	measure															
Q	circuit bre	akers ,discor	nnect switche	s	P	proport	ional					I		shee	et number ( 1	to 999)					
R	resistors a	nd potentiom	eters		Q	status	sensor														
S	operating d	evices (e.g.	pushbuttons	)	R	reset															
Τ	transformer	S			S	recordi	ng					EXAMPL	E : sheet ni	<b>`.</b> 6							
U	electrical	transducers			T	timing	delay operati	ion				1		2		3					
V	rectifiers				V	speed															
W	cables				W	additio	n 						•								
X	terminals ,	connectors			····X	multipl	lcation						\KM132.1								
7		sors	.y. sutenuta vat	Ves)	1	dioital							132.3								
2		5515				argrear								[133.3]							
												The co	opection sh	wo ones to s	wheet 7 column	- 3					
Each co	mponent is de	signed with a	a number and									at she	et 7 we have	: :		15					
referen	ice letters .				Ιf	in the sam	e column of f	the same she	et there are												
The num	ber indicates	where			а	lot of comp	onents having	g the same r	reference let	ters,											
this co	mponent is pl	aced in this	way :		aı	number must	be placed at	t the right	end for disc	riminatior	n.										
		_												[1	132.2]						
K	M 132.	5				K M 1	32	. 5													
		T							4						132.3						
		└─── colu	ımn number ( 1	l to 9 )		K M 1	132	. 5 /	T					f	91						
			t number í 1	to 9991										Γ							
		51166	, e nomber ( I	,										L							
	L	comp	onent functio	חכ										F	12						
		comp	oonent type											КМ	133.3						
									M	ACCHINA	: FRIGUS	6 400M 40	90V, 50	/60 Hz			FOGLIC				
			<b>A_ T</b> _4		Lø																
				ia pa	Ν					LIENIE							_ SEGUE				
			Hoye	ər S.p.A.						RDINE	: .	DISEGNO N.:	1302036	b8 Rev.(	01 del (	89/01/0	3 5200C				

DISEGNATO: CEP MD VISTO:

SEGUE

б

DATA : 09 GEN 2003 SCALA : //

1	2	3	4	5	6	7	8	9	10		11 12	13	14	15	16	17	18	19
PAG	C	ESCR	IZION	١E					P	AG	C	)ESCR	IZION	ΙE				
1	INTEST	AZIONE								1	HEADER							
2	LEGEND	ιΑ								2	LEGEND							
3	SIMBOL	I ELETT	RICI							3	LIST OF E	LECRICA	L SYMBOI	LS				
4	SIMBOL	I ELETT	RICI							4	LIST OF E	LECRICA	L SYMBOI	LS				
5	NOTE P	ER LA L	ETTURA	DELLO	SCHEMA					5	NOTES TO	READ TH	E ELECT	RIC DIA	AGRAM			
6	INDICE	PAGINE								6	INDEX							
10	CIRCUI	TO DI PO	OTENZA						1	.0	POWER CIR	CUIT						
11	CIRCUI	TO DI PO	OTENZA						1	. 1	POWER CIR	CUIT						
12	ALIMEN	TAZIONE	AUSILI	ARI					1	.2	AUXILIARY	POWER S	SUPPLY					
13	CIRCUI	TO AUSI	LIARIO	220V AC	2				1	.3	220V AC A	UXILIAR'	Y CIRCUI	ΙT				
15	CIRCUI	TO AUSI	LIARIO	24V AC					1	.5	24V AC A	UXILIAR'	Y CIRCUI	ΙT				
16	INDICA	TORI DI	GITALI						1	.6	DIGITAL D	ISPLAY						
17	POMPA	E ALBER	0						1	.7	PUMP AND	DASHER						
18	COMPRE	SSORE							1	.8	COMPRESSO	R						
19	INSERI	MENTO A	RIA E C	COMANDO	CIP				1	.9	OVERRUN A	ND C.I.F	P. CONTF	ROL				
20	DISPOS	ITIVI D	I SICUF	REZZA					2	20	SAFETY DE	VICES						
25	MORSET	TIERA							2	25	TERMINAL	BOARD						
26	MORSET	TIERA							2	26	TERMINAL	BOARD						
27	SCHEMA	TOPOGRE	AFICO G	UADRO					2	27	CABINET L	AYOUT						
28	SCHEMA	TOPOGRE	AFICO F	PANNELLO	) COMANE	Ι			2	28	CONTROL F	ANEL LA'	YOUT					
29	DISTIN	ITA MATER	RIALE						2	29	COMPONENT	LIST						
30	DISTIN	ITA MATER	RIALE						3	30	COMPONENT	LIST						
											1							



MACCHINA :	FRIGUS	400M 400V,	50/60 Hz		FUGLIU
CLIENTE :					6
ORDINE :	٠	DISEGNO N.:13020	0368 Rev.01 d	el 09/01/03	SEGUE
DISEGNATO:	CEP MD	VISTO:	DATA : 09 GEN 2003	SCALA : //	10



ORDINE

: .

DISEGNATO: CEP MD VISTO:

Hoyer S.p.A.

11 DATA : 09 GEN 2003 SCALA : //



Hoyer S.p.A.

SEGUE DISEGNO N.:13020368 Rev.01 del 09/01/03 ORDINE : . 12 DISEGNATO: CEP MD VISTO: DATA : 09 GEN 2003 SCALA : //





13

FOGLIO

12

SEGUE



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MACCHINA · FRIGUS	400M 400U.	50/60 Hz	FOGLIO
	10011 10001	38,88 112	13
CLIENTE : .			
ORDINE : .	DISEGNO N.:13020	0368 Rev.01 del 09/01/03	SEGUE
DISEGNATO: CEP MD	VISTO:	DATA : 09 GEN 2003 SCALA : //	14



MACCHINA	:	FRIGUE	5 400M 400V,	50/60 HZ		
CLIENTE	:	•				14
ORDINE	:	٠	DISEGNO N.:13020	0368 Rev.01 d	el 09/01/03	SEGUE
DISEGNATO	:	CEP MD	VISTO:	DATA : 09 GEN 2003	SCALA : //	15









	MACCHINA : FRIGUS	6 400M 400V,	50/60 Hz	FOGLIO
🖍 Tetra Pak	CLIENTE : .	T		10
Hoyer S.p.A.	ORDINE : .	DISEGNO N.:13020	0368 Rev.01 del 09/01/03	SEGUE
	DISEGNATO: CEP MD	VISTO:	DATA : 09 GEN 2003 SCALA : //	





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	COLOREE MORSETTI	G/U GRIGIO	GRIGIO CDICIO	0/9	GRIGIO	GRIGIO	GRIGIO	GRIGIO	GRIGIO	GRIGIO CDICIO	GR1G10	GRIGIO	GRIGIO	GRIGIO GRIGIO	GRIGIO	GRIGIO	GRIGIO GRIGIO	GRIGIO	GRIGIO	GRIGIO GRIGIO	GRIGIO	GRIGIO	GRIGIO GRIGIO	GRIGIO	GRIGIO	GRIGIO GRIGIO	GRIGIO	GRIGIO	GRIGIU CDICIO	GRIGIO	GRIGIO	GRIGIO	GRIGIO	GRIGIO GRIGIO	GRIGIO	GRIGIO	6K161U			•		•		•				•	•			•
	SEZIONE MORSETTI	6	ہ و	16	16	16	2.5	2,5	2,5	2.5 2.5	2.5	2.5	2.5	c.7 ۲.0	2.5	2,5	د.۲ 2.5	2,5	2,5 7 E	د، ۲ 2, 5	2.5	2.5	2.5	2.5	2.5	د.2 م ر	2,5	2.5	۲,2 ٦	2,5	2,5	2,5	2.5 2.5	2.5	2.5	2.5	د.2			•		• •	•			 •		•	•		•	
$\stackrel{\times}{\sim}$	NUMERAZIONE MORSETTI	• -	~ ~	י ר	4	ഗശ	20	21	22	26	ی 1 1 و	53	54	מ מ מ	28	62	64	67	68	29.27	74	75	80	81	82	ρα	85	86	χ α	500	96	91	92	04	95	96	р Л															
	NUMERAZIONE CONDUTTORI	± U10.7	U10.7		U10.14	U10.14 1.110 1.1	wic:14 11.1	11.2	11.3	221	1	• • m	• ຕ (		) (M	16.2	16.1	15.1	15.2	10.1	16.7	10.9	12.2	17.3	17.11	17.12	17.13	18.4	18.5 18.5	18.7	18.8	19.2	19.2	19.3	19.3	20.1	ZU.3															
МРО	SIGLA UTILIZZATORE	M1 M1	M1 M1	M2	M2	M2 M2	R11.11	R11.11	R11.11	AH13.4	4.CIII	SF15.5	B15.17	61-C./IC 01-1 P12	AH13.4	AH16.3	AH10.3 AH16.3	H15.7	B15.17	AH10.8 AH16.8	AH16.8	S19.10	517.5	S17.5	S17.15	<u>دا.،اد</u> ۲۲۶	S17.15	518.9	518.9 518 a	518.9	YU18.14	YU19.4	519.4 c10 /	519.10	YU19.12	B20.5	HH13.4															
PARECCHIATURE IN CA	DESCRIZIONE	ALBERO	DASHER		COMPRESSORE FRIGORIFERO	REFRIGERATING COMPRESSOR			QUADRO COMANDO	CONTROL PANEL		PRESSOSTATO ARIA / AIR PRESSURE SWITCH	QUADRO COMANDO	DDESCOLTATO EDEAN / EDEAN DDESCUDE SU	PROTEZIONE ELETTRONICA		QUADRO COMANDO Control panel		PRESSOSTATO ARIA / AIR PRESSURE SWITCH	QUADRO COMANDO	CONTROL PANEL		VHLVULH 645 LALUU / HUI 645 VALVE			QUADRO COMANDO Control Panel					UALVOLA FREON / LIQUID FREON VALVE	INSERIMENTO ARIA / DVERRUN	QUADRO COMANDO	CONTROL PANEL	ARIA PER C.I.P. / AIR FOR C.I.P.	PRESSOSTATO ARIA / AIR PRESSURE SWITCH	QUADRO COMANDO / CONTROL PANEL															
ЧЧ	NOTE																																																			



массніма : FRIG	6 400M 400V, 50/60 Hz	FOGLIO
CLIENTE : .		25
ORDINE : .	DISEGNO N.:13020368 Rev.01 del 09/01/03	SEGUE
DISEGNATO: CEP M	VISTO: DATA : 09 GEN 2003 SCALA : //	26

1	2	З			4				5				6			7		8		9		1	10		11	1			12			13	3			14			15			16			17	7		1	8		1	9	
	COLOREE MORSETTI	GRIGIO GRIGIO	GRIGIO	GRIGIO	GRIGIO CDICIO	CDICIO	CDICIO CDICIO	CDICIO CDICIO	CDICIO	GRIGIO	GRIGIO	GRIGIO	GRIGIO	GRIGIO	GRIGIO	•					• •						•	•			•	•		•			•				•	•				•						•	•
	SEZIONE MORSETTI	2.5	2.5	2.5	2,5	ر، ر ۱	с, л л	C'7	с. л г	۲.2 ۲.5	2.5	2,5	2.5	2.5	2.5	•				•	• •						•				•	•		•						•	•	•										•	
$\times$	NUMERAZIONE MORSETTI	110	112	114	115	0 I. I.			ד דת	121	122	123	124	125	126																																						
	NUMERAZIONE CONDUTTORI			9	•		10.11	71.01		14.8	14.2	14,1	14.8 🕏	14.4	~																																						
																																											$\overline{\top}$					$\overline{\top}$					_
РО	SIGLA UTILIZZATOR	LAMPADE	YU16.12	YU18.14	YU19.4	YUI9.12	0.0110 0.0110	8.81HH	0.4.C 2.14.D	514.6	514.6	SF14.7	SF14.7	SF14.7	SF14.7																																						
JRE IN CAL	I 0 N E	CONTROL PANEL	/ HOT GAS VALUE	QUID FREON VALUE	(A / DUERRUN	AIR FOR C.I.P.	MANDO DANFI			ASHER LIMIT SWITCH	1													I																													
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MACCHINA · FRIG	IIS 400M 400V. 50/60 Hz	OGLIO
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	DISEGNO N .13020368 Rev 01 del 09/01/03	SEGUE
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		POS	ITEM	TYPE/DATA	DESCRIPTION
1 2		1	H15.3	WHITE LIGHT	POWER ON
$\bigotimes$ $\bigotimes$		2	H15.7	RED LIGHT	ALARM
		3	S17.5	GREEN LIGHT SELECTOR SW. 1-0-2 IMP.	MIX PUMP CONTROL STOP - START
<b>(</b> ∭ 3		4	R11.11	1KΩ 0.2W POTENTIOMETER	MIX PUMP SPEED REFERENCE
6 04		5	S17.15	GREEN LIGHT SELECTOR SW. 1-0-2 IMP.	DASHER CONTROL STOP - START
		6	AH16.3	DIGITAL DISPLAY	MIX PUMP SPEED
7 0 5		7	AH16.8	DIGITAL DISPLAY	HOT GAS AMMETER
		8	/	/	/
		9	S18.9	GREEN LIGHT SELECTOR SW. 1-0-2 IMP.	COMPRESSOR CONTROL STOP - START
و (		10	R16.9	4.7KΩ 0.2W POTENTIOMETER	REFRIGERATING CONTROL
		11	S19.4	GREEN LIGHT SELECTOR SW. 0-1	OVERRUN CONTROL*
<b>(</b> ) 12		12	S19.10	GREEN LIGHT SELECTOR SW. 0-1	C.I.P. CONTROL
_		13	SF15.5	RED MUSHROOM HEAD PUSHBUTTON	SAFETY STOP
0 13		14	/	DM63 0/4 bar 1/4" CP INOX	OVERRUN MANOMETER
		15	/	MANNESMANN	OVERRUN PRESSURE REG.
$\sum$		16	/	DM63 0/4 bar 1/4" R INOX	OUTLET PRODUCT STOPPER MANOMETER
14 (15)		17	/	MANNESMANN	OUTLET PRODUCT STOPPER PRESSURE REG.
$\sim$		18	/	/	FREON MANOMETER
16 ) (17)		19	•		
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18		21	•		
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A: Tetra Pak Hoyer S.p.A.

MACCHINA : FRIGUS	6 400M 400V,	50/60 Hz	FOGLIO
CLIENTE : .			28
ORDINE : .	DISEGNO N.:13020368 Rev.01 del 09/01/03		
DISEGNATO: CEP MD	VISTO:	DATA : 09 GEN 2003 SCALA : //	