1 Machine identification data

2 General information

3 Description of the machine and technical data

4 Installation

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6 Operating procedures

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HOYER FRIGUS 600

1 - MACHINE IDENTIFICATION DATA

Contents

1.1 Introduction 1-2
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1.1 Introduction

Thank you for choosing a machine manufactured by Tetra Pak Hoyer S.p.A.
We recommend that you read this manual carefully as it is indispensable for the installation, checking and maintenance operations required to keep your machine in perfect working order.

Il manuale contiene tavole, disegni e schemi che Vi permetteranno di familiarizzare con la macchina in tutti i suoi dettagli.
Vi preghiamo di segnalarci le Vostre osservazioni nel caso qualche spiegazione sia stata omessa o non sia esauriente. Ne terremo conto per migliorare il carattere funzionale di questo manuale.

1.2 Identification plate

For maintenance and overhaul operations not covered by this manual and for all technical problems, our Service Department will be happy to supply any information required and to agree the necessary course of action.
When calling our Service Department, please quote the data shown on the identification plate affixed to the machine and shown in Fig. 1.1.

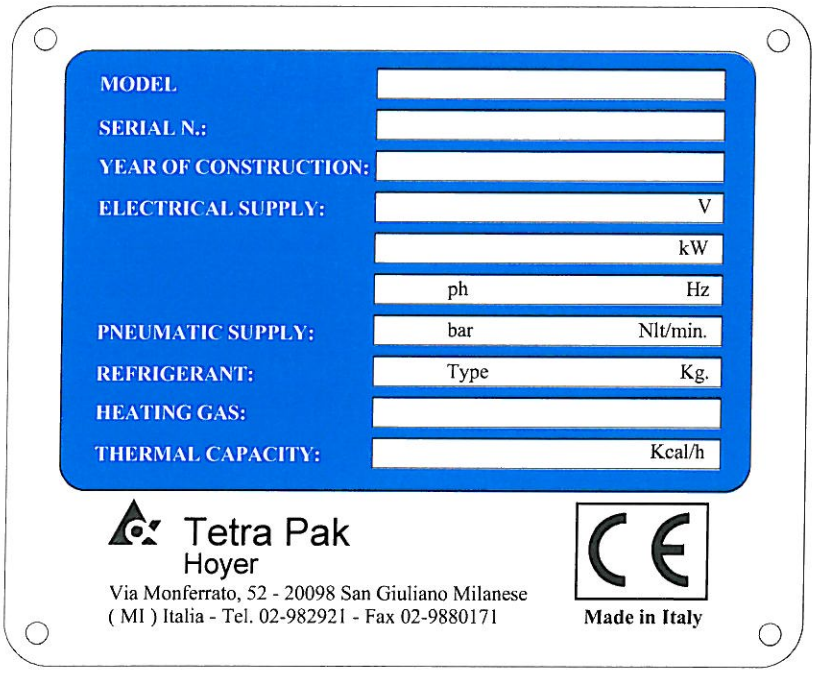

Fig. 1.1 - Identification plate

1.3 Service Centres

For any assistance you may require, please contact one of the following Tetra Pak Hoyer authorised service centres:

EUROPE and MIDDLE EAST:

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, 52
I - 20098 San Giuliano Milanese
(Milan)
Italy
Phone: + 39 2 98 29 21
Fax: + 39 2 98 80 171

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

NORTH AMERICA:

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

ASIA/PACIFIC:

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

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

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 600

2 - GENERAL INFORMATION

Contents

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2.2 Preliminary points 2-2
2.3 General safety rules 2-2
2.4 Special warnings 2-3
2.5 Ambient operating limits 2-3
2.6 Residual risks 2-3

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** machine is designed and manufactured in accordance with the provisions of Directive 98/37/CE (Machinery Directive) and with the above-mentioned standards.

2.2 Preliminary observations

- 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 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.**

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 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 Ambient operating limits

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

- Temperature : from 4°C to 40°C
- Humidity : from 20% to 95%.

☞ **NOTE:**

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

2.6 Residual risks

The Frigus maker is used for combining ice-cream 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 ice-cream.
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.
The top lid of the freezing cylinder is interfaced with a safety microswitch. The machine will stop if the lid is removed.
All the transmission parts, the kinematic motions and the refrigerating system are protected by fixed boards.
Dismantling side panels (anchored in place with screws) permits contact with moving parts.
This residual risk is referred to in section **3.5 Prohibition and hazard signs** and with a sign indicating **moving parts** positioned on the panels.
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.**

HOYER FRIGUS 600

3 - DESCRIPTION OF THE MACHINE AND TECHNICAL DATA

Contents

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3.1 Description of the machine

The machine mixes sanitised air into ice cream mix to obtain the desired overrun, cools and agitate the 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, and sends the product to the freezing cylinder.
- The sanitised air compressed capacity that is added to the mix is controlled by a "mass flow controller".
- 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.

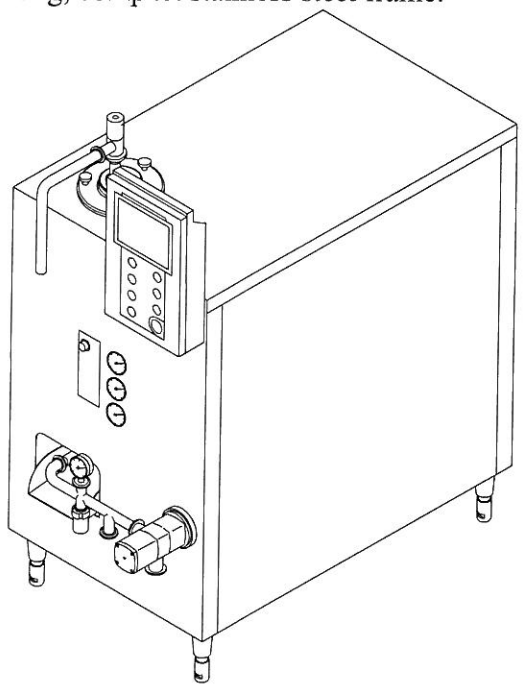


Fig. 3.1

3.1.1 Filter set (3.2)

The compressed air supply (the machine does not include an air compressor) passes through a micro-filter for removal of oil vapours (1),an active carbon filter (2) which eliminates odours and through the air dryer (3).
After the air filters, it goes through an "air booster" (4) that increases the pressure up to the values suitable to its injection after the pump.
Finally, the clean air and pressurised goes through a (sterilisable) Teflon (5) membrane filter with microscopic pores specifically intended to stop the passage of bacteria.
The sanitised air thus obtained is let into the mix through a check valve (6) with a flow rate controlled by "mass flow controller".
The desired value is set on the control panel of the PLC that controls the "mass flow controller".

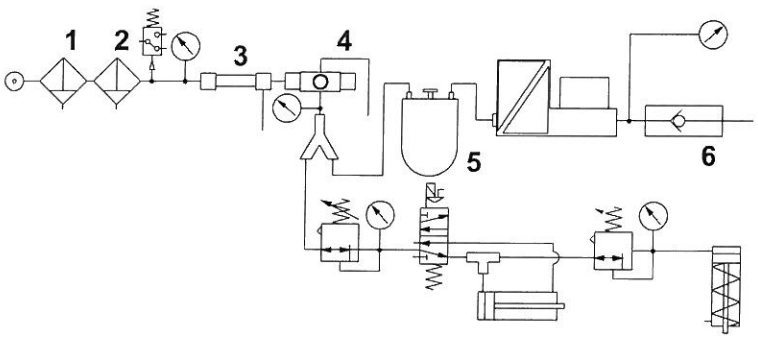


Fig. 3.2

3.1.2 Mix pump

The pump (1) receives the product from the maturing vats, doses the quantity set by the operator according to the required hourly output, and transfers it to the freezing cylinder.
The sanitising air is injected, by means of a check valve, to the pump downstream (2).
By adjusting the delivery 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 may also include a pneumatic by-pass (optional) for the CIP washing. It works properly at relatively high pressures, so that no extraction pump is needed coming off the machine.)

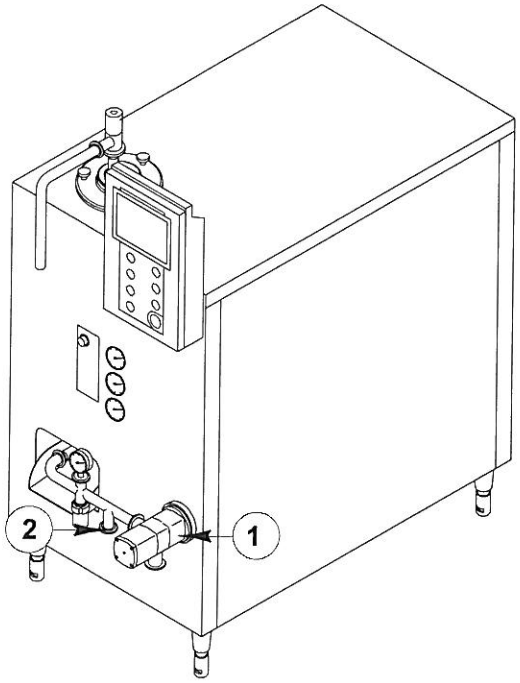


Fig. 3.3

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 fluid 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) (2).
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 (2), 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 scraper blades are in perfect condition and have been assembled correctly.

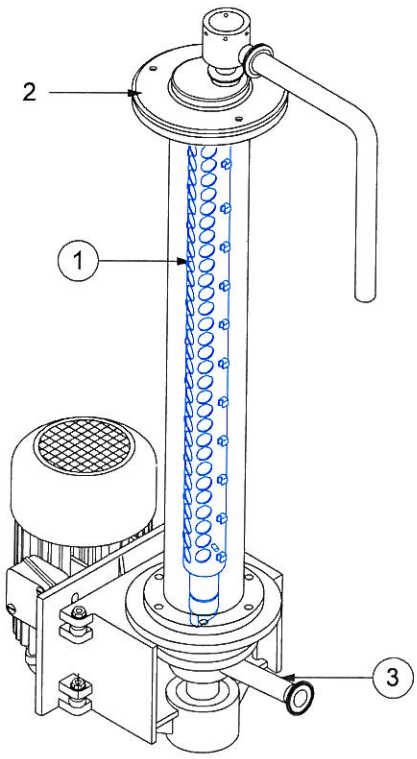


Fig. 3.4

3.1.4 Refrigerating plant

Composed of the freezing cylinder (evaporator), a Scroll Compliant rotary compressor, a high efficiency condenser, an economiser, a thermostatic valve and a number of minor accessories. All these components are designed specifically for operation at low temperatures using R404A coolant gas.
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 thermostatic valve and is vaporized in the freezer cylinder (transforming into gaseous state once more) before returning to the compressor and starting the cycle again.
Vaporization 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 coming from the cooling 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 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 Automatic cycle pushbutton

2 Pump start/stop pushbutton

3 Dasher start/stop pushbutton

4 Reset pushbutton

5 C.I.P. washing pushbutton

6 Overrun start pushbutton

7 Compressor start/stop pushbutton

8 Emergency stop pushbutton

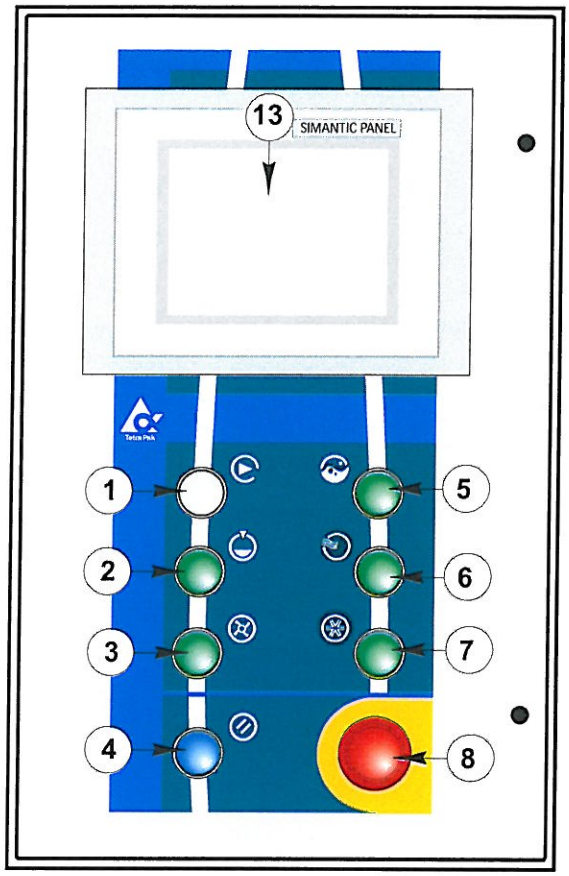
9 Ice cream outlet valve pressrue regulator

10 Outlet ice cream valve pressure gauge

11 Compressor suction pressure gauge

12 Ice cream pressure gauge

13 Touch screen



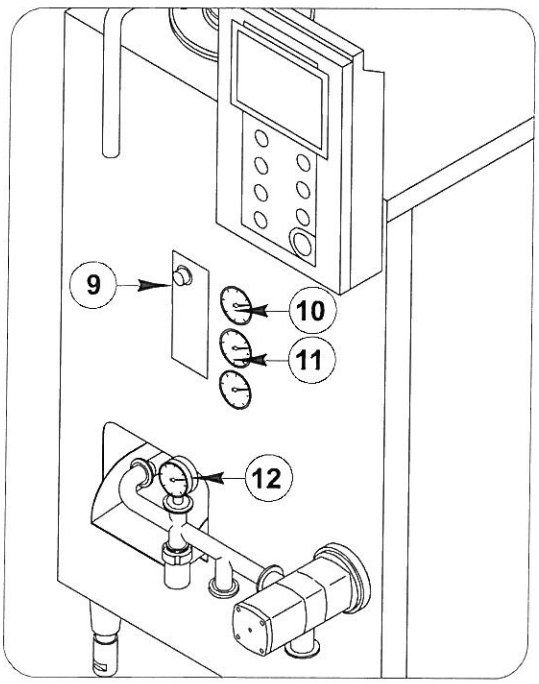


Fig. 3.5

3.2 Technical data

Dimensions and weights:
Dimensions

A = 1330 mm
B = 755 mm
C = 1665 ± 25 mm

Net weight: 525 Kg
Gross weight: 725 Kg
Volume (with packaging): 2.96 m^3
(1,60x0,95x1,95h metres)

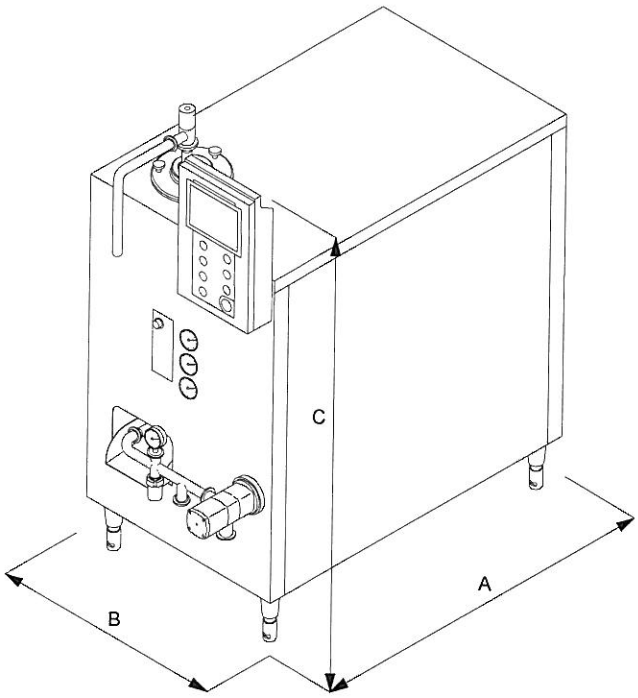


Fig. 3.6

Rated capacity in standard conditions:
from 200 to 600 litres/hour of ice cream at –5.5°C
Standard conditions:
Mix input temperature: + 4°C
Overrun: 100%
Neutral mix with 38% solids content

Electrical specifications:

Dasher motor:	5.5	kW
Pump motor:	0,75	kW
Refrigerator compressor:	9,5	kW
Auxiliaries:	0,85	kW
Total installed power:	16,6	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°C	600 l/h
b) mains water	+15°C	1300 l/h
c) tower water	+28°C	3600 l/h

Water inlet connector: 1" gas female
Water outlet connector: 1" gas female

Noise:
A-weighted equivalent sound pressure level at 1 metre:
Leq(A) = 70.5 dB(A)
Max. C-weighted instantaneous sound pressure level at working positions:
Less than 130 dB/20uPa
Max. non-weighted sound pressure level at working positions:
Less than 140 dB/20uPa

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

Number of operators: 1

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 thecorrect 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.

WARNING! When finished using machines 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.

WARNING :

Dismantling side panels (anchored in place with screws) permits contact with moving parts.
A **moving parts** sign must be positioned on the panels.

HOYER FRIGUS 600

4 - INSTALLATION

Contents

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4.2.4 Electrical connection 4-5
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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.

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.

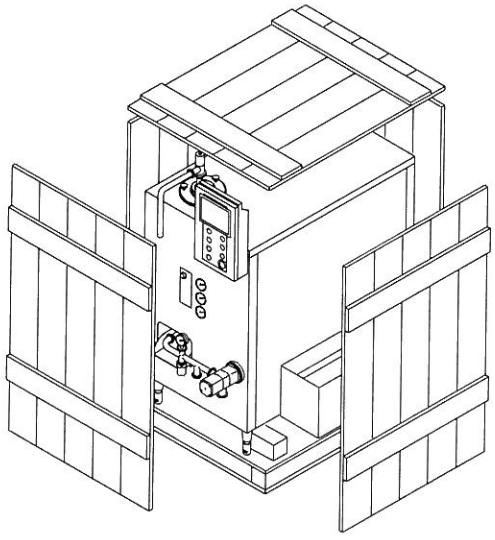

Fig. 4.1

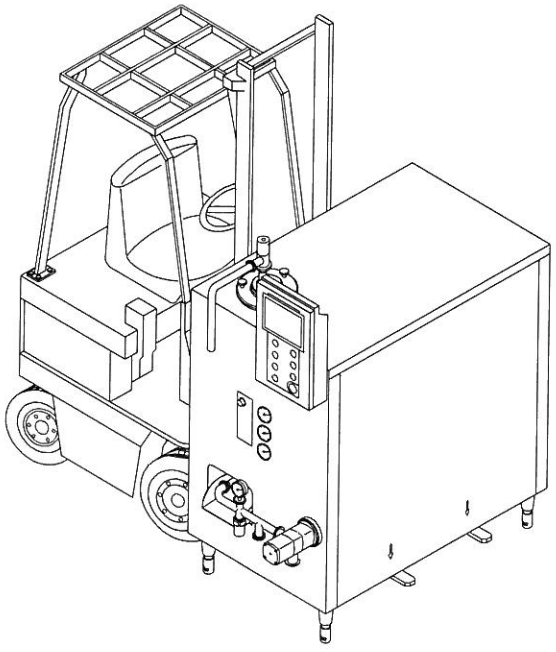

Fig. 4.2

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, and compressed air 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). If tower water (+28°C) is used for cooling, use inlet (7) and shut off inlet (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 ground and to the electrical power supply (6).

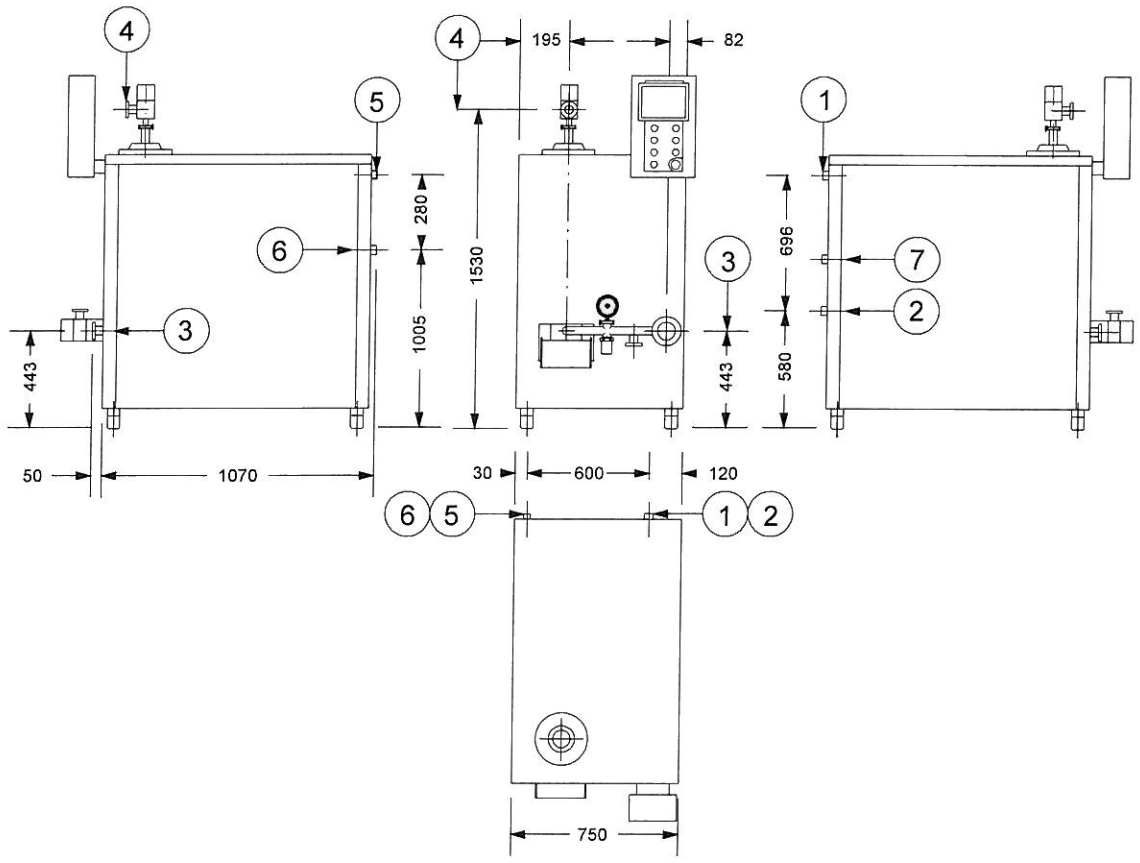

Fig. 4.3

4.2.1 Cooling water connection (tower water)

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 (1) and out through the connection at the top (2). 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). In any case, it is recommended that you install the filter to reduce soiling of the condenser.

See Chapter **CLEANING AND MAINTENANCE** .

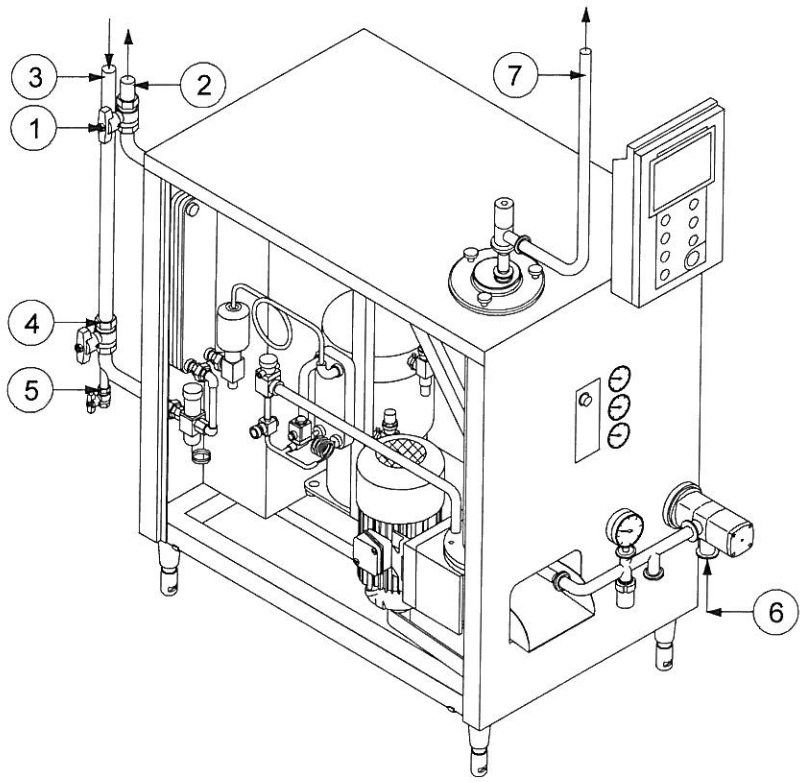

Fig. 4.4

4.2.2 Ice cream intake and outlet connection

Connect the mix supply pipe to the mix pump inlet connection (6) 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 (6), 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.

CAUTION:
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 (7) 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

CAUTION:
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 touch screen light 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). Make sure that the panel switches on.
In case of the alarm message: "phase seq. not correct", change the rotation direction. 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.

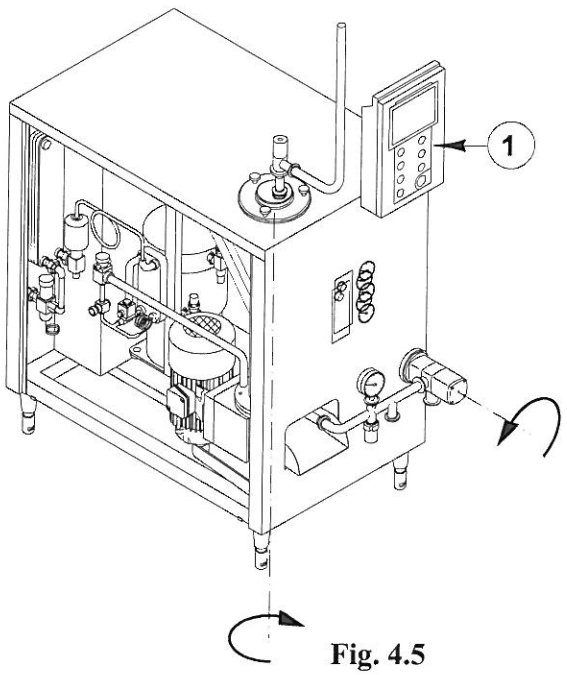

Fig. 4.5

HOYER FRIGUS 600

5 - OPERATOR PANEL

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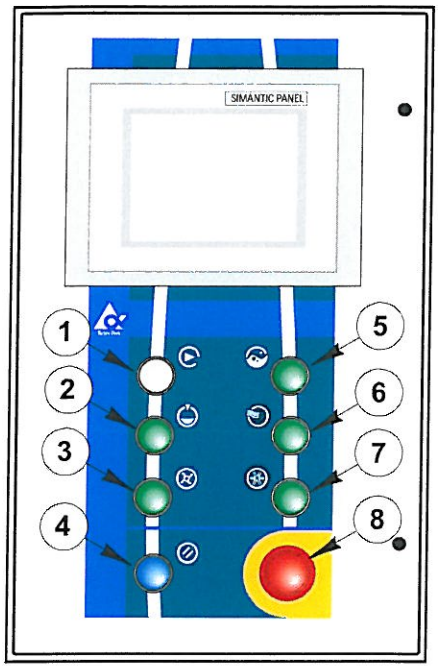
5.1 Pages and panel structure

The machine panel is of Touch-Screen type, that is to say, it is not necessary to have a keyboard at one's disposal to enable the controls, but it is enough to touch the screen in some pre-set points in order to carry on the desired operations.



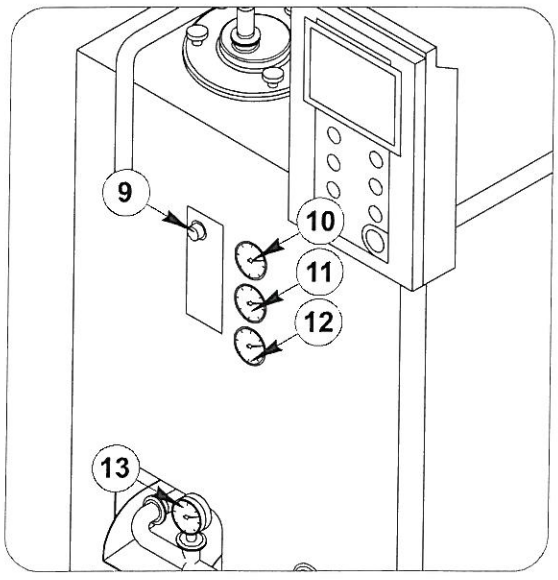


Fig. 5.1

Below the panel are the buttons having the following functions (Fig.5.2):

- Automatic cycle button (1)
- Pump start-stop button (2)
- Pump start-stop Dasher (3)
- Reset button (4)
- CIP sequence start button CIP (5)
- Overrun start button (6)
- Compressor start-stop button (7)
- Emergency stop button (8)
- Knob adjusting the ice-cream distribution valve pressure (9)
- Valve pressure manometer (10)
- Overrun air manometer (11)
- Compressor suction pressure manometer (12)
  Ice-cream pressure manometer (13)

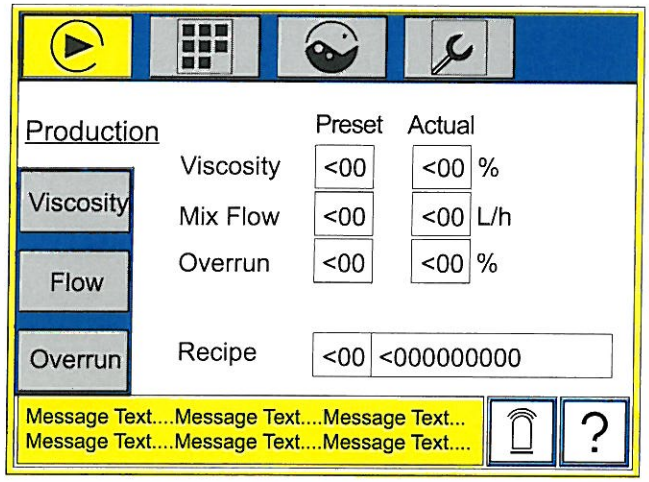
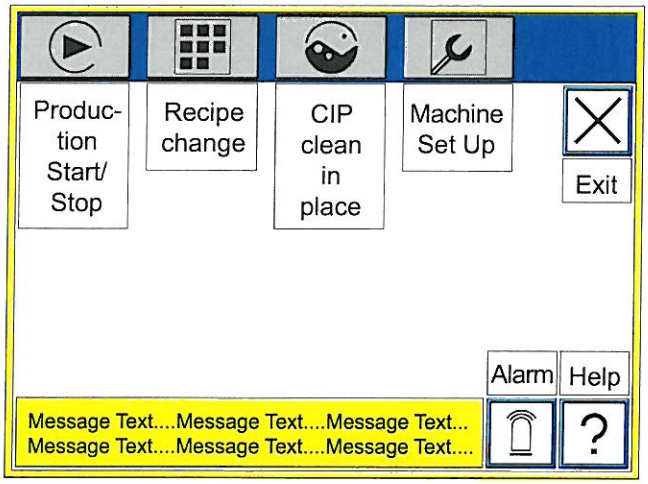


Fig. 5.2

In the middle of the video-page (Fig. 5.2), the contents of the page, the data and selections etc. are viewed. Generally, the sides of the page show the rectangular areas identifying the "touch-screen" keys.
Thanks to the graphics of the keys, it is possible to clearly understand the key functions.

Example of a key that, once it is pressed, opens the "viscosity" page.

5.1.1 Keys "Help" page



In the main pages, by pressing the key [?], it is possible to view the current page. This page views the helps on the key functions.

Page contents:

By pressing this key, you enter into the production menu page.

By pressing this key, you enter into the recipe setting menu pages.

By pressing this key, you enter into the washing cycle setting menu pages.

By pressing this key, you enter into the maintenance menu pages.

By pressing this key, you enter into the previous page.

By pressing this key, you enter into the alarm viewing pages.

By pressing this key, you enter into the key function help pages.

Functions of other general keys:

Prod — By pressing this key, you enter into the production data page.

Viscosity — By pressing this key, you enter into the product viscosity parameters setting page.

Flow — By pressing this key, you enter into the pump delivery parameters setting page.

Overrun — By pressing this key, you enter into the overrun air flow parameters setting page.

Maintain — By pressing this key, you enter into the maintenance page.

Screen — By pressing this key, you enter into the video image and the touch-screen touch sensitiveness setting page.

Clock — By pressing this key, you enter into the clock data setting page.

5.1.2 "Programming and control panel"page

General description
Hoyer Frigus is operated by means of a control panel. On the panel alarms and information are shown and parameters and programs (recipes) are changed.

Emergency stop function is placed below the panel.
The machine cannot run if the emergency stop is activated.

Touch panel

The panel is a standard touch panel of the type TP170A. The screen is used to observe the operating status of the machine or system being monitored and, at the same time, to intervene directly in the process running simply by touching the buttons and input files displayed.

Operating touch elements
Touch elements are contact-sensitive operating elements provided on the touch panel screen, such as buttons, input fields and message windows. Their operation is basically no different from pressing conventional keys.
Touch elements are operated by touching them lightly with your finger or a suitable object.

Note:
Never use pointed or sharp instruments to operate the touch panel to prevent damage to the plastic surface of the touch screen.

Attention:
Be sure to touch only one point of the touch panel screen element. Never touch more than one touch element at a time. Otherwise, an action may be unintentionally initiated.

Operation acknowledgement
As soon as the touch panel detects valid contact with a touch element, it responds by displaying a visual acknowledgement. An acknowledgement is independent of communication with the PLC. It is not an indication of the required action actually having been executed.

The type of visual acknowledgement is dependent on the operating element touched.

- Buttons
  In the case of 3D-effect configurations, visual representation is distinguished according to the statuses *touched* or *untouched*. Examples of representation are illustrated below by means of the status button.

Touched Untouched

- Input fields
  After an input field has been touched, the screen keyborad **illustrated on Fig. 5.3** appears as acknowledgment of the operation.

Enter numeric values

In order to enter numeric values, the touch panel automatically displays a numeric screen keeyboard, after touching an input field, for example. Keys on the keyboard which are available for operation are highlighted as 3D keys, those not available are simply displayed as areas. After completing the input, the screen keyboard is automatically hidden.

Below Fig. 5.3 illustrates an example of the screen keyboard for entering numeric values. The keys A to F for entering hexadecimal values are inoperable in this example. The HELP key is only displayed when help text has been configured for that particular input field.

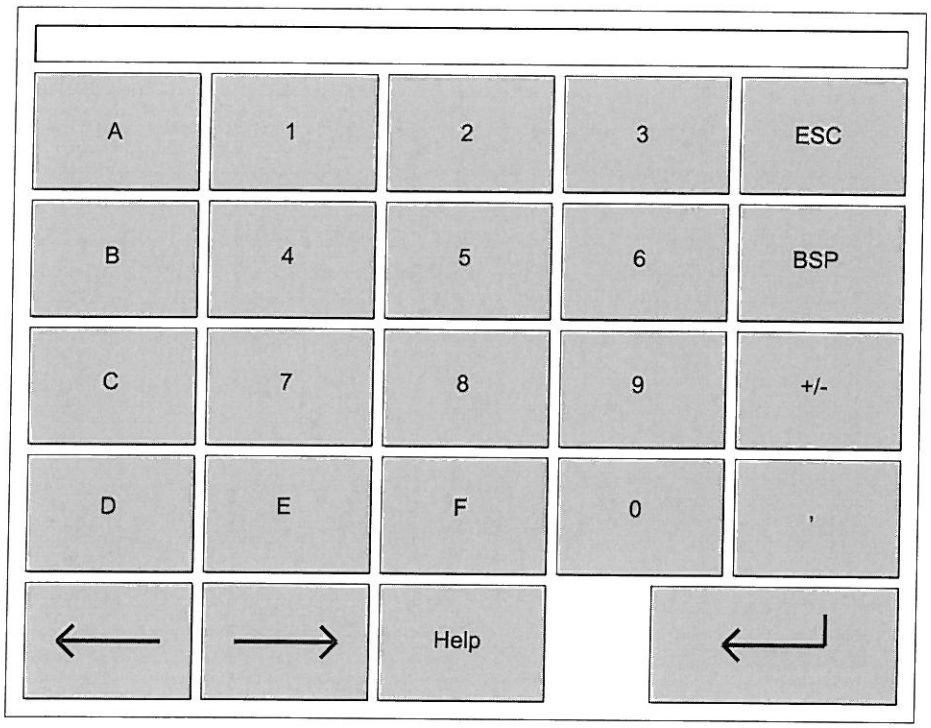


Fig. 5.3 Screen keyboard for numeric values

Meaning of buttons

BUTTON	FUNCTION	PURPOSE
0 .... ,	Enter character	Enter character via the keyboard in normal or Shift level
←	Move input position to the left	Move current input position one character to the left
→	Move input position to the right	Move current input position one character to the right
ESC	Cancel (Echap)	Discard input and close the screen keyboard
↵	Enter	Confirm input and close the screen keyboard
Help	Call in help text	Calls in the configured help text
BSP	Backspace	Deletes the character to the left of the current cursor position

Fig. 5.4

Procedure
Numeric values are entered character by character using the input keys on the screen keyboard. If a value already exists in the field, this is deleted on entering the first character.
After beginning entering a value, it is impossible to exit from the field without either confirming the entry or cancelling it.

Characters entered are aligned to the right.
On entering a new character, all those already entered are shifted one position to the left (pocket calculator format).

Invalid characters are rejected and an error message appears. On exceeding the maximum number of characters, the last chartacter entered is overwritten.
Confirm the values entered by pressing ENTER or cancel the input by pressing ESC.

The window is closed in both cases.

Limit value text
Limit values can be configured for numeric fields. In this case, values entered are only accepted when they lie within the limits configured. If an attempt is made to enter a value which is outside the configured limits, it is rejected and the original value automatically reinserted.

Enter alphanumeric values
In order to enter alphanumeric values, the touch panel automatically displays an alphanumeric screen keyboard after touching an input field. Keys on the keyboard which are available for operation are highlighted as 3D keys, those not available are simply displayed as areas. After completing the input, the keyboard is automatically hidden.

Below Fig. 5.5 illustrates an example of a normal screen keyboard to enter alphanumeric values. The HELP key is only displayed when help text has been configured for that particular input field.

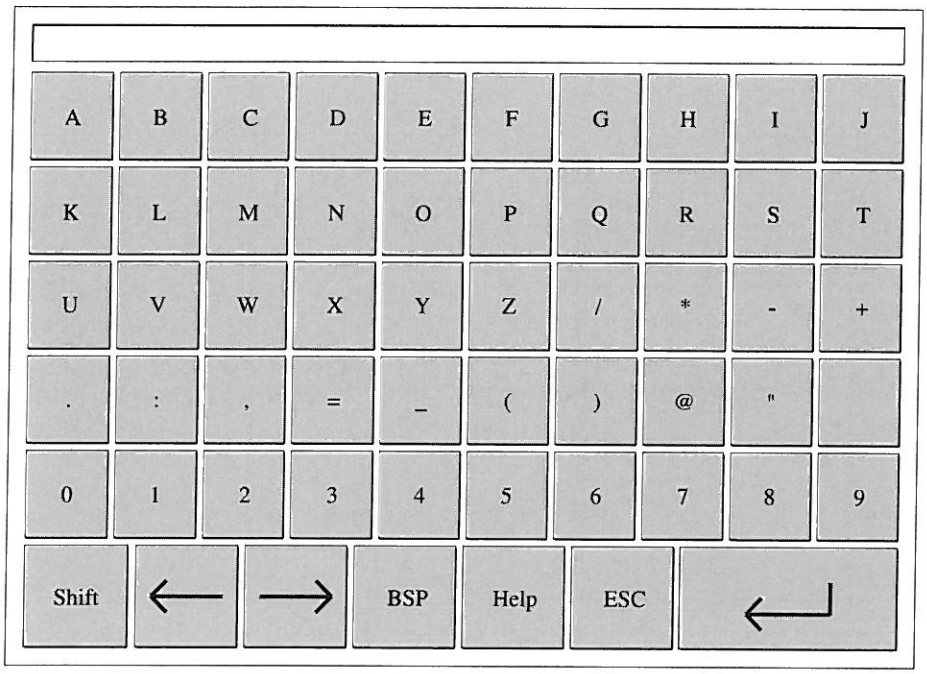


Fig. 5.5 Screen keyboard for alphanumeric values, normal level

Keyboard levels
The alphanumeric screen keyboard has two levels:

- Normal level (Fig. 5.5)
- Shift level (Fig. 5.6)

Toggle between the two levels by pressing the SHIFT key.

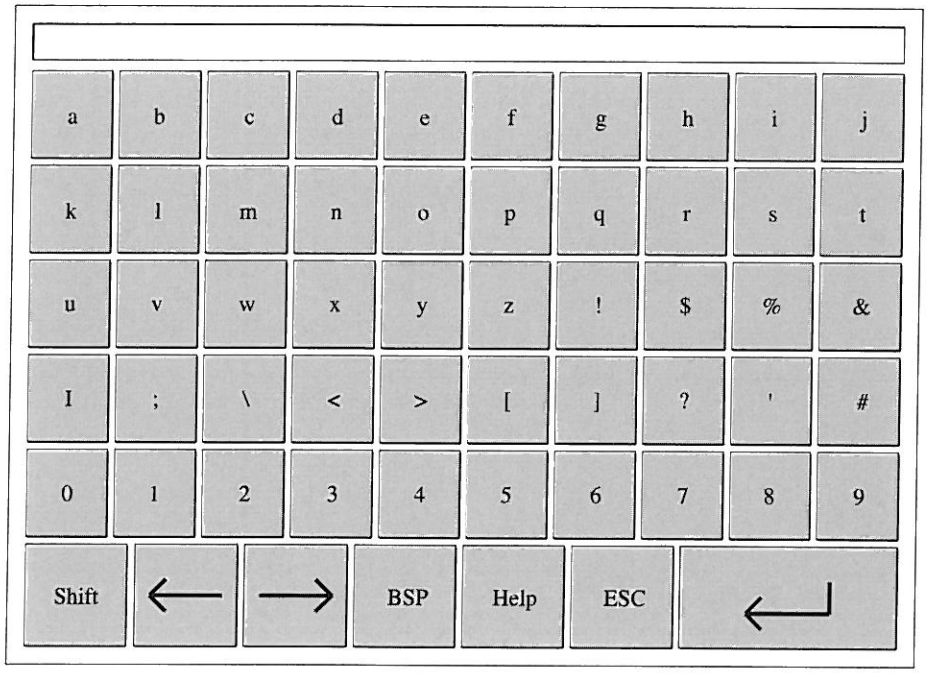


Fig. 5.6 Screen keyboard for alphanumeric values, shift level

Procedure

Characters entered are aligned to the left. Following each entry, the cursor skips to the right to the next entry position.

If an alphanumeric input field already contains a value, it is displayed in reversed colours and deleted as the new value is entered.
In order to edit an existing value, press one of the cursor keys as the first entry. On pressing CURSOR LEFT, the cursor remains on the first character, after pressing CURSOR RIGHT it skips to the second character. In this case, the value reverts back to its normal representation and can be edited.

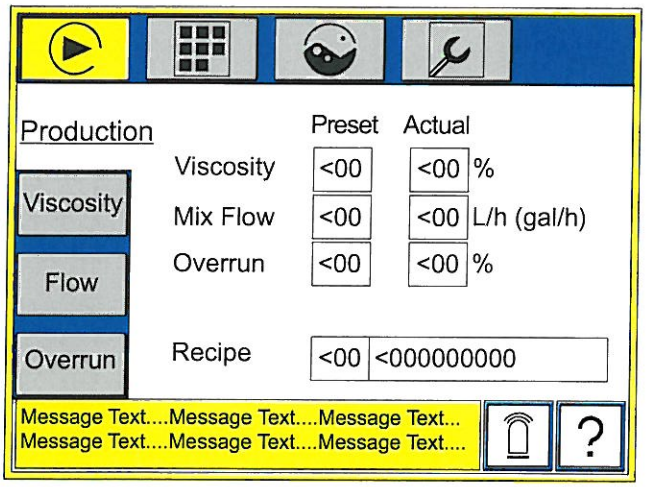
On exceeding the maximum number of characters, the last character entered is overwritten.

Confirm the value entered by pressing ENTER or cancel the input by pressing ESC.
The window is closed in both cases.

The current input position is displayed in inverse colours. Invalid characters (e.g. values higher 23 when specifying the time for a clock) are rejected and an error message appears. On exceeding the maximum number of characters which can be entered, the last character entered is overwritten.

5.2 Main pages

5.2.1 "Production" page



Press  to go to the production page.

The "Production" page is the page that appears when starting the machine; through this page, you enter into all the other pages.

Page contents:

Viscosity: product viscosity, set value and actual value

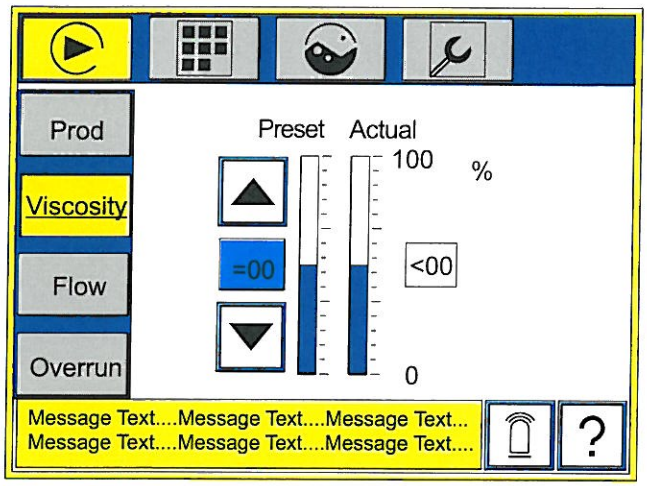
Mix Flow: Set and real ice-cream mixture flow (in litres/hour) or gallons/ hour depending on the units of measurement set.

Overrun: Set and actual overrun air flow as % of mix flow.

Recipe: denomination and number of thecurrent recipe.

Message Text:: alarm messages.

5.2.2 "Viscosity" page



In the main page, by pressing the key and the Viscosity key, you enter into the current page.Through the current page it is possible to view the setting data of the product viscosity, expressed in percentage referred to the maximum current absorbed by the motor. The minimum value that is possible to set is 30%, while the maximum value that is possible to set is 100% of the maximum absorption of the dasher motor.

Page contents:

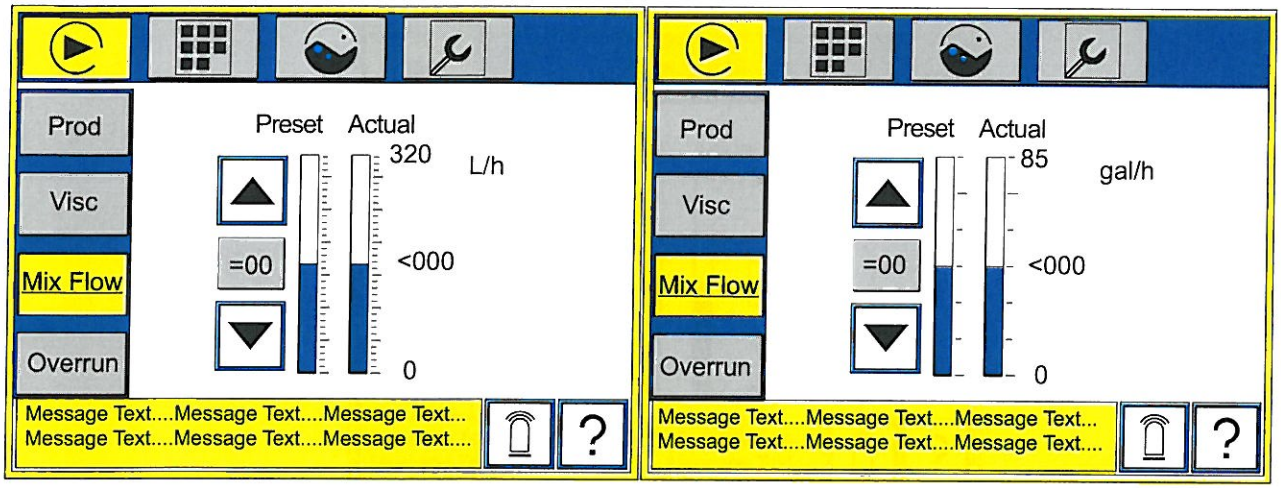
Preset: set value
Actual: current value

By pressing this key, you increase the set value.

=00 By pressing this key, you enter into the alphanumeric table to enter the desired value.

By pressing this key, you reduce the set value.

5.2.3 "Mix Flow liquid delivery setting" page



In the main pages, by pressing the key and the Flow key, you enter into the current page. Through the current page it is possible to view the mixture flow setting data (litres or gallons/ hour).

Page contents:

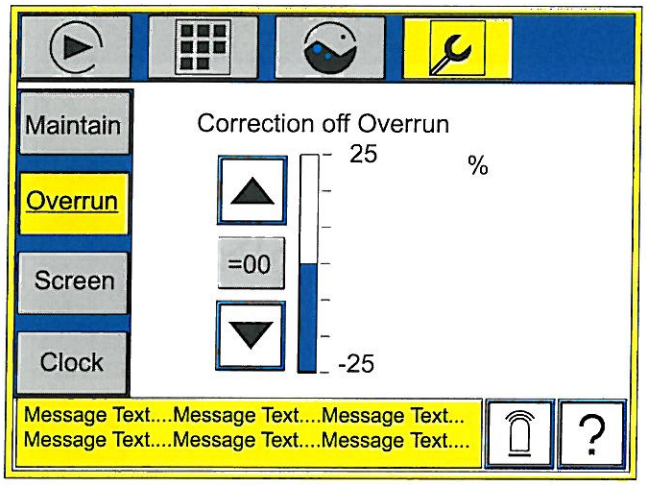
Preset: set value
Actual: current value

By pressing this key, you increase the flow value.

=00 By pressing this key, you enter into the numeric table to enter the desired value.

By pressing this key, you reduce the flow value.

5.2.5 "Overrun correction" page



In the main page, by pressing the key and the Overrun key, you enter into the current page. If the overrun value obtained is different from the set value, it is necessary to carry on a correction of the overrun value, available in this page.

Page contents:

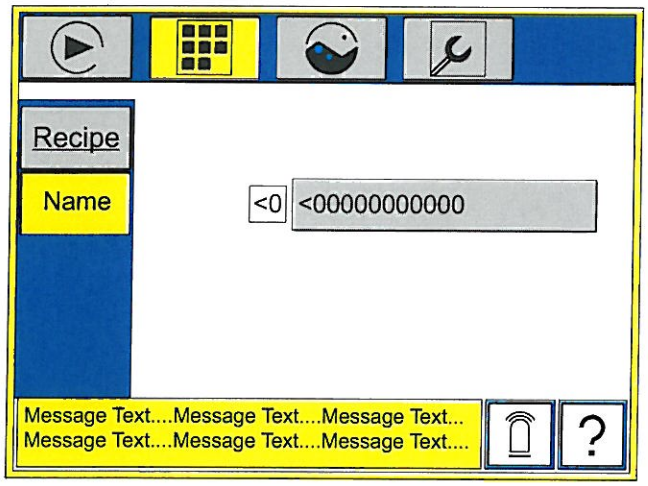
Correction off overrun: set correction value

By pressing this key, you increase the set value.

=00 By pressing this key, you enter into the alphanumeric table to enter the desired value.

By pressing this key, you reduce the set value.

5.2.7 "Recipe name" page



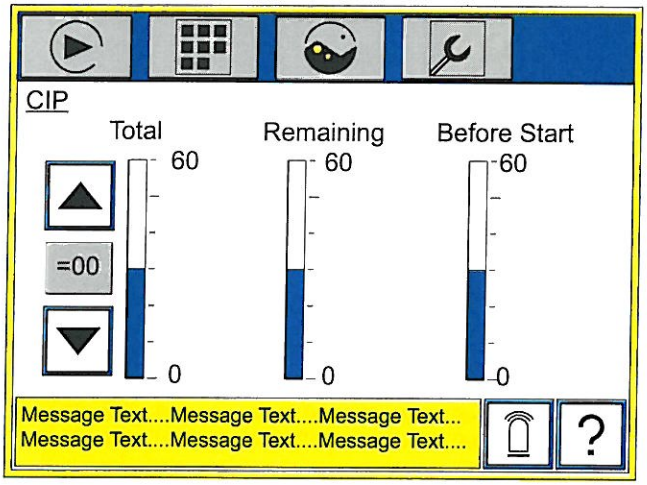
In the main pages, by pressing the key and the Name key, you enter into the current page. Through the current page it is possible to go to recipe name change.

Page contents:

Name: denomination of the current recipe.

Recipe By pressing this key, it is possible to display the "Recipe" page.

5.2.8 "C.I.P" page



In the main pages, by pressing the key, you enter into the current page. This page provides access to information on washing cycle settings.

Page contents:

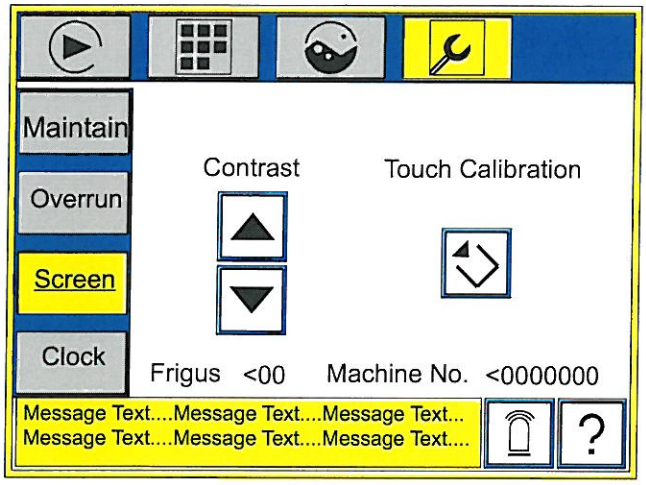
Total: washing cycle time in minutes
Remaining: remaining time to end cycle (min)
Before start: time prior to pump and dasher start-up in seconds

Press this key to increase cycle time.

=00 Press this key to enter cycle time.

Press this key to reduce cycle time.

5.2.10 "Screen" page



In the main page, by pressing the key and the Screen key, you enter into the current page. The "Screen" page is the page that allows to adjust contrast and touch sensitiveness on the touch screen.

Page contents:

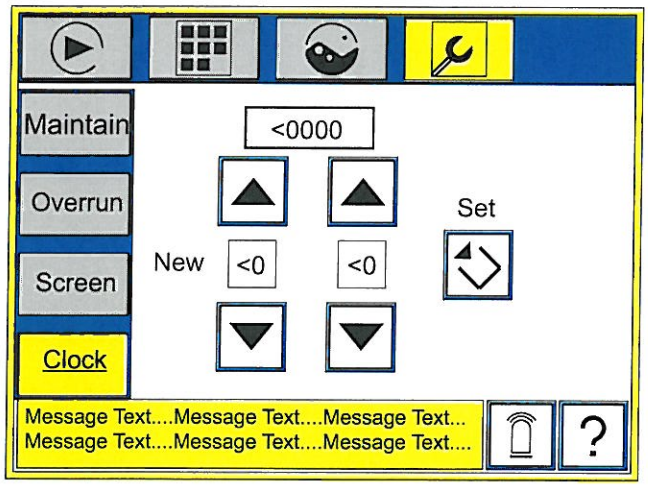
Frigus: name of the machine in use
Machine no.: machine number

Contrast: By pressing this key, you increase the contrast of the video image.

Contrast: By pressing this key, you decrease the contrast of the video image.

Touch calibration: By pressing this key, you adjust the touch sensitiveness on the touch screen.

5.211 "Clock" page



In the main page, by pressing the key and the clock key, you enter into the current page. Through the current page it is possible to set the clock data.

Page contents:

0000: set hour and minutes.

By pressing this key, you increase the value by a point.

By pressing this key, you decrease the value by a point.

By pressing this key, you confirm the values selected.

5.2.12 "Alarm" page

In the main page, by pressing the key, you enter into the current page. Through the current page it is possible to view the alarm messages.

Page contents:

Message text: hour and identification number of the alarm message and text message.

Remove the cause of the alarm and press the reset button; restart the production.

5.2.13 List of alarms, causes, solutions

Alarm	Cause/Solution
- *Mix pump overheat*	Mix pump overheat: check the pump working.
- *Mix pump VLT fault*	Mix pump VLT fault: mixture pump start fault.
- *Pumps overload*	Pumps overload: check the pump working.
- *Emergency stop*	Emergency stop: the machine is in alarm condition. Find the cause, solve the problem and restart the production cycle.
- *Emergency stop activated*	Emergency stop actvated: find the cause and restart the production.
- *Dasher cover open*	The cylinder cover is open or not properly closed: close it properly.
- *Phase seq not correct*	Phase seq not correct: invert two power supply phases.
- *Main motor overheat*	Main motor overheat: check the motor working.
- *Main motor overload*	Main motor overload: check the temperature relay.
- *Compressor overheat*	Compressor overheat: check the compressor working.
- *Compressor overload*	Compressor overload: check the temperature relay.
- *Compressor pressure failure*	Compressor pressure failure: check the compressor working.
- *Impending overload*	Impending overload: check the viscosity.
- *Max viscosity*	Max viscosity: the maximum viscosity has been reached; decrease the viscosity parameters in the panel.
- *Irregular overrun*	The viscosity reading recovers 15% of the set point value. Check the set point and the functioning of the hot gas valve.
- *Failing overrun*	Failing overrun: check the air controller working and the set data.
- *Air pressure fault*	Air pressure fault: check the working and the compressed air supply connection.
- *Maintenance warning*	Scheduled maintenance operations are necessary; carry on the operations required and restart the production cycle.
- *PLC memory lost*	PLC memory lost: contact the Technical Service.
- *PLC restarted*	PLC restarted: wait for the data loading end.
- *Set up fault*	Set up fault: check the data and reset the loading.

HOYER FRIGUS 600

6 - OPERATING PROCEDURES

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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 (5) 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 (4) 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 (1) pipes are fitted correctly.

h. Check that the all panels are assembled and fitted.

i. Check that the machine has been sterilised.

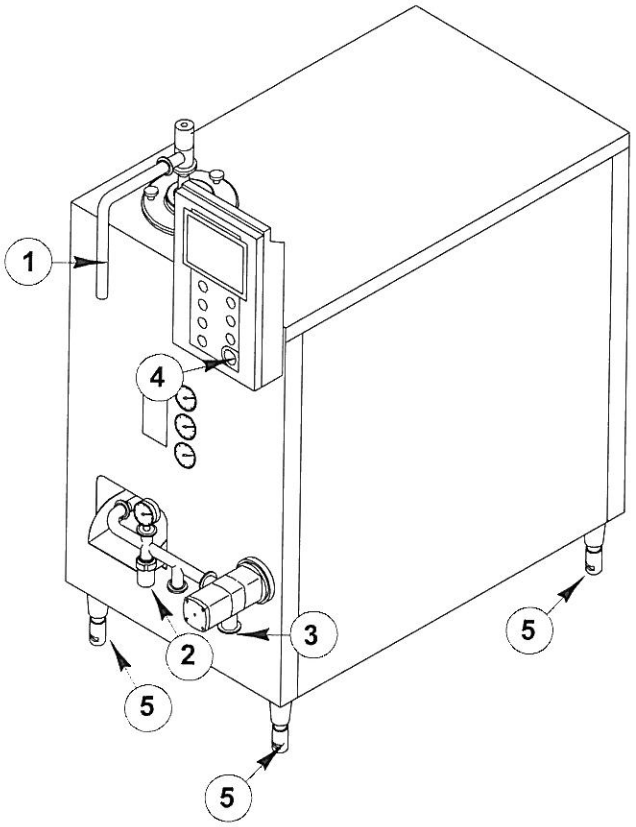


Fig. 6.1

WARNING:

It is dangerous to operate the machine with the closing panels dismantled.

6.2 Start of production

6.2.1 Automatic start

a. Connect the pump with the container containing the mixture.

b. If the recipe has already been saved with the desired parameters, open the "Recipe" page and choose the desired recipe (see **paragraph 5.2.2**), if not, set the overrun flow and viscosity parameters.

c. Start the automatic cycle by pressing the button (1) (the button starts blinking). The pump will start up at 2/3 max. speed.

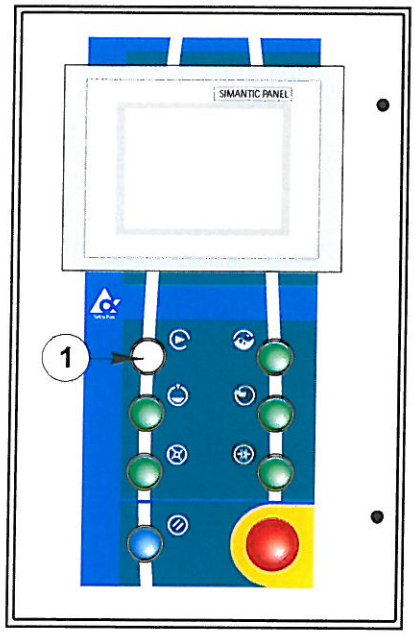
d. Wait for the mixture to go out of the freezer exiting pipe.

e. By pressing the button again (1), the pump speed is automatically reduced to the minimum and the following devices are operated one after the other:
- the dasher;
- the refrigerator compressor;
- the overrun (to the prefixed value).

f. Adjust the ice-cream pressure inside the cylinder by means of the regulator (2) that operates the pneumatic valve positioned above the cylinder.
Make sure that the manometer (3) shows an ice-cream pressure between 4 and 8 inside the freezer cylinder.

A pressure higher than 10 bar is to be considered as too high and must be reduced. Therefore:
- check the correct adjustment of the regulator (2);
- make sure that the ice-cream exiting pipe is not throttled and that its length is not higher than 3 meters;

If the excessive pressure should be caused by a too low production, it could be necessary to increase the pump speed by means of the "Mix flow" page.



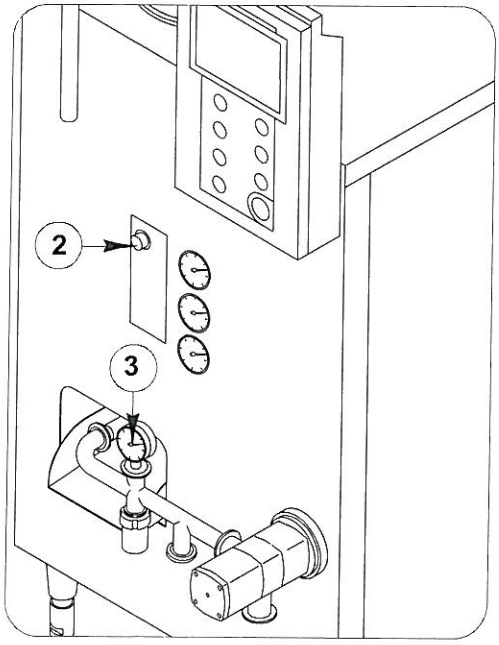


Fig. 6.2

g. The ice-cream hardness degree is viewed in the "Production" page (see **paragraph 5.2.1**).

h. When the real viscosity of the ice-cream approaches the value set, the freezer gradually reaches the productivity set.

6.2.2 Manual start

a. Connect the pump with the container containing the mixture.

b. Start the pump by pressing the button *(Pos. 4, Fig.6.3)*.

c. Wait for the mixture to go out of the freezer exiting pipe.

d. Reduce the pump capacity to the minimum by using the touch screen.

e. Start the dasher by pressing the button *(Pos. 6, Fig. 6.3)*.

f. Start the refrigerator compressor by pressing the button *(Pos.3, Fig. 6.3)*.

g. Operate the overrun by pressing the button *(Pos. 5, Fig. 6.3)* and set the desired value by using the touch screen.

h. When the ice-cream reaches the correct consistency, increase the pump capacity up to the desired value by using the touch screen.

i. Adjust the ice-cream pressure inside the cylinder by means of the regulator (*Pos. 7, Fig. 6.3)* that operates the pneumatic valve positioned above the cylinder.
Make sure that the manometer *(Pos. 3, Fig. 6.2)* shows an ice-cream pressure between 4 and 8 inside the freezer cylinder.

A pressure higher than 10 bar is to be considered as too high and must be reduced. Therefore:

- check the correct adjustment of the regulator *(Pos. 3, Fig. 6.3)* with the manometer *(Pos. 3, Fig. 6.2)*;
- make sure that the ice-cream exiting pipe is not throttled and that its length is not higher than 3 meters;

If the excessive pressure should be caused by a too low production, it could be necessary to increase the pump speed by means of the "Mix flow" page.

6.3 Production changeover

If production of different flavours of ice cream is organized 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.

6.3.1 Automatic stop

a. By pressing the button (1) the following devices are disactivated one after the other:
- the refrigerator compressor;
- the overrun;
- the pump;
- the dasher (after the prefixed time).

b. Disconnect the supply to the freezer (2) 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.

6.3.2 Manual stop

a. Stop the refrigerator comrpessor using the button (3).

b. Stop the pump by pressing the button (4).

c. Stop the overrun by pressing the button (5).

d. Stop the dasher by pressing the button (6).

e. Disconnect the supply to the freezer (2) 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.

6.3.3 Production restart

a. To start production again in automatic mode, **see paragraph 6.2.1 Automatic start.**

b. To start again the production in manual mode, proceed as follows:
Turn on the refrigerator compressor by pressing the button (3);
- Turn on the pump by pressing the button (4);
- Turn on the overrun by pressing the button (5).

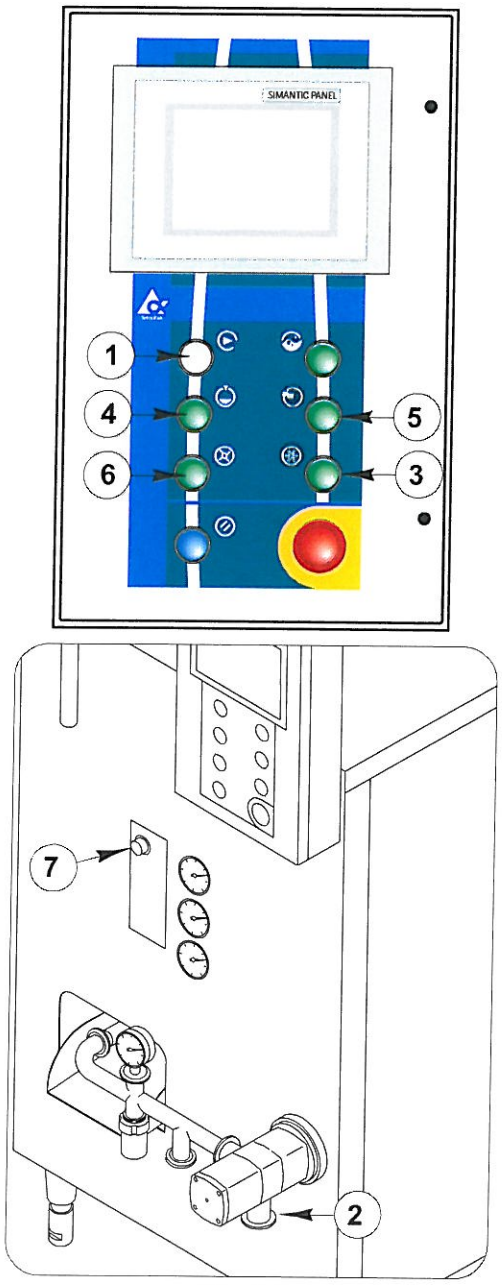


Fig. 6.3

6.4 End of production

6.4.1 Automatic sequence

a. Turn off the machine pressing the button (1). **See chapter 6.3.1 Automatic stop**
b. Slowly release ice cream pressure until the pressure gauge (2) indicates zero using the regulator (3).
c. Connect up the pump intake and ice cream outlet to the CIP washing pipes.
d. Start up the CIP washing cycle by turning on the CIP washing pumps (not included in the supply of Frigus 600) and turn on the freezer CIP cycle using the switch (4).

6.4.2 Manual sequence

a. Switch off the compressor by pressing the button (7)
b. Switch off the pump by pressing the button (5)
c. Switch off the dasher by pressing the button (6)

Repeat points b-c-d of the automatic sequence.
When finished washing, disconnect the freezer from the compressed air supply and cooling water supply.

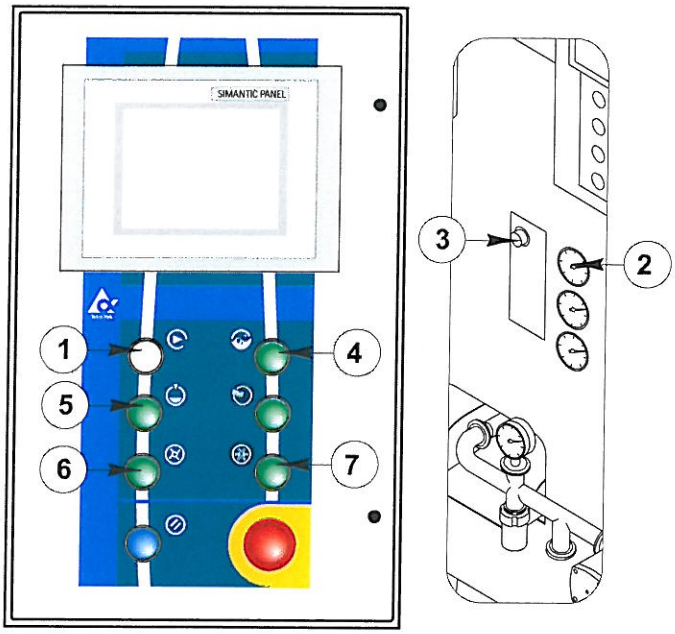


Fig. 6.4

6.5 Washing

WARNING:

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.

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

- Prewash with warm 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 or by a cleaning with not appropriate concentrations.

6.5.1 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.
   he correct speed of the flow for a good CIP washing is about 1,5 m/s in the frigus exiting pipe. This involves a capacity of 5000 l/h for a 1 1/2" exiting pipe. In these conditions, the pressure drop is about 2 bar. The CIP washing pump must guarantee these flow rate and pressure characteristics.

3. Connect the pump outlet to the mix inlet hose (1) and the freezer outlet hose (2) to the container.

4. Start the CIP wash cycle (see par. **5.2.4** and **6.4**).
   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 and pump work 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.

5. Start up the wash tank pump. The wash cycle will be carried out as follows:

a- Prewash with warm 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.

6. At the end of the washing programme, stop the tank pump and disconnect hoses for connection with freezer. Wait until all water has flowed out.

7. After the washing programme, fill the machine with disinfectant solution.
   Connect the freezer mix inlet (3) to a container filled with disinfectant solution; start up the freezer pump and wait until solution flows out of the ice cream outlet pipe (4), then stop the pump. Drain the solution and rinse with clean water before starting production again.

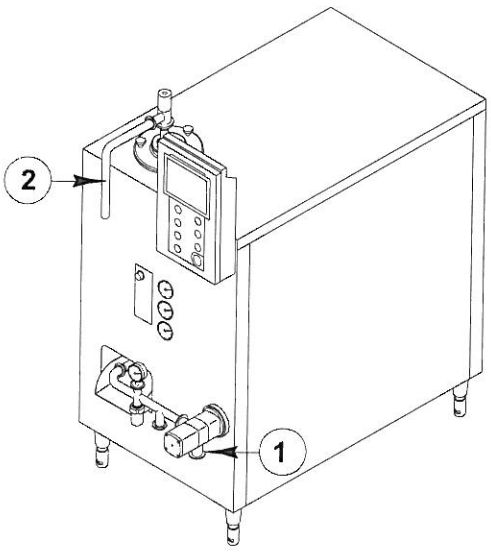


Fig. 6.5

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

6.5.2 Manual washing

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. Turn off the machine in automatic mode (see paragraph **6.3.1 Automatic stop**).

b. Disconnect the mix supply from the vat and supply the freezer pump with warm water, no hotter than 60 to 65°C.

c. Start up the pump using the switch *(Pos. 5 - Fig. 6.4)*.

d. Start up the dasher using the switch *(Pos.6 - Fig. 6.4)*.

e. Let hot water flow through the machine until the water flowing out of it is fairly clean. Keep washing as short as possible to prevent damage to the pump.

f. Stop the dasher and the pump by pushing the switches *(Pos. 6 Fig. 6.4)* and *(Pos.5 - Fig.6.4)*.

g. Open the safety valve (1) to drain the water contained inside the machine *(Fig. 6.6)*.

h. Remove the cover (2) by unscrewing the knobs holding it in place.

i. Disconnect the pipes and the valve (5) on top of the cover.

l. Remove the dasher (3) using the tool provided, and dismantle the blades (6). Wear strong non-slip gloves to protect against cuts from the blades.

m. Dismantle the cylinder bottom (4).

n. Wash all components thoroughly, immersing them in a solution containing the recommended percentage of an appropriate detergent.

o. Rinse well in running water.

p. 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 (7). 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.

q. Sanitise the freezer by pumping a sterilising solution. Rinse and then drain the solution.

r. Before beginning production, it is recommended that rinse water be pumped through the system for 2 to 3 minutes. Drain the water by opening the safety valve (1).

s. Reposition the safety valve.

The freezer is now ready for use again.

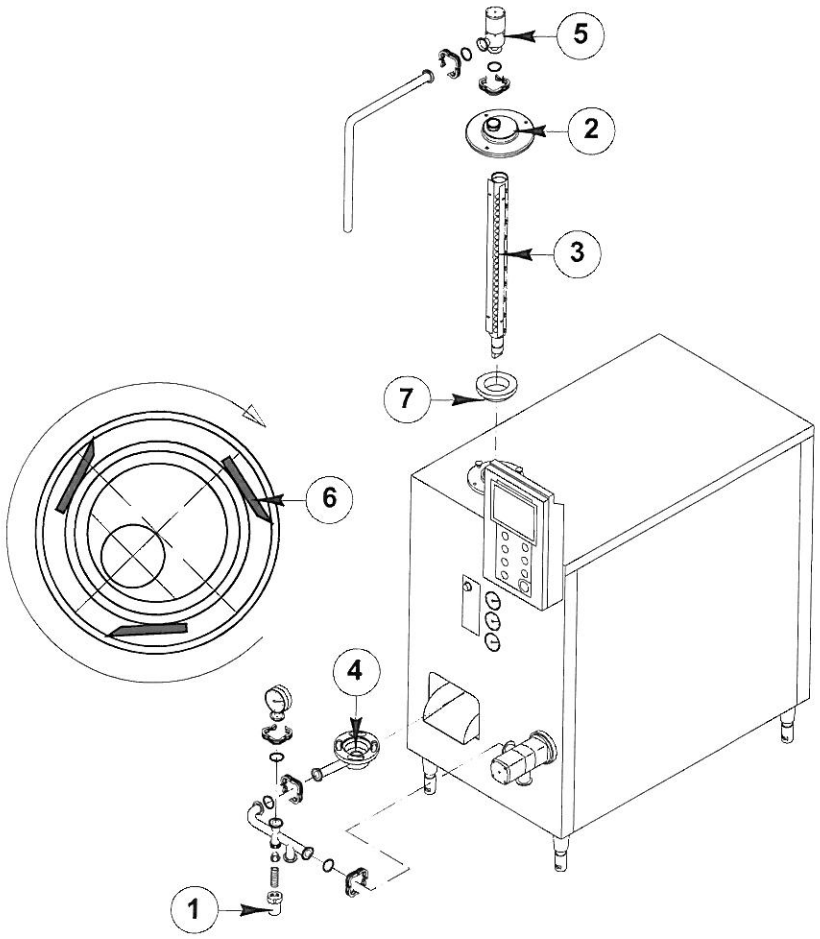


Fig. 6.6

6.5.3 Washing the outside of the machine

Proceed as follows to wash the outside of the machine:

a- Prewash with hot water (50°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.

CAUTION

Do not use high pressure jets of water.

Recommended products:

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

HOYER FRIGUS 400

7 - CLEANING AND MAINTENANCE

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7.1 Maintenance

7.1.1 Mechanical maintenance

- **Transmission belt (Fig. 7.2)**
  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 (1) assembled on the lower end of the dasher and coupled to the bush (2) fastened to the bottom by the ring nut (3).
  The rotating seal has a housing made of hard metal which, under pressure from the spring (5), rotates against the face of the bush (2).
  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 (6) 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 support (16) and the eccentric (13) from the dasher (18) and check the condition of the bushings (17). Lubricate the bushings before reassembling the dasher.

- **Scraper blades (Fig. 7.3)**
  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.

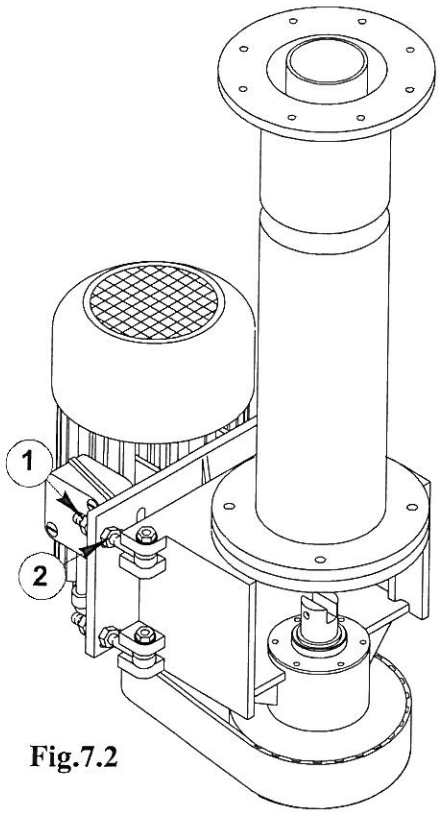


Fig.7.2

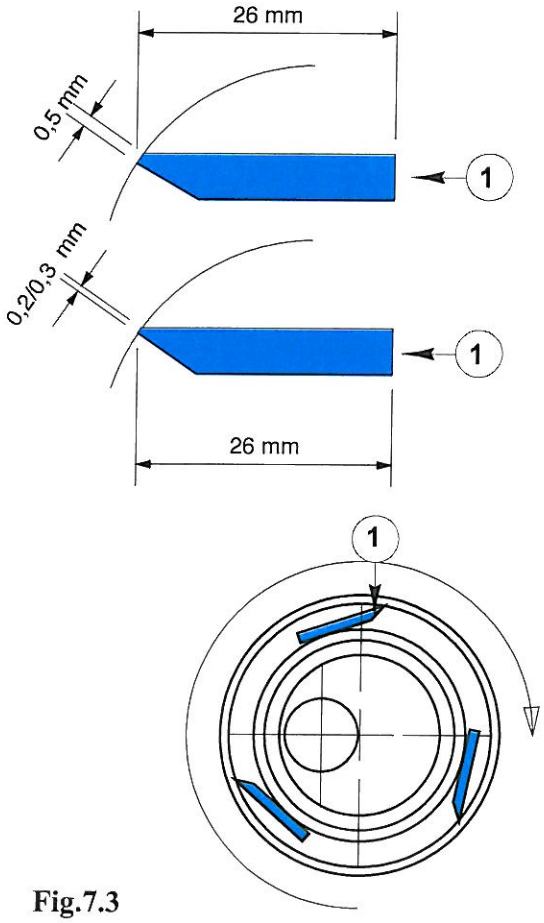


Fig.7.3

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. 7.3).
After sharpening the thickness of the cutting edge must be minimum 26 mm (Fig.7.3). If the width is lower it is necessary to replace the blades.

CAUTION:

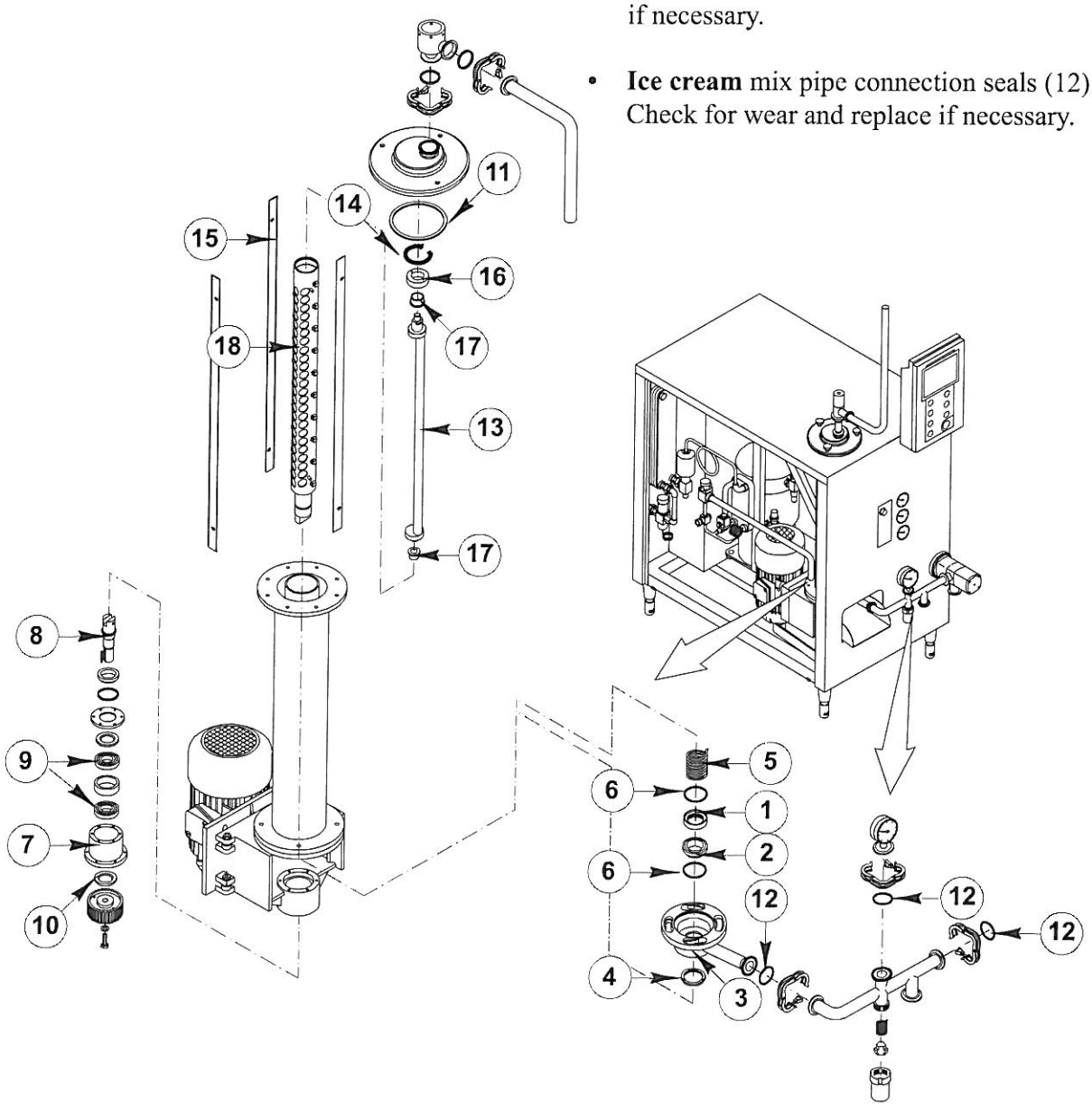
It is important to assemble the blades as shown in Fig. 7.3.

- **Dasher motor drive**
  If the dasher is noisy during operation, dismantle the support (7) and pull out the shaft (8).
  Disassemble the bearings (9) and gaskets (10), check their efficiency and replace them if necessary.
  Reassemble carefully in inverse order.

- **Cylinder bottom**
  Inspect the rotating seal sliding bush (2).
  Check for wear on the gasket (1), spring (5), and lip seals (6) and replace if necessary.

- **Cylinder lid**
  Check for wear on the gasket (11) and replace if necessary.

- **Ice cream** mix pipe connection seals (12)
  Check for wear and replace if necessary.



7.1.2 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 shuts down due to overload, the alarm page on the touch-screen signals an alarm message due to a tripped thermal.
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.
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.

7.1.3 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 has condensers with pressure valves which are factory set and keep condensation pressure at the optimal value (3-4 bar). If water from a cooling 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.

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.
The condensation temperature must be between 28°C and 36°C. If the water temperature is less than or equal to 28°C; about 3600 litres/hour of water will be required at a temperature of 28°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 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 T288) 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.

WARNING:

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 valve 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,
  - liquid 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 valve is set correctly, the temperature of the water (flowing out of the outlet with the system in operation) should have a temperature of 28/35°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.

CAUTION:

Do not add coolant to the refrigerator circuit unless absolutely necessary.
The refrigerating plant will not work properly with too much gas in it.

7.1.4 Maintenance of the pneumatic system

Periodically check the efficiency of the pneumatic system and check whether the filters are obstructed.

- Check that pneumatic connections are tight.
- Check that mix does not flow 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.

7.2 Lubricating list

Component	Supplier	Type
1-Pump reducer	Agip	Blasia 320 (ISO 3448)
2-Compressor*	Mobil	EAL Arctic 22 CC ICI Emkarate RL 32 CF
3-Bearings	NILS	Atomic T 4938 Longlife grease EP Low temp.
4-Bushings	NILS	Atomic T 4938 Longlife grease EP Low temp.

*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 alkylic-benzene oils. Do not use mineral oils on cooling circuit components.

7.3 Maintenance summary table

*** = Planned maintenance work**

Component	Lub.	Frequency of work				Rif.
		End of shift	500 hours	3000 hours	6000 hours	
Freezer		A*	-	C*	-	----
Pump - Reducer	1-3	-	-	B*	-	---
Freezer cylinder-Blades	-	-	F*	G*	H*	---
Freezer cylinder-Bushings	4	-	F*	-	I*	---
Freezer cylinder-Gaskets	-	-	F	D*	-	---
Freezer cylinder-Rotating seal	-	-	F	-	D*	---
Sterilising filter	-	-	-	-	L*	---
High yield filter	-	-	-	-	L*	---
Active carbon filters	-	-	-	-	L*	---

A = Work: Cleaning
B = Level restoring
C = Work: Bearings lubrication
D = Work: Gaskets replacing
E = Work: Wrist pins and pistons bushings replacing
F = Work: Functional test
G = Work: Grinding blades
H = Work: Blades replacing
I = Work: Bushings replacing
L = Work: Filter replacing

HOYER FRIGUS 600

8 - TROUBLESHOOTING

Contents

8.1 Troubleshooting 8-2

8.1 Troubleshooting

Problem	Cause	Remedy
The screen does not switch on.	• Power failure. • General switch in "0" position. • General switch fault. • Protection triggered. • Display fault.	• Restore voltage supply. • Turn general switch to "1". • Replace. • Reset the protection. • Replace the display.
The pump stops, or does not start.	• No compressed air. • Switch fault. • Pump rotor seized. • Inverter in emergency state. • Inverter thermal cutout • Bearings blocked. • Inverter fault. • Main motor fault.	• Check compressed air pressure. • Replace switch. • Remove rotor, check condition and if necessary replace. • Turn off the general switch and turn back on after a few minutes. • Wait 20 seconds, then restart the pump. • Replace following instructions in "Mechanical maintenance" section. • Replace. • Replace/repair.
Mixer shaft stops or does not start.	• Thermal cutout tripped. • Switch fault. • Motor fault. • Build up of ice in the cylinder.	• Reset thermal cutout. • Replace switch. • Replace/repair. • Turn on hot gas.
The refrigerator compressor will not start up.	• Dasher off. • Thermal cutout tripped. • Electronic overload tripped. • Switch fault. • High-pressure cutoff switch tripped. • Low pressure cutoff tripped	• Restart dasher. • Reset. • Reset by switching general switch off then on again. • Replace switch. • Check water temperature. • Turn on hot gas for about 30 seconds

Problem	Cause	Remedy
No flow or insufficient flow of mix.	• No mix supply.	• Restore supply.
	• Mix supply hose crimped or blocked.	• Remove blockage/crimp.
	• Air bubbles in the supply hose.	• Stop overrun, increase pump speed to recall mix rapidly into the cylinder, reset desired pump speed and restart overrun.
	• The pump has stopped.	• See problem "The pump stops, or does not start".
	• The pump is out of phase.	• Align the pump.
The mixer shaft is malfunctioning.	• Ice-cream too hard.	• Reduce the set value of ice cream viscosity.
	• Scraper blades worn.	• Sharpen or replace, following correct fitting procedure.
	• Reduction gear broken.	• Replace.
Mix cooling problematic at start-up.	• Condenser out of or low on water.	• Check water supply.
	• Hot water.	• Check water temperature.
	• Refrigerator unit fault.	• Call qualified refrigerator technician.
Ice-cream too soft.	• Excessive ice-cream production rate.	• Reduce the production.
	• Input mix too hot.	• Check that mix is at 4°C.
	• 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 valve.
	• No coolant gas.	• Check for leaks in refrigerator unit and reset gas charge.
	• Coolant gas filter blocked.	• Replace filter.
	• Refrigerator unit fault.	• Call refrigerator technician.

Problem	Cause	Remedy
Overrun insufficient.	• Loss of pressure in compressed air system.	• Check compressed air system for leaks and check solenoid valve operation.
	• Clogged filters.	• Replace as described in the "Compressed air system maintenance" section .
	• Check 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.
	• Insufficient overrun pressure.	• Correct overrun pressure on the internal regulator.
	• Flow rate not read correctly by controller.	• Correct overrun on the touch screen.
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.
The compressor ices up.	• Condenser water too cold.	• Check water temperature.
	• Blades worn.	• Replace.
	• Thermostatic valve fault.	• Replace.
	• Excessive quantity of coolant gas.	• Unload gas and reload observing value in technical data.
Hourly ice-cream production rate remains unchanged even by changing the capacity through the panel.	• Inverter fault.	• Replace.

Problem	Cause	Remedy
Hot gas activates before correct time.	• Viscosity value set not correct.	• Verify the value.
Hot gas does not activate.	• Viscosity value set not correct.	• Verify the value.
Hot gas activates but with no effect.	• Hot gas faucet closed. • Hot gas solenoid and valve fault.	• Open faucet. • Replace.

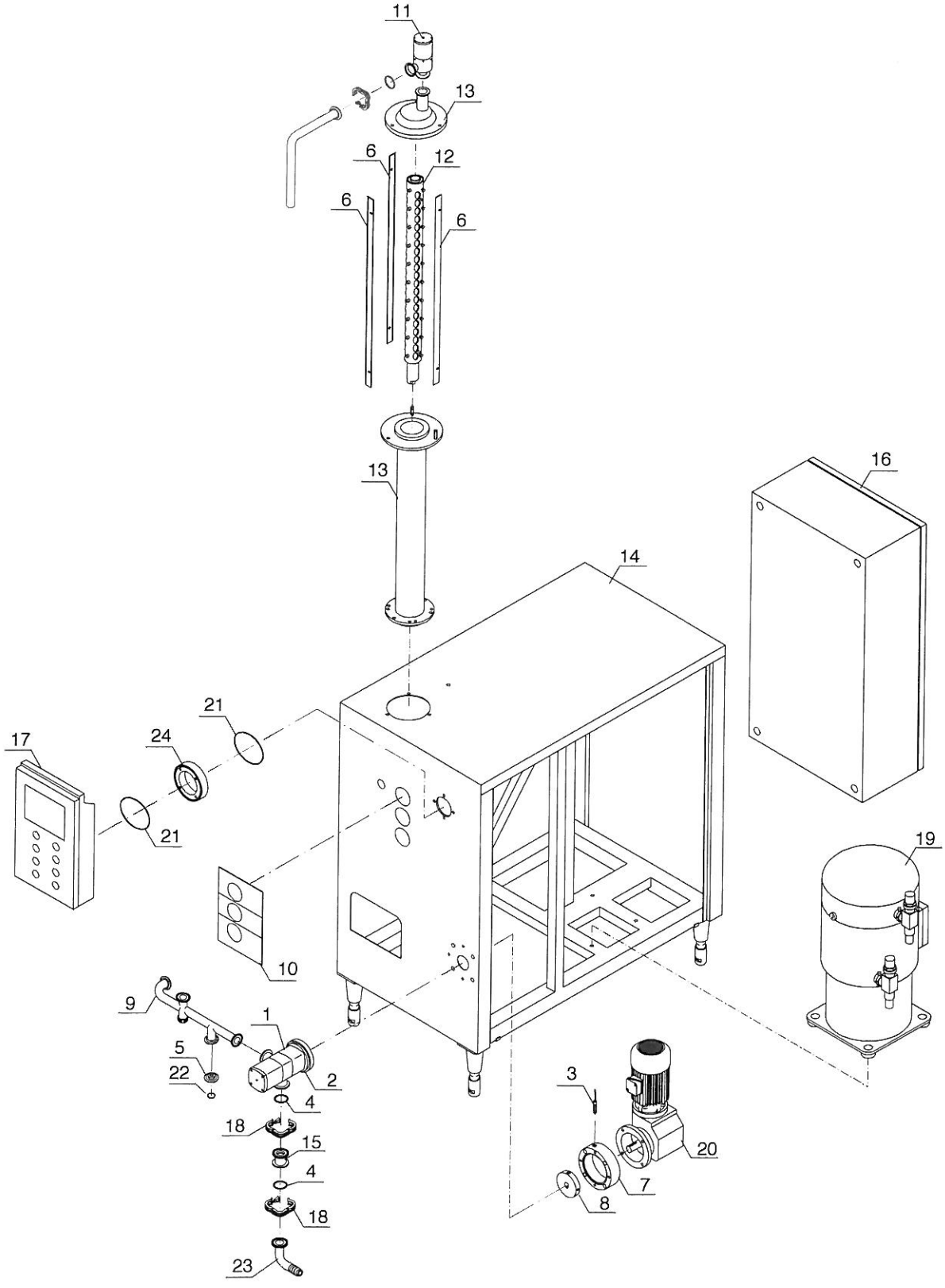
HOYER 13200190R *N.COMMESSA 13200190R*

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

Indice - *Contents - Sommaire*

13200190R - 1/1	Frigus 600 Pr - *Frigus 600 Pr - Frigus 600 Pr*
13020383 - 1/1	Carpenteria - *Carpentry - Charpenterie*
13020364 - 1/1	Cilindro congelatore - *Freezer cylinder - Cylindre congélateur*
13020113 - 1/1	Micro di sicurezza - *Safety microswitch - Micro de sécurité*
13020347 - 1/1	Gruppo trazione - *Drive - Traction*
13020094 - 1/1	Albero sbattitore - *Dasher unit - Groupe dasher*
13020025 - 1/1	Uscita gelato - *Mix outlet unit - Groupe sortie mélange*
00960113 - 1/1	Mensola per pompa - *Bracket for pump - Console pour pompe*
00960068 - 1/1	Pompa - *Pump - Pompe*
13020407 - 1/1	Valvola di non ritorno - *Check valve - Soupape de tenue*
13020374 - 1/1	Impianto pneumatico - *Pneumatic plant - Installation pneumatique*
13020358 - 1/1	Impianto frigorifero - *Refrigerator plant - Installation frigorifique*
13020417 - 1/1	Dotazione standard - *Standard equipment - Dotation standard*

POS.	COD.	Q.TA'	DESCRIZIONE	DESCRIPTION	DESCRIPTION
1	00960068	1	Pompa	Pump	Pompe
2	00960113	1	Supporto	Support	Support
3	017035921	1	Proximity	Proximity sensor	Capteur de proximité
4	018020582	2	Guarnizione 1 1/2"	Gasket	Joint
5	GM50E54001	1	Valvola di non ritorno	Check valve	Soupape de tenue
6	12020085	3	Lama	Blade (*)	Lame (*)
7	12020323	1	Distanziale	Spacer	Entretoise
8	12020324	1	Disco	Disc	Disque
9	12020325	1	Tubo	Hose	Tube
10	12020388	1	Targhetta	Data plate	Plaquette frigus
11	13020025	1	Uscita gelato	Mix outlet unit	Groupe sortie mélange
12	13020094	1	Dasher	Dasher unit	Groupe dasher
13	13020364	1	Cilindro congelatore	Freezer cylinder	Cylindre
14	13020383	1	Carpenteria	Carpentry	Charpenterie
15	13020407	1	Valvola di non ritorno	Check valve	Soupape de tenue
16	13020369	1	Quadro elettrico	Electrical cabinet	Armoire électrique
17	13020373	1	Quadro comando	Control panel	Tableau de commande
18	016060218	2	Clamp	Clamp	Clamp
19	17020255	1	Compressore	Compressor	Compression
20	170001609	1	Motoriduttore	Motor reduction gear	Moto-réducteur
21	336067137	4	Guarnizione	Gasket	Joint
22	336067532	1	Guarnizione	Gasket	Joint
23	540204085	1	Curva	Elbow	Coude
24	540501038	2	Distanziale Q.E. comando	Spacer	Entretoise

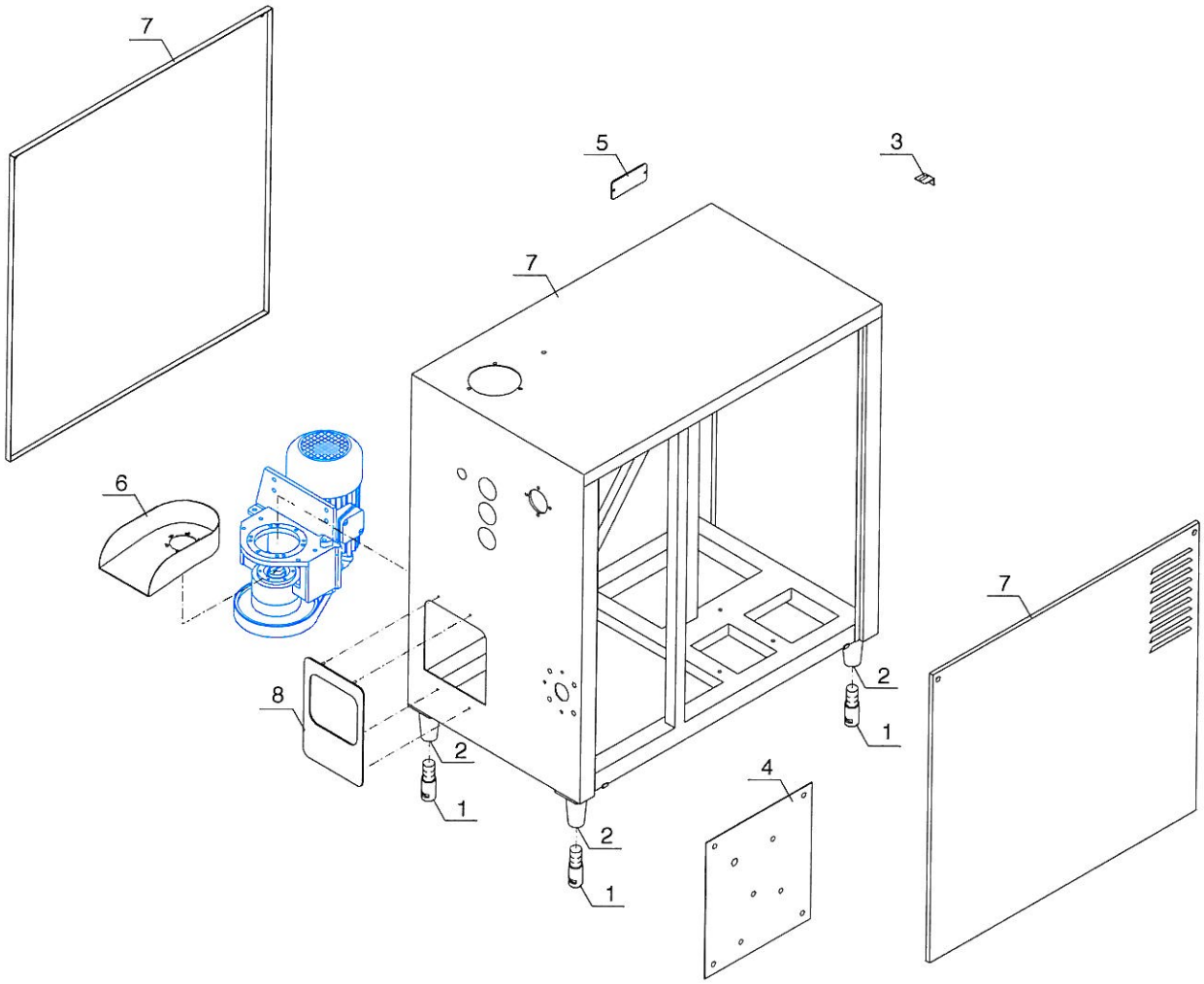


1/1 - 13200190R

Carpenteria 1/1 13020383

Carpentry - Charpenterie

POS.	COD.	Q.TA'	DESCRIZIONE	DESCRIPTION	DESCRIPTION
1	12000002	4	Piede	Foot	Pied
2	12000003	4	Boccola	Bush	Bague
3	12020051	1	Piastrina	Plate	Plaquette
4	12020322	1	Supporto pneumatico	Support	Support
5	12020148	1	Piastrina	Plate	Plaquette
6	12020293	1	Scivolo	Chute	Goulotte
7	12020393	1	Telaio	Frame	Châssis
8	12020374	1	Pannello	Panel	Panneau

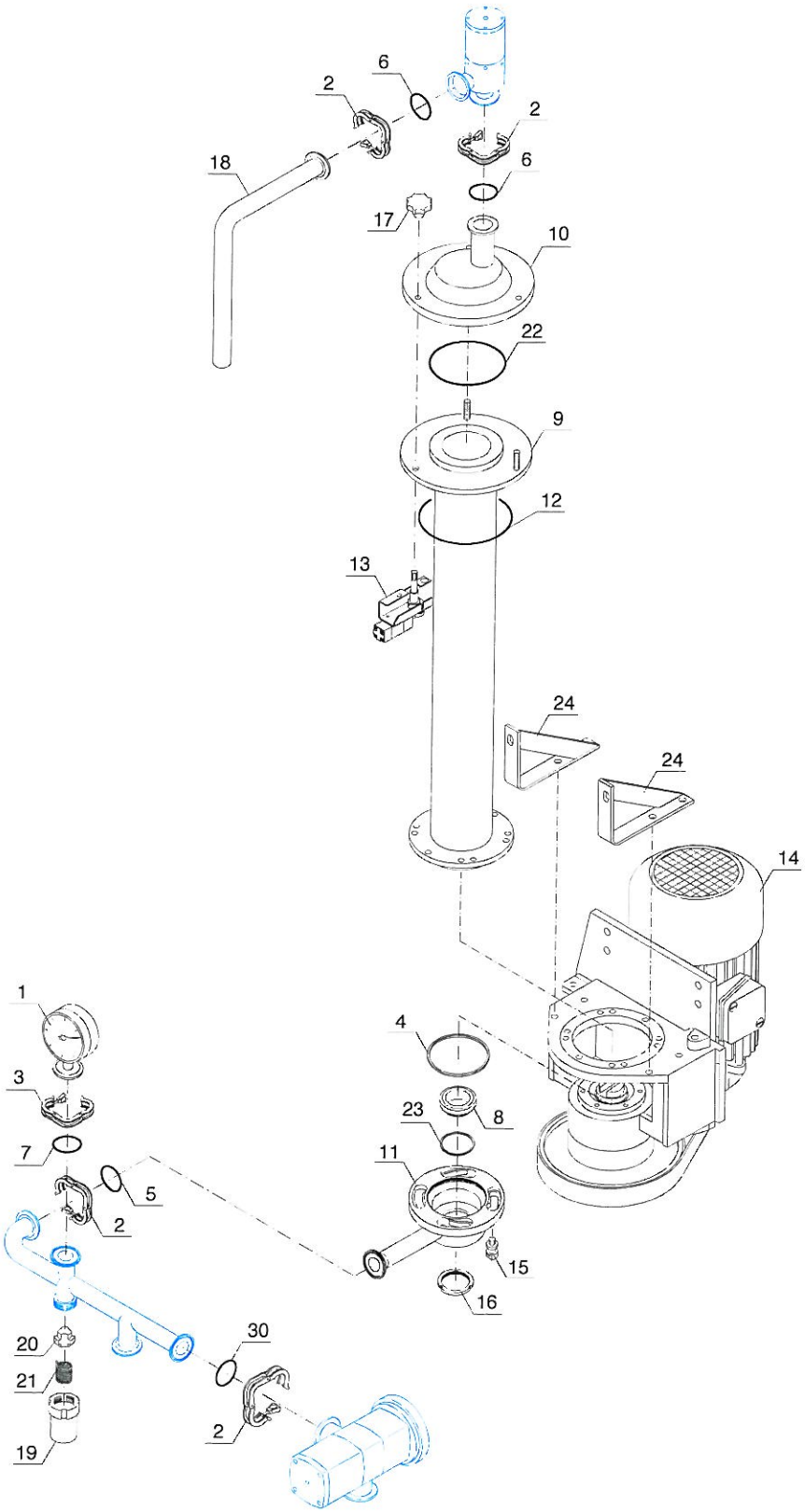


1/1 - 13020383

Cilindro congelatore **1/1** **13020364**

Freezer cylinder - Cylindre congélateur

POS.	COD.	Q.TA'	DESCRIZIONE	DESCRIPTION	DESCRIPTION
1	015075615	1	Manometro	Gauge	Manomètre
2	016060218	5	Clamp	Clamp	Clamp
3	016060219	1	Clamp 2"	Clamp 2"	Clamp 2"
4	336067145	1	Guarnizione	O-ring	Joint
5	018020581	3	Guarnizione clamp 1"	Seal	Joint
6	018020582	2	Guarnizione 1 1/2"	Gasket	Joint
7	018020583	1	Guarnizione	O-ring	Joint
8	12020058	1	Anello	Ring	Anneau
9	12020078	1	Cilindro	Cylinder	Cylindre
10	12020081	1	Coperchio	Cover	Couvercle
11	12020147	1	Culatta	Bottom	Culasse
12	336067184	1	Guarnizione	O-ring	Joint
13	13020113	1	Micro di sicurezza	Safety microswitch	Micro de sécurité
14	13020347	1	Gruppo trazione	Drive	Traction
15	141015458	4	Perno	Pin	Axe
16	141015473	1	Ghiera	Ring nut	Bague
17	141035120	3	Pomolo	Handgrip	Manople
18	141040365	1	Tubo	Hose	Tube
19	146000010	1	Bicchierino	Cup	Godet
20	146000015	1	Tappo	Cap	Bouchon
21	146000020	1	Molla	Spring	Ressort
22	336067069	1	Guarnizione	O-ring	Joint
23	336067141	1	Guarnizione	O-ring	Joint
24	12020347	1	Squadra	Bracket	Equerre

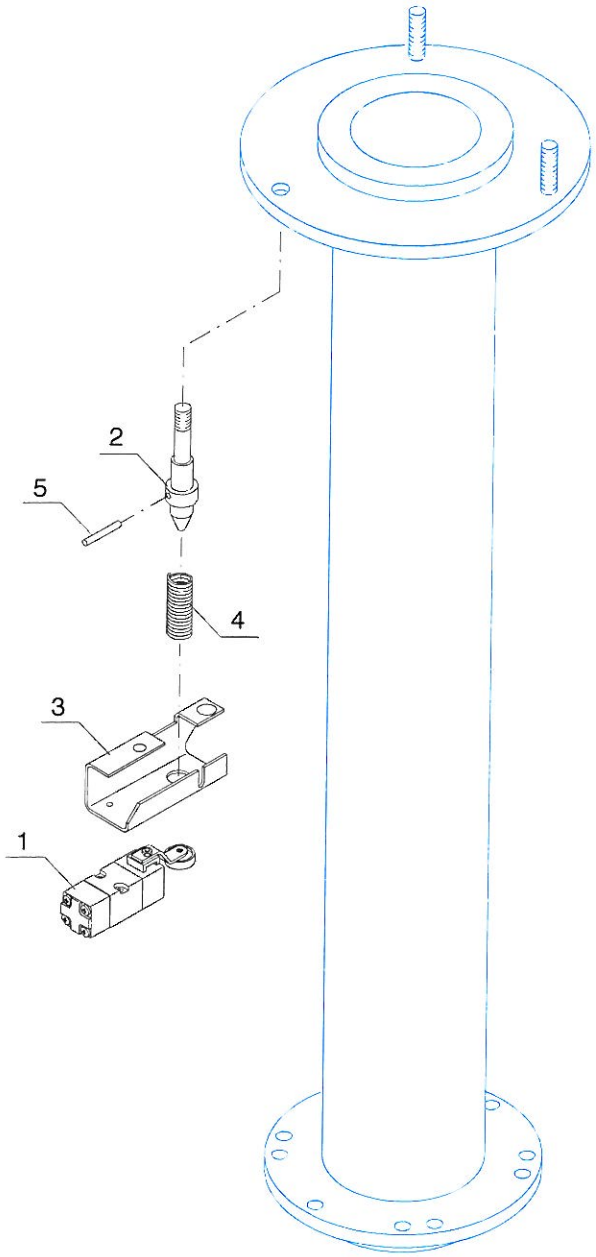


1/1 - 13020364

Micro di sicurezza **1/1 13020113**

Safety microswitch - Micro de sécurité

POS.	COD.	Q.TA'	DESCRIZIONE	DESCRIPTION	DESCRIPTION
1	017035938	1	Finecorsa	Limit switch	Fin de course
2	12020282	1	Perno	Pin	Axe
3	12020283	1	Supporto micro	Micro support	Support micro
4	17020090	1	Molla	Spring	Ressort
5	326024270	1	Spina	Pin	Goupille

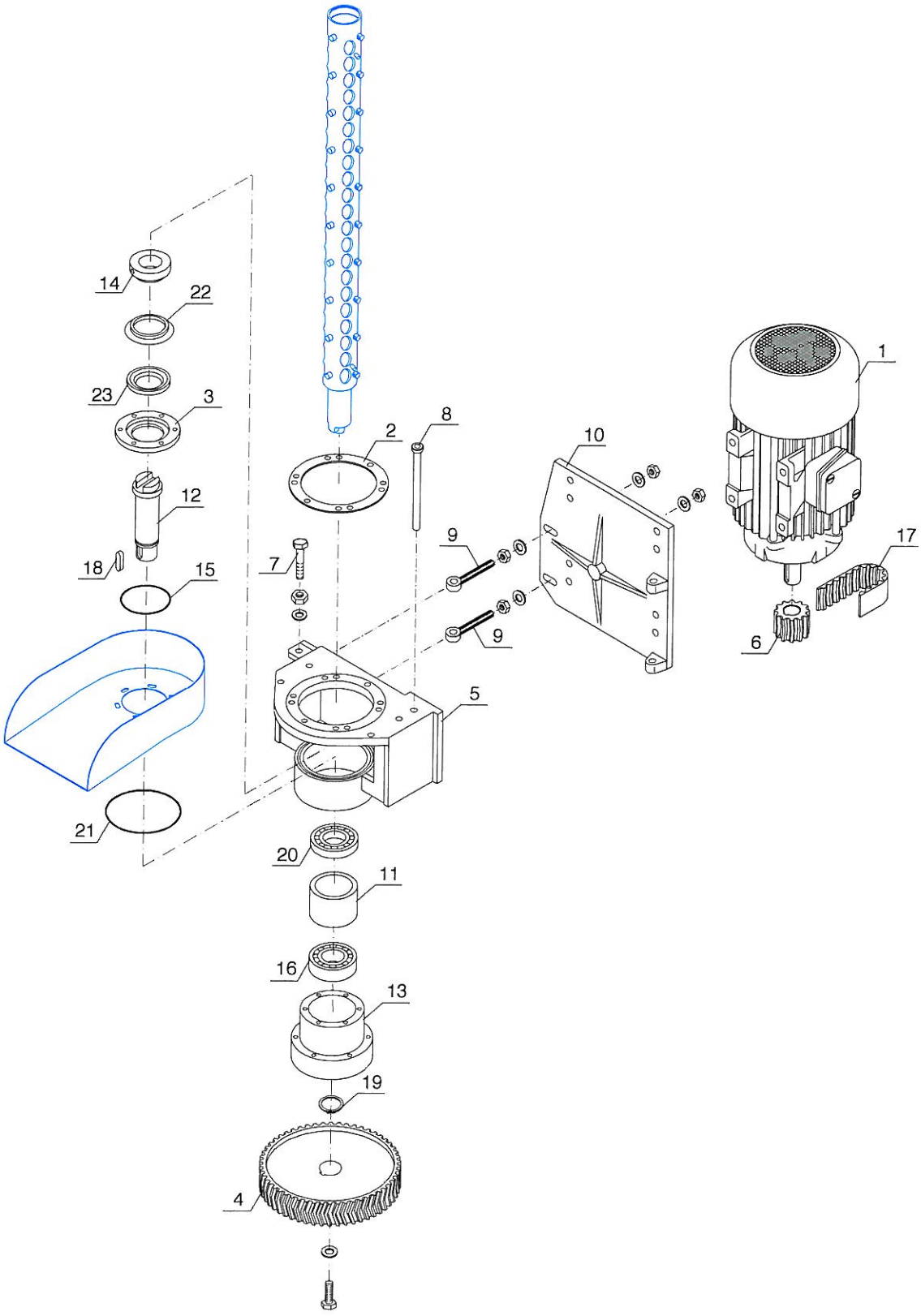


1/1 - 13020113

Gruppo trazione **1/1 13020347**

Drive - Traction

POS.	COD.	Q.TA'	DESCRIZIONE	DESCRIPTION	DESCRIPTION
1	014045799	1	Motore	Motor	Moteur
2	12020143	1	Guarnizione	Gasket	Joint
3	12020289	1	Anello	Ring	Anneau
4	12020295	1	Puleggia	Pulley	Poulie
5	12020299	1	Fusione supporto	Support casting	Support coulé
6	12020300	1	Puleggia	Pulley	Poulie
7	12020303	1	Perno	Pin	Axe
8	12020302	2	Perno	Pin	Axe
9	12020304	2	Tirante	Tie rod	Entretoise
10	12020342	1	Piastra	Plate	Plaque
11	12020343	1	Distanziale	Spacer	Entretoise
12	12020344	1	Albero	Shaft	Arbre
13	12020345	1	Flangia	Flange	Bride
14	141015451	1	Anello	Ring	Anneau
15	17000867	1	Guarnizione OR	Seal	Joint torique OR
16	17020127	1	Cuscinetto	Bearing	Roulement
17	17020186	1	Cinghia	Belt	Courroie
18	326013124	1	Chiavetta	Key	Clavette
19	326019040	1	Seeger	Seeger	Seeger
20	336001720	1	Cuscinetto	Bearing	Roulement
21	336067069	1	Guarnizione	Gasket	Joint
22	336069034	1	Guarnizione	Gasket	Joint
23	336071382	1	Corteco seal	Corteco	Corteco

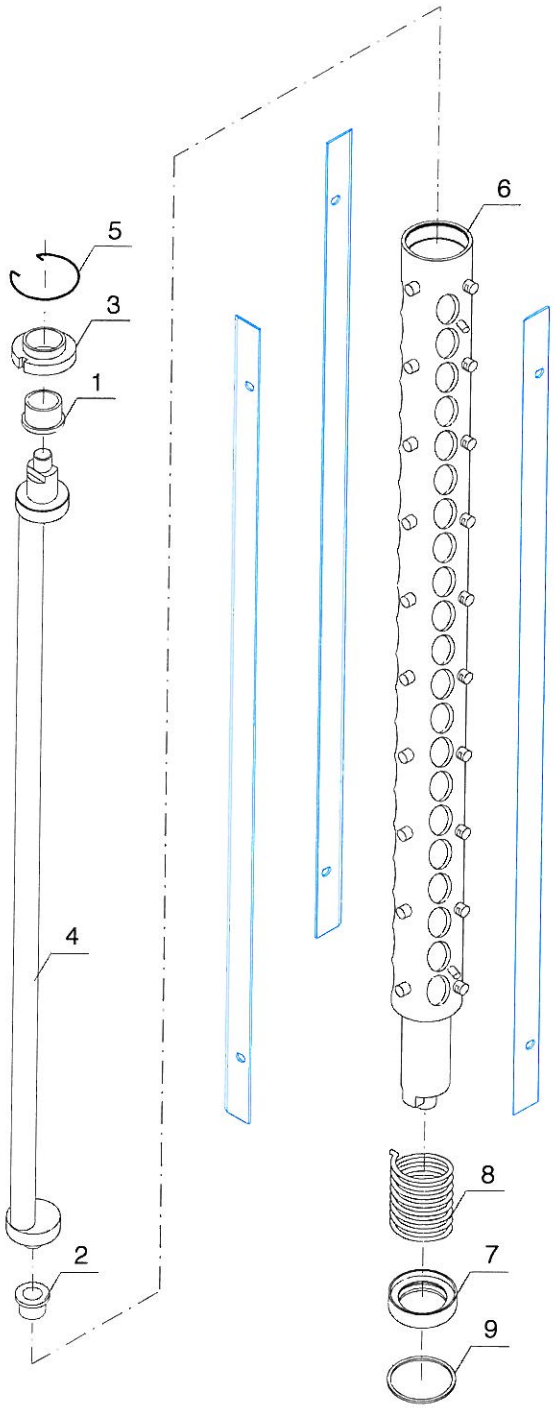


1/1 - 13020347

Albero sbattitore **1/1** **13020094**

Dasher unit - Groupe dasher

POS.	COD.	Q.TA'	DESCRIZIONE	DESCRIPTION	DESCRIPTION
1	12020056	1	Bronzina	Bushing	Douille
2	12020057	1	Bronzina	Bushing	Douille
3	12020082	1	Ghiera	Ring nut	Bague
4	12020083	1	Eccentrico	Eccentric cam	Excentrique
5	12020104	1	Molla	Spring	Ressort
6	12020144	1	Albero	Shaft	Arbre
7	145500026	1	Ghiera	Ring nut	Bague
8	145500029	1	Molla	Spring	Ressort
9	336067170	1	Guarnizione OR	Seal	Joint torique OR

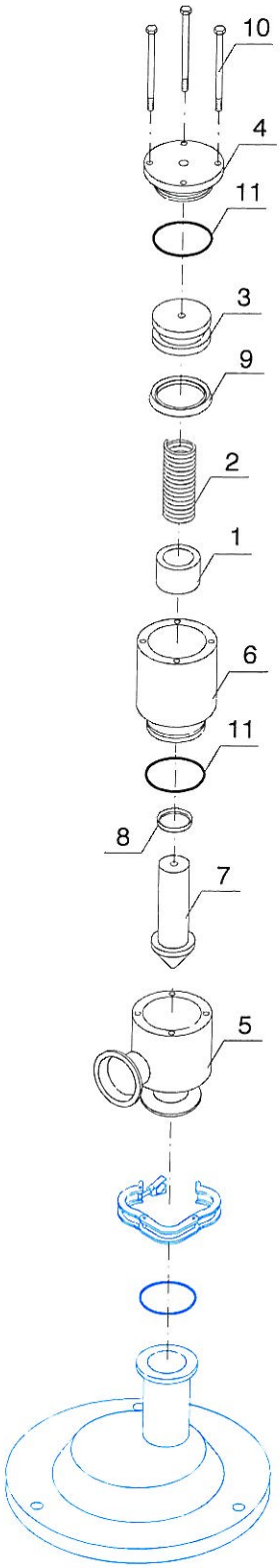


1/1 - 13020094

Uscita gelato **1/1 13020025**

Mix outlet unit - Groupe sortie mélange

POS.	COD.	Q.TA'	DESCRIZIONE	DESCRIPTION	DESCRIPTION
1	12020024	1	Boccola	Bush	Bague
2	12020027	1	Molla	Spring	Ressort
3	12020073	1	Stelo	Stem	Tige
4	12020074	1	Tappo	Cap	Bouchon
5	12020075	1	Corpo inferiore	Lower body	Corps inférieur
6	12020076	1	Corpo superiore	Upper body	Corps supérieur
7	12020077	1	Pistone	Piston	Piston
8	17000134	1	Guarnizione	Gasket	Joint
9	17000436	1	Guarnizione	Gasket	Joint
10	326003078	4	Vite	Screw	Vis
11	336067057	2	Guarnizione	Gasket	Joint

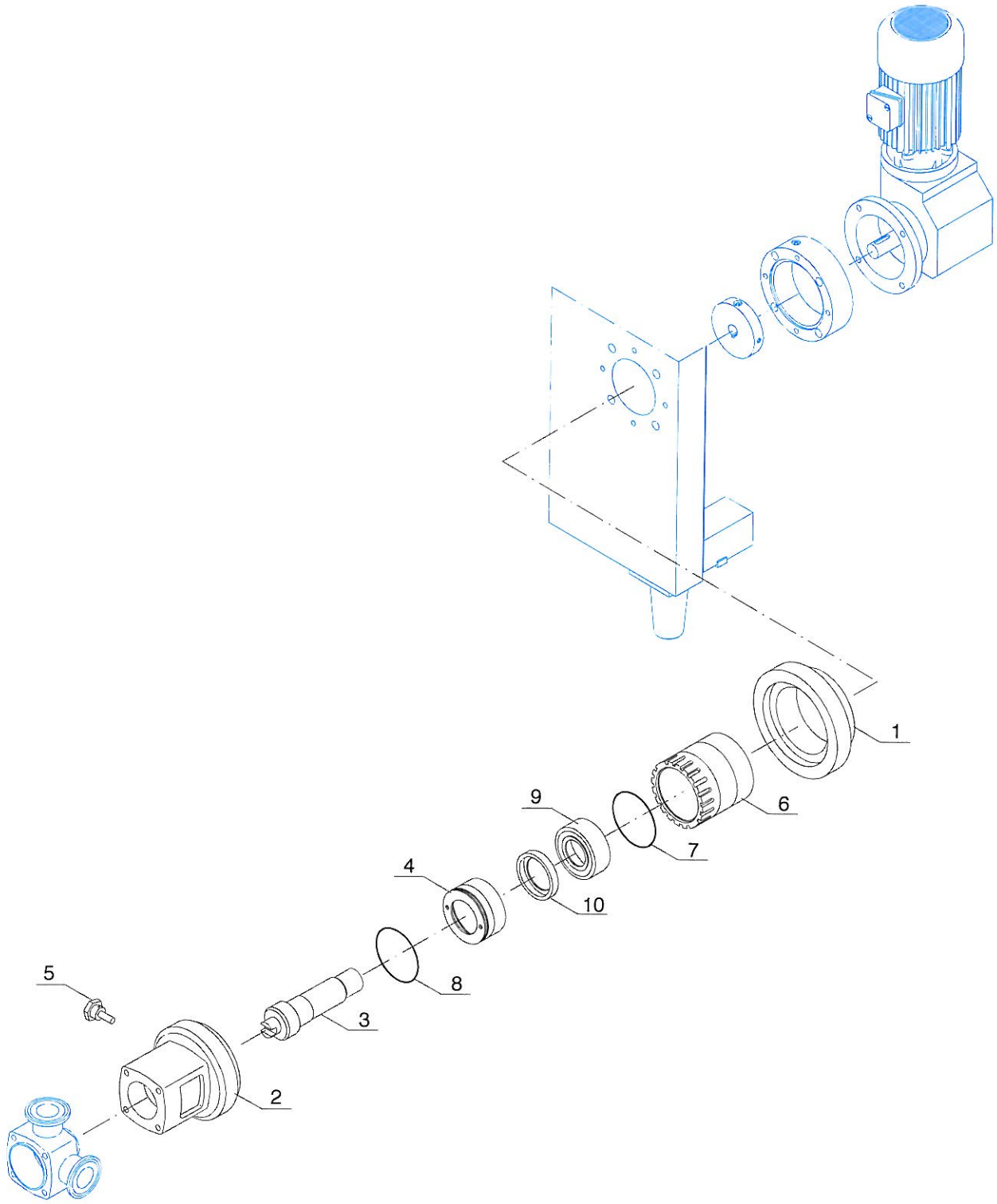


1/1 - 13020025

Mensola per pompa **1/1 00960113**

Bracket for pump - Console pour pompe

POS.	COD.	Q.TA'	DESCRIZIONE	DESCRIPTION	DESCRIPTION
1	00920110	1	Anello	Ring	Anneau
2	00920156	1	Corpo	Body	Corps
3	00920158	1	Albero	Shaft	Arbre
4	00920159	1	Ghiera	Ring nut	Bague
5	00920161	1	Bullone	Bolt	Boulon
6	00920223	1	Ghiera	Ring nut	Bague
7	17000867	1	Guarnizione OR	Seal	Joint
8	17001611	1	Guarnizione	O-ring	Joint
9	17001612	1	Cuscinetto	Bearing	Roulement
10	17001613	1	Corteco	Corteco seal	Corteco

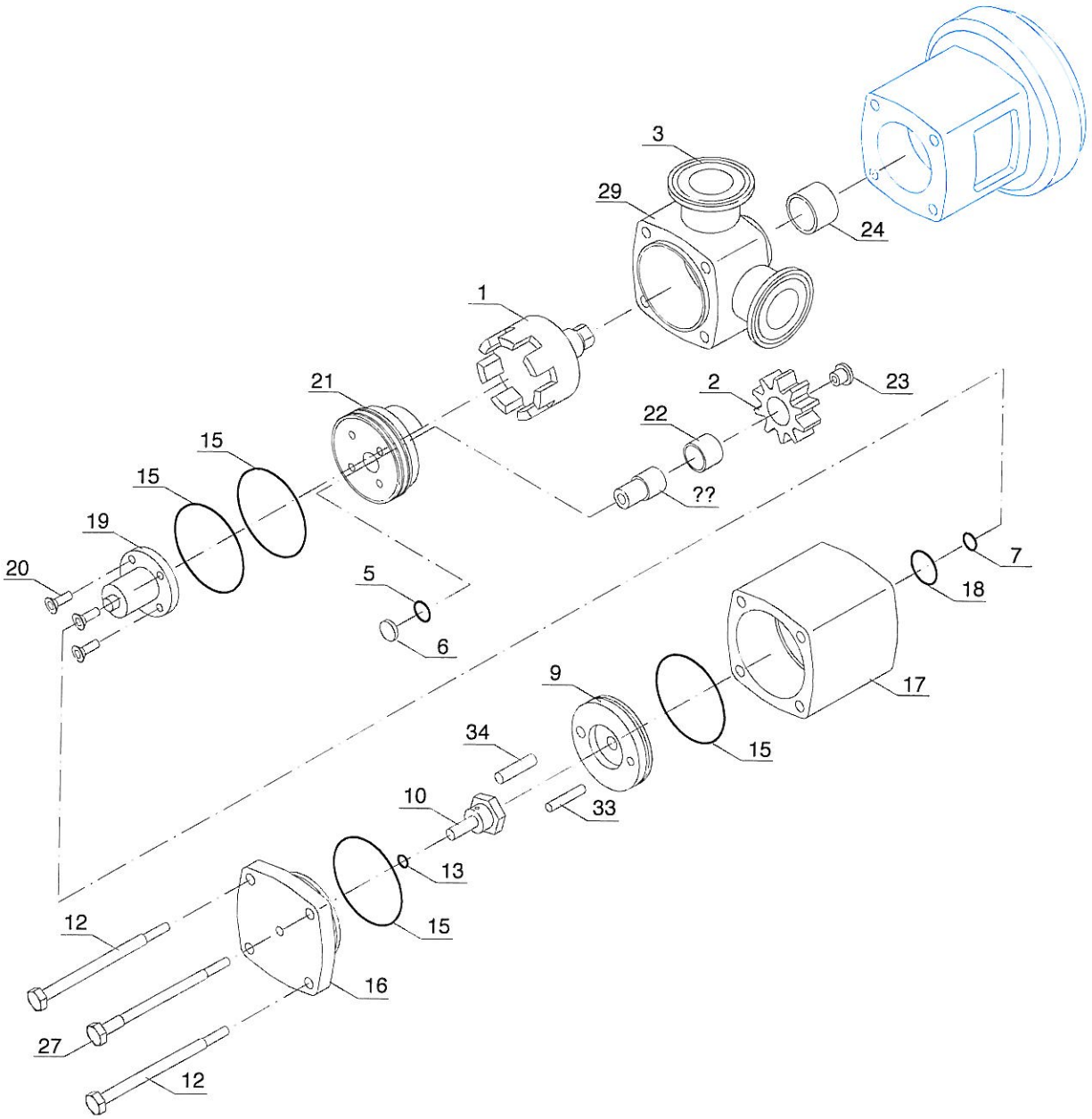


1/1 - 00960113

Pompa **1/1 00960068**

Pump - Pompe

POS.	COD.	Q.TA'	DESCRIZIONE	DESCRIPTION	DESCRIPTION
1	00920029	1	Ventola	Impeller	Hélice de ventilation
2	00910048	1	Ruota	Wheel	Roue
3	512290005	2	Guarnizione	Gasket	Joint
5	51240009	1	O-ring	O-Ring	Joint torique OR
6	00910376	1	Rondella	Washer	Rondelle
7	51242170	1	O-ring	O-Ring	Joint torique OR
9	00920001	1	Pistone	Piston	Piston
10	00920184	1	Spinotto	Piston pin	Branche
12	00910326	3	Bullone	Bolt	Boulon
15	51242168	4	O-ring	O-Ring	Joint torique OR
16	00920004	1	Coperchio	Cover	Couvercle
17	00910315	1	Pompa	Pump	Pompe
18	51242169	1	O-ring	O-Ring	Joint torique OR
19	00910317	1	Asta	Rod	Tige
20	52272635	4	Vite a ferro	Machine screw	Vis de machine
21	00910381	1	Protezione	Protection	Protection
22	00103833	1	Bussola	Bush	Douille
23	00910321	1	Controdado	Lock nut	Contre-écrou
24	00103675	1	Bussola	Bush	Douille
27	00910327	1	Bullone	Bolt	Boulon
29	00920048	1	Corpo pompa	Pump body	Corps pompe
33	00922002	1	Asta di guida	Rod	Tige
34	00922003	1	Asta di guida	Rod	Tige

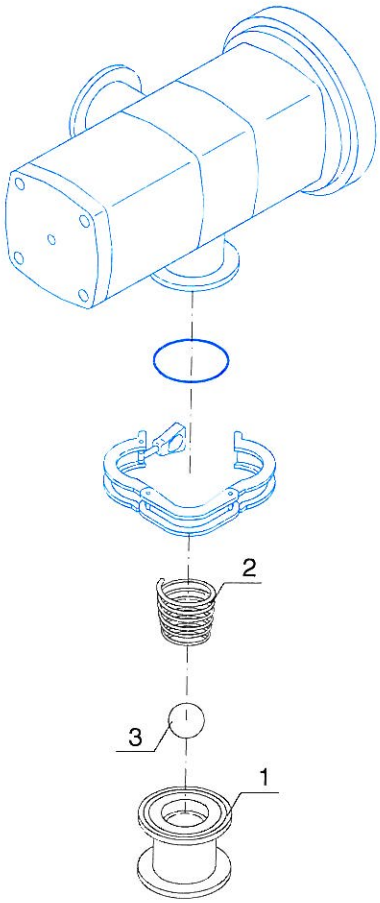


1/1 - 00960068

Valvola di non ritorno **1/1 13020407**

Check valve - Soupape de tenue

POS.	COD.	Q.TA'	DESCRIZIONE	DESCRIPTION	DESCRIPTION
1	12040710	1	Contenitore	Container	Conteneur
2	12040711	1	Molla	Spring	Ressort
3	336003999	1	Sfera	Ball	Bille

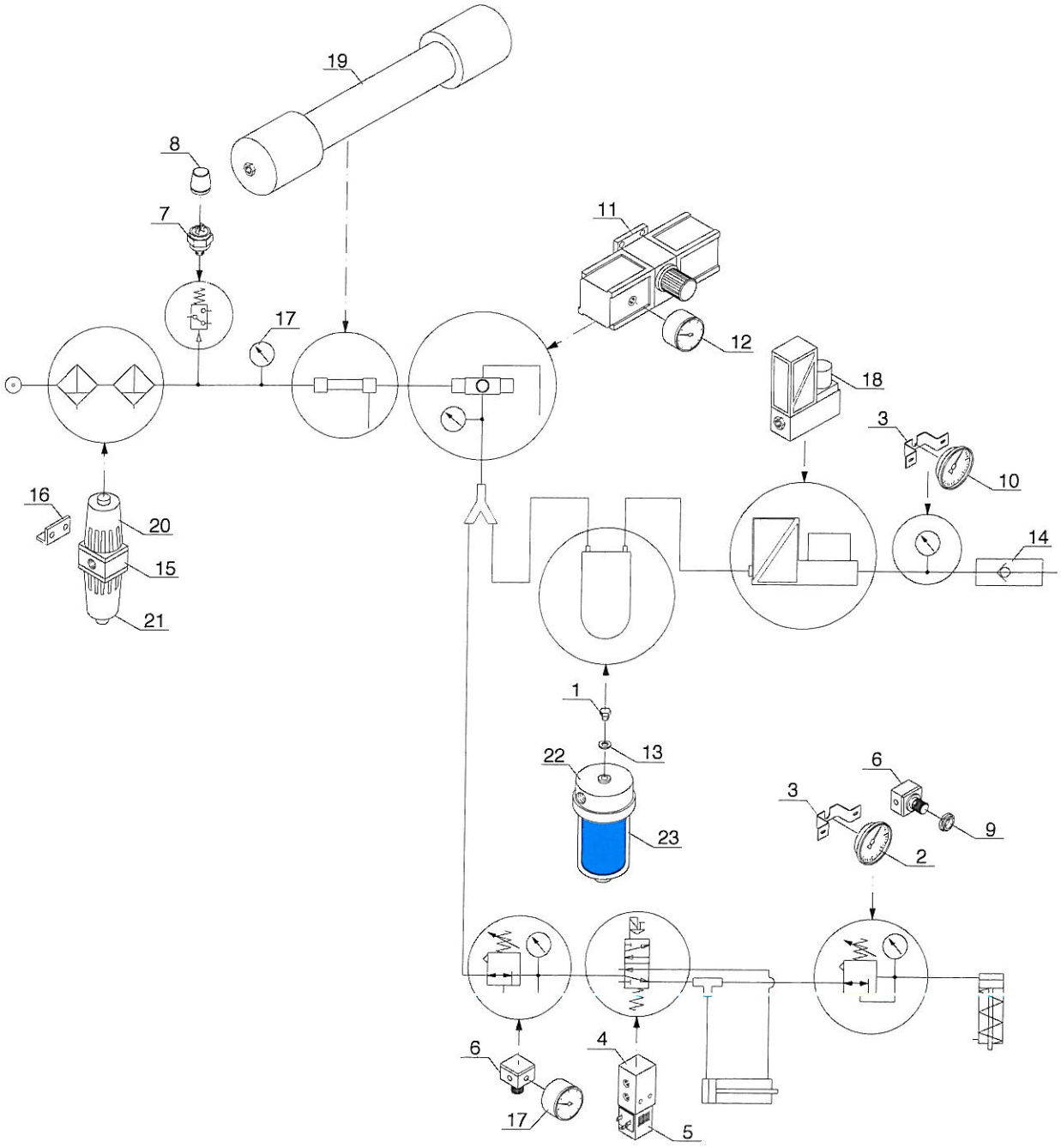


1/1 - 13020407

Impianto pneumatico **1/1 13020374**

Pneumatic plant - Installation pneumatique

POS.	COD.	Q.TA'	DESCRIZIONE	DESCRIPTION	DESCRIPTION
1	011045779	1,00	Tappo	Cap	Bouchon
2	015975050	1,00	Manometro	Gauge	Manomètre
3	015975052	2,00	Squadretta	Bracket	Equerre
4	17000086	1,00	Valvola	Valve	Vanne
5	17000092	1,00	Connettore	Connector	Connecteur
6	17000168	2,00	Riduttore	Reduction gear	Réducteur
7	17000207	1,00	Pressostato	Pressure switch	Pressostat
8	17000208	1,00	Cappuccio	Cover	Couvercle
9	17000234	1,00	Ghiera	Ring nut	Bague
10	17020240	1,00	Manometro	Gauge	Manomètre
11	17020243	1,00	Compressore	Compressor	Compression
12	17020244	1,00	Manometro	Gauge	Manomètre
13	326007200	1,00	Rondella	Washer	Rondelle
14	333004114	1,00	Valvola	Valve	Vanne
15	333012022	1,00	Filtro	Filter	Filtre
16	333012043	1,00	Staffa	Bracket	Etrier
17	333021011	2,00	Manometro	Gauge	Manomètre
18	17020241	1,00	Air controller	Air controller	Air controller
19	53549060	1,00	Essiccatore	Dryer	Dessiccateur
20	333012025	1,00	Cartuccia olio	Oil cartridge	Cartouche
21	333012026	1,00	Cartuccia carboni attivi	Cartridge	Cartouche
22	12020080	1,00	Filtro sterilizzante	Sterilizing filter	Filtre haute efficacité
23	333012027	1,00	Cartuccia aria alimentare	Cartridge	Cartouche

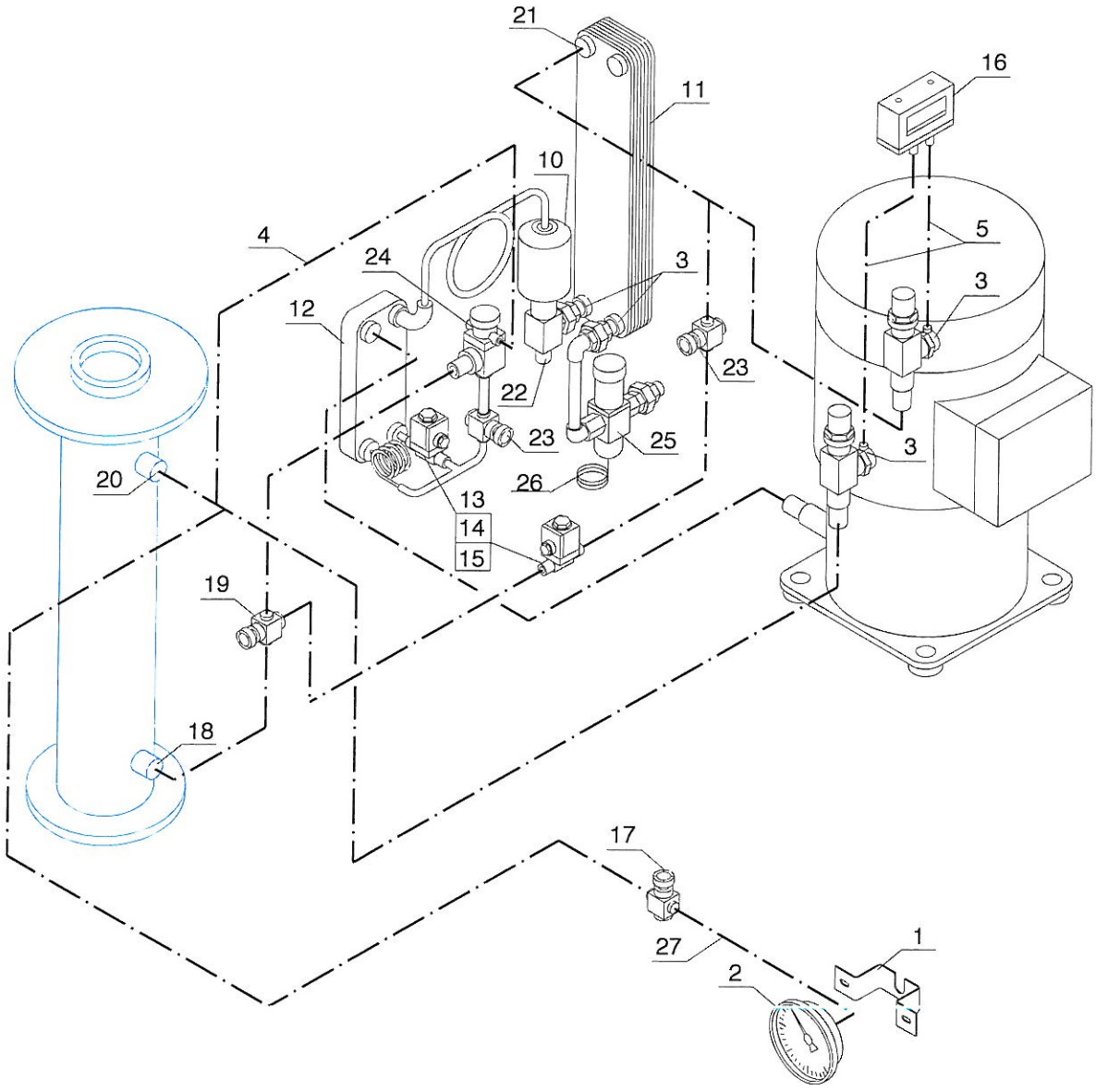


1/1 - 13020374

Impianto frigorifero **1/1 13020358**

Refrigerator plant - Installation frigorifique

POS.	COD.	Q.TA'	DESCRIZIONE	DESCRIPTION	DESCRIPTION
	17020046	1	Gruppo orificio	Orifice unit	Groupe orifice
	17020048	1	Gruppo orificio	Orifice unit	Groupe orifice
1	015075480	1	Staffa	Bracket	Etrier
2	015075387	1	Manometro	Manometer	Manomètre
3	17000364	5	Guarnizione	Gasket	Joint
4	017055100	4	Tubo	Hose	Tube
5	017055102	2	Tubo	Hose	Tube
10	17020094	1	Filtro	Filter	Filtre
11	13020448	1	Economizzatore	Economiser	Economiseur
12	13020447	1	Condensatore	Condenser	Condensateur
13	17020118	1	Corpo valvola	Body valve	Corps vanne
13	17020119	1	Corpo valvola	Body valve	Corps vanne
14	017995082	2	Bobina	Coil	Bobine
16	017055056	1	Pressostato	Pressure switch	Pressostat
17	016010860	1	Rubinetto	Cock	Robinet
19	016050609	1	Miscelatore	Mixer	Mélangeur
20	015935064	2	Raccordo	Union	Raccord
21	015935066	1	Raccordo	Union	Raccord
22	016910002	1	Rubinetto	Cock	Robinet
23	17020093	1	Rubinetto	Cock	Robinet
24	17020049	1	Elemento termostatico	Thermostat element	Elément thermostatique
25	17020045	1	Corpo valvola	Body valve	Corps vanne
26	015085299	1	Valvola	Valve	Vanne
27	017055102	1	Tubo	Hose	Tube

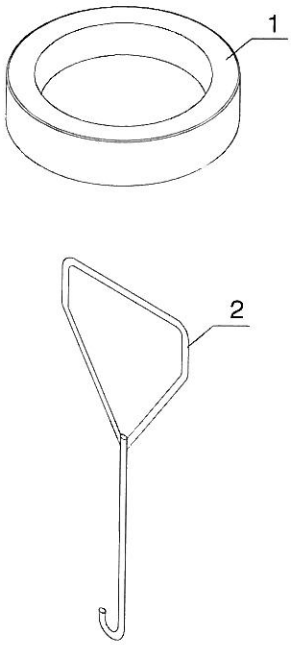


1/1 - 13020358

Dotazione standard **1/1 13020417**

Standard equipment - Dotation standard

POS.	COD.	Q.TA'	DESCRIZIONE	DESCRIPTION	DESCRIPTION
1	12020106	1	Ghiera invito albero	Shaft raiser ring nut	Bague invitation arbre
2	12020124	1	Attrezzo estrazione albero	Shaft removal tool	Equipement extr. arbre



1/1 - 13020417

F 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 thermostat.*
- ***GM:*** *Ammeter with 2 programmable thresholds (gas and comp), hot gas control, defrosting.*
- ***BAR:*** *Pressure gauge with 2 programmable thresholds.*

General features

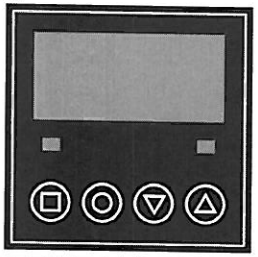
Display	: 3 green displays, 1 red LED, 1 green LED.
Outputs	: 2 24 V AC 4 A UNPROTECTED with static relays for hot gas and compressor enabling
Proximity sensor input (Px)	: for NPN proximity sensor, supplied at 15 DC
Pressure input (Pr)	: for 16 bar fs 4 – 20 mA self-powered sensor
Amp. input	: for current 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.
- Minimum sampling time (period accumulation) 1 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

GM: Ammeter
- 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 over-absorption.
- 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.

Front view



Rear view and electrical connections

Programming

- To access the programming mode, keep the □ 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 □ button.
- To select a function, press □ and release, then press Δ or ∇.
- Hold down O to display parameter name.
- Release O to display parameter value.
- To select a parameter, hold down O and press Δ or ∇.
- To set the selected parameter, release O and press Δ or ∇.

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.***	1...5	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	50...90	Threshold for turning off refrigerator compressor.
GM	***GAS***	2.0...50.0	Threshold for turning on hot gas (amperes).
	CMP	2.0...50.0	Threshold for turning off refrigerator compressor.
	dEF	5...30	Duration of defrosting (seconds).
	A		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 Δ or ∇ for more than 1 second to go from slow to rapid repetition.
Press Δ and ∇ 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

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

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0 1 2 3 4 5 6 7 8 9

FRIGUS 600 CON PLC

400V / 50-60Hz

Tetra Pak Hoyer

Project FRIGUS 600 PLC		Title INTESTAZIONE / COVER	Id/rev. 13020369	Dev.Func. =COV	
Date 01/12/03	Sign. BAKIR-M240034		Location	Global sheet: 1	Function sheet: 1

Print date : @plotdate

Multifoglio/Fil	Fg/Sh	Descrizione	Description	Pag.
=COV	=COV/1	INTESTAZIONE	COVER	1
=IND	=IND/1	LISTA PAGINE	INDEX	2
=FUNL	=FUNL/1	LEGENDA FUNZIONI	FUNCTION LIST	3
	=FUNL/2	LEGENDA FUNZIONI	FUNCTION LIST	4
=BOM	=BOM/1	LISTA MATERIALI	PART LIST	5
	=BOM/2	LISTA MATERIALI	PART LIST	6
=PSP	=PSP/1	ALIMENTAZIONE GENERALE	POWER SUPPLY	7
	=PSP/2	RELE CONTROLLO FASI	PHASE MONITOTIHG	8
	=PSP/3	ALIMENTATORE	DC POWER SUPPLY	9
	=PSP/4	INPUT/OUTPUT	INPUT/OUTPUT	10
=VNT1	=VNT1/5	VENTILAZIONE QUADRO	CABINET VENTILATION	11
=EST	=EST1/1	MODULO DI SICUREZZA	SAFETY CONTROL	12
	=EST1/2	EMERGENZE 1	EMERGENCY 1	13
	=EST1/3	IMPUT/OUTPUT PLC	IMPUT/OUTPUT PLC	14
=MXP1	=MXP1/1	VARIATORE DI VELOCITA' - POTENZA	SPEED CONVERTER DRIVE - POWER	15
	=MXP1/2	VARIATORE DI VELOCITA' - COMANDO	SPEED CONVERTER DRIVE -	16
	=MXP1/3	VARIATORE DI VELOCITA' - COMANDO	SPEED CONVERTER DRIVE -	17
=CIP1	=CIP1/1	LAVAGGIO	CIP	18
=AIR1	=AIR1/1	ARIA GENERALE	AIR SUPPLY	19
	=AIR1/2	CONTROLLO ARIA	AIR CONTROL	20
=MMI1	=MMI1/1	PANNELLO OPERATORE	CONTROL PANEL	21
=MM01	=MM01/1	MOTORE PRINCIPALE	MAIN MOTOR	22
	=MM01/2	IMPUT/OUTPUT PLC	IMPUT/OUTPUT PLC	23
=COL1	=COL1/1	COMPRESSORE RAFFREDDAMENTO	COOLING COMPRESSOR	24
	=COL1/2	IMPUT/OUTPUT PLC	IMPUT/OUTPUT PLC	25
	=COL1/3	VALVOLE RAFFREDDAMENTO	COOLING VALVES	26
=RCK	=RCK/1	RACK PLC	PLC RACK	27
=LYT	=LYT/1	LAY-OUT	LAY-OUT	28
=TMBL	=TMBL/1	MORSETTIERA X21-51-52-55-56	TERMINAL BLOCK X21-51-52-55-56	29
	=TMBL/2	CONNETTORE AIR CONTROLLER	AIR CONTROLLER CONNECTOR	30
	=TMBL/3	MORSETTIERA XI0-1-2	TERMINAL BLOCK XI0-1-2	31
	=TMBL/4	MORSETTIERA XQ0-1-2	TERMINAL BLOCK XQ0-1-2	32
	=TMBL/5	MORSETTIERA XW-X11-X31-X41	TERMINAL BLOCK XW-X11-X31-X41	33

Tetra Pak Hoyer

Project: FRIGUS 600 PLC

Date: 01/12/03

Sign.: BAKIR-M240034

Title: LISTA PAGINE / INDEX

Id/rev.: 13020369

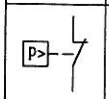
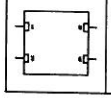
Location:

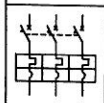
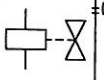
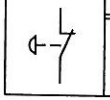
Dev.Func.: =IND

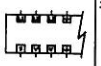
Global sheet: 2

Function sheet: 1

Print date : @plotdate

Sim.\Sym.	Sigla\Item	Funzione\Use Type
	=AIR1/1S1 QG =AIR1/1	PRESSOSTATO PRESSURE SWITCH
	=AIR1/1U1 QG =AIR1/1	ABILITAZIONE ARIA AIR ON
	=AIR1/1SH1 QG =AIR1/1	START/STOP ARIA AIR START/STOP
	=AIR1/1YV2 QG =AIR1/1	ARIA GENERALE AIR SUPPLY
	=CIP/1/2 QG =CIP1/1	INSERZIONE VALVOLA LAVAGGIO CIP VALVE INSERCTION
	=CIP1/1SH1 QG =CIP1/1	LAVAGGIO CIP
	=CIP1/1YV1 QG =CIP1/1	VALVOLA LAVAGGIO MIX PUMP CIP VALVE
	=COL1/1M1 QG =COL1/1	COMPRESSORE COMPRESSOR
	=COL1/1M3 =COL1/1	PROTEZIONE ELETTRONICA ELECTRONIC PROTECTION
	=COL1/2S1 QG =COL1/2	PRESSOSTATO PRESSURE SWITCH
	=COL1/3U1 QG =COL1/3	INSERZIONE VALVOLA GAS FREDDDO HOTGAS VALVE INSERCTION

Sim.\Sym.	Sigla\Item	Funzione\Use Type
	=COL1/3U2 QG =COL1/3	INSERZIONE VALVOLA LIQUIDO LIQUID VALVE INSERCTION
	=COL1/1QF1 QG =COL1/1	PROTEZIONE COMPRESSORE COMPRESSOR PROTECTION
	=COL1/1QF2 QG =COL1/1	PROTEZIONE MODULO ELETTRONICO ELECTRONIC MODULE PROTECTION
	=COL1/2KM1 QG =COL1/2	INSERZIONE COMPRESSORE INSERCTION COMPRESSOR
	=COL1/2SH1 QG =COL1/2	START/STOP RAFFREDDAMENTO START/STOP COOLING
	=COL1/3YV1 QG =COL1/3	VALVOLA GAS FREDDO HOTGAS VALVE
	=COL1/3YV2 QG =COL1/3	VALVOLA LIQUIDO LIQUID VALVE
	=EST1/1K1 QG =EST1/1	RELE' D'EMERGENZA EMERGRNCY STOP RELAY
	=EST1/2S1 =EST =EST1/2	SICUREZZA PORTA COVER SWITCH
	=EST1/1KA1 =EST =EST1/1	RESET RESET
	=EST1/2SB1 =EST =EST1/2	EMERGENZA 1 EMERGENCY 1

Sim.\Sym.	Sigla\Item	Funzione\Use Type
	=EST1/3SH1 QG =EST1/3	RESET RESET
	=MM01/1K2 =MM01/1	WATTMETRO
	=MM01/1M1 QG =MM01/1	MOTORE PRINCIPALE PAIN MOTOR
	=MM01/1KM1 QG =MM01/1	AVVIAMENTO MOTORE START MOTOR
	=MM01/1QF1 QG =MM01/1	PARTENZA MOTORE MANUALE MANUAL MOTOR STARTER
	=MM01/2SH1 QG =MM01/2	START/STOP MOTORE PRINCIPALE MAIN MOTOR START/STOP
	=MMI1/1D2 QG =MMI1/1	PANNELLO OPERATORE OPERATOR PANEL
	=MXP1/1A1 =MXP1/1	PORTAFUSIBILE FUSE CARRIER
	=MXP1/1M1 =MDR =MXP1/1	POMPA PUMP
	=MXP1/1U1 QG =MXP1/1	VARIATORE DI VELOCITA SPEED CONVERTER DRIVE
	=MXP1/3S1 QG =MXP1/3	CLIXON MOTORE POMPA PUMP MOTOR CLIXON

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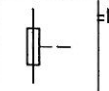
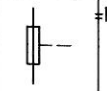
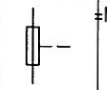
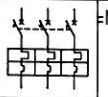
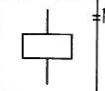
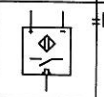
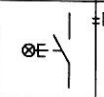
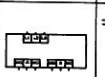
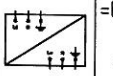
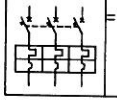
Project	FRIGUS 600 PLC	Title	LEGENDA FUNZIONI *FUNCTION LIST*
Date	01/12/03	Sign.	BAKIR-M240034
Id/rev.	13020369	Dev.Func.	=FUNL
Location		Global sheet:	3
		Function sheet:	1

Print date : @plotdate

Sim.\Sym.	Sigla\Item	Funzione\Use Type
	=MXP1/1FU1 QG =MXP1/1	FUSIBILE 20A FUSE 20A
	=MXP1/1FU2 QG =MXP1/1	FUSIBILE 20A FUSE 20A
	=MXP1/1FU3 QG =MXP1/1	FUSIBILE 20A FUSE 20A
	=MXP1/1QF1 QG =MXP1/1	PROTEZIONE INVERTER INVERTER PROTECTION
	=MXP1/2KM1 QG =MXP1/2	START START
	=MXP1/2SQ1 QG =MXP1/2	PROXIMITY PROXIMITY
	=MXP1/3SH1 QG =MXP1/3	START/STOP POMPA START/STOP PUMP
	=PSP/2G3 QG =PSP/2	RELE CONTROLLO FASI PHASE MONITORING
	=PSP/3G3 QG =PSP/3	ALIMENTATORE 24VDC DC POWER SUPPLY
	=PSP/1QS1 QG =PSP/1	INTERRUTTORE GENERALE MANUAL MOTOR STARTER
	=PSP/3QF1 QG =PSP/3	PROTEZIONE ALIMENTATORE POWER SUPPLY PROTECTION

Sim.\Sym.	Sigla\Item	Funzione\Use Type
	=PSP/3QF2 QG =PSP/3	PROTEZIONE AUSILIARI 24VDC AUXILIARY 24VDC PROTECTION
	=PSP/4SH1 QG =PSP/4	START/STOP SEQUENZA START/STOP SEQUENCE
	=RCK/1D2 QG =RCK/1	CPU CPU
	=RCK/1D4 QG =RCK/1	MODULO DIGITALE PLC INPUT/OUTPUT PLC DIGITAL INPUT/OUTPUT MODULE
	=RCK/1D6 QG =RCK/1	MODULO PLC INPUT&OUTPUT ANALOGICI PLC ANALOGIC INPUT&OUTPUT MODULE
	=VNT1/1M2 QG =VNT1/5	VENTILAZIONE QUADRO CABINET VENTILATION

Sim.\Sym.	Sigla\Item	Funzione\Use Type

Tetra Pak Hoyer

Project: FRIGUS 600 PLC	Title: LEGENDA FUNZIONI / *FUNCTION LIST*	Id/rev.: 13020369	Dev.Func.: =FUNL
Date: 01/12/03	Sign.: BAKIR-M240034	Location:	Global sheet: 4 / Function sheet: 2

Print date : @plotdate

Nome/Item	Tipo/Type	Descrizione/Description	Costruttore/Marke	Quadro/Board	Fg/Sh	Q.ta/Q.ty
=AIR1/1S1		Comandato dalla pressione (pressostato) NO		QG	=AIR1/1	1
=AIR1/1SH1	3SB35010AA41	PULSANTE LUMINOSO METALLO VERDE 22	SIEMENS	QG	=AIR1/1	1
	3SB34001D	PORTALAMPADA CON LAMPADA 24V PER PULSANTI LUMINOSI	SIEMENS			1
	3SB34000B	BLOCCO CONTATTO 1NO PER PULSANTI	SIEMENS			1
	3SB34000B	BLOCCO CONTATTO 1NO PER PULSANTI	SIEMENS			1
=CIP1/1KA1	G2R-1-S 24Vc.c.	Relè ausiliario zoccolato 1 contatto di scambio	OMRON	QG	=CIP1/1	1
	P2RF-05-E	Zoccolo per relè	OMRON			1
=CIP1/1SH1	3SB35010AA41	PULSANTE LUMINOSO METALLO VERDE 22	SIEMENS	QG	=CIP1/1	1
	3SB34001D	PORTALAMPADA CON LAMPADA 24V PER PULSANTI LUMINOSI	SIEMENS			1
	3SB34000B	BLOCCO CONTATTO 1NO PER PULSANTI	SIEMENS			1
	3SB34000B	BLOCCO CONTATTO 1NO PER PULSANTI	SIEMENS			1
=CIP1/1YV1		Elettrovalvola aperta (in chiusura)		QG	=CIP1/1	1
=COL1/1M1		Motore asincrono trifase		QG	=COL1/1	1
=COL1/1QF1	3RV10 31-4EA10+3RV19011E	Int. aut. magnetotermico tripolare+Contatti aux.	SIEMENS	QG	=COL1/1	1
=COL1/1QF2	5SY61027BB	INT.AUT.1P C 2A 6KA IP2X	SIEMENS	QG	=COL1/1	1
=COL1/2KM1	3RT10 34-1BB40	Bobina contattore	SIEMENS	QG	=COL1/2	1
	3RH19111FA22	BLOC.CONT.AUX.2L 2R S00	SIEMENS			1
=COL1/2S1		Comandato dalla pressione (pressostato) NC		QG	=COL1/2	1
=COL1/2SH1	3SB35010AA41	PULSANTE LUMINOSO METALLO VERDE 22	SIEMENS	QG	=COL1/2	1
	3SB34001D	PORTALAMPADA CON LAMPADA 24V PER PULSANTI LUMINOSI	SIEMENS			1
	3SB34000B	BLOCCO CONTATTO 1NO PER PULSANTI	SIEMENS			1
	3SB34000B	BLOCCO CONTATTO 1NO PER PULSANTI	SIEMENS			1
=COL1/3U1	G3R-0DX-025N + P2RF-05-E	RELE' STATICO 2A	OMRON	QG	=COL1/3	1
=COL1/3U2	G3R-0DX-025N + P2RF-05-E	RELE' STATICO 2A	OMRON	QG	=COL1/3	1
=COL1/3YV1		Elettrovalvola aperta (in chiusura)		QG	=COL1/3	1
=COL1/3YV2		Elettrovalvola aperta (in chiusura)		QG	=COL1/3	1
=EST1/1K1	3TK28251BB40	Disp.sicurezza Siemens (3TK2825).	SIEMENS	QG	=EST1/1	1
=EST1/1KA1	G2R-1-S 24Vc.c.	Relè ausiliario zoccolato 1 contatto di scambio	OMRON	=EST	=EST1/1	1
	P2RF-05-E	Zoccolo per relè	OMRON			1
=EST1/2SB1	3SB35001HA20	PULANTE FUNGO EM.SBL.ROT.	SIEMENS	=EST	=EST1/2	1
	3SB34000B	BLOCCO CONTATTO 1NO PER PULSANTI	SIEMENS			1
	3SB34000C	BLOCCO CONTATTO 1NC PER PULSANTI	SIEMENS			1
	3SB39010AB	SUPPORTO PER PULSANTI	SIEMENS			1
=EST1/3S1		Fine corsa NO		=EST	=EST1/3	1
=EST1/3SH1	3SB35010AA51	PULSANTE LUMINOSO METALLO BLU 22	SIEMENS	QG	=EST1/3	1
	3SB34001D	PORTALAMPADA CON LAMPADA 24V PER PULSANTI LUMINOSI	SIEMENS			1
	3SB34000B	BLOCCO CONTATTO 1NO PER PULSANTI	SIEMENS			1
	3SB34000B	BLOCCO CONTATTO 1NO PER PULSANTI	SIEMENS			1
=MM01/1KM1	3RT10 25-1BB40	Bobina contattore	SIEMENS	QG	=MM01/1	1
=MM01/1M1		Motore asincrono trifase		QG	=MM01/1	1
=MM01/1QF1	3RV10 21-4AA10+3RV19011E	Int. aut. magnetotermico tripolare+Conatti aux.	SIEMENS	QG	=MM01/1	1
=MM01/1R1		Morsetto con resistore 1 KOhm	WEIDMULLER	QG	=MM01/1	1
=MM01/1U2	E82 2025	Trasformatore amperometrico GAVAZZI.	CARLO GAVAZZI	QG	=MM01/1	1
=MM01/2SH1		Pulsante con lampada di segnalazione incorporata NO		QG	=MM01/2	1
=MMI1/1D2	TP170A 6AV6 545-0BA15-2AX0	Pannello operatore	SIEMENS	QG	=MMI1/1	1

Tetra Pak Hoyer

Project FRIGUS 600 PLC	Title LISTA MATERIALI / *PART LIST*	Id/rev. 13020369	Dev.Func. =BOM
Date 01/12/03	Sign. BAKIR-M240034	Location	Global sheet: 5 Function sheet: 1

Print date : @plotdate

Nome/Item	Tipo/Type	Descrizione/Description	Costruttore/Marke	Quadro/Board	Fg/Sh	Q.ta/Q.ty
=MXP1/1M1		Motore asincrono trifase		=MDR	=MXP1/1	1
=MXP1/1M1		Contatto sensibile alla temperatura NC		QG	=MXP1/3	1
=MXP1/1QF1	3RV13 21-1BC10	INT.MAGNET.3x3.2A 2.2-3.2A	SIEMENS	QG	=MXP1/1	1
	3RV19 01-1E	CONTATTI AUSILIARI FRONTALI 1NO+1NC PER INTERRUTTORI: S00 - S0 - S2 - S3.	SIEMENS			1
=MXP1/1U1	VLT2807 195N1015	Inverter 2807 3X380/400V 0.75KW	DANFOSS	QG	=MXP1/1	1
=MXP1/2KM1	3RT10151BB42	CONT.S00 3KW 1R 24VCC	SIEMENS	QG	=MXP1/2	1
	3RT19161LM00	DIODO ANTIDISTURBO 24VDC S00	SIEMENS			1
=MXP1/2SQ1		Disp. di prossimita' alimentato in D.C. NO per Input PLC		QG	=MXP1/2	1
=MXP1/3SH1	3SB35010AA41	PULSANTE LUMINOSO METALLO VERDE 22	SIEMENS	QG	=MXP1/3	1
	3SB34001D	PORTALAMPADA CON LAMPADA 24V PER PULSANTI LUMINOSI	SIEMENS			1
	3SB34000B	BLOCCO CONTATTO 1NO PER PULSANTI	SIEMENS			1
	3SB34000B	BLOCCO CONTATTO 1NO PER PULSANTI	SIEMENS			1
=PSP/1QS1	3LD27 14-0TK53	INTERRUTTORE	SIEMENS	QG	=PSP/1	1
=PSP/2G3	3UG35 11-1BQ50	RELE CONTROLLO FASI	SIEMENS	QG	=PSP/2	1
=PSP/3A3	6EP14342BA00	ALIMENTATORE 3 AC 400/500VAC - 24VDC 10A	SIEMENS	QG	=PSP/3	1
=PSP/3QF1	3RV10111DA10	INT.MAGNET.3x3.2A 2.2-3.2A	SIEMENS	QG	=PSP/3	1
=PSP/3QF2	5SY61067BB	Int.-sez. di potenza aut. unipolare	SIEMENS	QG	=PSP/3	1
=PSP/4SH1	3SB35010AA41	PULSANTE LUMINOSO METALLO VERDE 22	SIEMENS	QG	=PSP/4	1
	3SB34001D	PORTALAMPADA CON LAMPADA 24V PER PULSANTI LUMINOSI	SIEMENS			1
	3SB34000B	BLOCCO CONTATTO 1NO PER PULSANTI	SIEMENS			1
	3SB34000B	BLOCCO CONTATTO 1NO PER PULSANTI	SIEMENS			1
=RCK/1D2	6ES7 214 1AD20-0XB0	CPU 224 6ES7 214 1DA20-0XB0 SIEMENS S7-200.	SIEMENS	QG	=RCK/1	1
=RCK/1D4	6ES7 223 1BH20-0XA0	Slot 8 Input 8 Output PLC S7-200 Siemens.	SIEMENS	QG	=RCK/1	1
=RCK/1D6	235-0KD21-0XA0	Slot 4 Input 1 Output PLC S7-200 Siemens.	SIEMENS	QG	=RCK/1	1
=VNT1/1M2	3322.024+3322.200+3322.800	Motore corrente continua eccitazione in serie+Filtro uscita+cuffia protezione	RITTAL	QG	=VNT1/5	1
J1	9 POLI	Connettore a vaschetta 9 poli	ILME	QG	=AIR1/2	1
X11	WDU 2.5	Morsetto standard 2,5mm per barra Omega	WEIDMULLER	QG	=MM01/1	4
X21	SAK 2.5	Morsetto standard 2,5mm per barra Din	WEIDMULLER	QG	=COL1/1	9
X41	WDU 2.5	Morsetto standard 2,5mm per barra Omega	WEIDMULLER	QG	=AIR1/2	3
X52	SAK 2.5	Morsetto standard 2,5mm per barra Din	WEIDMULLER	QG	=EST1/2	10
X55	SAK 2.5	Morsetto standard 2,5mm per barra Din	WEIDMULLER	QG	=AIR1/1	4
X56	SAK 2.5	Morsetto standard 2,5mm per barra Din	WEIDMULLER	QG	=MXP1/3	9
XI0	DLD 2.5	Morsetto comp. passante per sensori a 3 piani 2.5 mm	WEIDMULLER	QG	=MXP1/2	3
XI1	DLD 2.5	Morsetto comp. passante per sensori a 3 piani 2.5 mm	WEIDMULLER	QG	=EST1/3	6
XI2	DLD 2.5	Morsetto comp. passante per sensori a 3 piani 2.5 mm	WEIDMULLER	QG	=PSP/4	20
XQ2	DLD 2.5	Morsetto comp. passante per sensori a 3 piani 2.5 mm	WEIDMULLER	QG	=PSP/4	21

Tetra Pak Hoyer

Project: FRIGUS 600 PLC

Date: 01/12/03

Sign.: BAKIR-M240034

Title: LISTA MATERIALI / *PART LIST*

Id/rev.: 13020369

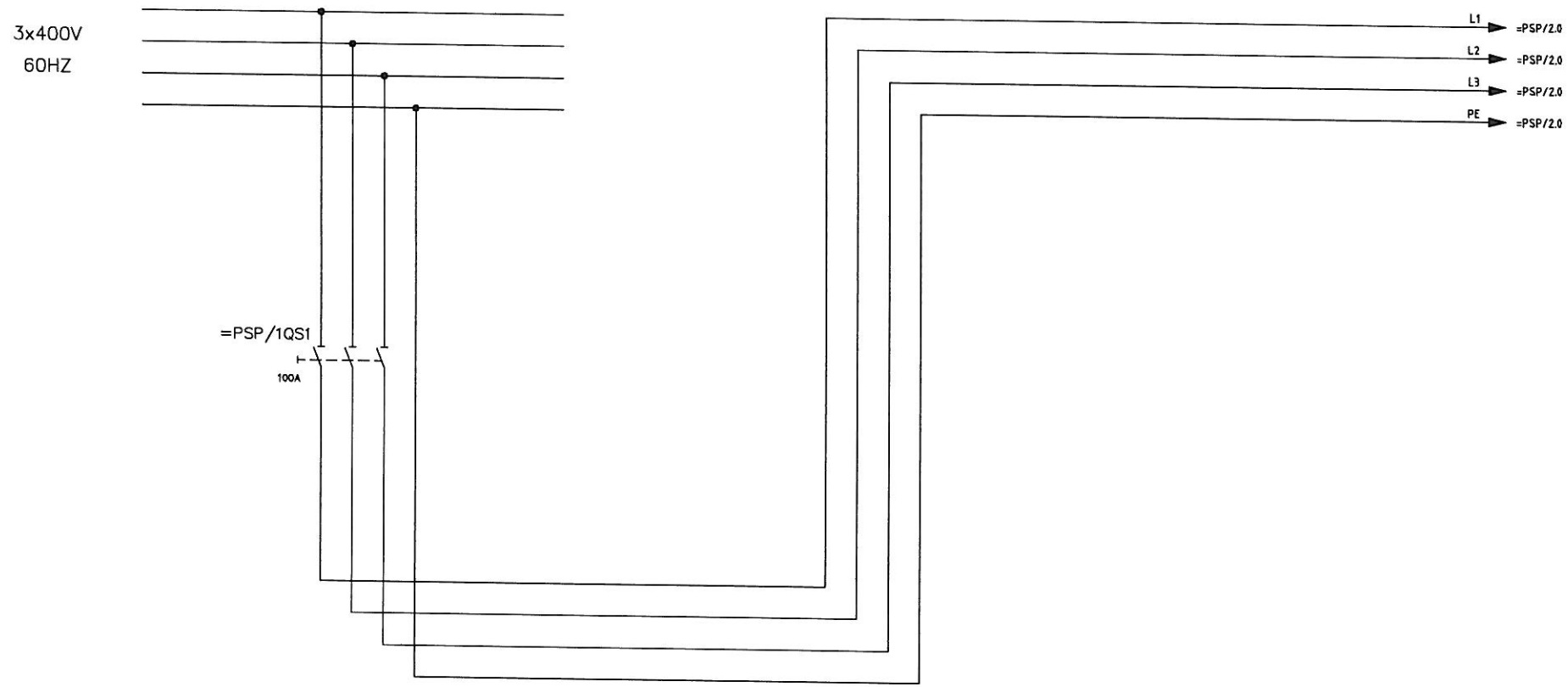
Location:

Dev.Func.: =BOM

Global sheet: 6

Function sheet: 2

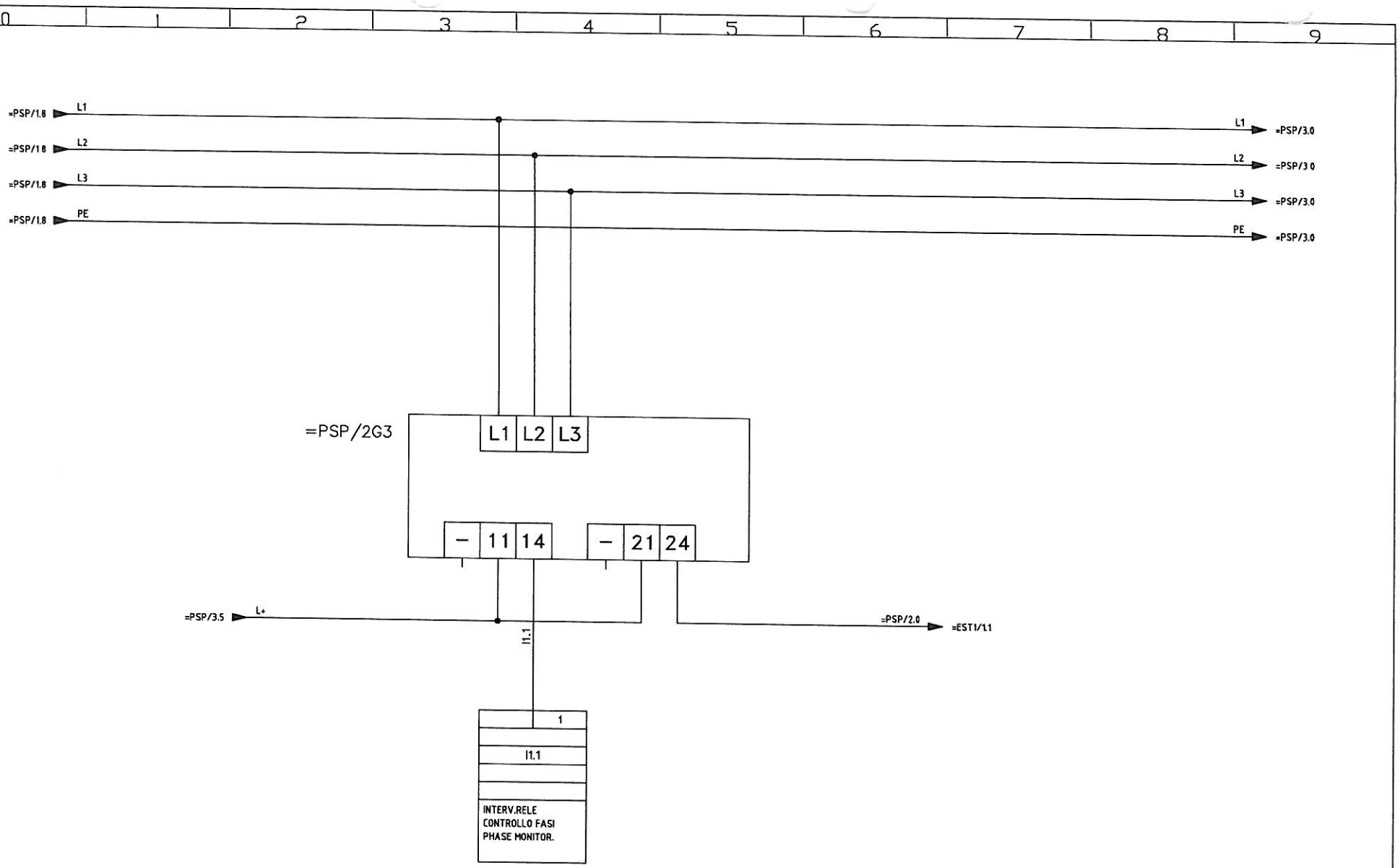
Print date : @plotdate



Tetra Pak Hoyer

Project: FRIGUS 600 PLC		Title: ALIMENTAZIONE GENERALE / *POWER SUPPLY*	Id/rev.: 13020369	Dev.Func.: =PSP	
Date: 01/12/03	Sign.: BAKIR-M240034		Location:	Global sheet: 7	Function sheet: 1

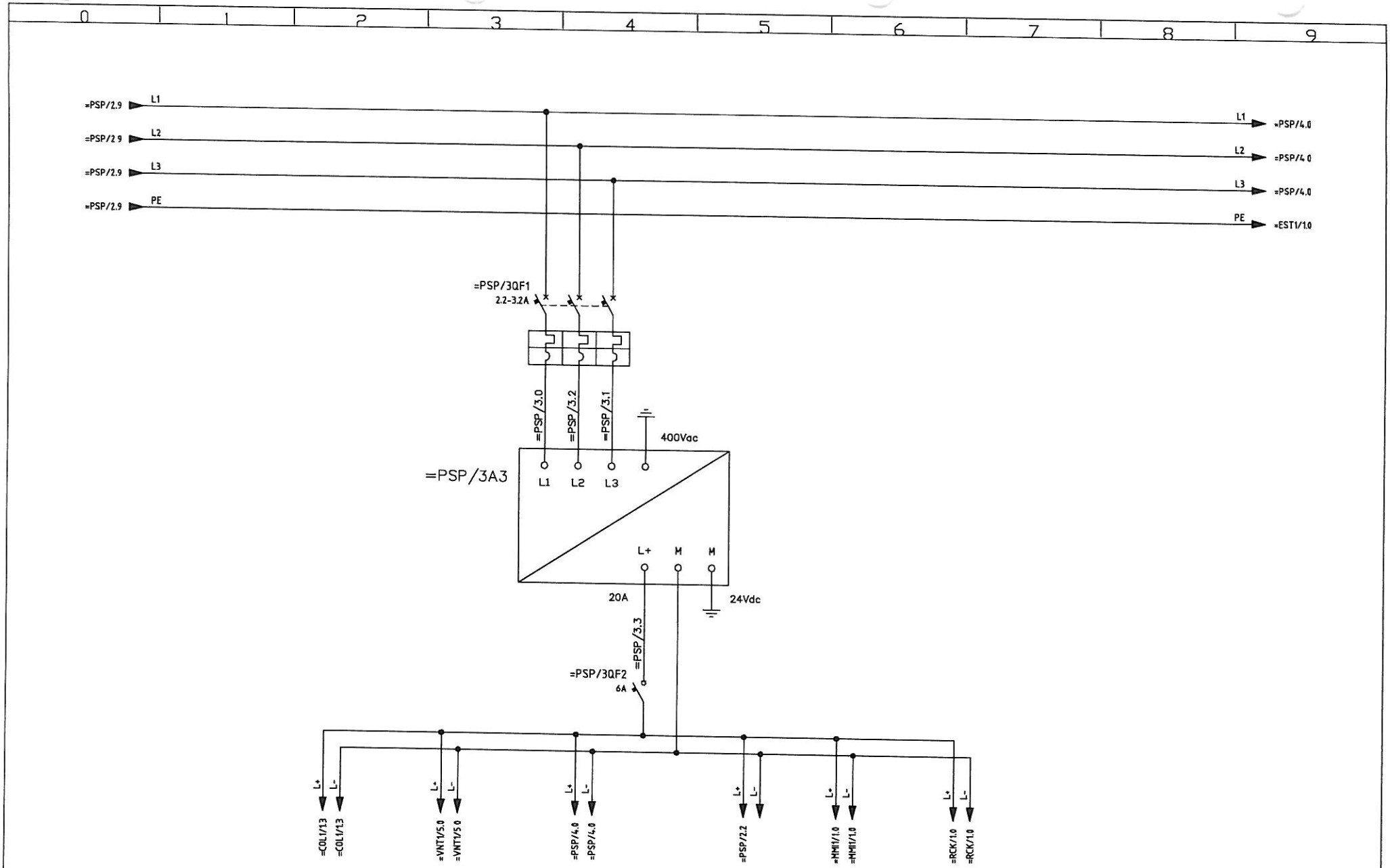
Print date : @plotdate



Tetra Pak Hoyer

Project: FRIGUS 600 PLC	Title: RELE CONTROLLO FASI / *PHASE MONITOTIHG*	Id/rev.: 13020369	Dev.Func.: =PSP
Date: 01/12/03	Sign.: BAKIR-M240034	Location:	Global sheet: 8 Function sheet: 2

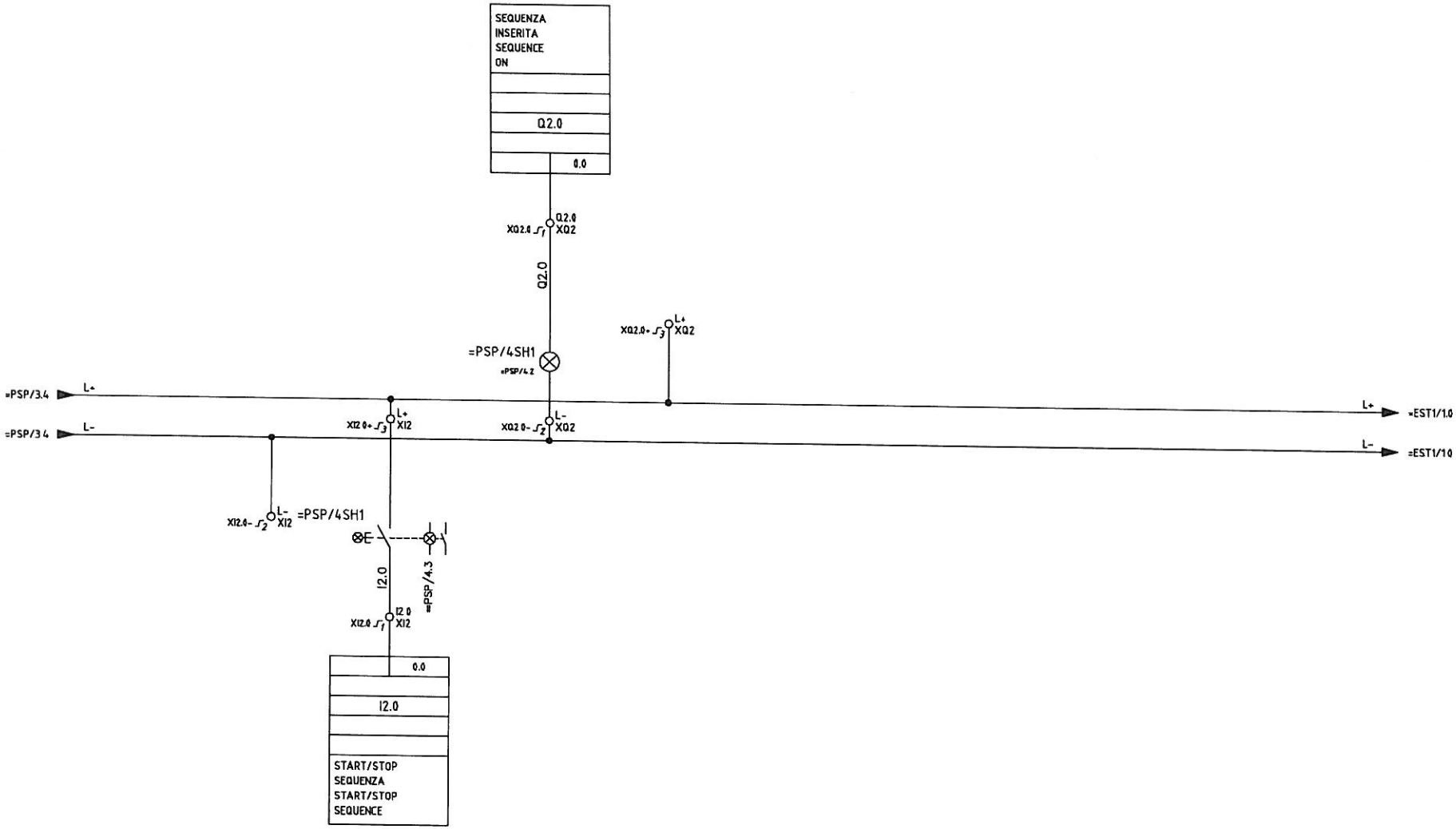
Print date : @plotdate



Tetra Pak Hoyer

Project: FRIGUS 600 PLC	Title: ALIMENTATORE / DC POWER SUPPLY	Id/rev.: 13020369	Dev.Func.: =PSP
Date: 01/12/03 — Sign.: BAKIR-M240034		Location:	Global sheet: 9 — Function sheet: 3

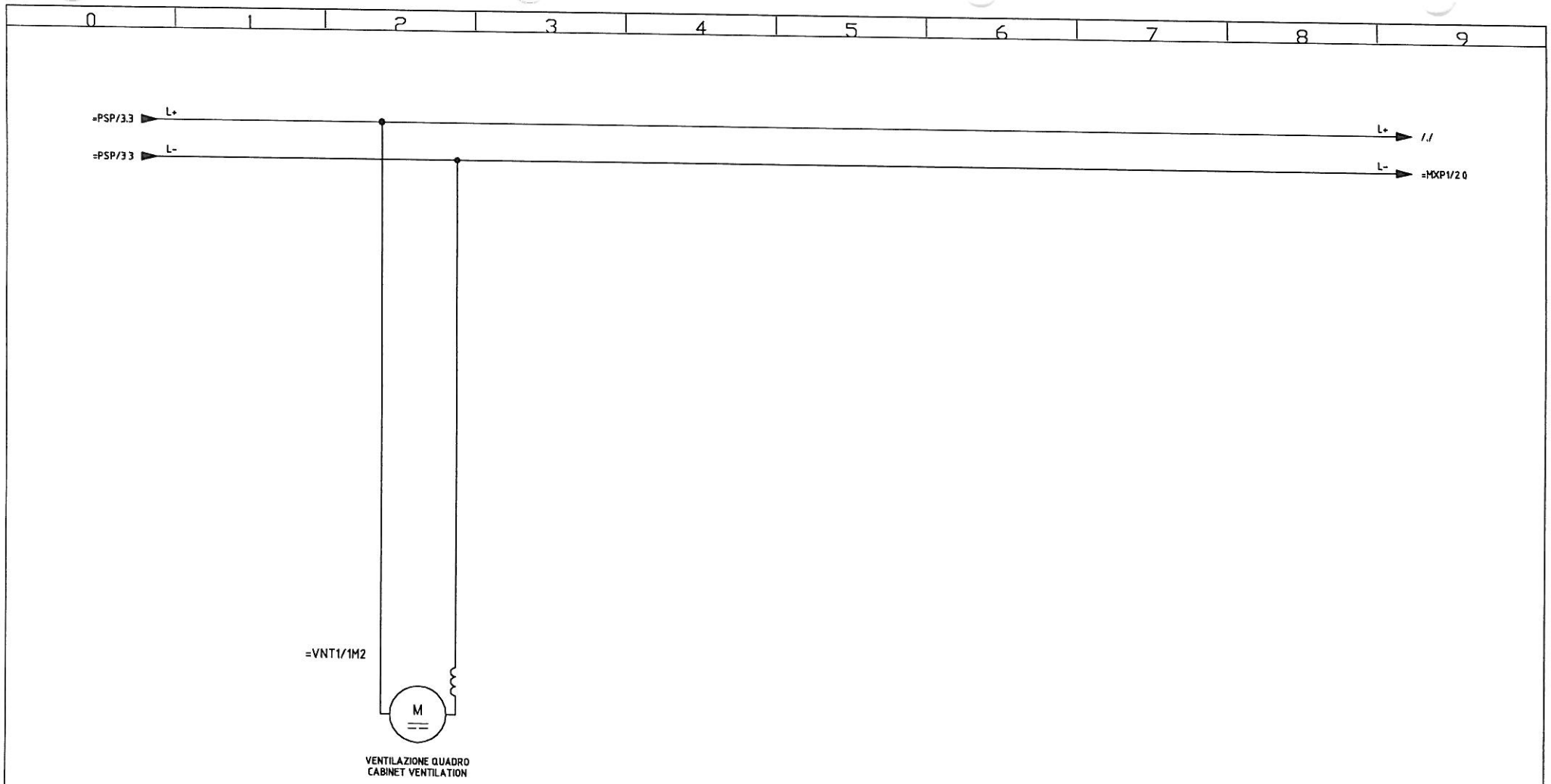
Print date : @plotdate



Tetra Pak Hoyer

Project: FRIGUS 600 PLC		Title: INPUT/OUTPUT / *INPUT/OUTPUT*	Id/rev.: 13020369	Dev.Func.: =PSP	
Date: 01/12/03	Sign.: BAKIR-M240034		Location	Global sheet: 10	Function sheet: 4

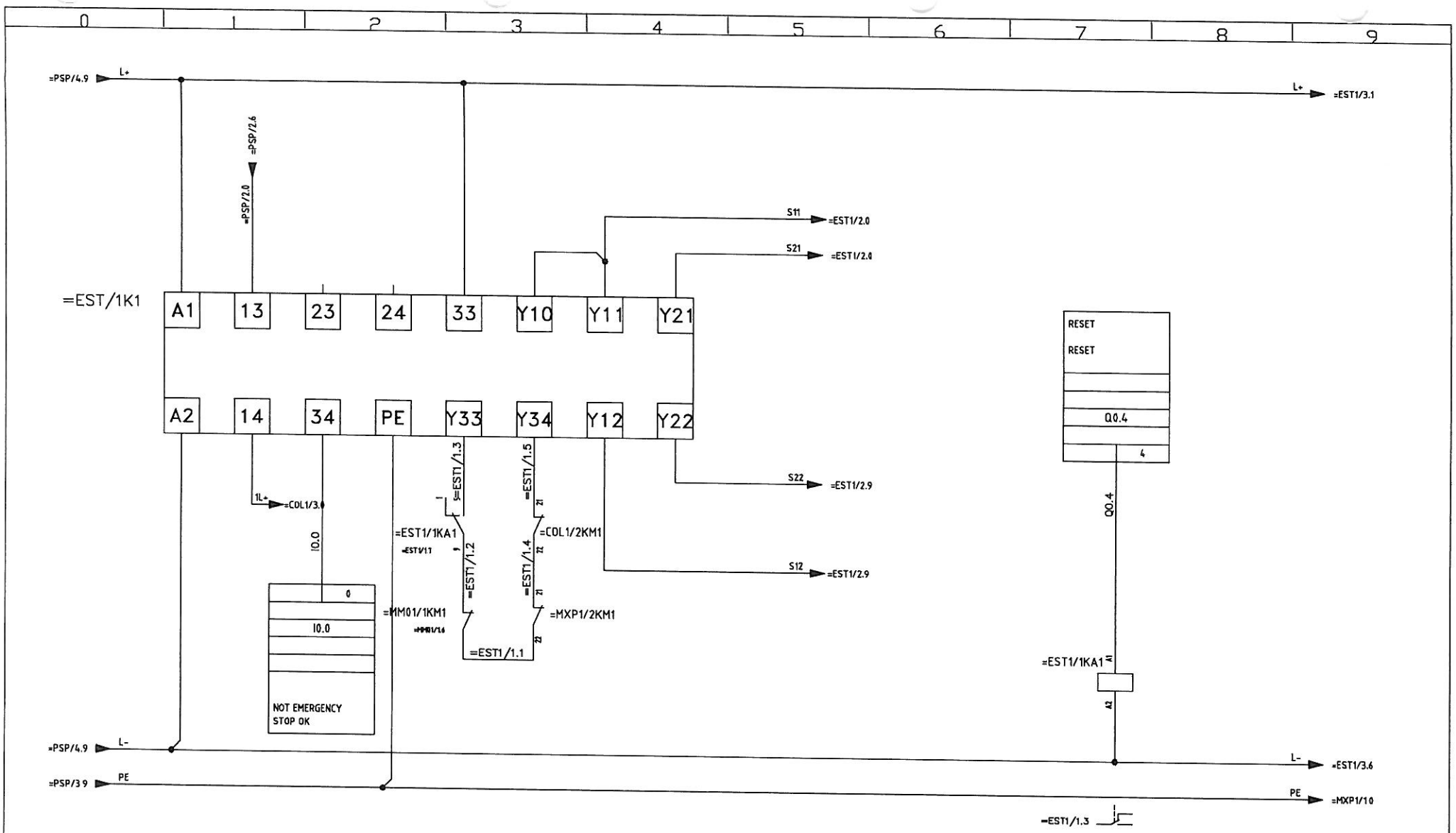
Print date : @plotdate



Tetra Pak Hoyer

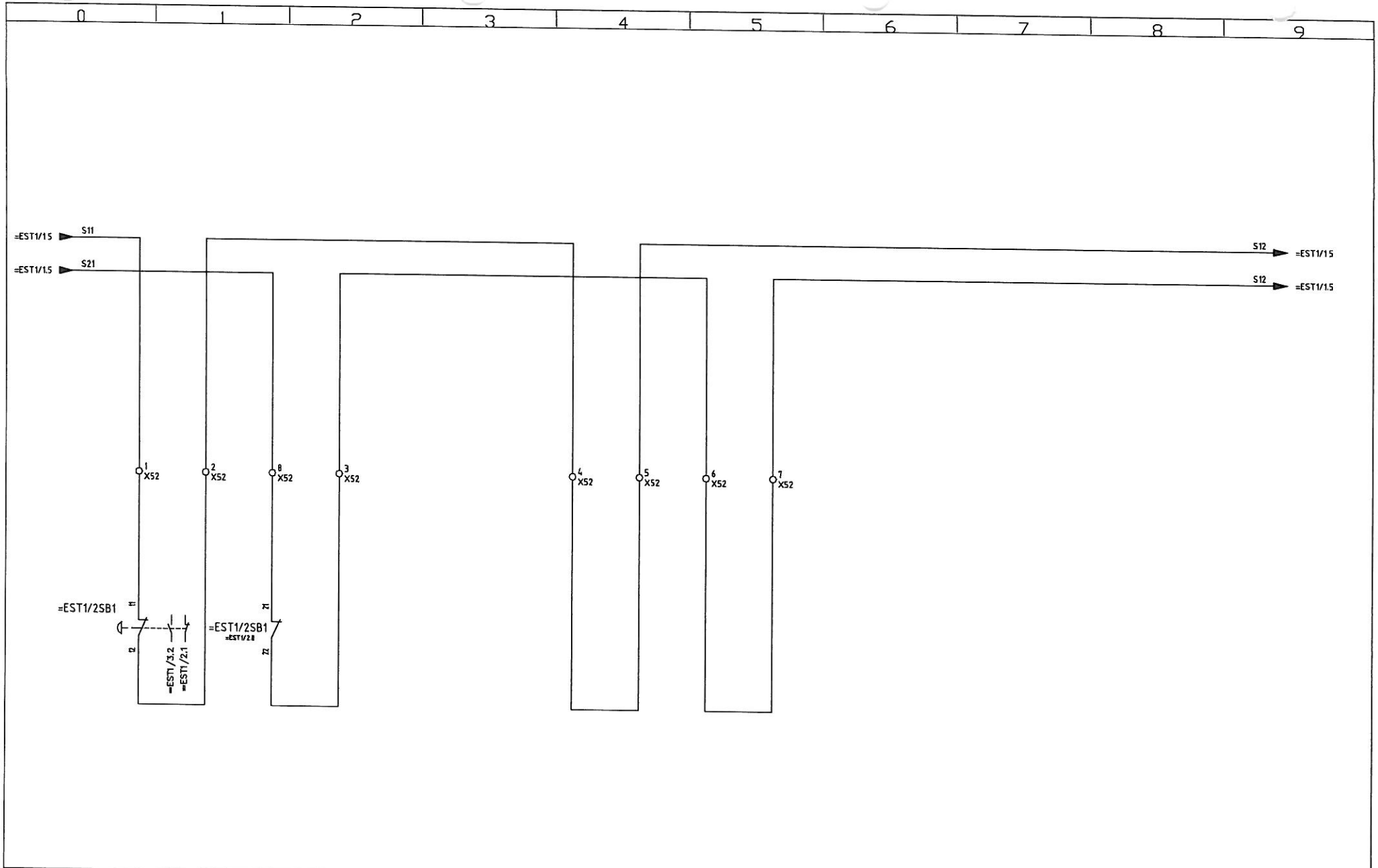
Project: FRIGUS 600 PLC		Title: VENTILAZIONE QUADRO / *CABINET VENTILATION*	Id/rev.: 13020369	Dev.Func.: =VNT1	
Date: 01/12/03	Sign.: BAKIR-M240034		Location	Global sheet: 11	Function sheet: 1

Print date : @plotdate



Tetra Pak Hoyer	Project FRIGUS 600 PLC	Title MODULO DI SICUREZZA / *SAFETY CONTROL*	Id/rev. 13020369	Dev.Func. =EST1
	Date 01/12/03 Sign. BAKIR-M240034		Location	Global sheet: 12 Function sheet: 1

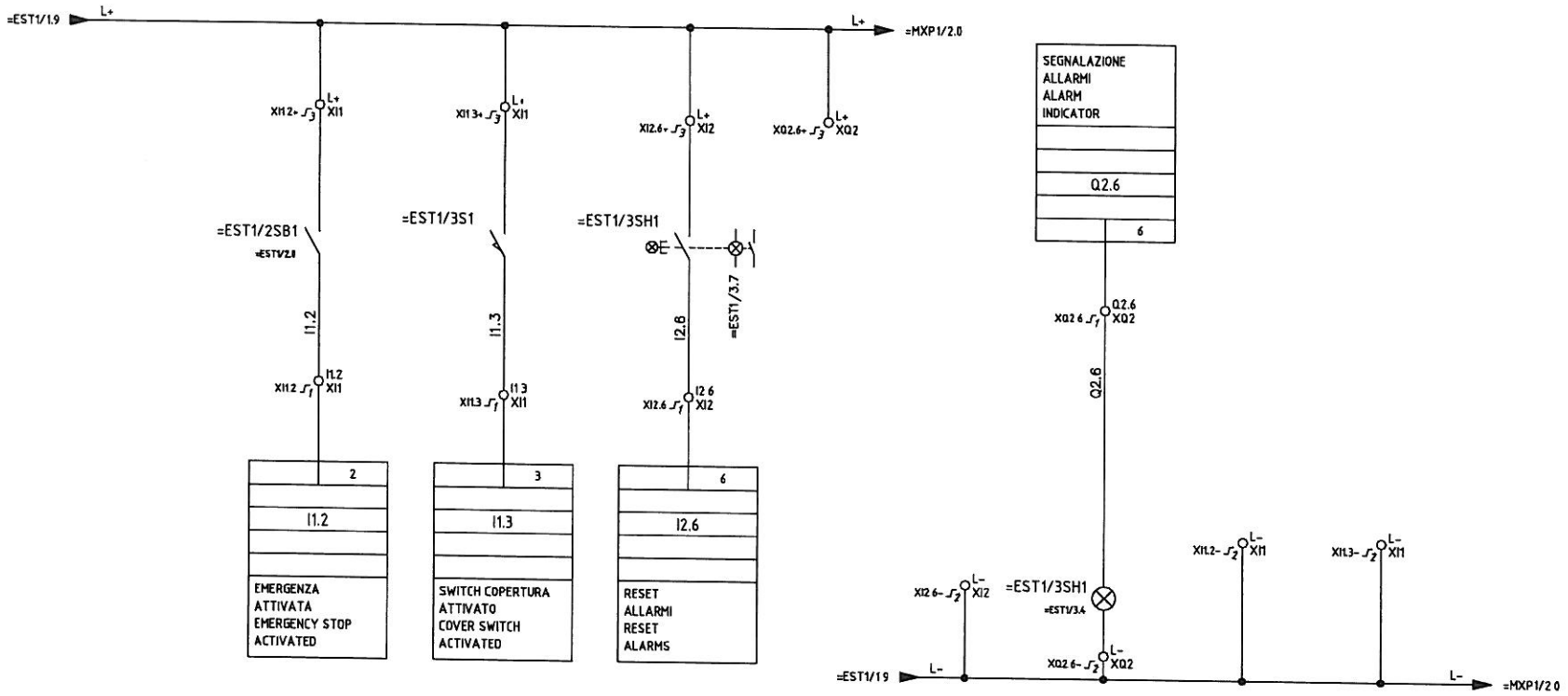
Print date : @plotdate



Tetra Pak Hoyer

Project: FRIGUS 600 PLC	Title: EMERGENZE 1 / EMERGENCY 1	Id/rev.: 13020369	Dev.Func.: =EST1
Date: 01/12/03 — Sign.: BAKIR-M240034		Location:	Global sheet: 13 — Function sheet: 2

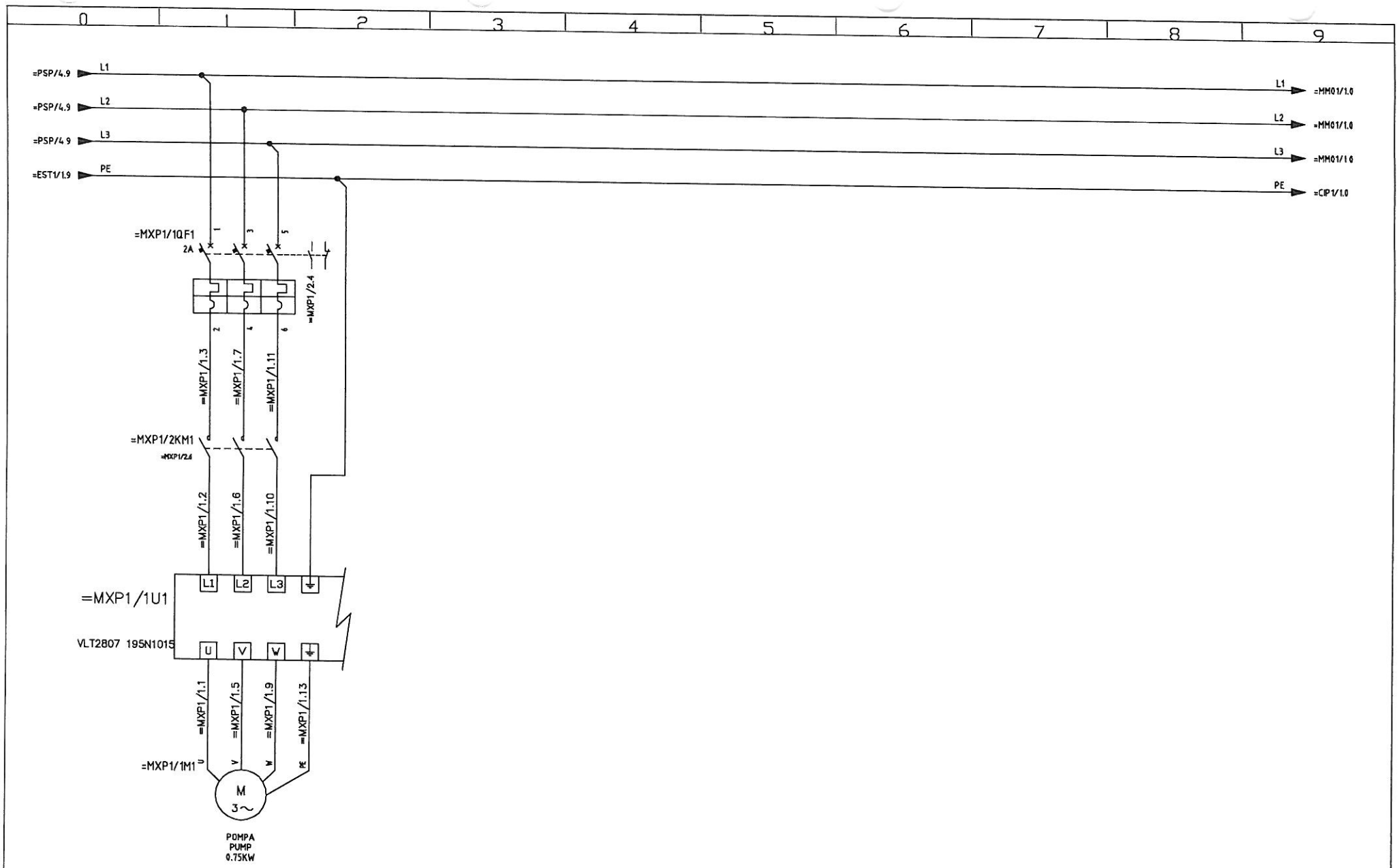
Print date : @plotdate



Tetra Pak Hoyer

Project: FRIGUS 600 PLC	Title: IMPUT/OUTPUT PLC / *IMPUT/OUTPUT PLC*	Id/rev.: 13020369	Dev.Func.: =EST1
Date: 01/12/03 — Sign.: BAKIR-M240034		Location:	Global sheet: 14 — Function sheet: 3

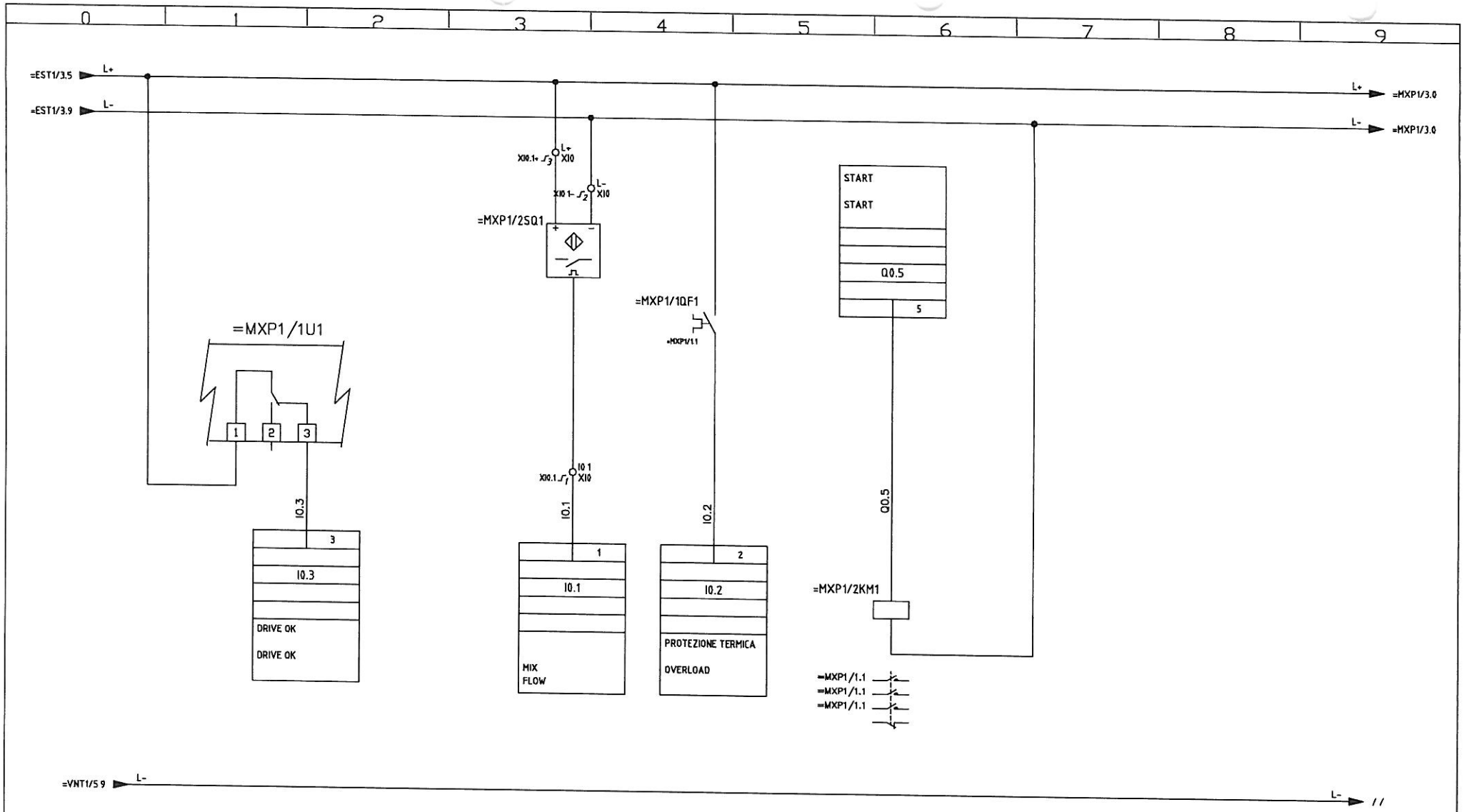
Print date : @plotdate



Tetra Pak Hoyer

Project FRIGUS 600 PLC		Title VARIATORE DI VELOCITA' - POTENZA	Id/rev. 13020369	Dev.Func. =MXP1	
Date 01/12/03	Sign. BAKIR-M240034	*SPEED CONVERTER DRIVE - POWER*	Location	Global sheet: 15	Function sheet: 1

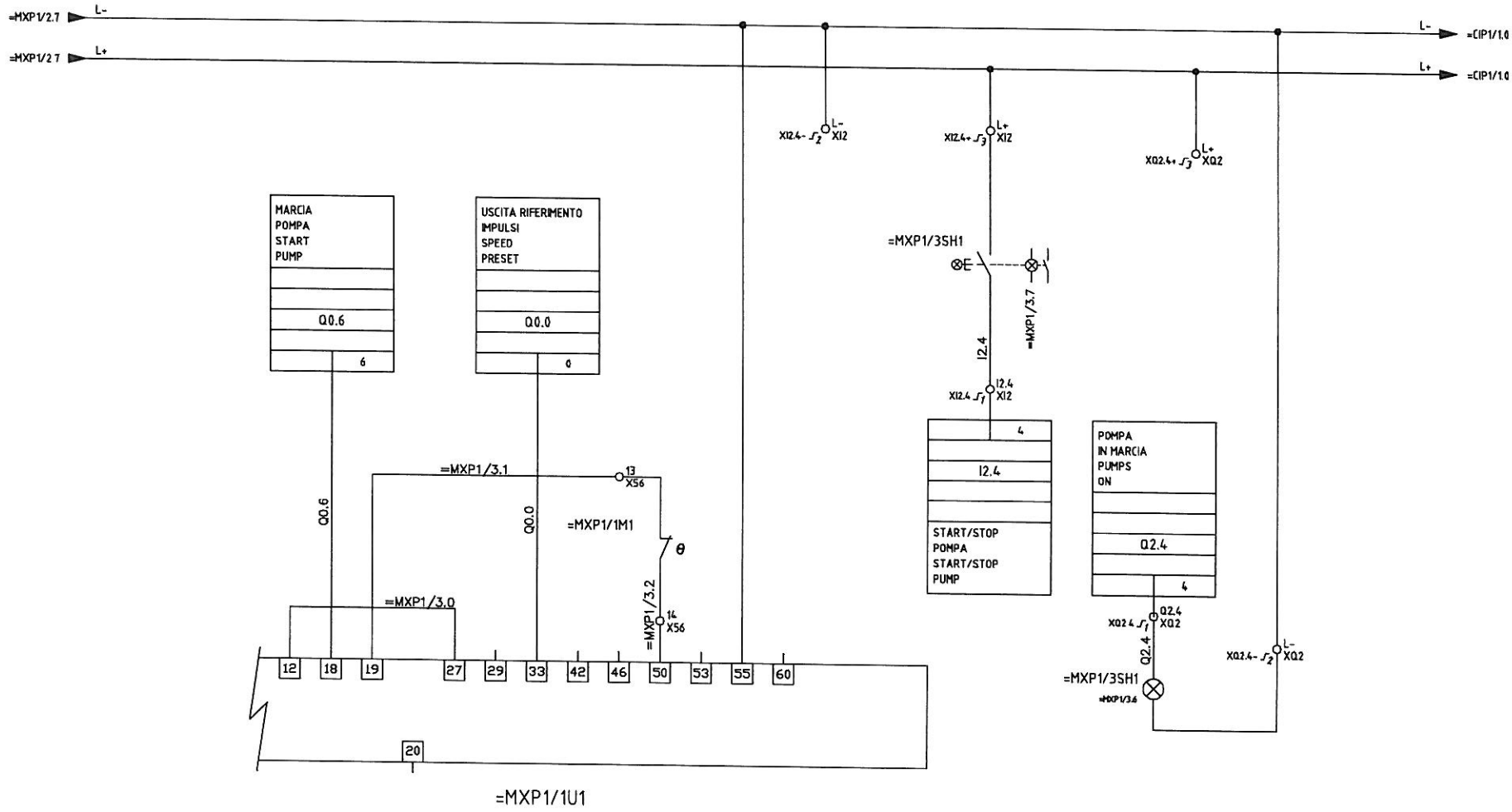
Print date : @plotdate



Tetra Pak Hoyer

Project: FRIGUS 600 PLC	Title: VARIATORE DI VELOCITA' - COMANDO / *SPEED CONVERTER DRIVE -*	Id/rev.: 13020369	Dev.Func.: =MXP1
Date: 01/12/03 Sign.: BAKIR-M240034		Location:	Global sheet: 16 Function sheet: 2

Print date : @plotdate



Tetra Pak Hoyer	Project: FRIGUS 600 PLC	Title: VARIATORE DI VELOCITA' - COMANDO / *SPEED CONVERTER DRIVE -*	Id/rev.: 13020369	Dev.Func.: =MXP1
	Date: 01/12/03 Sign.: BAKIR-M240034		Location	Global sheet: 17 Function sheet: 3

Print date : @plotdate

N°PAR.	PARAMETER DESCRIPTION	Frequency converter		
		Mix pump		Cream pump
		Dobbel piston	F.K.	
001	Language			
002	Local/remote operation			
003	Local reference			
004	Active Setup			
005	Programming Setup			
006	Setup copying			
007	LCP copy			
008	Display scaling of output frequency			
009	Large display readout			
010	Small display line 1.1			
011	Small display readout 1.2			
012	Small readout 1.3			
013	Local control			
014	Local stop			
015	Local jog			
016	Local reversing			
017	Local reset of trip			
018	Lock for data changes			
019	Operating mode at power-up, local operation			
100	Configuration			
101	Torque characteristic			
102	Motor power P (M,N)	0.75KW x	0.75KW x	
103	Motor voltage V (M,N)	400V x	400V x	
104	Motor frequency f (M,N)	50Hz x	50Hz x	
105	Motor current I (M,N)	2.0A x	2.2A x	
106	Rated motor speed	1435 x	1375 x	
107	Automatinc motor tuning, AMT			
108	Stator resistance R (s)			
109	Stator resistance X (s)			
119	High start torque			
120	Start delay			
121	Start function			
122	Function at stop			
123	Min. frequncy for activation of function aty stop			
126	DC brake time			
127	DC brake cut-in frequence			
128	Motor thermal protection			
130	Start frequence			
131	Initial voltage			
132	DC brake voltege			
133	Start voltage			
134	Load compensation			
135	U/f-ratio			
136	Slip compensation			
137	DC hold voltage			
138	Brake cut out value			
139	Brake cut in frequency			
142	Spread reactance X (L)			
143	Internal fan control	always ON	always ON	always ON
144	Gain AC brake			
200	Output frequency range			
201	Output frequency low limit, f (MIN)	15Hz	10Hz	

N°PAR.	PARAMETER DESCRIPTION	Frequency converter		
		Mix pump		Cream pump
		Dobbel piston	F.K.	
202	Output frequency high limit, f (MAX)	65Hz	44Hz	
203	Reference range			
204	Minimum reference, Ref(MIN)	15Hz	10Hz	
205	Maximum reference, Ref(MAX)	65Hz	44Hz	
206	Ramp type			
207	Ramp-up time 1			
208	Ramp-down time 1			
209	Ramp-up time 2			
210	Ramp-down time 2			
211	Jog ramp time			
212	Quick-stop ramp-down time			
213	Jog frequency			
214	Reference function			
215	Preset reference 1			
216	Preset reference 2			
217	Preset reference 3			
218	Preset reference 4			
219	Catch up/slow down reference			
221	Current limit, I (LIM)			
223	Warning: Low corrent, I (LOW)			
224	Warning: High current, I (HIGH)			
225	Warning: Low frequency, f (LOW)			
226	Warning: High frequency, f (HIGH)			
227	Warning:LOw feedback, FB (LOW)			
228	Warning: High feedback, FB (HIGH)			
229	Frequency by pass 1			
230	Frequency by pass 2			
231	Digital inputs, Term. N°18			
302	Digital inputs, Term. N°18			
303	Digital inputs, Term. N°19	31	31	
304	Digital inputs, Term. N°27	0	0	
305	Digital inputs, Term. N°29			
307	Digital inputs, Term. N°33	28	28	
308	Terminal 53, analogue input voltage	0	0	
309	Terminal 53, Min. scaling			
310	Terminal 53, Max scaling			
314	Terminal 60, analogue input current			
315	Terminal 60, Min. scaling			
316	Terminal 60, Max scaling			
317	Time out			
318	Function after time out			
319	Analogue output terminal 42			
323	Relay output 1-3			
327	Pulse / reference feedback	1000Hz	1000Hz	
341	Digital outputterminal 46			
342	Terminal 46, Max pulse output			
343	Precise stop function			
344	Counter value			
400	Brake function			
405	Reset function	Powerup	Powerup	
406	Automatic restart time			
409	Trip delay overcurrent, I (LIM)			

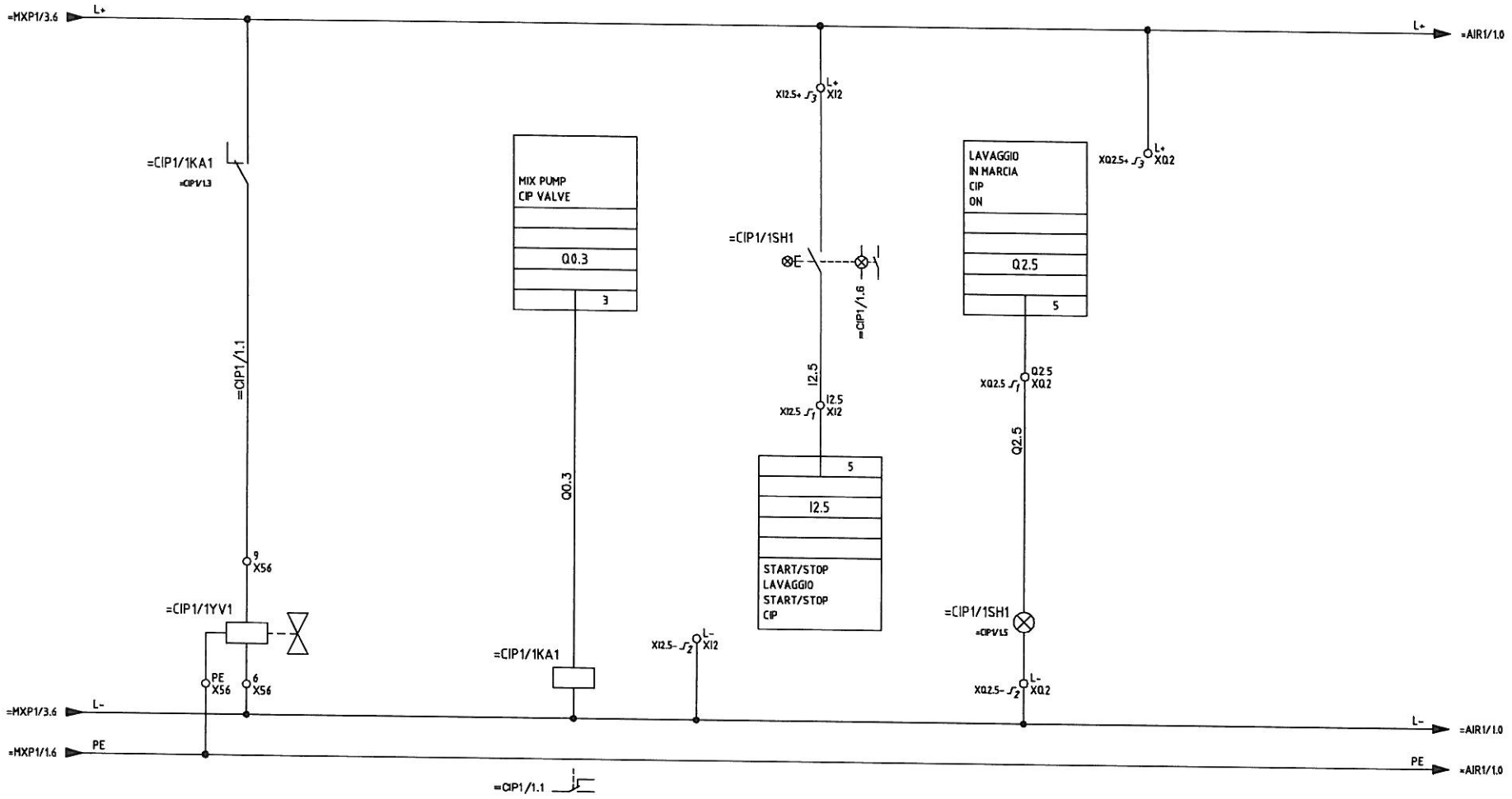
N°PAR.	PARAMETER DESCRIPTION	Frequency converter		
		Mix pump		Cream pump
		Dobbel piston	F.K.	
411	Switching frequency			
412	Variable switching frequency			
413	Overmodulation function			
414	Minimum feedback, FB (MIN)			
415	Maximum feedback, FB (MAX)			
416	Process units			
417	Speed PID proportional gain			
418	Speed PID integral time			
419	Speed PID differential time			
420	Speed PID D-gain limit			
421	Speed PID lowpass filter time			
423	U1 voltage			
424	F1 frequency			
425	U2 voltage			
426	F2 frequency			
427	U3 voltage			
428	F3 frequency			
437	Process PID normal/inverse control			
438	Process PID anti windup			
439	Process PID start frequency			
440	Process PID proportional gain			
441	Process PID integration time			
442	Process PID differentation time			
443	Process PID diff.gain limit			
444	Process PID lowpass filter time			
445	Flying factor			
451	FF factor			
452	Controller range			
800	Protocol select			
803	Bus time out			
804	Bus time out functionn			
805	Function of control word bit 10			
904	PPO type select for DP			
915	PCD config. write			
916	PCD config. Read			
917	Activate spontaneous messagees			
918	Station adress			
953	Warning parameter 1			
967	Contro word			
968	Status word			
970	Edit set up selection			
971	Store data values			

x = SEE MOT.ID. PLATE

Tetra Pak Hoyer

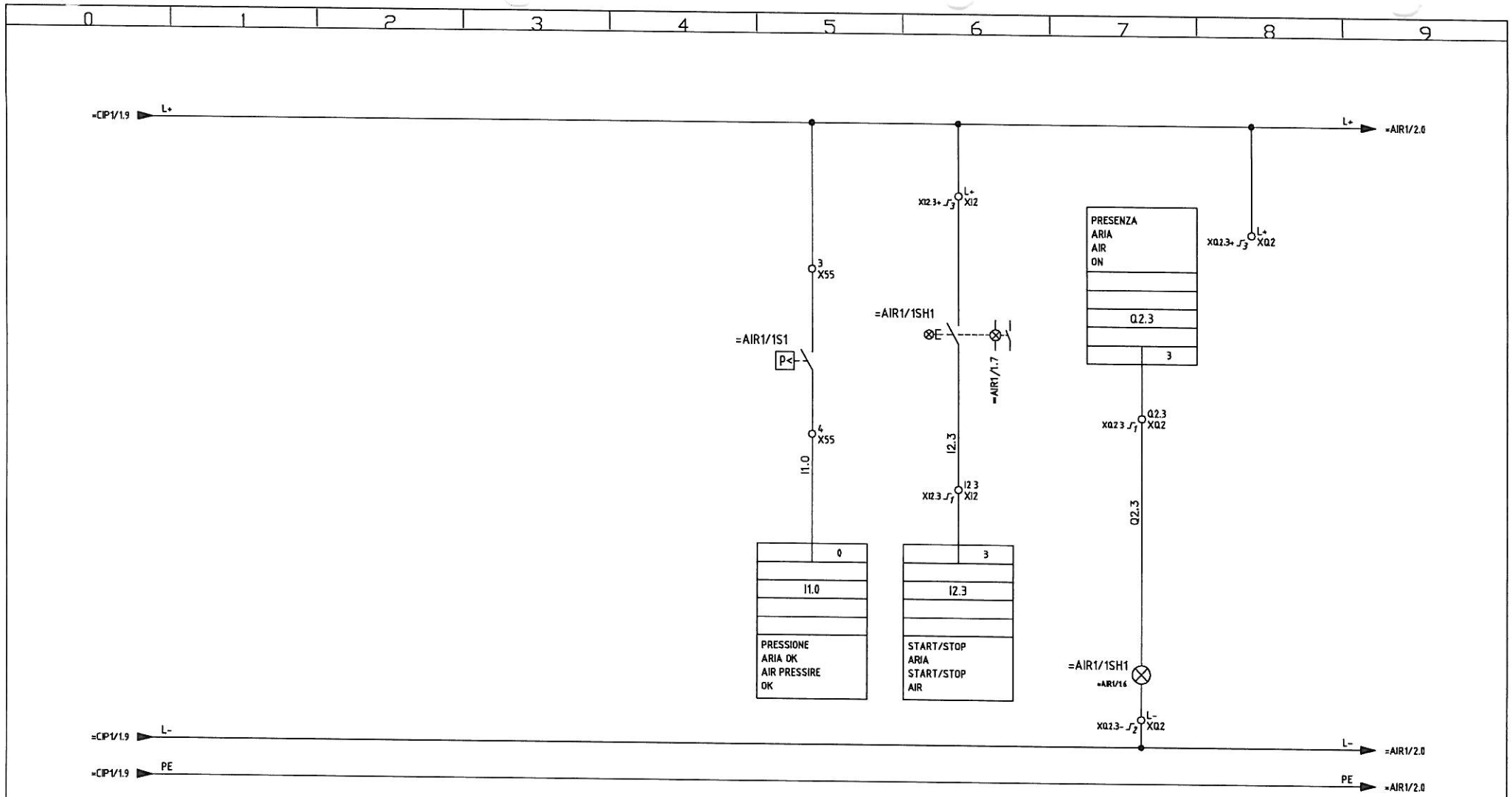
Project: FRIGUS 600 PLC	Title: DESCRIZIONE PARAMETRI / PARAMETER DESCRIPTION	Id/rev.: 13020369	Dev.Func.: =MXP1
Date: 01/12/03 — Sign.: BAKIR-M240034		Location	Global sheet: 17A — Function sheet: 4

Print date : @plotdate



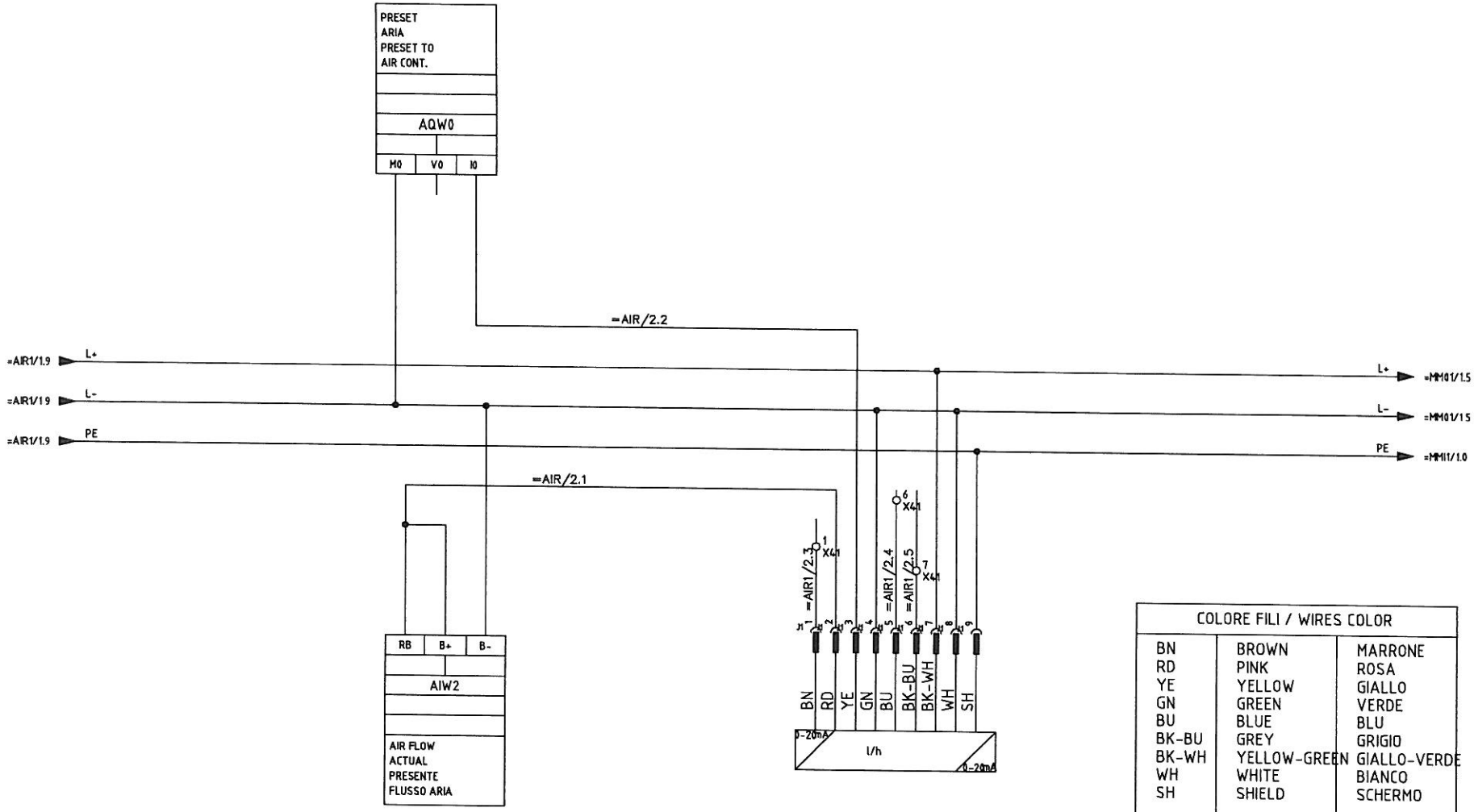
Tetra Pak Hoyer	Project FRIGUS 600 PLC		Title LAVAGGIO CIP	Id/rev. 13020369	Dev.Func. =CIP1
	Date 01/12/03	Sign. BAKIR-M240034		Location	Global sheet: 18 Function sheet: 1

Print date : @plotdate



Tetra Pak Hoyer	Project FRIGUS 600 PLC		Title ARIA GENERALE / *AIR SUPPLY*	Id/rev. 13020369	Dev.Func. =AIR1
	Date 01/12/03	Sign. BAKIR–M240034		Location	Global sheet: 19 Function sheet: 1

Print date : @plotdate



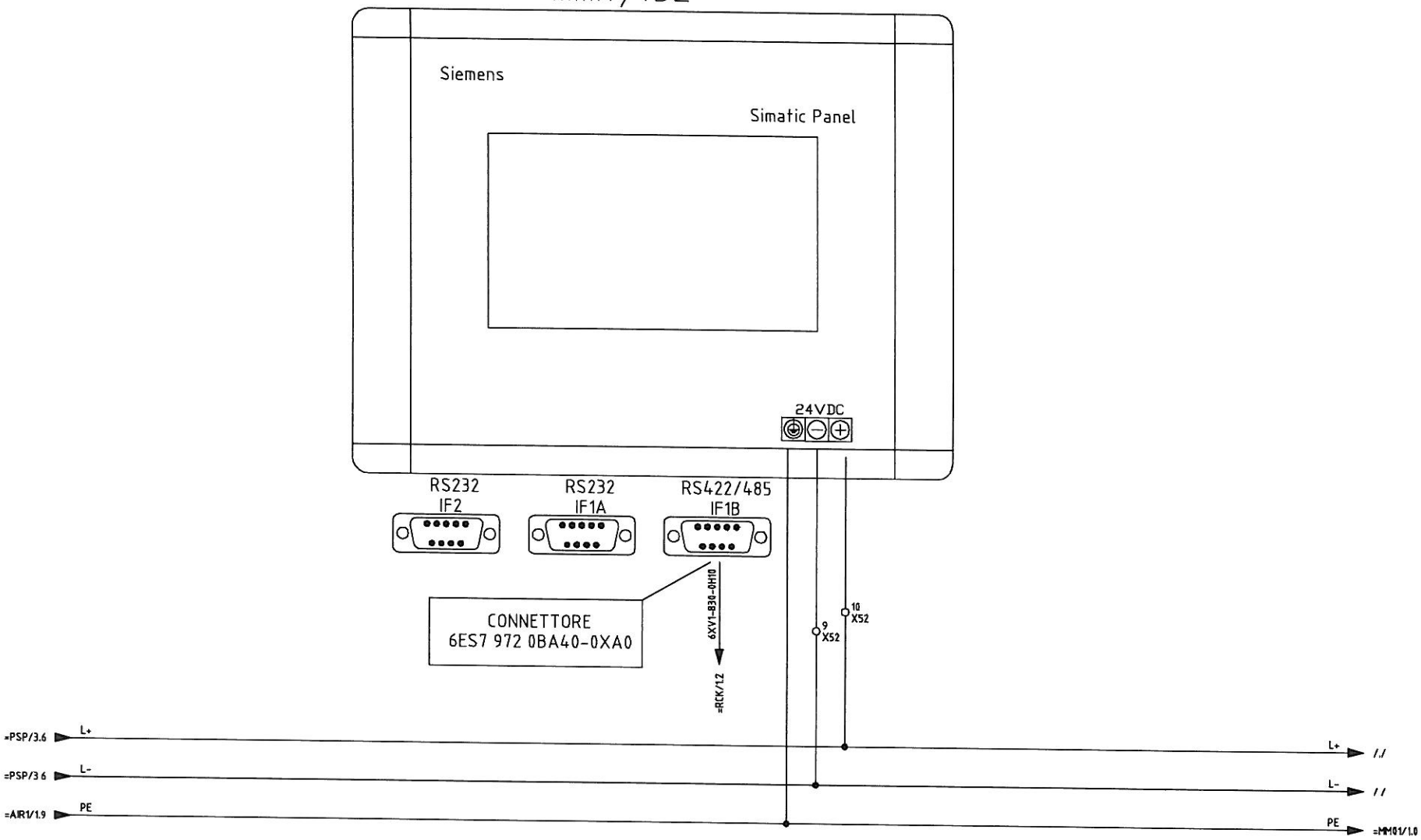
COLORE FILI / WIRES COLOR		
BN	BROWN	MARRONE
RD	PINK	ROSA
YE	YELLOW	GIALLO
GN	GREEN	VERDE
BU	BLUE	BLU
BK-BU	GREY	GRIGIO
BK-WH	YELLOW-GREEN	GIALLO-VERDE
WH	WHITE	BIANCO
SH	SHIELD	SCHERMO

Tetra Pak Hoyer

Project: FRIGUS 600 PLC	Title: CONTROLLO ARIA / *AIR CONTROL*	Id/rev.: 13020369	Dev.Func.: =AIR1
Date: 01/12/03	Sign.: BAKIR-M240034	Location:	Global sheet: 20 Function sheet: 2

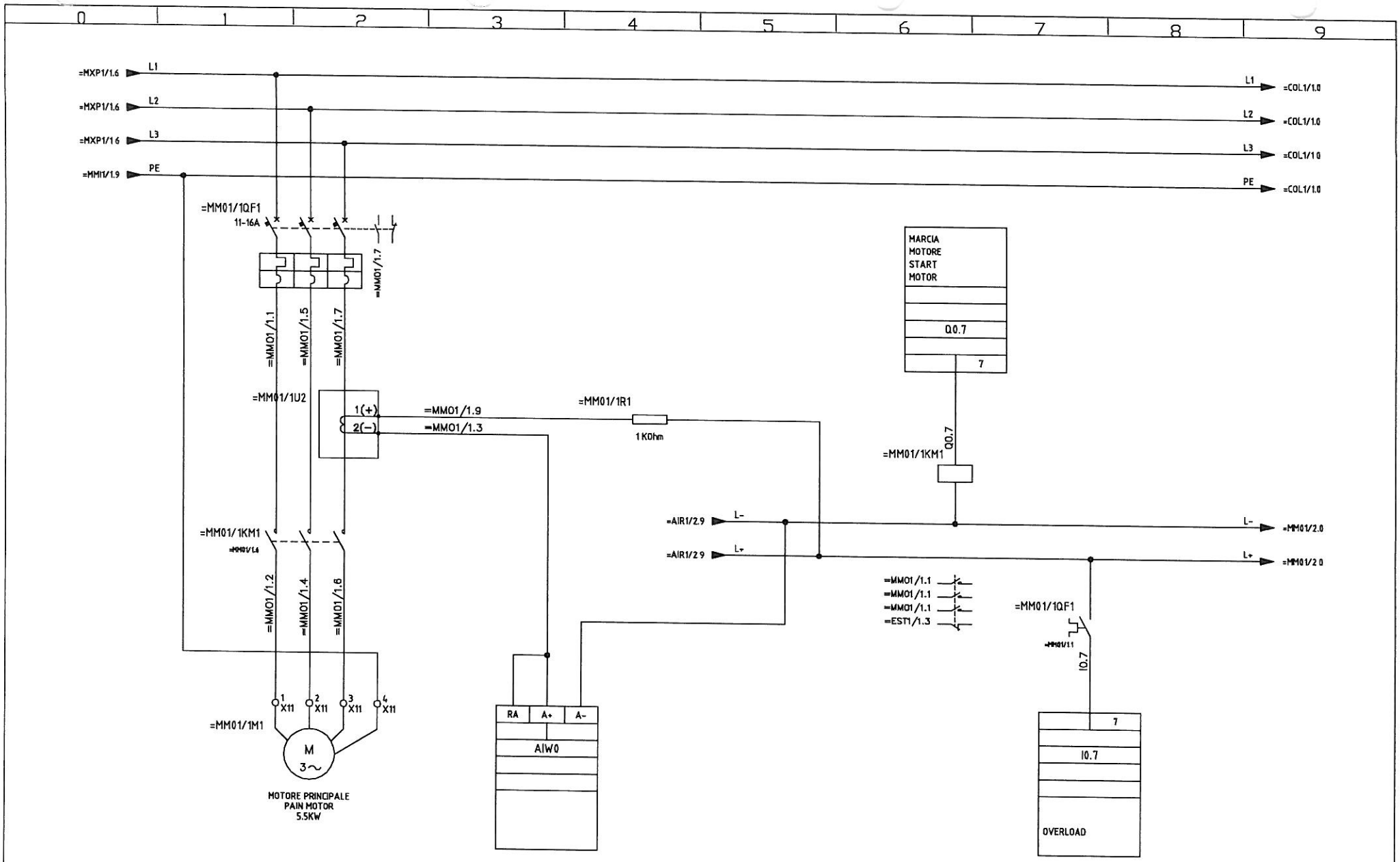
Print date : @plotdate

=MMI1/1D2



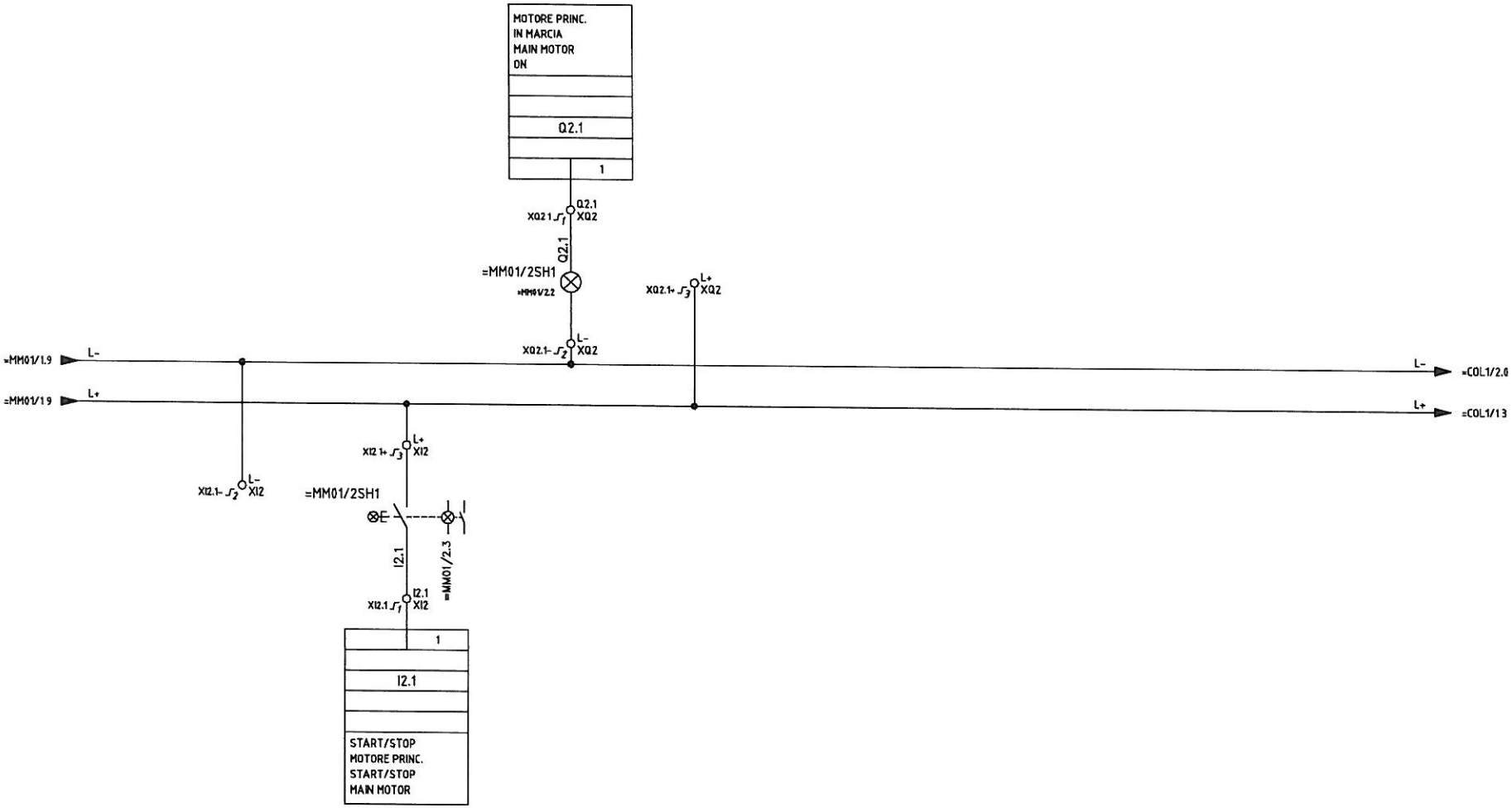
Tetra Pak Hoyer	Project FRIGUS 600 PLC		Title PANNELLO OPERATORE / CONTROL PANEL	Id/rev. 13020369	Dev.Func. =MMI1
	Date 01/12/03	Sign. BAKIR-M240034		Location	Global sheet: 21 Function sheet: 1

Print date : @plotdate



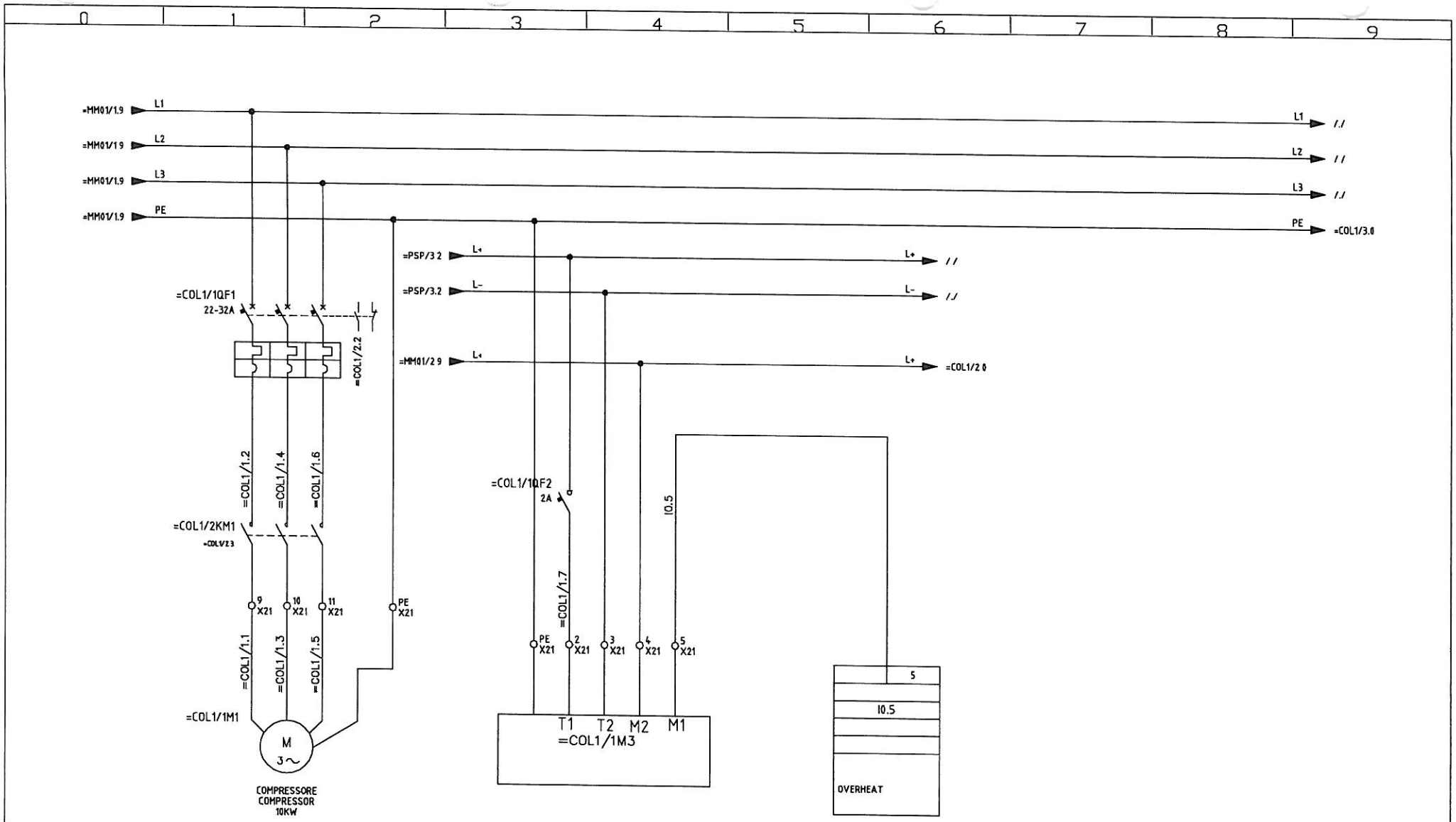
Tetra Pak Hoyer	Project FRIGUS 600 PLC	Title MOTORE PRINCIPALE / *MAIN MOTOR*	Id/rev. 13020369	Dev.Func. =MM01
	Date 01/12/03 Sign. BAKIR-M240034		Location	Global sheet: 22 Function sheet: 1

Print date : @plotdate



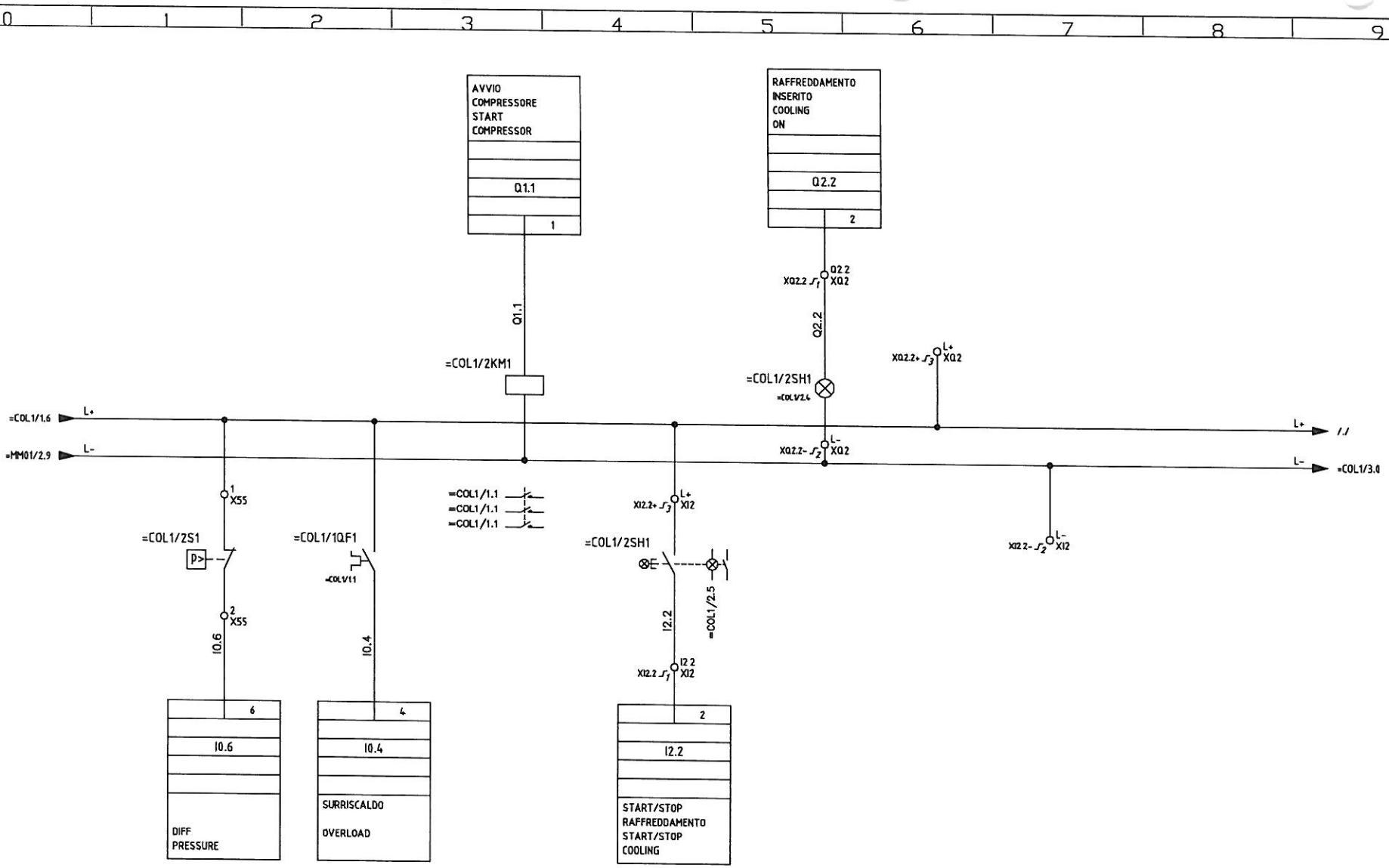
Tetra Pak Hoyer	Project FRIGUS 600 PLC		Title IMPUT/OUTPUT PLC *IMPUT/OUTPUT PLC*	Id/rev. 13020369	Dev.Func. =MM01
	Date 01/12/03	Sign. BAKIR-M240034		Location	Global sheet: 23 Function sheet: 2

Print date : @plotdate



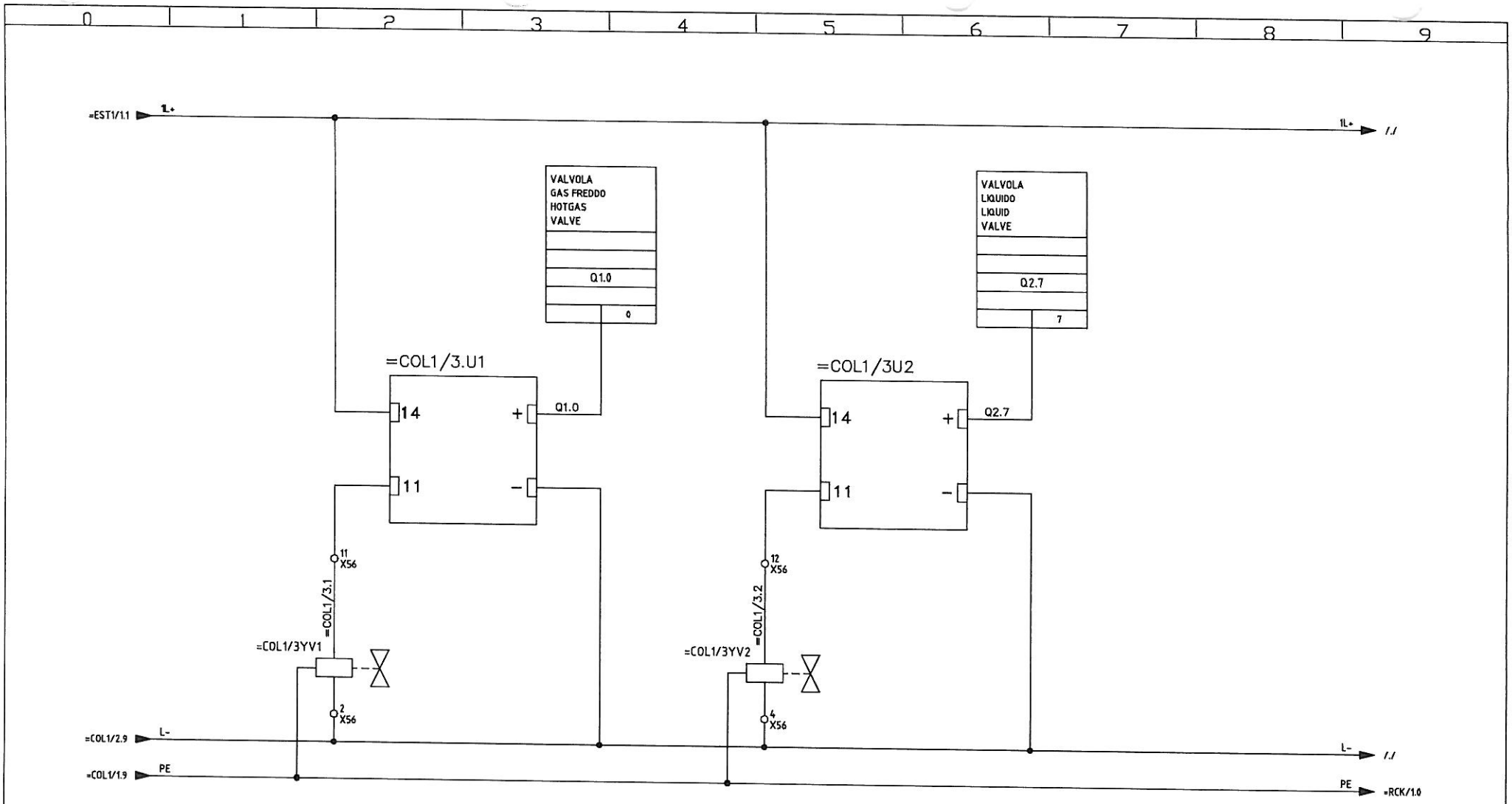
Tetra Pak Hoyer	Project FRIGUS 600 PLC		Title COMPRESSORE RAFFREDDAMENTO / *COOLING COMPRESSOR*	Id/rev. 13020369	Dev.Func. =COL1
	Date 01/12/03	Sign. BAKIR-M240034		Location	Global sheet: 24 Function sheet: 1

Print date : @plotdate



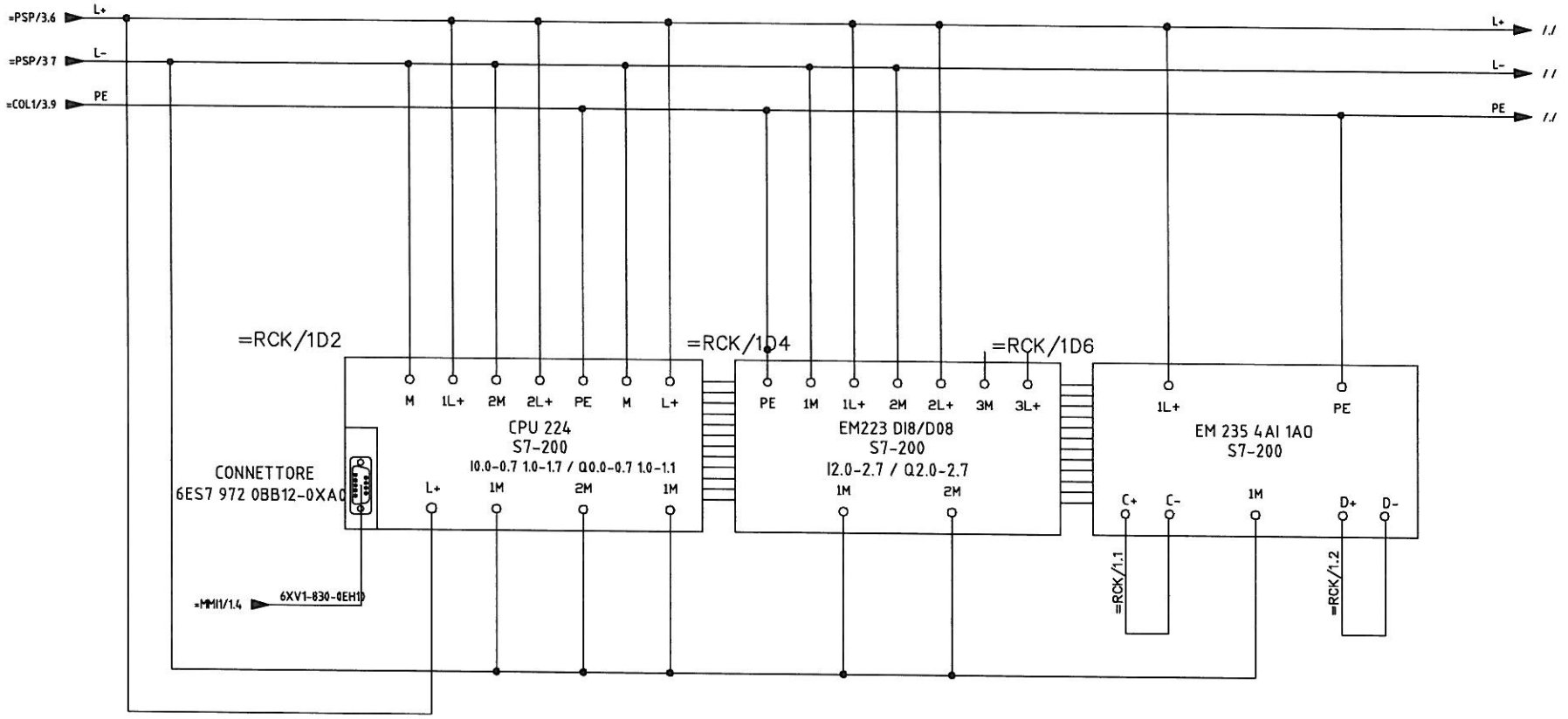
Tetra Pak Hoyer	Project FRIGUS 600 PLC		Title IMPUT/OUTPUT PLC	Id/rev. 13020369	Dev.Func. =COL1
	Date 01/12/03	Sign. BAKIR-M240034	IMPUT/OUTPUT PLC	Location	Global sheet: 25 Function sheet: 2

Print date : @plotdate



Tetra Pak Hoyer	Project: FRIGUS 600 PLC	Title: VALVOLE RAFFREDDAMENTO / *COOLING VALVES*	Id/rev.: 13020369	Dev.Func.: =COL1
	Date: 01/12/03 — Sign.: BAKIR-M240034		Location	Global sheet: 26 — Function sheet: 3

Print date : @plotdate



Tetra Pak Hoyer	Project: FRIGUS 600 PLC	Title: RACK PLC / *PLC RACK*	Id/rev.: 13020369	Dev.Func.: =RCK	
	Date: 01/12/03	Sign.: BAKIR-M240034	Location	Global sheet: 27	Function sheet: 1

Print date : @plotdate

QUADRO QG
MORSETTIERA X21

NumI	NumM	NumO	Tipo	Costruttore	Sez.	Fg.Cat
PE	PE	PE	SAK 4	SIEMENS	2.5	=COL1/1.2
=COL1/1.7	2	=COL1/1.7	SAK 2.5	SIEMENS	2.5	=COL1/1.3
L2	3	L2	SAK 2.5	SIEMENS	2.5	=COL1/1.4
L+	4	L+	SAK 2.5	SIEMENS	2.5	=COL1/1.4
I0.5	5	I0.5	SAK 2.5	SIEMENS	2.5	=COL1/1.4
=COL1/1.1	9	=COL1/1.1	SAK 16	SIEMENS	16	=COL1/1.1
=COL1/1.3	10	=COL1/1.3	SAK 16	SIEMENS	16	=COL1/1.1
=COL1/1.5	11	=COL1/1.5	SAK 16	SIEMENS	16	=COL1/1.2

QUADRO QG
MORSETTIERA X41
AIR CONTROLLER

NumI	NumM	NumO	Tipo	Costruttore	Sez.	Fg.Cat
=AIR1/2.3	1	=AIR1/2.3	WDU 2.5	SIEMENS	2.5	=AIR1/2.5
=AIR1/2.4	6	=AIR1/2.4	WDU 2.5	SIEMENS	2.5	=AIR1/2.5
=AIR1/2.5	7	=AIR1/2.5	WDU 2.5	SIEMENS	2.5	=AIR1/2.6

QUADRO QG
MORSETTIERA X56

NumI	NumM	NumO	Tipo	Costruttore	Sez.	Fg.Cat
L-	2	L-	SAK 2.5	SIEMENS	2.5	=COL1/3.2
L-	4	L-	SAK 2.5	SIEMENS	2.5	=COL1/3.5
L-	6	L-	SAK 2.5	SIEMENS	2.5	=CIP1/1.1
L-	8	L-	SAK 2.5	SIEMENS	2.5	=AIR1/1.1
=CIP1/1.1	9	=CIP1/1.1	SAK 2.5	SIEMENS	2.5	=CIP1/1.1
=COL1/3.1	11	=COL1/3.1	SAK 2.5	SIEMENS	2.5	=COL1/3.2
=COL1/3.2	12	=COL1/3.2	SAK 2.5	SIEMENS	2.5	=COL1/3.5
=MXP1/3.1	13	=MXP1/3.1	SAK 2.5	SIEMENS	2.5	=MXP1/3.4
=MXP1/3.2	14	=MXP1/3.2	SAK 2.5	SIEMENS	2.5	=MXP1/3.4
PE	PE	PE	SAK 6	SIEMENS	6	=CIP1/1.1

QUADRO QG
MORSETTIERA X11

NumI	NumM	NumO	Tipo	Costruttore	Sez.	Fg.Cat
=MM01/1.2	1	=MM01/1.2	WDU 6	SIEMENS	2.5	=MM01/1.1
=MM01/1.4	2	=MM01/1.4	WDU 6	SIEMENS	2.5	=MM01/1.1
=MM01/1.6	3	=MM01/1.6	WDU 6	SIEMENS	2.5	=MM01/1.1
PE	4	PE	WDU 6	SIEMENS	2.5	=MM01/1.2

QUADRO QG
MORSETTIERA X55

NumI	NumM	NumO	Tipo	Costruttore	Sez.	Fg.Cat
L+	1	L+	SAK 2.5	SIEMENS	2.5	=COL1/2.1
I0.6	2	I0.6	SAK 2.5	SIEMENS	2.5	=COL1/2.1
L+	3	L+	SAK 2.5	SIEMENS	2.5	=AIR1/1.5
I1.0	4	I1.0	SAK 2.5	SIEMENS	2.5	=AIR1/1.5

QUADRO QG
MORSETTIERA X52

NumI	NumM	NumO	Tipo	Costruttore	Sez.	Fg.Cat
S11	1	S11	SAK 2.5	WEIDMULLER	2.5	=EST1/2.0
S12	2	S12	SAK 2.5	WEIDMULLER	2.5	=EST1/2.1
S22	3	S22	SAK 2.5	WEIDMULLER	2.5	=EST1/2.2
S12	4	S12	SAK 2.5	WEIDMULLER	2.5	=EST1/2.4
S12	5	S12	SAK 2.5	WEIDMULLER	2.5	=EST1/2.4
S22	6	S22	SAK 2.5	WEIDMULLER	2.5	=EST1/2.5
S22	7	S22	SAK 2.5	WEIDMULLER	2.5	=EST1/2.5
S21	8	S21	SAK 2.5	WEIDMULLER	2.5	=EST1/2.1
L-	9	L-	SAK 2.5	WEIDMULLER	2.5	=MMI1/1.5
L+	10	L+	SAK 2.5	WEIDMULLER	2.5	=MMI1/1.5

Tetra Pak Hoyer

Project: FRIGUS 600 PLC
Date: 01/12/03
Sign.: BAKIR-M240034

Title: MORSETTIERA X21-41-52-55-56
TERMINAL BLOCK X21-41-52-55-56

Id/rev.: 13020369
Location:

Dev.Func.: =TMBL
Global sheet: 29
Function sheet: 1

Print date : @plotdate

QUADRO QG			
SPINA J1			
COSTRUTTORE ILME			
TIPO 9 POLI			
Connettore a vaschetta 9 poli			
CONNETTORE A VASCHETTA "AIR CONTROLLER"			
Pin	NumI	NumO	Fg.Cat
1	=AIR1/2.3	=AIR1/2.3	=AIR1/2.5
2	=AIR1/2.1	=AIR1/2.1	=AIR1/2.5
3	=AIR1/2.2	=AIR1/2.2	=AIR1/2.5
4	L-	L-	=AIR1/2.5
5	=AIR1/2.4	=AIR1/2.4	=AIR1/2.5
6	=AIR1/2.5	=AIR1/2.5	=AIR1/2.6
7	L+	L+	=AIR1/2.6
8	L-	L-	=AIR1/2.6
9	PE	PE	=AIR1/2.6

Tetra Pak Hoyer

Project: FRIGUS 600 PLC		Title: CONNETTORE AIR CONTROLLER J1 / AIR CONTROLLER J1 CONNECTOR	Id/rev.: 13020369	Dev.Func.: =TMBL	
Date: 01/12/03	Sign.: BAKIR-M240034		Location	Global sheet: 30	Function sheet: 2

Print date : @plotdate

QUADRO QG MORSETTI MULTIPLI XI0 INPUT PLC						
NumI	NumM	NumO	Tipo	Costruttore	LIV.	Fg.Cat
I0.1	XI0.1	I0.1	DLD 2.5	WEIDMULLER	1/3	=MXP1/2.3
L+	XI0.1+	L+	DLD 2.5	WEIDMULLER	3/3	=MXP1/2.3
L-	XI0.1-	L-	DLD 2.5	WEIDMULLER	2/3	=MXP1/2.4

QUADRO QG MORSETTI MULTIPLI XI1						
NumI	NumM	NumO	Tipo	Costruttore	LIV.	Fg.Cat
I1.2	XI1.2	I1.2	DLD 2.5	WEIDMULLER	1/3	=EST1/3.2
L-	XI1.2-	L-	DLD 2.5	WEIDMULLER	2/3	=EST1/3.7
L+	XI1.2+	L+	DLD 2.5	WEIDMULLER	3/3	=EST1/3.2
I1.3	XI1.3	I1.3	DLD 2.5	WEIDMULLER	1/3	=EST1/3.3
L-	XI1.3-	L-	DLD 2.5	WEIDMULLER	2/3	=EST1/3.8
L+	XI1.3+	L+	DLD 2.5	WEIDMULLER	3/3	=EST1/3.3

QUADRO QG MORSETTI MULTIPLI XI2 INPUT PLC						
NumI	NumM	NumO	Tipo	Costruttore	LIV.	Fg.Cat
I2.0	XI2.0	I2.0	DLD 2.5	WEIDMULLER	1/3	=PSP/4.2
L-	XI2.0-	L-	DLD 2.5	WEIDMULLER	2/3	=PSP/4.2
L+	XI2.0+	L+	DLD 2.5	WEIDMULLER	3/3	=PSP/4.2
I2.1	XI2.1	I2.1	DLD 2.5	WEIDMULLER	1/3	=MM01/2.2
L-	XI2.1-	L-	DLD 2.5	WEIDMULLER	2/3	=MM01/2.1
L+	XI2.1+	L+	DLD 2.5	WEIDMULLER	3/3	=MM01/2.2
I2.2	XI2.2	I2.2	DLD 2.5	WEIDMULLER	1/3	=COL1/2.4
L-	XI2.2-	L-	DLD 2.5	WEIDMULLER	2/3	=COL1/2.7
L+	XI2.2+	L+	DLD 2.5	WEIDMULLER	3/3	=COL1/2.4
I2.3	XI2.3	I2.3	DLD 2.5	WEIDMULLER	1/3	=AIR1/1.6
L-	XI2.3-	L-	DLD 2.5	WEIDMULLER	2/3	=AIR1/1.2
L+	XI2.3+	L+	DLD 2.5	WEIDMULLER	3/3	=AIR1/1.6
I2.4	XI2.4	I2.4	DLD 2.5	WEIDMULLER	1/3	=MXP1/3.6
L-	XI2.4-	L-	DLD 2.5	WEIDMULLER	2/3	=MXP1/3.5
L+	XI2.4+	L+	DLD 2.5	WEIDMULLER	3/3	=MXP1/3.6
I2.5	XI2.5	I2.5	DLD 2.5	WEIDMULLER	1/3	=CIP1/1.5
L-	XI2.5-	L-	DLD 2.5	WEIDMULLER	2/3	=CIP1/1.4
L+	XI2.5+	L+	DLD 2.5	WEIDMULLER	3/3	=CIP1/1.5
I2.6	XI2.6	I2.6	DLD 2.5	WEIDMULLER	1/3	=EST1/3.4
L-	XI2.6-	L-	DLD 2.5	WEIDMULLER	2/3	=EST1/3.6
L+	XI2.6+	L+	DLD 2.5	WEIDMULLER	3/3	=EST1/3.4

Tetra Pak Hoyer

Project: FRIGUS 600 PLC		Title: MORSETTIERA XI0-2 *TERMINAL BLOCK XI0-2*	Id/rev.: 13020369
Date: 01/12/03	Sign.: BAKIR-M240034		Location

Dev.Func.: =TMBL

Global sheet: 31 Function sheet: 3

Print date : @plotdate

QUADRO QG
MORSETTI MULTIPLI XQ2
OUTPUT PLC

NumI	NumM	NumO	Tipo	Costruttore	LIV.	Fg.Cat
Q2.0	XQ2.0	Q2.0	DLD 2.5	WEIDMULLER	1/3	=PSP/4.3
L-	XQ2.0-	L-	DLD 2.5	WEIDMULLER	2/3	=PSP/4.3
L+	XQ2.0+	L+	DLD 2.5	WEIDMULLER	3/3	=PSP/4.4
Q2.1	XQ2.1	Q2.1	DLD 2.5	WEIDMULLER	1/3	=MM01/2.3
L-	XQ2.1-	L-	DLD 2.5	WEIDMULLER	2/3	=MM01/2.3
L+	XQ2.1+	L+	DLD 2.5	WEIDMULLER	3/3	=MM01/2.4
Q2.2	XQ2.2	Q2.2	DLD 2.5	WEIDMULLER	1/3	=COL1/2.5
L-	XQ2.2-	L-	DLD 2.5	WEIDMULLER	2/3	=COL1/2.5
L+	XQ2.2+	L+	DLD 2.5	WEIDMULLER	3/3	=COL1/2.6
Q2.3	XQ2.3	Q2.3	DLD 2.5	WEIDMULLER	1/3	=AIR1/1.7
L-	XQ2.3-	L-	DLD 2.5	WEIDMULLER	2/3	=AIR1/1.7
L+	XQ2.3+	L+	DLD 2.5	WEIDMULLER	3/3	=AIR1/1.8
Q2.4	XQ2.4	Q2.4	DLD 2.5	WEIDMULLER	1/3	=MXP1/3.7
L-	XQ2.4-	L-	DLD 2.5	WEIDMULLER	2/3	=MXP1/3.8
L+	XQ2.4+	L+	DLD 2.5	WEIDMULLER	3/3	=MXP1/3.7
Q2.5	XQ2.5	Q2.5	DLD 2.5	WEIDMULLER	1/3	=CIP1/1.6
L-	XQ2.5-	L-	DLD 2.5	WEIDMULLER	2/3	=CIP1/1.6
L+	XQ2.5+	L+	DLD 2.5	WEIDMULLER	3/3	=CIP1/1.7
Q2.6	XQ2.6	Q2.6	DLD 2.5	WEIDMULLER	1/3	=EST1/3.7
L-	XQ2.6-	L-	DLD 2.5	WEIDMULLER	2/3	=EST1/3.7
L+	XQ2.6+	L+	DLD 2.5	WEIDMULLER	3/3	=EST1/3.5

Tetra Pak Hoyer

Project: FRIGUS 600 PLC
Date: 01/12/03
Sign.: BAKIR-M240034
Title: MORSETTIERA XQ2
TERMINAL BLOCK XQ2
Id/rev.: 13020369
Location:
Dev.Func.: =TMBL
Global sheet: 32
Function sheet: 4

Print date : @plotdate

0 1 2 3 4 5 6 7 8 9

Tetra Pak Hoyer

Project: FRIGUS 600 PLC	Title: RISERVA / *SPARE*	Id/rev.: 13020369	Dev.Func.: =TMBL
Date: 01/12/03	Sign.: BAKIR-M240034	Location:	Global sheet: 33 Function sheet: 5

Print date : @plotdate

Parametri Test di Dosaggio:		
Contropressione:	7.5	bar
Tempo dosaggio:	1.6-1.8	s
Tempo off:	1	s

FRIGUS 600 CON PLC

400V / 50-60Hz

Tetra Pak Hoyer

Project: FRIGUS 600 PLC	Title: INTESTAZIONE / COVER	Id/rev.: 13020369	Dev.Func.: =COV
Date: 30/09/02 — Sign.: ANUGA		Location	Global sheet: 1 — Function sheet: 1

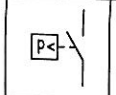
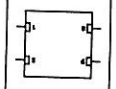
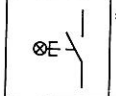
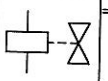
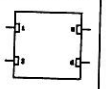
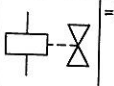
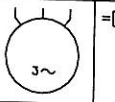
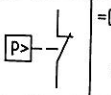
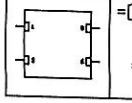
Print date : @plotdate

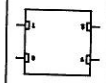
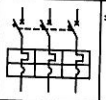
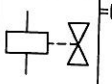
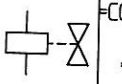
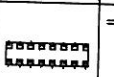
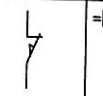
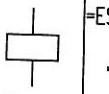
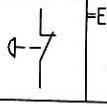
Multifoglio/File	Fg/Sh	Descrizione	Description	Pag.
=COV	=COV/1	INTESTAZIONE	COVER	1
=IND	=IND/1	LISTA PAGINE	INDEX	2
=FUNL	=FUNL/1	LEGENDA FUNZIONI	FUNCTION LIST	3
	=FUNL/2	LEGENDA FUNZIONI	FUNCTION LIST	4
=BOM	=BOM/1	LISTA MATERIALI	PART LIST	5
	=BOM/2	LISTA MATERIALI	PART LIST	6
=PSP	=PSP/1	ALIMENTAZIONE GENERALE	POWER SUPPLY	7
	=PSP/2	RELE CONTROLLO FASI	PHASE MONITOTIHG	8
	=PSP/3	ALIMENTATORE	DC POWER SUPPLY	9
	=PSP/4	INPUT/OUTPUT	INPUT/OUTPUT	10
=VNT1	=VNT1/5	VENTILAZIONE QUADRO	CABINET VENTILATION	11
=EST	=EST1/1	MODULO DI SICUREZZA	SAFETY CONTROL	12
	=EST1/2	EMERGENZE 1	EMERGENCY 1	13
	=EST1/3	IMPUT/OUTPUT PLC	IMPUT/OUTPUT PLC	14
=MXP1	=MXP1/1	VARIATORE DI VELOCITA' - POTENZA	SPEED CONVERTER DRIVE - POWER	15
	=MXP1/2	VARIATORE DI VELOCITA' - COMANDO	SPEED CONVERTER DRIVE -	16
	=MXP1/3	VARIATORE DI VELOCITA' - COMANDO	SPEED CONVERTER DRIVE -	17
=CIP1	=CIP1/1	LAVAGGIO	CIP	18
=AIR1	=AIR1/1	ARIA GENERALE	AIR SUPPLY	19
	=AIR1/2	CONTROLLO ARIA	AIR CONTROL	20
=MM1	=MM1/1	PANNELLO OPERATORE	CONTROL PANEL	21
=MM01	=MM01/1	MOTORE PRINCIPALE	MAIN MOTOR	22
	=MM01/2	IMPUT/OUTPUT PLC	IMPUT/OUTPUT PLC	23
=COL1	=COL1/1	COMPRESSORE RAFFREDDAMENTO	COOLING COMPRESSOR	24
	=COL1/2	IMPUT/OUTPUT PLC	IMPUT/OUTPUT PLC	25
	=COL1/3	VALVOLE RAFFREDDAMENTO	COOLING VALVES	26
=RCK	=RCK/1	RACK PLC	PLC RACK	27
=LYT	=LYT/1	LAY-OUT	LAY-OUT	28
=TMBL	=TMBL/1	MORSETTIERA X21-51-52-55-56	TERMINAL BLOCK X21-51-52-55-56	29
	=TMBL/2	CONNETTORE AIR CONTROLLER	AIR CONTROLLER CONNECTOR	30
	=TMBL/3	MORSETTIERA X10-1-2	TERMINAL BLOCK X10-1-2	31
	=TMBL/4	MORSETTIERA XQ0-1-2	TERMINAL BLOCK XQ0-1-2	32
	=TMBL/5	MORSETTIERA XW-X11-X31-X41	TERMINAL BLOCK XW-X11-X31-X41	33

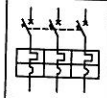
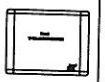
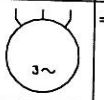
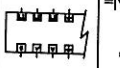
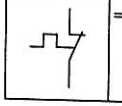
Tetra Pak Hoyer

Project: FRIGUS 600 PLC		Title: LISTA PAGINE / INDEX	Id/rev.: 13020369	Dev.Func.: =IND	
Date: 30/09/02	Sign.: L.M.		Location	Global sheet: 2	Function sheet: 1

Print date : @plotdate

Sim.\Sym.	Sigla\Item	Funzione\Use Type
	=AIR1/1S1 QG =AIR1/1	PRESSOSTATO PRESSURE SWITCH
	=AIR1/1U1 QG =AIR1/1	ABILITAZIONE ARIA AIR ON
	=AIR1/1SH1 QG =AIR1/1	START/STOP ARIA AIR START/STOP
	=AIR1/1YV2 QG =AIR1/1	ARIA GENERALE AIR SUPPLY
	=CIP/1/2 QG =CIP1/1	INSERZIONE VALVOLA LAVAGGIO CIP VALVE INSERCTION
	=CIP1/1SH1 QG =CIP1/1	LAVAGGIO CIP
	=CIP1/1YV1 QG =CIP1/1	VALVOLA LAVAGGIO MIX PUMP CIP VALVE
	=COL1/1M1 QG =COL1/1	COMPRESSORE COMPRESSOR
	=COL1/1M3 =COL1/1	PROTEZIONE ELETTRONICA ELECTRONIC PROTECTION
	=COL1/2S1 QG =COL1/2	PRESSOSTATO PRESSURE SWITCH
	=COL1/3U1 QG =COL1/3	INSERZIONE VALVOLA GAS FREDDDO HOTGAS VALVE INSERCTION

Sim.\Sym.	Sigla\Item	Funzione\Use Type
	=COL1/3U2 QG =COL1/3	INSERZIONE VALVOLA LIQUIDO LIQUID VALVE INSERCTION
	=COL1/1QF1 QG =COL1/1	PROTEZIONE COMPRESSORE COMPRESSOR PROTECTION
	=COL1/1QF2 QG =COL1/1	PROTEZIONE MODULO ELETTRONICO ELECTRONIC MODULE PROTECTION
	=COL1/2KM1 QG =COL1/2	INSERZIONE COMPRESSORE INSERCTION COMPRESSOR
	=COL1/2SH1 QG =COL1/2	START/STOP RAFFREDDAMENTO START/STOP COOLING
	=COL1/3YV1 QG =COL1/3	VALVOLA GAS FREDDO HOTGAS VALVE
	=COL1/3YV2 QG =COL1/3	VALVOLA LIQUIDO LIQUID VALVE
	=EST1/1K1 QG =EST1/1	RELE' D'EMERGENZA EMERGRNCY STOP RELAY
	=EST1/2S1 =EST =EST1/2	SICUREZZA PORTA COVER SWITCH
	=EST1/1KA1 =EST =EST1/1	RESET RESET
	=EST1/2SB1 =EST =EST1/2	EMERGENZA 1 EMERGENCY 1

Sim.\Sym.	Sigla\Item	Funzione\Use Type
	=EST1/3SH1 QG =EST1/3	RESET RESET
	=MM01/1K2 =MM01/1	WATTMETRO
	=MM01/1M1 QG =MM01/1	MOTORE PRINCIPALE PAIN MOTOR
	=MM01/1KM1 QG =MM01/1	AVVIAMENTO MOTORE START MOTOR
	=MM01/1QF1 QG =MM01/1	PARTENZA MOTORE MANUALE MANUAL MOTOR STARTER
	=MM01/2SH1 QG =MM01/2	START/STOP MOTORE PRINCIPALE MAIN MOTOR START/STOP
	=MMI1/1D2 QG =MMI1/1	PANNELLO OPERATORE OPERATOR PANEL
	=MXP1/1A1 =MXP1/1	PORTAFUSIBILE FUSE CARRIER
	=MXP1/1M1 =MOR =MXP1/1	POMPA PUMP
	=MXP1/1U1 QG =MXP1/1	VARIATORE DI VELOCITA SPEED CONVERTER DRIVE
	=MXP1/3S1 QG =MXP1/3	CLIXON MOTORE POMPA PUMP MOTOR CLIXON

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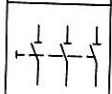
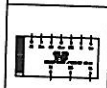
Project	FRIGUS 600 PLC	Title	LEGENDA FUNZIONI *FUNCTION LIST*
Date	30/09/02	Sign.	L.M.
Id/rev.	13020369	Dev.Func.	=FUNL
Location		Global sheet: 3	Function sheet: 1

Print date : @plotdate

Sim.\Sym.	Sigla\Item	Funzione\Use Type
	=MXP1/1FU1 QG =MXP1/1	FUSIBILE 20A FUSE 20A
	=MXP1/1FU2 QG =MXP1/1	FUSIBILE 20A FUSE 20A
	=MXP1/1FU3 QG =MXP1/1	FUSIBILE 20A FUSE 20A
	=MXP1/1QF1 QG =MXP1/1	PROTEZIONE INVERTER INVERTER PROTECTION
	=MXP1/2KM1 QG =MXP1/2	START START
	=MXP1/2SQ1 QG =MXP1/2	PROXIMITY PROXIMITY
	=MXP1/3SH1 QG =MXP1/3	START/STOP POMPA START/STOP PUMP
	=PSP/2G3 QG =PSP/2	RELE CONTROLLO FASI PHASE MONITORING
	=PSP/3G3 QG =PSP/3	ALIMENTATORE 24VDC DC POWER SUPPLY
	=PSP/1QS1 QG =PSP/1	INTERRUTTORE GENERALE MANUAL MOTOR STARTER
	=PSP/3QF1 QG =PSP/3	PROTEZIONE ALIMENTATORE POWER SUPPLY PROTECTION

Sim.\Sym.	Sigla\Item	Funzione\Use Type
	=PSP/3QF2 QG =PSP/3	PROTEZIONE AUSILIARI 24VDC AUXILIARY 24VDC PROTECTION
	=PSP/4SH1 QG =PSP/4	START/STOP SEQUENZA START/STOP SEQUENCE
	=RCK/1D2 QG =RCK/1	CPU CPU
	=RCK/1D4 QG =RCK/1	MODULO DIGITALE PLC INPUT/OUTPUT PLC DIGITAL INPUT/OUTPUT MODULE
	=RCK/1D6 QG =RCK/1	MODULO PLC INPUT&OUTPUT ANALOGICI PLC ANALOGIC INPUT&OUTPUT MODULE
	=VNT1/1M2 QG =VNT1/5	VENTILAZIONE QUADRO CABINET VENTILATION

Sim.\Sym.	Sigla\Item	Funzione\Use Type

Tetra Pak Hoyer

Project: FRIGUS 600 PLC	Title: LEGENDA FUNZIONI / *FUNCTION LIST*	Id/rev.: 13020369	Dev.Func.: =FUNL
Date: 30/09/02	Sign.: L.M.	Location:	Global sheet: 4 Function sheet: 2

Print date : @plotdate

Nome/Item	Tipo/Type	Descrizione/Description	Costruttore/Marke	Quadro/Board	Fg/Sh	Q.ta/Q.ty
=AIR1/1S1		Comandato dalla pressione (pressostato) NO		QG	=AIR1/1	1
=AIR1/1SH1	3SB35010AA41	PULSANTE LUMINOSO METALLO VERDE 22	SIEMENS	QG	=AIR1/1	1
	3SB34001D	PORTALAMPADA CON LAMPADA 24V PER PULSANTI LUMINOSI	SIEMENS			1
	3SB34000B	BLOCCO CONTATTO 1NO PER PULSANTI	SIEMENS			1
	3SB34000B	BLOCCO CONTATTO 1NO PER PULSANTI	SIEMENS			1
=CIP1/1KA1	G2R-1-S 24Vc.c.	Rel? ausiliario zoccolato 1 contatto di scambio	OMRON	QG	=CIP1/1	1
	P2RF-05-E	Zoccolo per rel?	OMRON			1
=CIP1/1SH1	3SB35010AA41	PULSANTE LUMINOSO METALLO VERDE 22	SIEMENS	QG	=CIP1/1	1
	3SB34001D	PORTALAMPADA CON LAMPADA 24V PER PULSANTI LUMINOSI	SIEMENS			1
	3SB34000B	BLOCCO CONTATTO 1NO PER PULSANTI	SIEMENS			1
	3SB34000B	BLOCCO CONTATTO 1NO PER PULSANTI	SIEMENS			1
=CIP1/1YV1		Elettrovalvola aperta (in chiusura)		QG	=CIP1/1	1
=COL1/1M1		Motore asincrono trifase		QG	=COL1/1	1
=COL1/1QF1	3RV10 31-4EA10+3RV19011E	Int. aut. magnetotermico tripolare+Contatti aux.	SIEMENS	QG	=COL1/1	1
=COL1/1QF2	5SY61027BB	INT.AUT.1P C 2A 6KA IP2X	SIEMENS	QG	=COL1/1	1
=COL1/2KM1	3RT10 34-1BB40	Bobina contattore	SIEMENS	QG	=COL1/2	1
	3RH19111FA22	BLOC.CONT.AUX.2L 2R S00	SIEMENS	QG	=COL1/2	1
=COL1/2S1		Comandato dalla pressione (pressostato) NC		QG	=COL1/2	1
=COL1/2SH1	3SB35010AA41	PULSANTE LUMINOSO METALLO VERDE 22	SIEMENS	QG	=COL1/2	1
	3SB34001D	PORTALAMPADA CON LAMPADA 24V PER PULSANTI LUMINOSI	SIEMENS			1
	3SB34000B	BLOCCO CONTATTO 1NO PER PULSANTI	SIEMENS			1
	3SB34000B	BLOCCO CONTATTO 1NO PER PULSANTI	SIEMENS			1
=COL1/3U1	G3R-ODX-025N + P2RF-05-E	RELE' STATICO 2A	OMRON	QG	=COL1/3	1
=COL1/3U2	G3R-ODX-025N + P2RF-05-E	RELE' STATICO 2A	OMRON	QG	=COL1/3	1
=COL1/3YV1		Elettrovalvola aperta (in chiusura)		QG	=COL1/3	1
=COL1/3YV2		Elettrovalvola aperta (in chiusura)		QG	=COL1/3	1
=EST1/1K1	3TK28251BB40	Disp.sicurezza Siemens (3TK2825).	SIEMENS	QG	=EST1/1	1
=EST1/1KA1	G2R-1-S 24Vc.c.	Rel? ausiliario zoccolato 1 contatto di scambio	OMRON	=EST	=EST1/1	1
	P2RF-05-E	Zoccolo per rel?	OMRON			1
=EST1/2SB1	3SB35001HA20	PULANTE FUNGO EM.SBL.ROT.	SIEMENS	=EST	=EST1/2	1
	3SB34000B	BLOCCO CONTATTO 1NO PER PULSANTI	SIEMENS			1
	3SB34000C	BLOCCO CONTATTO 1NC PER PULSANTI	SIEMENS			1
	3SB39010AB	SUPPORTO PER PULSANTI	SIEMENS			1
=EST1/3S1		Fine corsa NO		=EST	=EST1/3	1
=EST1/3SH1	3SB35010AA51	PULSANTE LUMINOSO METALLO BLU 22	SIEMENS	QG	=EST1/3	1
	3SB34001D	PORTALAMPADA CON LAMPADA 24V PER PULSANTI LUMINOSI	SIEMENS			1
	3SB34000B	BLOCCO CONTATTO 1NO PER PULSANTI	SIEMENS			1
	3SB34000B	BLOCCO CONTATTO 1NO PER PULSANTI	SIEMENS			1
=MM01/1KM1	3RT10 34-1BB40	Bobina contattore	SIEMENS	QG	=MM01/1	1
=MM01/1M1		Motore asincrono trifase		QG	=MM01/1	1
=MM01/1QF1	3RV10 21-4AA10+3RV19011E	Int. aut. magnetotermico tripolare+Conatti aux.	SIEMENS	QG	=MM01/1	1
=MM01/1R1		Resistore 750 Ohm		QG	=MM01/1	1
=MM01/1U2	E82 2025	Trasformatore amperometrico GAVAZZI	CARLO GAVAZZI	QG	=MM01/1	1
=MM01/2SH1		Pulsante con lampada di segnalazione incorporata NO		QG	=MM01/2	1
=MMI1/1D2	TP170A 6AV6 545-0BA15-2AX0	Pannello operatore	SIEMENS	QG	=MMI1/1	1

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Project: FRIGUS 600 PLC	Title: LISTA MATERIALI / *PART LIST*	Id/rev.: 13020369	Dev.Func.: =BOM
Date: 30/09/02	Sign.: L.M.	Location:	Global sheet: 5 Function sheet: 1

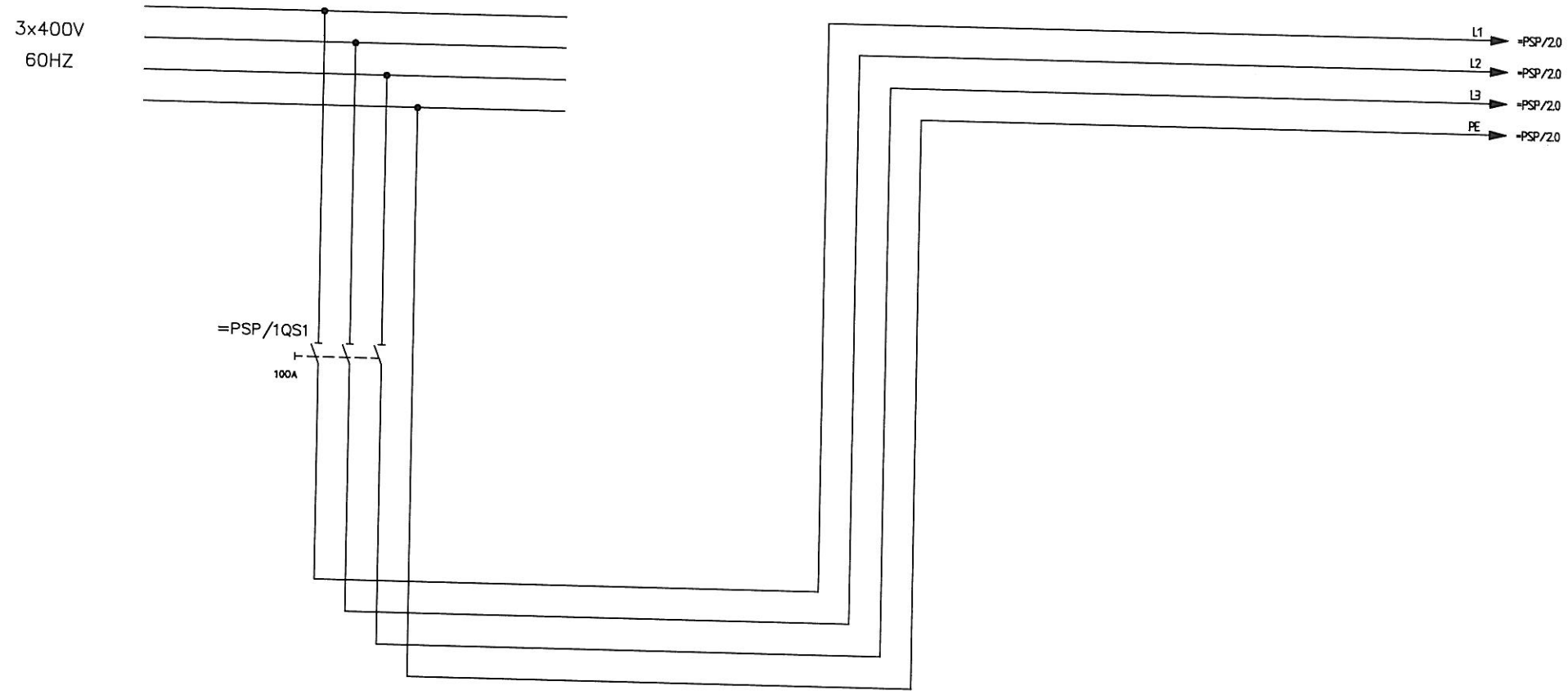
Print date : @plotdate

Nome/Item	Tipo/Type	Descrizione/Description	Costruttore/Marke	Quadro/Board	Fg/Sh	Q.ta/Q.ty
=MXP1/1M1		Motore asincrono trifase		=MDR	=MXP1/1	1
=MXP1/1M1		Contatto sensibile alla temperatura NC		QG	=MXP1/3	1
=MXP1/1QF1	3RV1B 21-1BC10	INT.MAGNET.3x3.2A 2.2-3.2A	SIEMENS	QG	=MXP1/1	1
	3RV19 01-1E	CONTATTI AUSILIARI FRONTALI 1NO+1NC PER INTERRUTTORI: S00 - S0 - S2 - S3.	SIEMENS			1
=MXP1/1U1	VLT2807 195N1015	Inverter 2807 3X380/400V 0.75KW	DANFOSS	QG	=MXP1/1	1
=MXP1/2KM1	3RT10151BB42	CONT.S00 3KW 1R 24VCC	SIEMENS	QG	=MXP1/2	1
	3RT19161LM00	DIODO ANTIDISTURBO 24VDC S00	SIEMENS			1
=MXP1/2SQ1		Disp. di prossimita' alimentato in D.C. NO per Input PLC		QG	=MXP1/2	1
=MXP1/3SH1	3SB35010AA41	PULSANTE LUMINOSO METALLO VERDE 22	SIEMENS	QG	=MXP1/3	1
	3SB34001D	PORTALAMPADA CON LAMPADA 24V PER PULSANTI LUMINOSI	SIEMENS			1
	3SB34000B	BLOCCO CONTATTO 1NO PER PULSANTI	SIEMENS			1
	3SB34000B	BLOCCO CONTATTO 1NO PER PULSANTI	SIEMENS			1
=PSP/1QS1	3LD27 14-0TK53	INTERRUTTORE	SIEMENS	QG	=PSP/1	1
=PSP/2G3	3UG35 11-1BQ50	RELE CONTROLLO FASI	SIEMENS	QG	=PSP/2	1
=PSP/3A3	6EP14342BA00	ALIMENTATORE 3 AC 400/500VAC - 24VDC 10A	SIEMENS	QG	=PSP/3	1
=PSP/3QF1	3RV10111DA10	INT.MAGNET.3x3.2A 2.2-3.2A	SIEMENS	QG	=PSP/3	1
=PSP/3QF2	5SY61067BB	Int.-sez. di potenza aut. unipolare	SIEMENS	QG	=PSP/3	1
=PSP/4SH1	3SB35010AA41	PULSANTE LUMINOSO METALLO VERDE 22	SIEMENS	QG	=PSP/4	1
	3SB34001D	PORTALAMPADA CON LAMPADA 24V PER PULSANTI LUMINOSI	SIEMENS			1
	3SB34000B	BLOCCO CONTATTO 1NO PER PULSANTI	SIEMENS			1
	3SB34000B	BLOCCO CONTATTO 1NO PER PULSANTI	SIEMENS			1
=RCK/1D2	6ES7 214 1AD20-0XB0	CPU 224 6ES7 214 1DA20-0XB0 SIEMENS S7-200.	SIEMENS	QG	=RCK/1	1
=RCK/1D4	6ES7 223 1BH20-0XA0	Slot 8 Input 8 Output PLC S7-200 Siemens.	SIEMENS	QG	=RCK/1	1
=RCK/1D6	235-0KD21-0XA0	Slot 4 Input 1 Output PLC S7-200 Siemens.	SIEMENS	QG	=RCK/1	1
=VNT1/1M2	3322.024+3322.200+3322.800	Motore corrente continua eccitazione in serie+Filtro uscita+cuffia protezione	RITTAL	QG	=VNT1/5	1
J1	9 POLI	Connettore a vaschetta 9 poli	ILME	QG	=AIR1/2	1
X11	WDU 2.5	Morsetto standard 2,5mm per barra Omega	WEIDMULLER	QG	=MM01/1	4
X21	SAK 2.5	Morsetto standard 2,5mm per barra Din	WEIDMULLER	QG	=COL1/1	9
X41	WDU 2.5	Morsetto standard 2,5mm per barra Omega	WEIDMULLER	QG	=AIR1/2	3
X52	SAK 2.5	Morsetto standard 2,5mm per barra Din	WEIDMULLER	QG	=EST1/2	10
X55	SAK 2.5	Morsetto standard 2,5mm per barra Din	WEIDMULLER	QG	=AIR1/1	4
X56	SAK 2.5	Morsetto standard 2,5mm per barra Din	WEIDMULLER	QG	=MXP1/3	9
X10	DLD 2.5	Morsetto comp. passante per sensori a 3 piani 2.5 mm	WEIDMULLER	QG	=MXP1/2	3
X11	DLD 2.5	Morsetto comp. passante per sensori a 3 piani 2.5 mm	WEIDMULLER	QG	=EST1/3	6
X12	DLD 2.5	Morsetto comp. passante per sensori a 3 piani 2.5 mm	WEIDMULLER	QG	=PSP/4	20
X02	DLD 2.5	Morsetto comp. passante per sensori a 3 piani 2.5 mm	WEIDMULLER	QG	=PSP/4	21

Tetra Pak Hoyer

Project: FRIGUS 600 PLC	Title: LISTA MATERIALI / PART LIST	Id/rev.: 13020369	Dev.Func.: =BOM
Date: 30/09/02	Sign.: L.M.	Location:	Global sheet: 6 Function sheet: 2

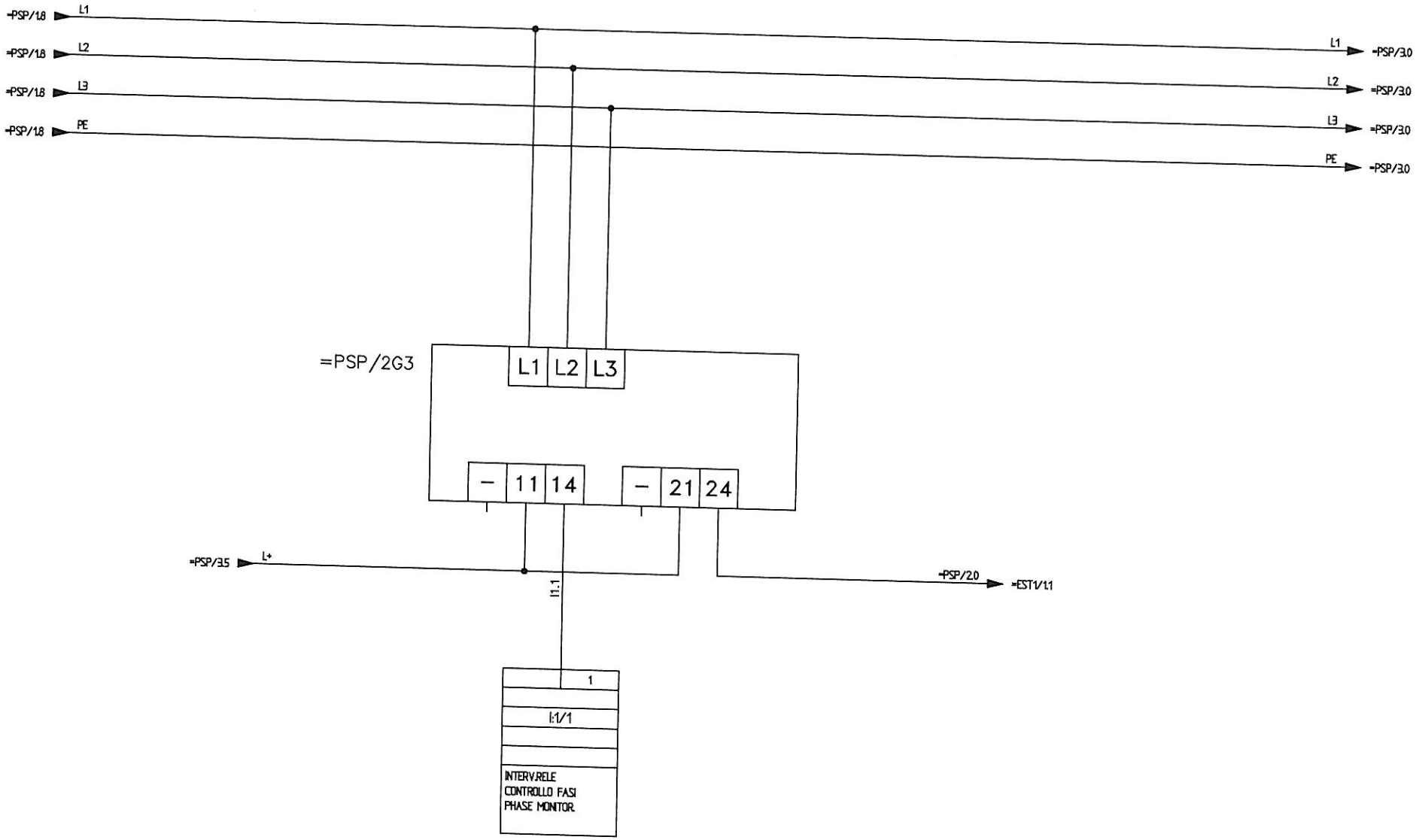
Print date : @plotdate



Tetra Pak Hoyer

Project: FRIGUS 600 PLC	Title: ALIMENTAZIONE GENERALE / POWER SUPPLY	Id/rev.: 13020369	Dev.Func.: =PSP
Date: 30/09/02 — Sign.: L.M.		Location	Global sheet: 7 — Function sheet: 1

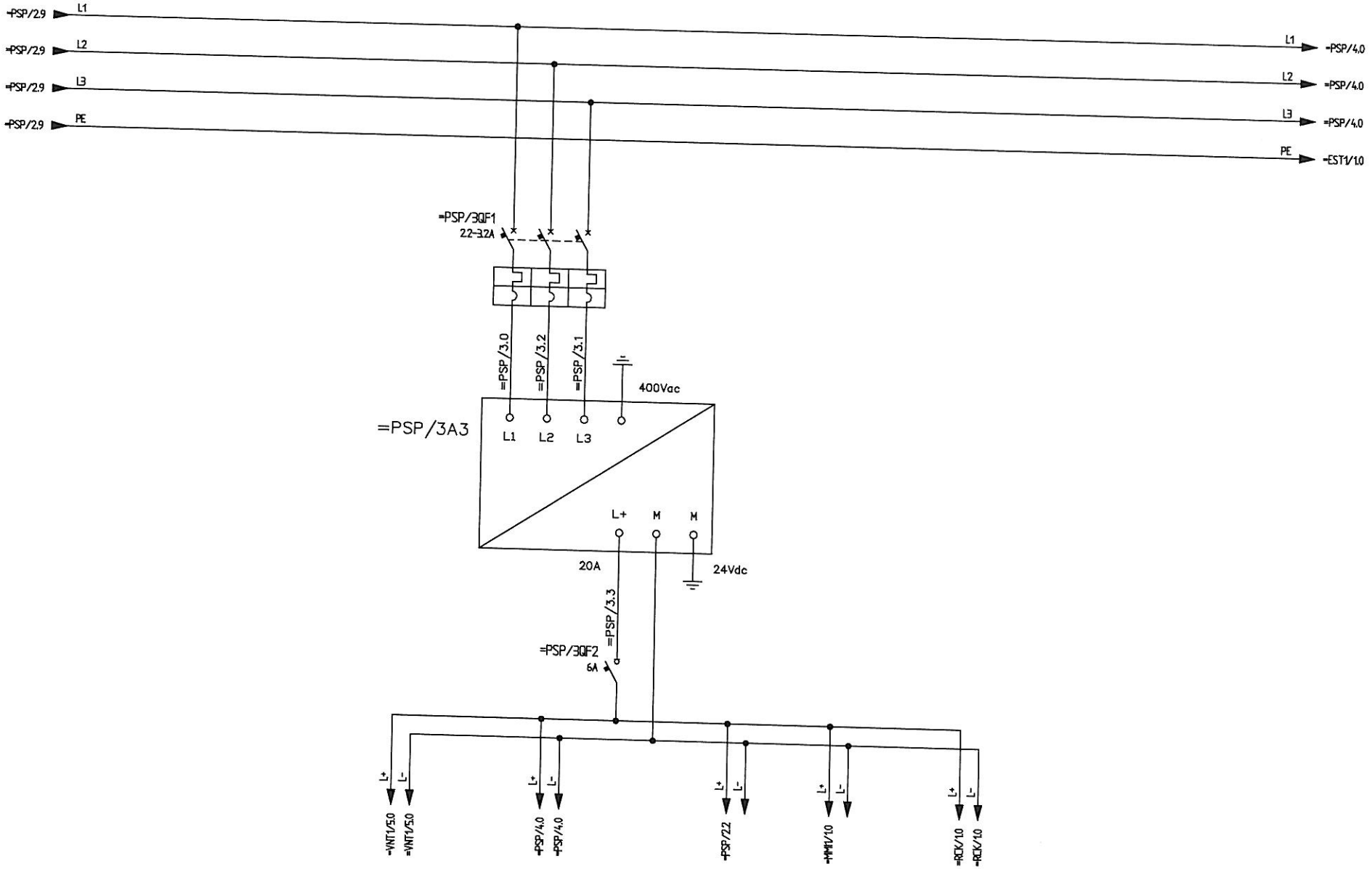
Print date : @plotdate



Tetra Pak Hoyer

Project: FRIGUS 600 PLC	Title: RELE CONTROLLO FASI / PHASE MONITOTIHG	Id/rev.: 13020369	Dev.Func.: =PSP
Date: 30/09/02	Sign.: L.M.	Location	Global sheet: 8 Function sheet: 2

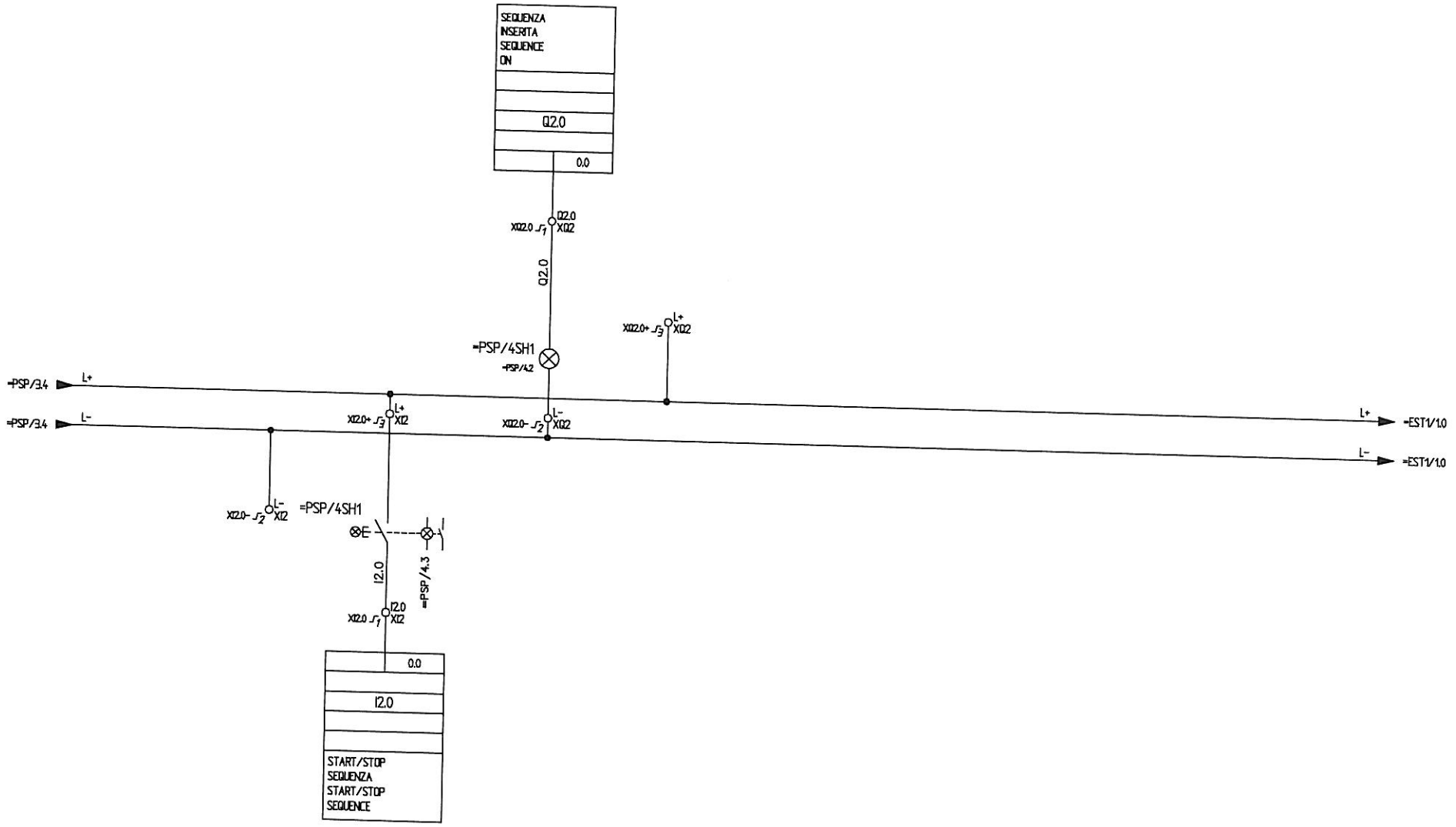
Print date : @plotdate



Tetra Pak Hoyer

Project: FRIGUS 600 PLC	Title: ALIMENTATORE / DC POWER SUPPLY	Id/rev.: 13020369	Dev.Func.: =PSP
Date: 30/09/02 Sign.: L.M.		Location:	Global sheet: 9 Function sheet: 3

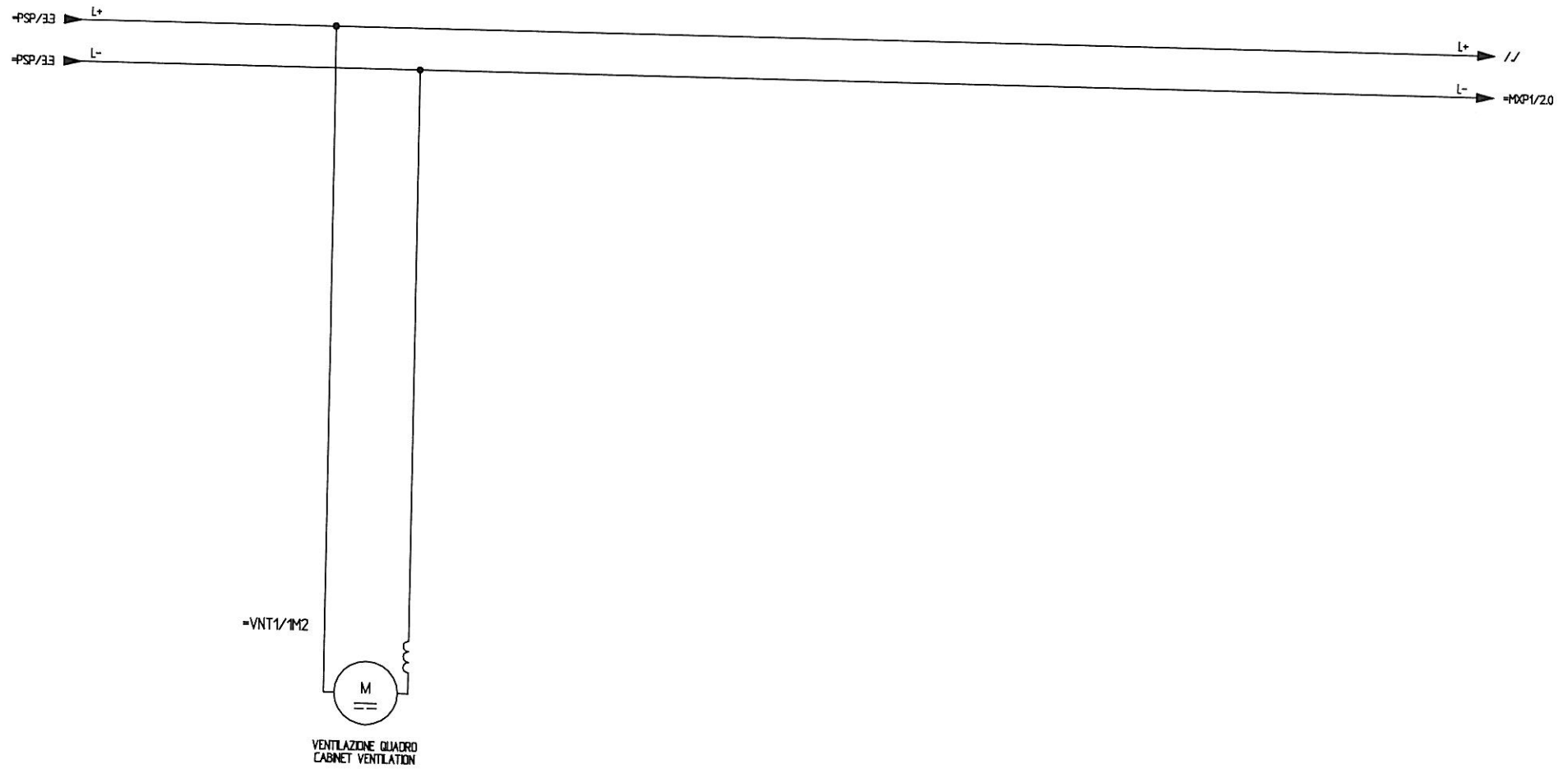
Print date : @plotdate



Tetra Pak Hoyer

Project: FRIGUS 600 PLC	Title: INPUT/OUTPUT / *INPUT/OUTPUT*	Id/rev.: 13020369	Dev.Func.: =PSP
Date: 30/09/02 Sign.: L.M.		Location	Global sheet: 10 Function sheet: 4

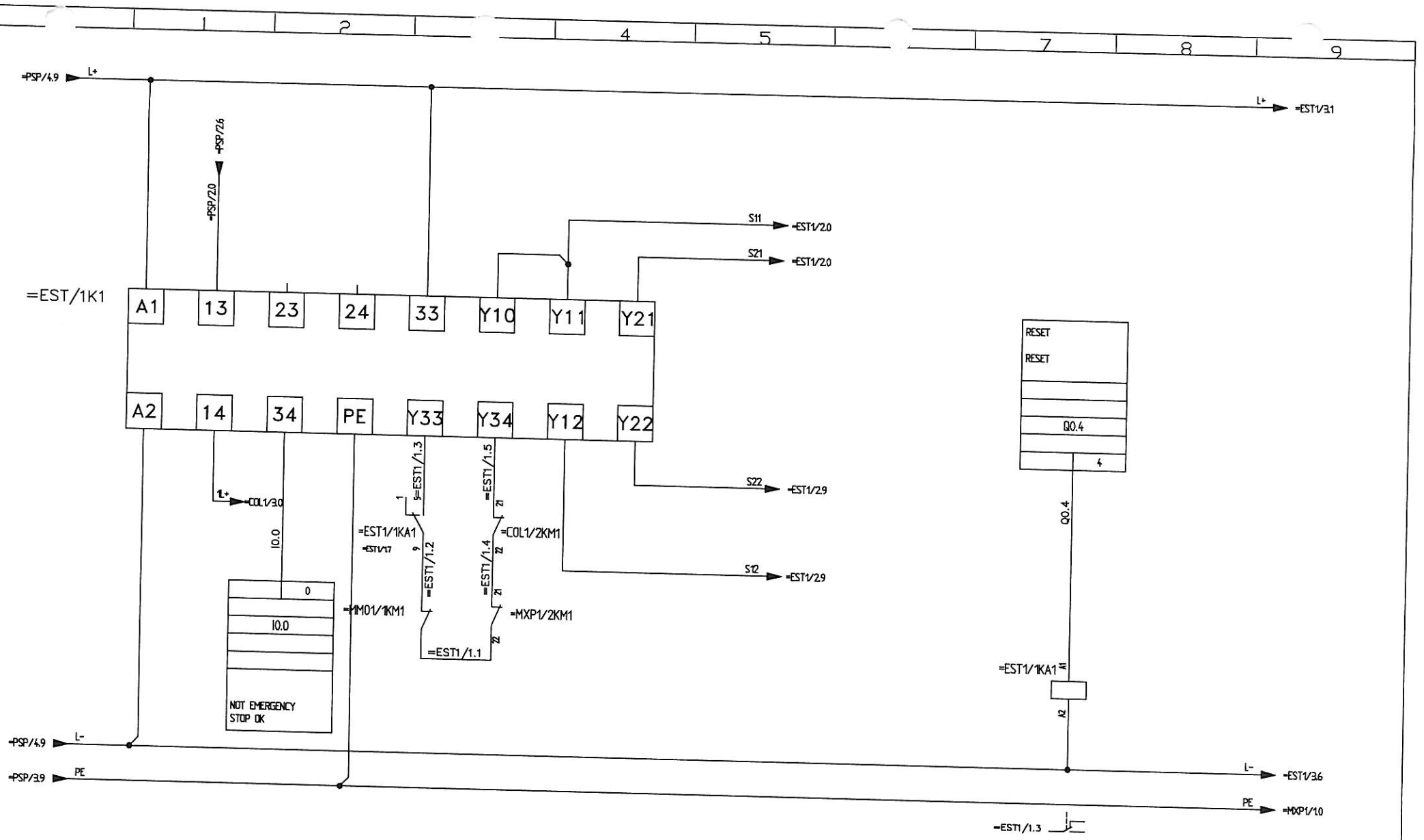
Print date : @plotdate



Tetra Pak Hoyer

Project: FRIGUS 600 PLC	Title: VENTILAZIONE QUADRO / *CABINET VENTILATION*	Id/rev.: 13020369	Dev.Func.: =VNT1
Date: 30/09/02 — Sign.: L.M.		Location	Global sheet: 11 — Function sheet: 1

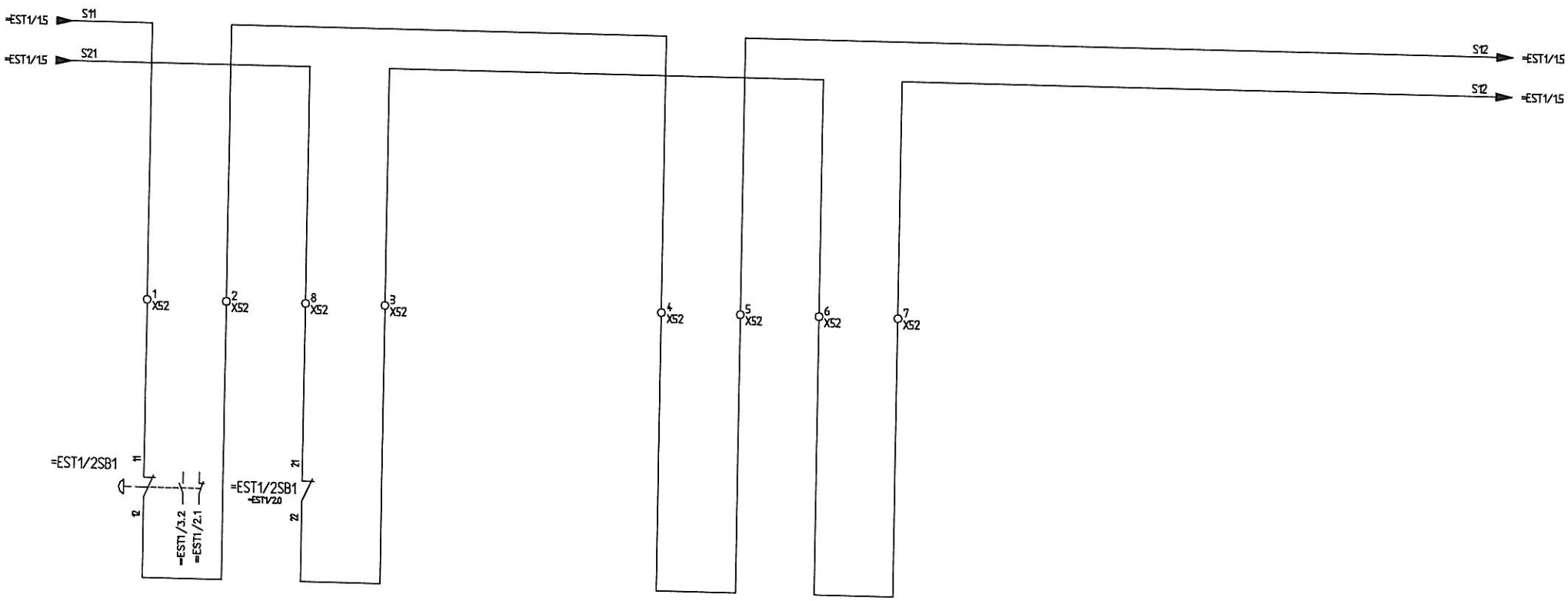
Print date : @plotdate



Tetra Pak Hoyer

Project: FRIGUS 600 PLC	Title: MODULO DI SICUREZZA / SAFETY CONTROL	Id/rev.: 13020369	Dev.Func.: =EST1
Date: 30/09/02	Sign.: L.M.	Location	Global sheet: 12 Function sheet: 1

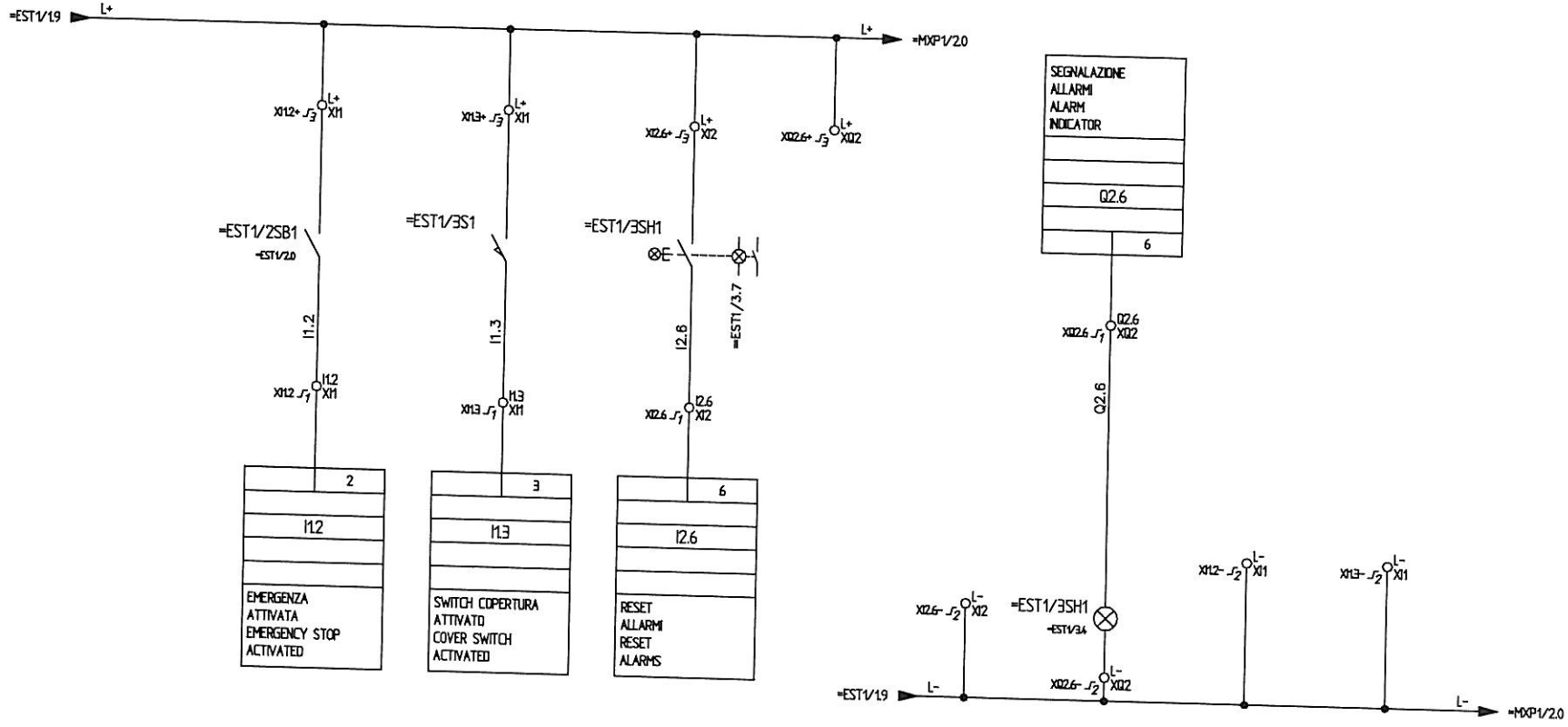
Print date : @plotdate



Tetra Pak Hoyer

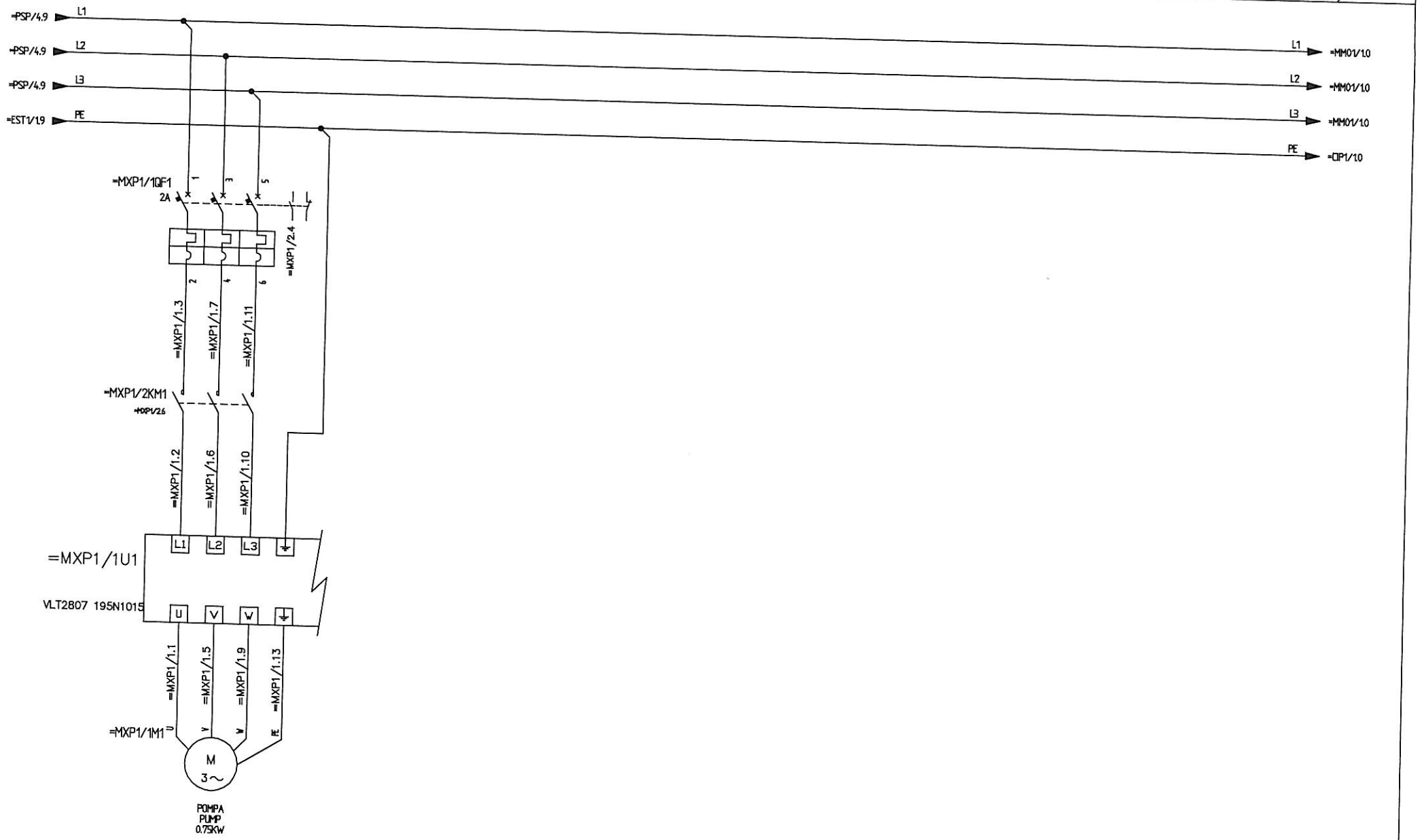
Project: FRIGUS 600 PLC	Title: EMERGENZE 1 / *EMERGENCY 1*	Id/rev.: 13020369	Dev.Func.: =EST1
Date: 30/09/02 Sign.: L.M.		Location:	Global sheet: 13 Function sheet: 2

Print date : @plotdate



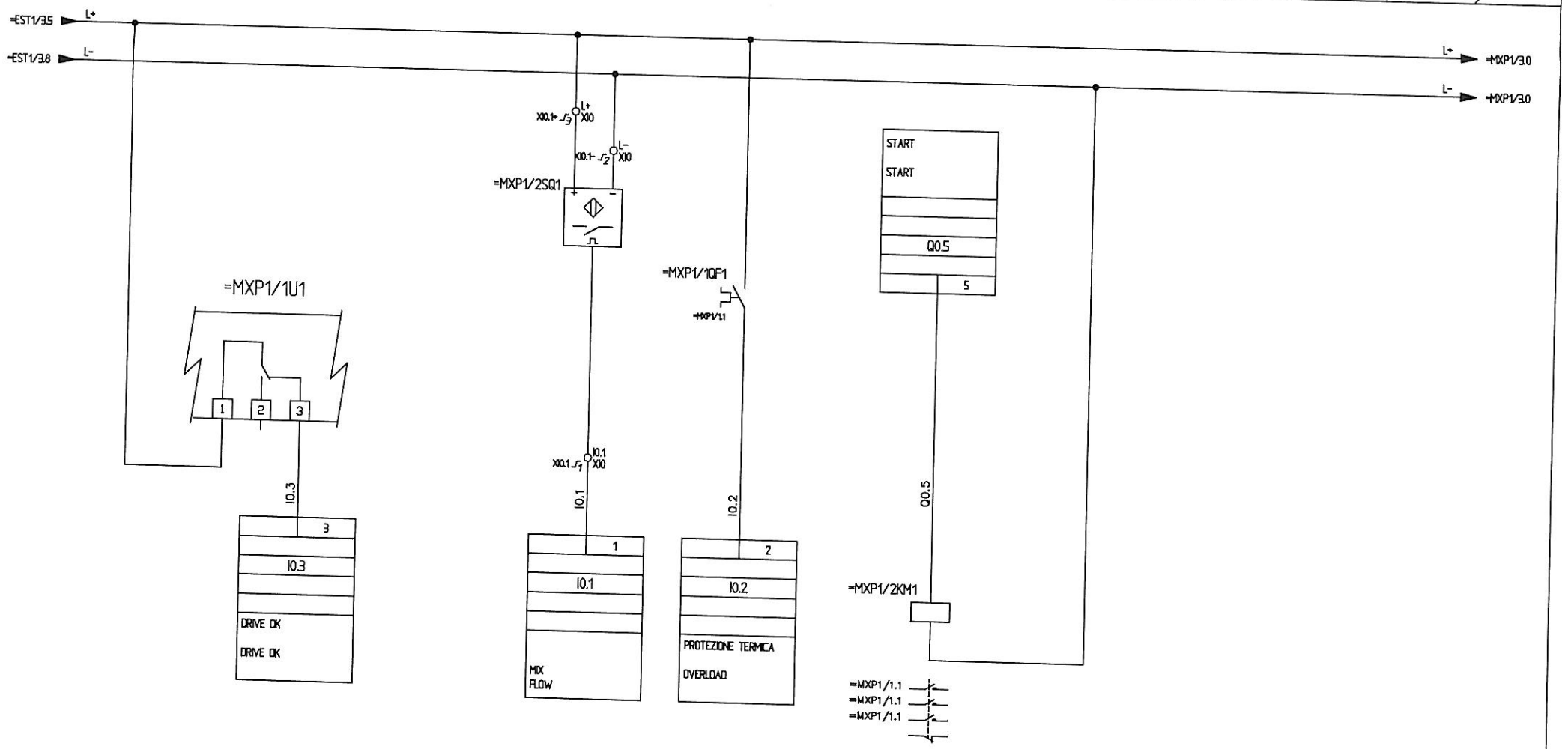
Tetra Pak Hoyer	Project FRIGUS 600 PLC		Title IMPUT/OUTPUT PLC *IMPUT/OUTPUT PLC*	Id/rev. 13020369	Dev.Func. =EST1
	Date 30/09/02	Sign. L.M.		Location	Global sheet: 14 Function sheet: 3

Print date : @plotdate



Tetra Pak Hoyer	Project FRIGUS 600 PLC		Title VARIATORE DI VELOCITA' - POTENZA / *SPEED CONVERTER DRIVE - POWER*	Id/rev. 13020369	Dev.Func. =MXP1
	Date 30/09/02	Sign. L.M.		Location	Global sheet: 15 Function sheet: 1

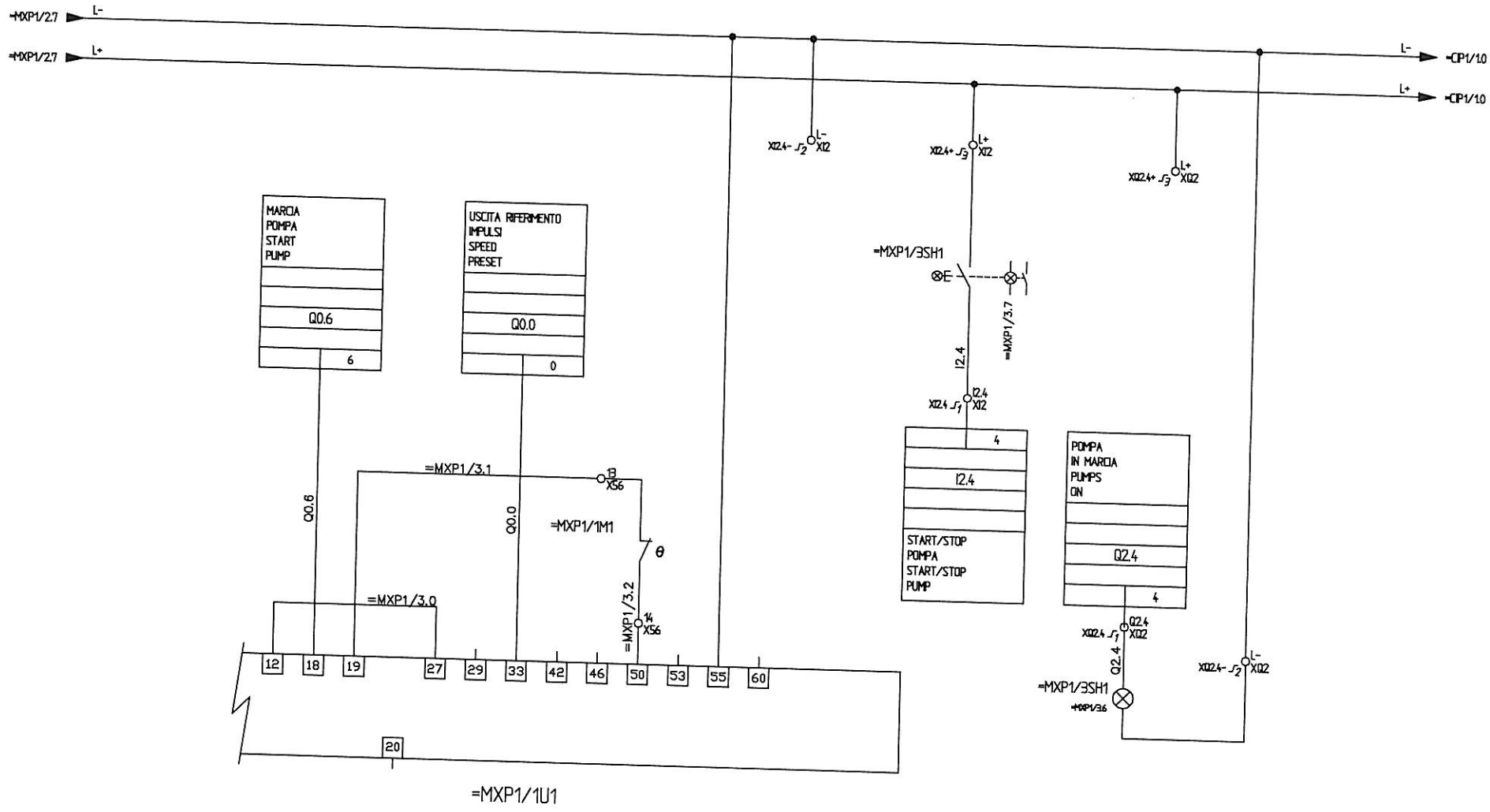
Print date : @plotdate



Tetra Pak Hoyer

Project: FRIGUS 600 PLC	Title: VARIATORE DI VELOCITA' - COMANDO / SPEED CONVERTER DRIVE -	Id/rev.: 13020369	Dev.Func.: =MXP1
Date: 30/09/02 Sign.: L.M.		Location	Global sheet: 16 Function sheet: 2

Print date : @plotdate



Tetra Pak Hoyer

Project: FRIGUS 600 PLC	Title: VARIATORE DI VELOCITA' - COMANDO / *SPEED CONVERTER DRIVE -*	Id/rev.: 13020369	Dev.Func.: =MXP1
Date: 30/09/02 Sign.: L.M.		Location	Global sheet: 17 Function sheet: 3

Print date : @plotdate

N°PAR.	PARAMETER DESCRIPTION	Frequency converter		
		Mix pump		Cream pump
		Dobbel piston	F.K.	
001	Language			
002	Local/remote operation			
003	Local reference			
004	Active Setup			
005	Programming Setup			
006	Setup copying			
007	LCP copy			
008	Display scaling of output frequency			
009	Large display readout			
010	Small display line 1.1			
011	Small display readout 1.2			
012	Small readout 1.3			
013	Local control			
014	Local stop			
015	Local jog			
016	Local reversing			
017	Local reset of trip			
018	Lock for data changes			
019	Operating mode at power-up, local operation			
100	Configuration			
101	Torque characteristic			
102	Motor power P (M,N)	0.75KW *	0.75KW *	
103	Motor voltage V (M,N)	400V *	400V *	
104	Motor frequency f (M,N)	50Hz *	50Hz *	
105	Motor current I (M,N)	2.0A *	2.2A *	
106	Rated motor speed	1435 *	1375 *	
107	Automatinc motor tuning, AMT			
108	Stator resistance R (s)			
109	Stator resistance X (s)			
119	High start torque			
120	Start delay			
121	Start function			
122	Function at stop			
123	Min. frequncy for activation of function aty stop			
126	DC brake time			
127	DC brake cut-in frequence			
128	Motor thermal protection			
130	Start frequence			
131	Initial voltage			
132	DC brake voltege			
133	Start voltage			
134	Load compensation			
135	U/f-ratio			
136	Slip compensation			
137	DC hold voltage			
138	Brake cut out value			
139	Brake cut in frequency			
142	Spread reactance X (L)			
143	Internal fan control	always ON	always ON	always ON
144	Gain AC brake			
200	Output frequency range			
201	Output frequency low limit, f (MIN)	15Hz	10Hz	

N°PAR.	PARAMETER DESCRIPTION	Frequency converter		
		Mix pump		Cream pump
		Dobbel piston	F.K.	
202	Output frequency high limit, f (MAX)	65Hz	44Hz	
203	Reference range			
204	Minimum reference, Ref(MIN)	15Hz	10Hz	
205	Maximum reference, Ref(MAX)	65Hz	44Hz	
206	Ramp type			
207	Ramp-up time 1			
208	Ramp-down time 1			
209	Ramp-up time 2			
210	Ramp-down time 2			
211	Jog ramp time			
212	Quick-stop ramp-down time			
213	Jog frequency			
214	Reference function			
215	Preset reference 1			
216	Preset reference 2			
217	Preset reference 3			
218	Preset reference 4			
219	Catch up/slow down reference			
221	Current limit, I (LIM)			
223	Warning: Low corrent, I (LOW)			
224	Warning: High current, I (HIGH)			
225	Warning: Low frequency, f (LOW)			
226	Warning: High frequency, f (HIGH)			
227	Warning:LOw feedback, FB (LOW)			
228	Warning: High feedback, FB (HIGH)			
229	Frequency by pass 1			
230	Frequency by pass 2			
231	Digital inputs, Term. N°18			
302	Digital inputs, Term. N°18			
303	Digital inputs, Term. N°19	31	31	
304	Digital inputs, Term. N°27	0	0	
305	Digital inputs, Term. N°29			
307	Digital inputs, Term. N°33	28	28	
308	Terminal 53, analogue input voltage	0	0	
309	Terminal 53, Min. scaling			
310	Terminal 53, Max scaling			
314	Terminal 60, analogue input current			
315	Terminal 60, Min. scaling			
316	Terminal 60, Max scaling			
317	Time out			
318	Function after time out			
319	Analogue output terminal 42			
323	Relay output 1-3			
327	Pulse / reference feedback	1000Hz	1000Hz	
341	Digital outputterminal 46			
342	Terminal 46, Max pulse output			
343	Precise stop function			
344	Counter value			
400	Brake function			
405	Reset function	Powerup	Powerup	
406	Automatic restart time			
409	Trip delay overcurrent, I (LIM)			

N°PAR.	PARAMETER DESCRIPTION	Frequency converter		
		Mix pump		Cream pump
		Dobbel piston	F.K.	
411	Switching frequency			
412	Variable switching frequency			
413	Overmodulation function			
414	Minimum feedback, FB (MIN)			
415	Maximum feedback, FB (MAX)			
416	Process units			
417	Speed PID proportional gain			
418	Speed PID integral time			
419	Speed PID differential time			
420	Speed PID D-gain limit			
421	Speed PID lowpass filter time			
423	U1 voltage			
424	F1 frequency			
425	U2 voltage			
426	F2 frequency			
427	U3 voltage			
428	F3 frequency			
437	Process PID normal/inverse control			
438	Process PID anti windup			
439	Process PID start frequency			
440	Process PID proportional gain			
441	Process PID integration time			
442	Process PID differentation time			
443	Process PID diff.gain limit			
444	Process PID lowpass filter time			
445	Flying factor			
451	FF factor			
452	Controller range			
800	Protocol select			
803	Bus time out			
804	Bus time out functionn			
805	Function of control word bit 10			
904	PPO type select for DP			
915	PCD config. write			
916	PCD config. Read			
917	Activate spontaneous messagees			
918	Station adress			
953	Warning parameter 1			
967	Contro word			
968	Status word			
970	Edit set up selection			
971	Store data values			

* = SEE MOT.ID. PLATE

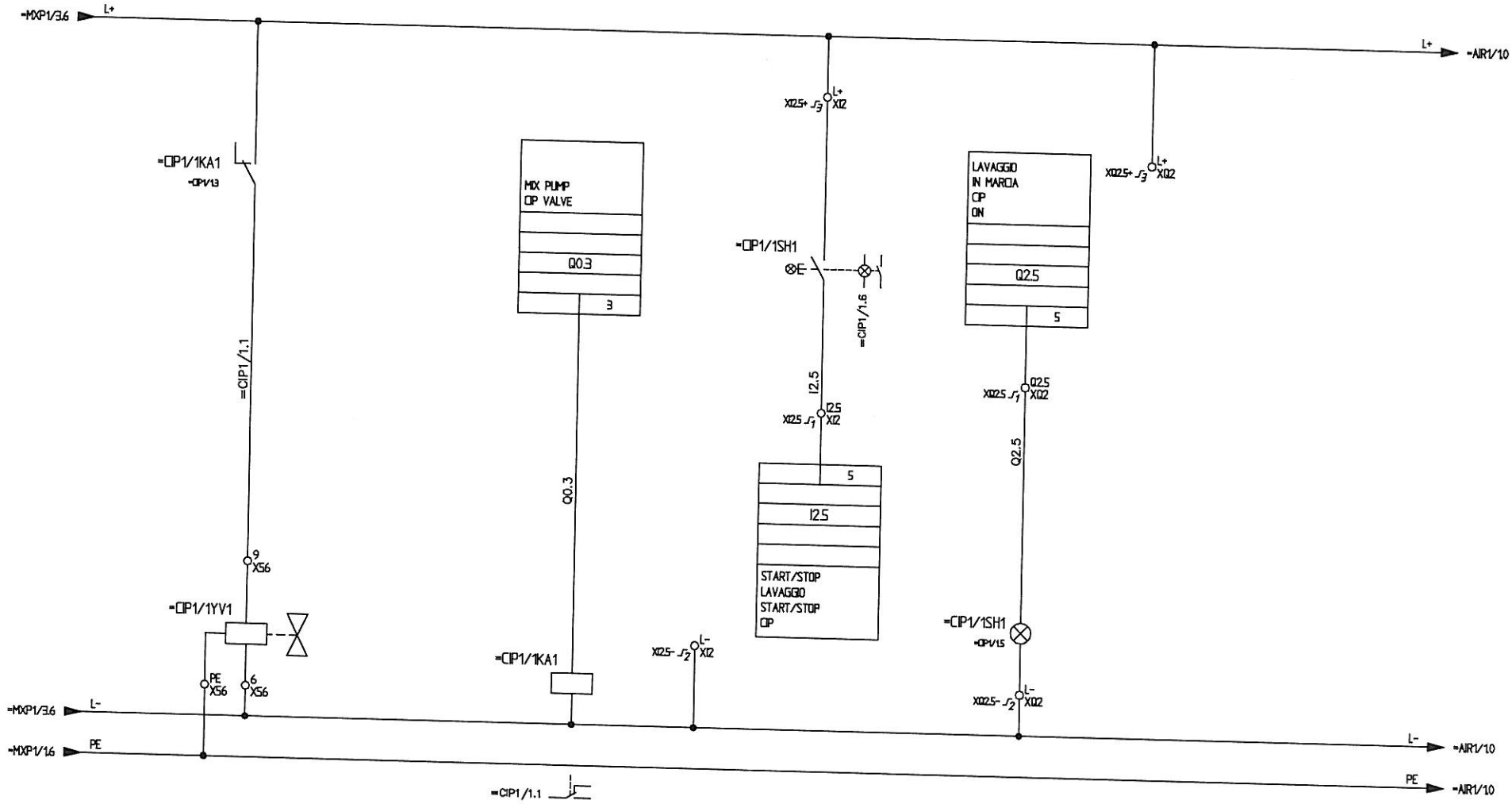
Tetra Pak Hoyer

Project: FRIGUS 600 PLC		Title: DESCRIZIONE PARAMETRI / *PARAMETER DESCRIPTION*	Id/rev.: 13020369
Date: 30/09/02	Sign.: L.M.		Location:

Dev.Func.: =MXP1

Global sheet: 17A Function sheet: 4

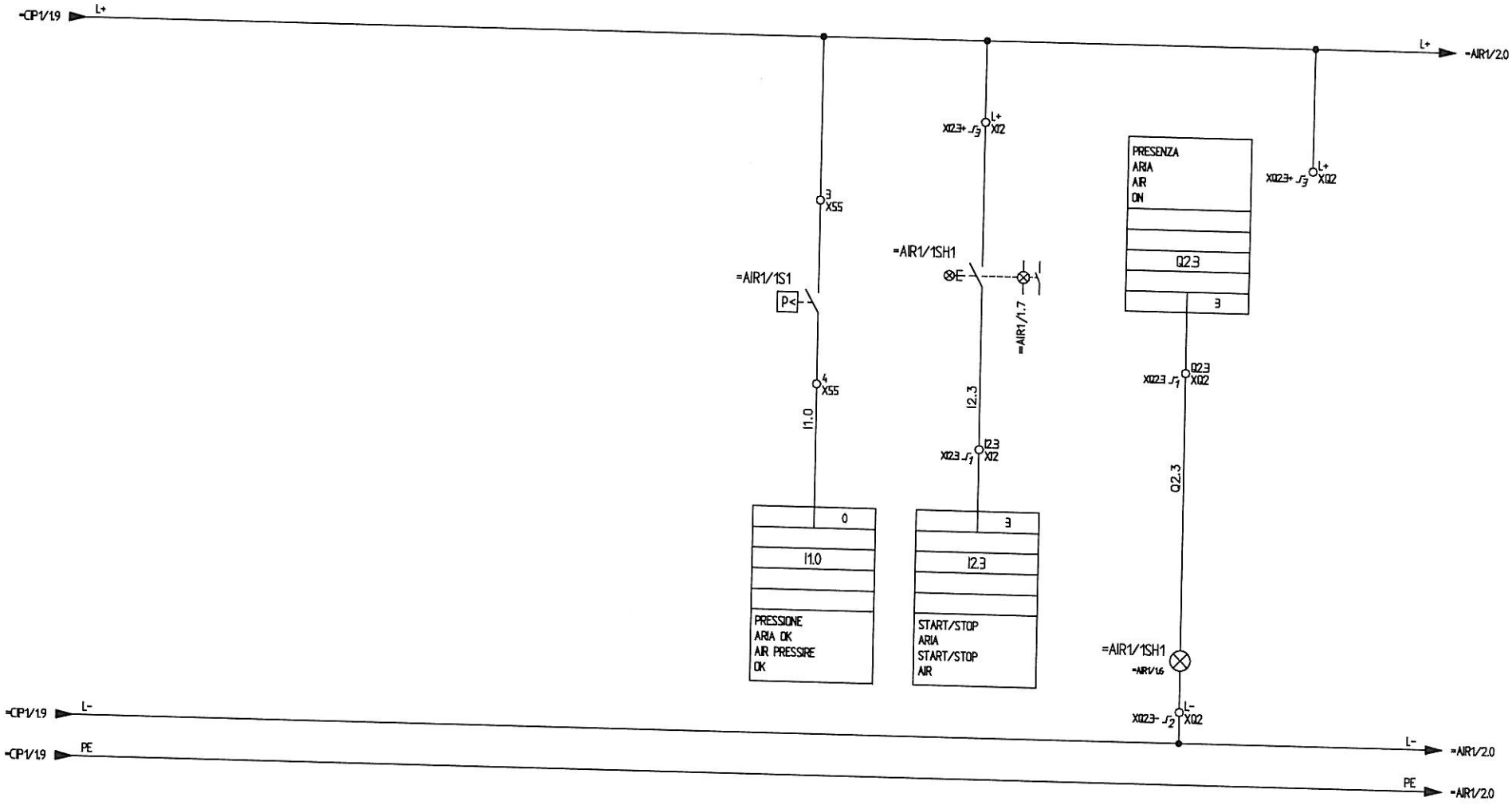
Print date : @plotdate



Tetra Pak Hoyer

Project: FRIGUS 600 PLC	Title: LAVAGGIO CIP	Id/rev.: 13020369	Dev.Func.: =CIP1
Date: 30/09/02 Sign.: L.M.		Location	Global sheet: 18 Function sheet: 1

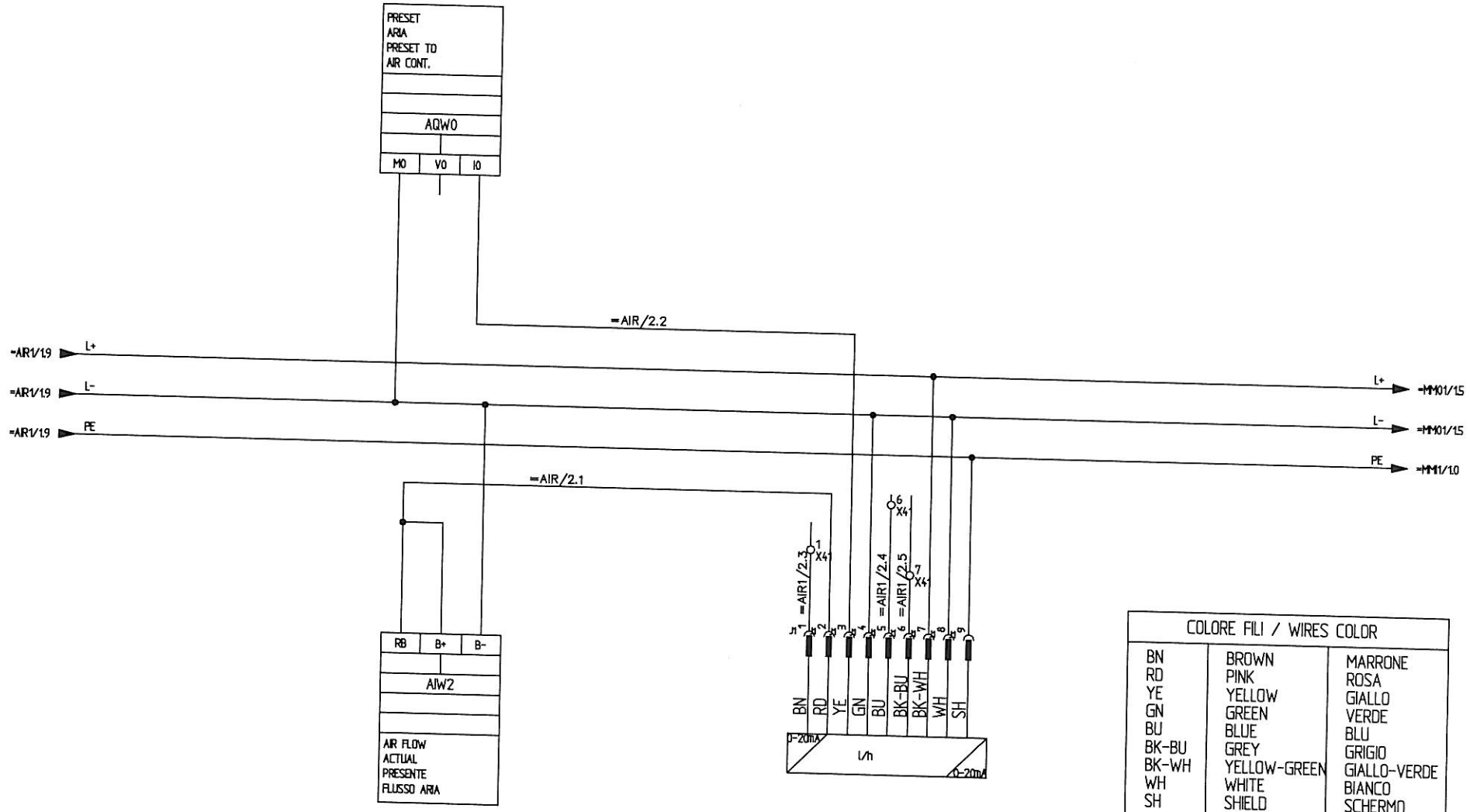
Print date : @plotdate



Tetra Pak Hoyer

Project: FRIGUS 600 PLC	Title: ARIA GENERALE / *AIR SUPPLY*	Id/rev.: 13020369	Dev.Func.: =AIR1
Date: 30/09/02 — Sign.: L.M.		Location	Global sheet: 19 — Function sheet: 1

Print date : @plotdate



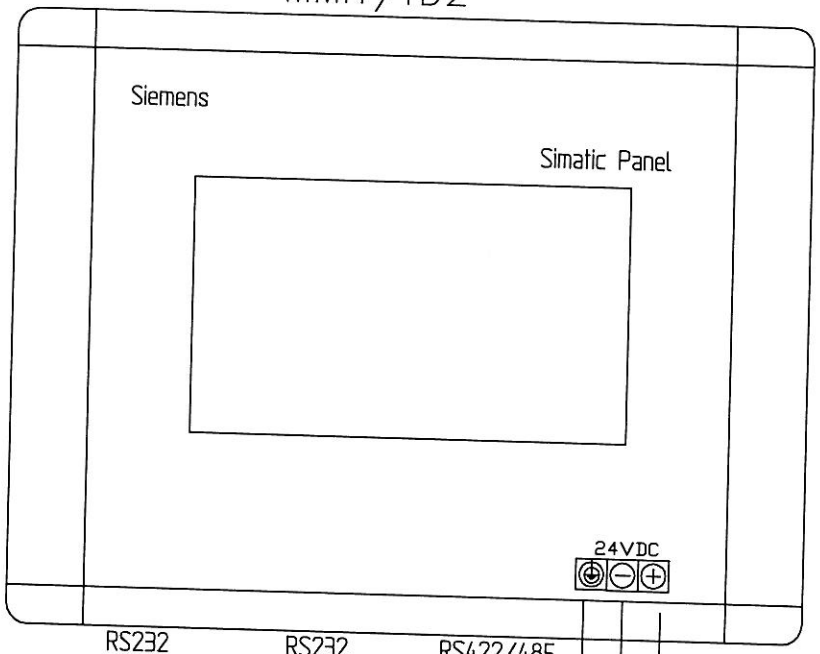
COLORE FILI / WIRES COLOR		
BN	BROWN	MARRONE
RD	PINK	ROSA
YE	YELLOW	GIALLO
GN	GREEN	VERDE
BU	BLUE	BLU
BK-BU	GREY	GRIGIO
BK-WH	YELLOW-GREEN	GIALLO-VERDE
WH	WHITE	BIANCO
SH	SHIELD	SCHERMO

Tetra Pak Hoyer

Project: FRIGUS 600 PLC	Title: CONTROLLO ARIA / *AIR CONTROL*	Id/rev.: 13020369	Dev.Func.: =AIR1
Date: 30/09/02	Sign.: L.M.	Location:	Global sheet: 20 Function sheet: 2

Print date : @plotdate

=MMI1/1D2



RS232 IF2

RS232 IF1A

RS422/485 IF1B

CONNETTORE 6ES7 972 0BA40-0XA0

6XV1-830-0H10

=RCK/12

9 X52

10 X52

=PSP/35 L+

L-

=AR1/19 PE

L+ //

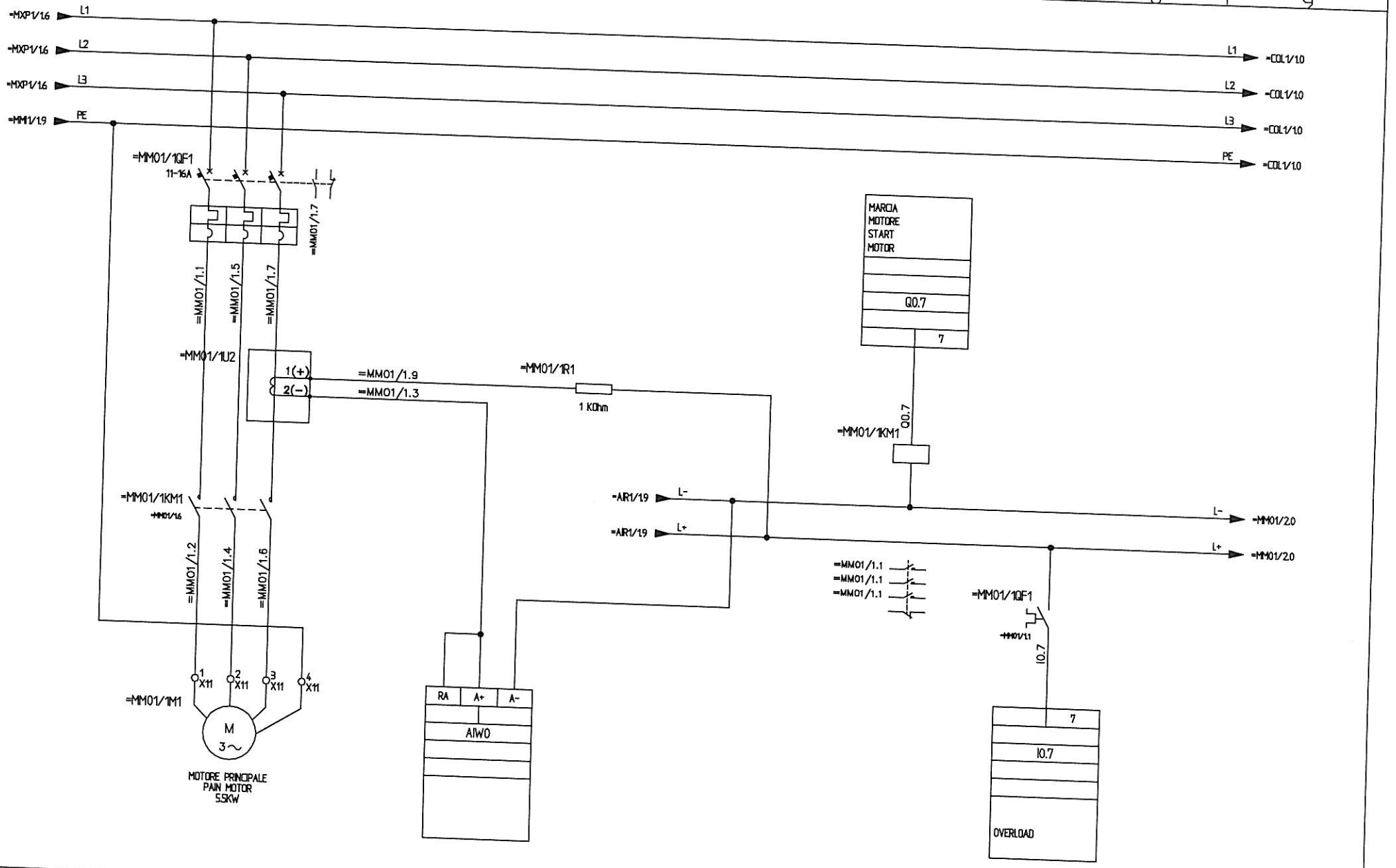
L-

PE =MM01/10

Tetra Pak Hoyer

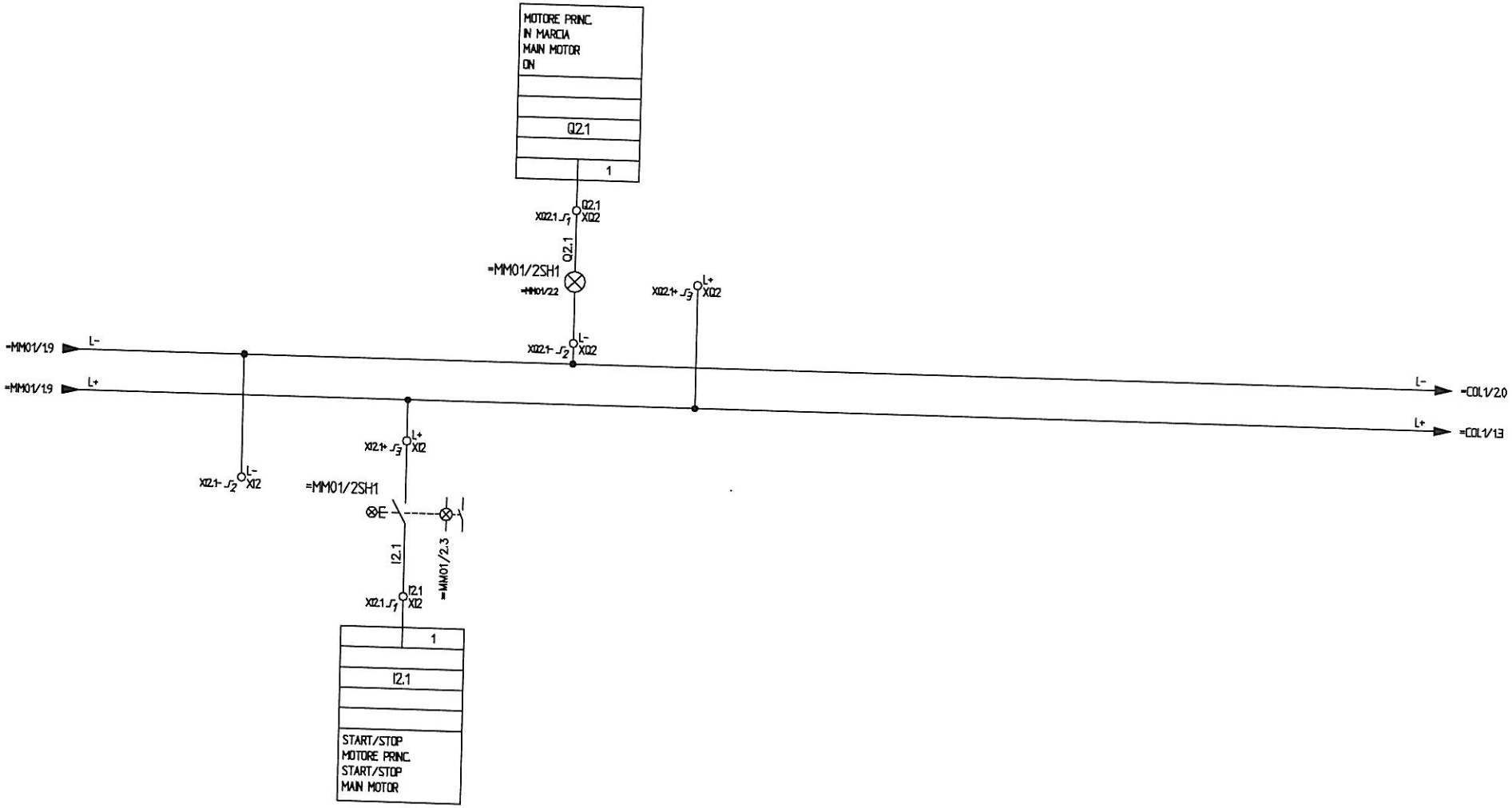
Project: FRIGUS 600 PLC	Title: PANNELLO OPERATORE / CONTROL PANEL	Id/rev.: 13020369	Dev.Func.: =MMI1
Date: 30/09/02 Sign.: L.M.		Location	Global sheet: 21 Function sheet: 1

Print date : @plotdate



Tetra Pak Hoyer	Project FRIGUS 600 PLC		Title MOTORE PRINCIPALE / MAIN MOTOR	Id/rev. 13020369	Dev.Func. =MM01
	Date 30/09/02	Sign. L.M.		Location	Global sheet: 22 Function sheet: 1

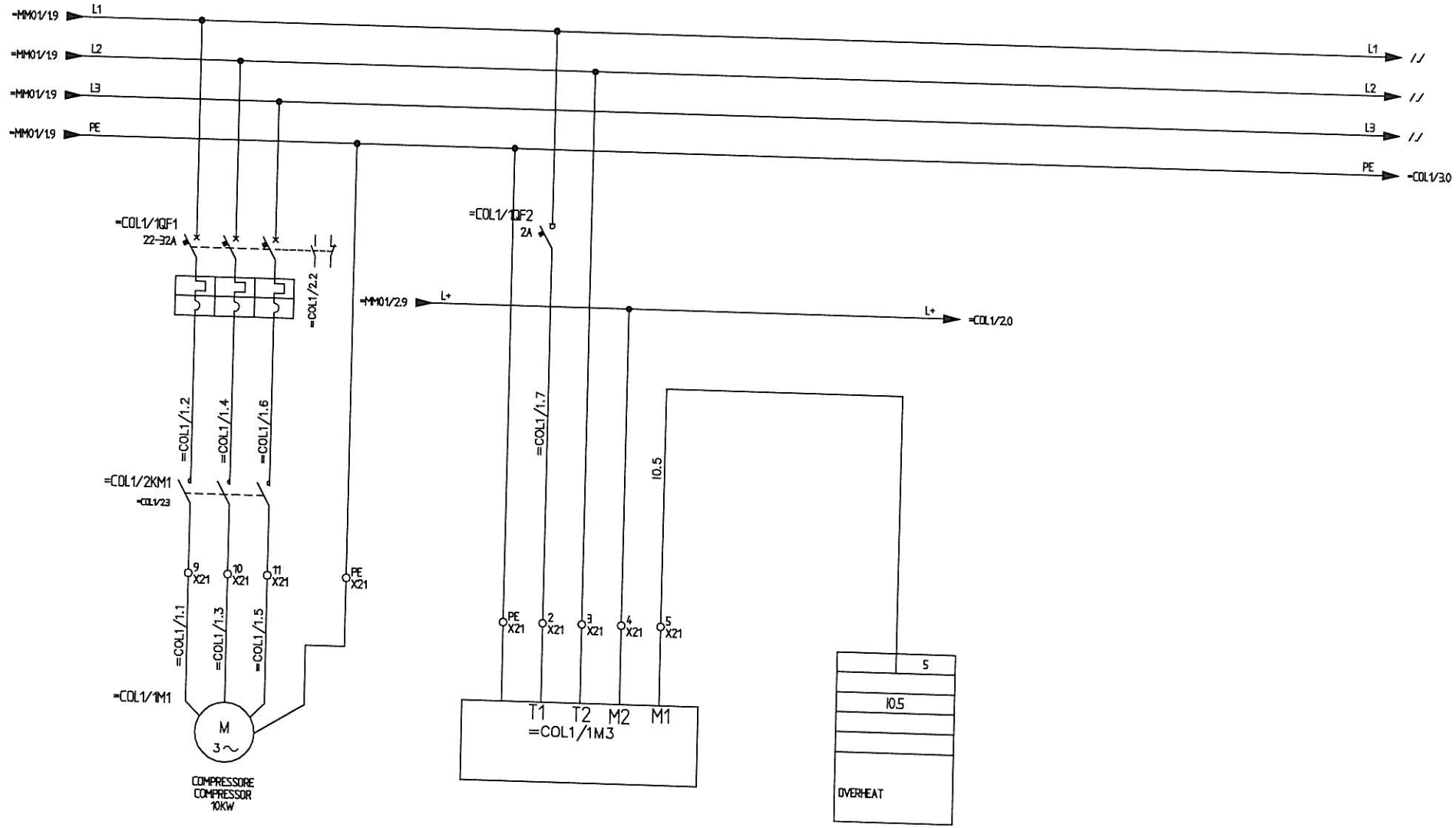
Print date : @plotdate



Tetra Pak Hoyer

Project: FRIGUS 600 PLC	Title: IMPUT/OUTPUT PLC / *IMPUT/OUTPUT PLC*	Id/rev.: 13020369	Dev.Func.: =MM01
Date: 30/09/02 — Sign.: L.M.		Location	Global sheet: 23 — Function sheet: 2

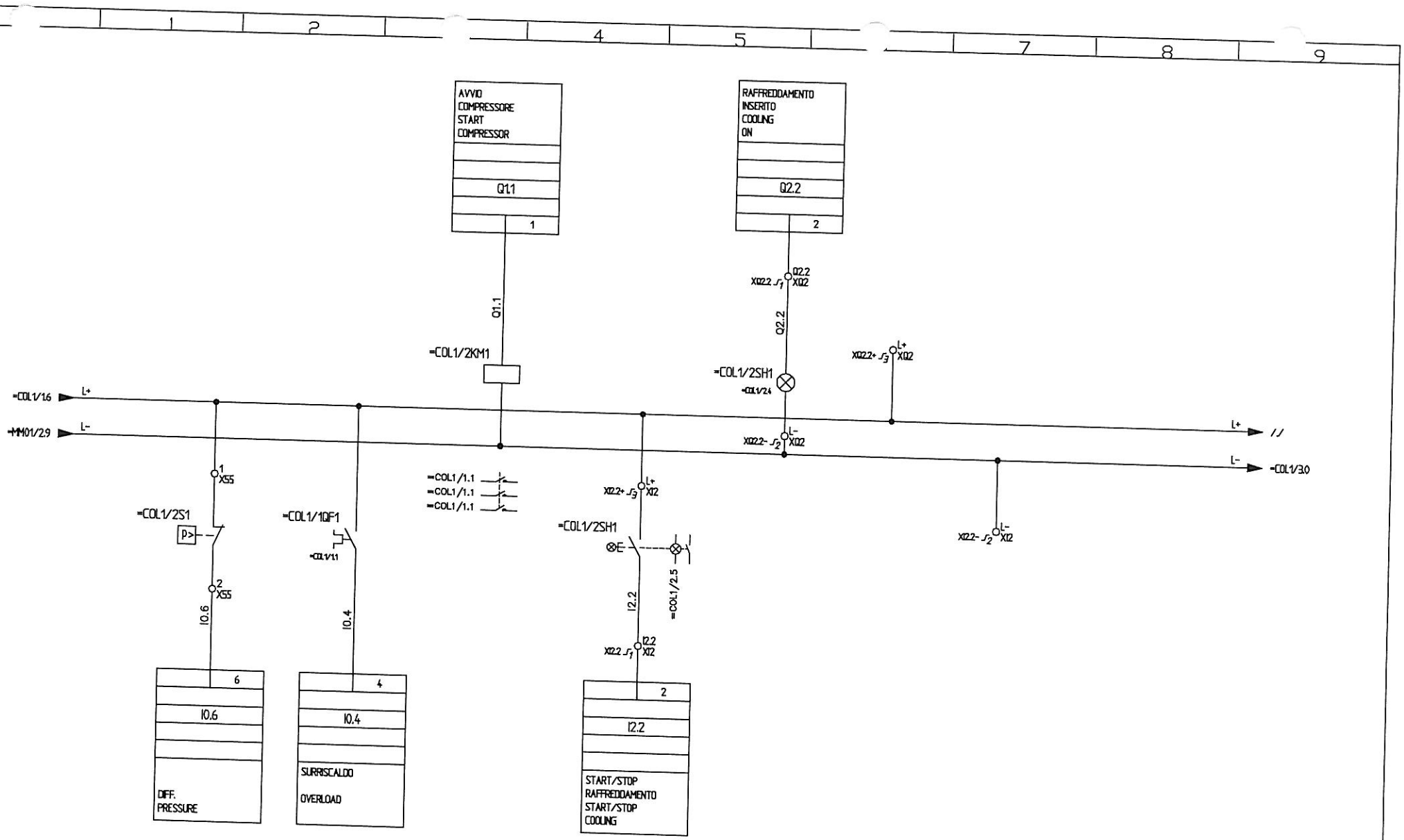
Print date : @plotdate



Tetra Pak Hoyer

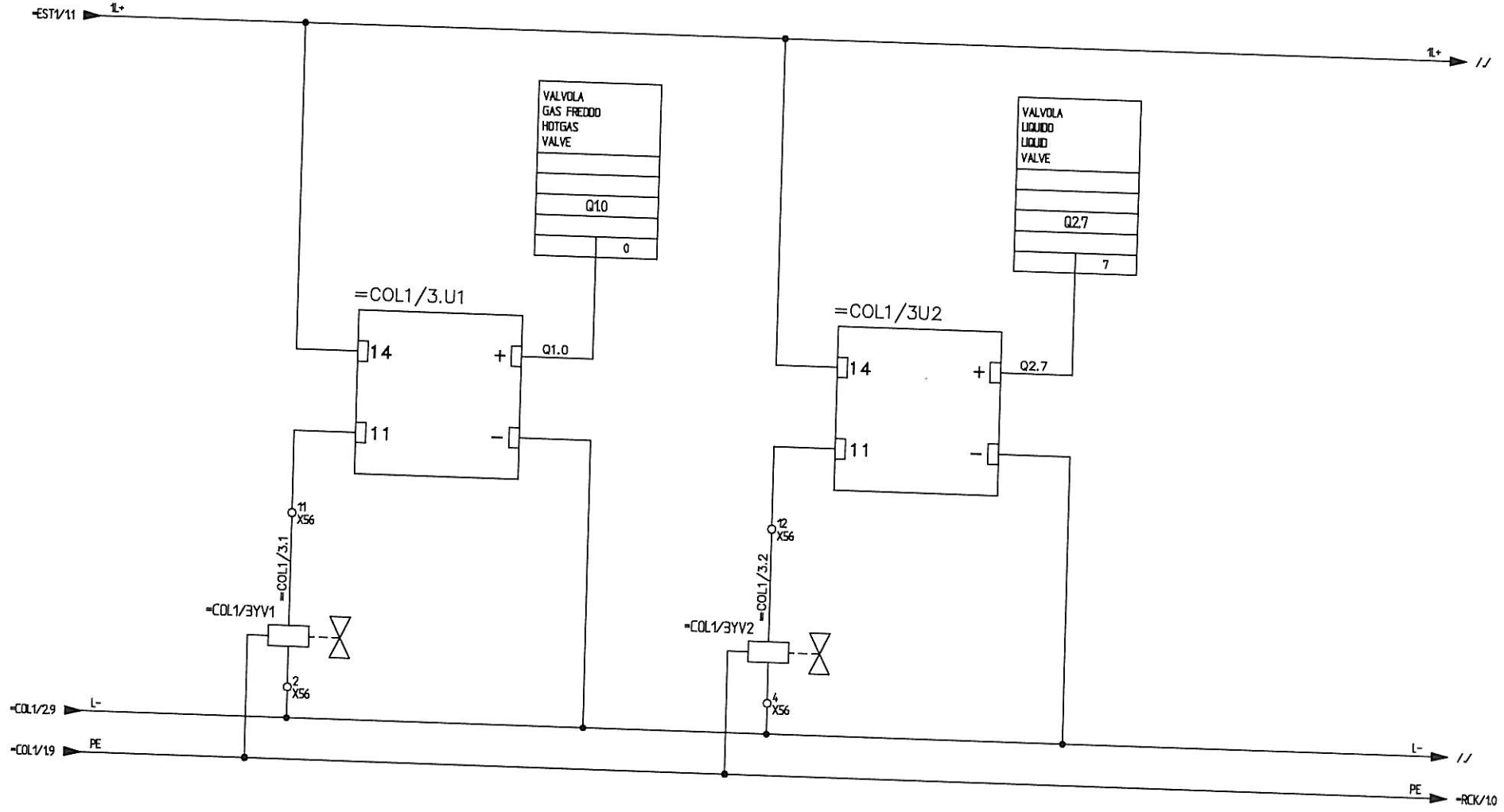
Project: FRIGUS 600 PLC		Title: COMPRESSORE RAFFREDDAMENTO / COOLING COMPRESSOR		Id/rev.: 13020369	Dev.Func.: =COL1
Date: 30/09/02	Sign.: L.M.			Location:	Global sheet: 24 Function sheet: 1

Print date : @plotdate



Tetra Pak Hoyer	Project: FRIGUS 600 PLC	Title: IMPUT/OUTPUT PLC	Id/rev.: 13020369	Dev.Func.: =COL1	
	Date: 30/09/02	Sign.: L.M.	IMPUT/OUTPUT PLC	Location	Global sheet: 25 Function sheet: 2

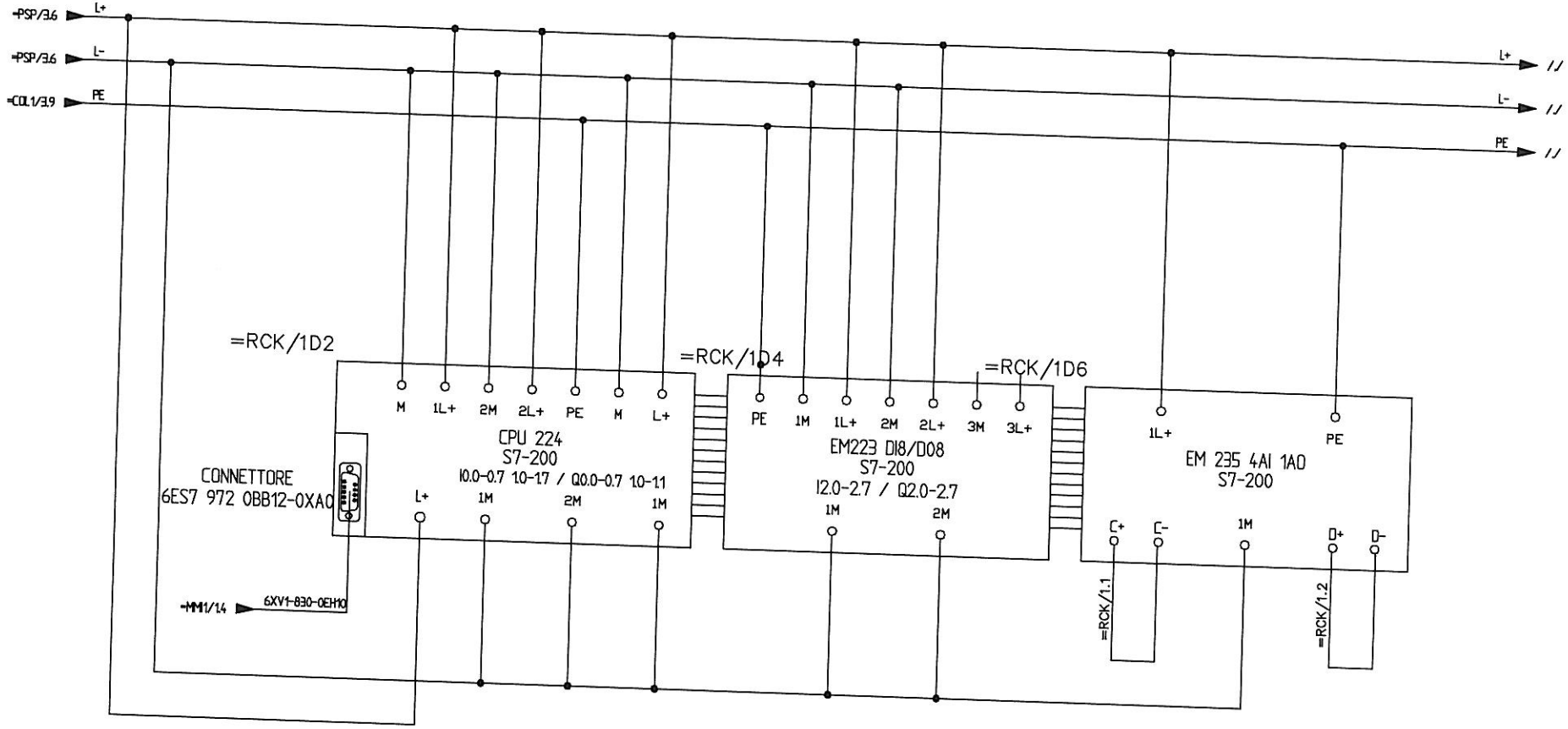
Print date : @plotdate



Tetra Pak Hoyer

Project: FRIGUS 600 PLC		Title: VALVOLE RAFFREDDAMENTO / *COOLING VALVES*	Id/rev.: 13020369	Dev.Func.: =COL1	
Date: 30/09/02	Sign.: L.M.		Location	Global sheet: 26	Function sheet: 3

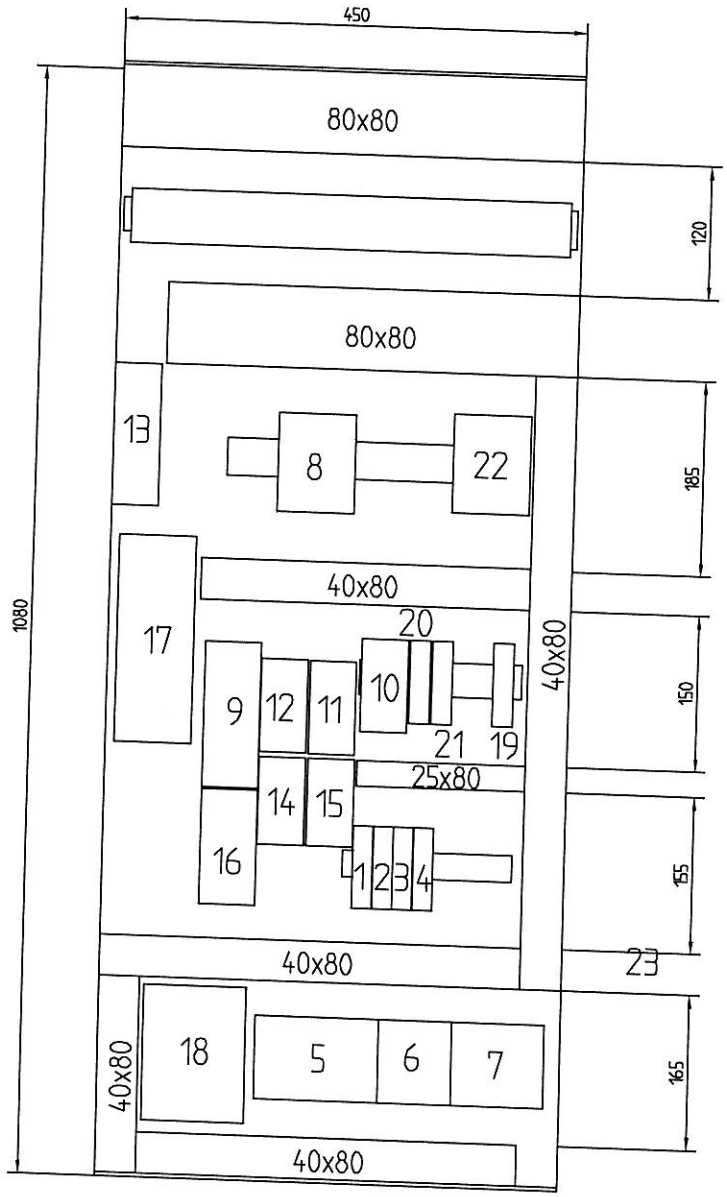
Print date : @plotdate



Tetra Pak Hoyer	Project FRIGUS 600 PLC		Title RACK PLC / PLC RACK	Id/rev. 13020369	Dev.Func. =RCK
	Date 30/09/02	Sign. L.M.		Location	Global sheet: 27 Function sheet: 1

Print date : @plotdate

1=COL1/3U1
2=COL1/3U2
3=EST/1KA1
4=CIP/1KA1
5=RCK/1D1
6=RCK/1D3
7=RCK/1D6
8=PSP/1QS1
9=COL1/1QF1
10=PSP/3QF1
11=MXP1/1GF1
12=MM01/1QF1
13=VNT1/1M2
14=MXP1/2KM1
15=MM01/1KM1
16=COL1/2KM1
17=MXP1/1U1
18=PSP/3G3
19=PSP/2G3
20=PSP/3QF2
21=COL1/1QF2
22=EST1/1K1



SCALA 2:1

Tetra Pak Hoyer

Project: FRIGUS 600 PLC		Title: LAY-OUT / LAY-OUT	Id/rev.: 13020369	Dev.Func.: =LYT	
Date: 30/09/02	Sign.: L.M.		Location	Global sheet: 28	Function sheet: 1

Print date : @plotdate

QUADRO QG
MORSETTIERA X21

NumI	NumM	NumO	Tipo	Costruttore	Sez.	Fg.Cat
PE	PE	PE	SAK 16	SIEMENS	16	=COL1/1.3
PE	PE	PE	SAK 2.5	SIEMENS	2.5	=COL1/1.2
=COL1/1.7	2	=COL1/1.7	SAK 2.5	SIEMENS	2.5	=COL1/1.3
L2	3	L2	SAK 2.5	SIEMENS	2.5	=COL1/1.4
L+	4	L+	SAK 2.5	SIEMENS	2.5	=COL1/1.4
10.5	5	10.5	SAK 2.5	SIEMENS	2.5	=COL1/1.4
=COL1/1.1	9	=COL1/1.1	SAK 16	SIEMENS	16	=COL1/1.1
=COL1/1.3	10	=COL1/1.3	SAK 16	SIEMENS	16	=COL1/1.1
=COL1/1.5	11	=COL1/1.5	SAK 16	SIEMENS	16	=COL1/1.2

QUADRO QG
MORSETTIERA X11

NumI	NumM	NumO	Tipo	Costruttore	Sez.	Fg.Cat
=MM01/1.2	1	=MM01/1.2	WDU 2.5	SIEMENS	2.5	=MM01/1.1
=MM01/1.4	2	=MM01/1.4	WDU 2.5	SIEMENS	2.5	=MM01/1.1
=MM01/1.6	3	=MM01/1.6	WDU 2.5	SIEMENS	2.5	=MM01/1.1
PE	4	PE	WDU 2.5	SIEMENS	2.5	=MM01/1.2

QUADRO QG
MORSETTIERA X41
AIR CONTROLLER

NumI	NumM	NumO	Tipo	Costruttore	Sez.	Fg.Cat
=AIR1/2.3	1	=AIR1/2.3	WDU 2.5	SIEMENS	2.5	=AIR1/2.5
=AIR1/2.4	6	=AIR1/2.4	WDU 2.5	SIEMENS	2.5	=AIR1/2.5
=AIR1/2.5	7	=AIR1/2.5	WDU 2.5	SIEMENS	2.5	=AIR1/2.6

QUADRO QG
MORSETTIERA X55

NumI	NumM	NumO	Tipo	Costruttore	Sez.	Fg.Cat
L+	1	L+	SAK 2.5	SIEMENS	2.5	=COL1/2.1
10.6	2	10.6	SAK 2.5	SIEMENS	2.5	=COL1/2.1
L+	3	L+	SAK 2.5	SIEMENS	2.5	=AIR1/1.5
11.0	4	11.0	SAK 2.5	SIEMENS	2.5	=AIR1/1.5

QUADRO QG
MORSETTIERA X56

NumI	NumM	NumO	Tipo	Costruttore	Sez.	Fg.Cat
L-	2	L-	SAK 2.5	SIEMENS	2.5	=COL1/3.2
L-	4	L-	SAK 2.5	SIEMENS	2.5	=COL1/3.5
L-	6	L-	SAK 2.5	SIEMENS	2.5	=CIP1/1.1
L-	8	L-	SAK 2.5	SIEMENS	2.5	=AIR1/1.1
=CIP1/1.1	9	=CIP1/1.1	SAK 2.5	SIEMENS	2.5	=CIP1/1.1
=AIR1/1.1	10	=AIR1/1.1	SAK 2.5	SIEMENS	2.5	=AIR1/1.1
=COL1/3.1	11	=COL1/3.1	SAK 2.5	SIEMENS	2.5	=COL1/3.2
=COL1/3.2	12	=COL1/3.2	SAK 2.5	SIEMENS	2.5	=COL1/3.5
=MXP1/3.1	13	=MXP1/3.1	SAK 2.5	SIEMENS	2.5	=MXP1/3.4
=MXP1/3.2	14	=MXP1/3.2	SAK 2.5	SIEMENS	2.5	=MXP1/3.4
PE	PE	PE	SAK 6	SIEMENS	6	=CIP1/1.1

QUADRO QG
MORSETTIERA X52

NumI	NumM	NumO	Tipo	Costruttore	Sez.	Fg.Cat
S11	1	S11	SAK 2.5	WEIDMULLER	2.5	=EST1/2.0
S12	2	S12	SAK 2.5	WEIDMULLER	2.5	=EST1/2.1
S22	3	S22	SAK 2.5	WEIDMULLER	2.5	=EST1/2.2
S12	4	S12	SAK 2.5	WEIDMULLER	2.5	=EST1/2.4
S12	5	S12	SAK 2.5	WEIDMULLER	2.5	=EST1/2.4
	6		SAK 2.5	WEIDMULLER	2.5	=EST1/2.5
	7		SAK 2.5	WEIDMULLER	2.5	=EST1/2.5
S21	8		SAK 2.5	WEIDMULLER	2.5	=EST1/2.1
L-	9	L-	SAK 2.5	WEIDMULLER	2.5	=MM1/1.5
L+	10	L+	SAK 2.5	WEIDMULLER	2.5	=MM1/1.5

Tetra Pak Hoyer

Project: FRIGUS 600 PLC		Title: MORSETTIERA X21-41-52-55-56 / TERMINAL BLOCK X21-41-52-55-56	Id/rev.: 13020369
Date: 30/09/02	Sign.: L.M.		Location

Dev.Func. =TMBL

Global sheet: 29 Function sheet: 1

Print date : @plotdate

QUADRO QG			
SPINA J1			
COSTRUTTORE ILME			
TIPO 9 POLI			
Connettore a vaschetta 9 poli			
CONNETTORE A VASCHETTA "AIR CONTROLLER"			
Pin	Num1	Num0	Fg.Cat
1	=AIR1/2.3	=AIR1/2.3	=AIR1/2.5
2	=AIR1/2.1	=AIR1/2.1	=AIR1/2.5
3	=AIR1/2.2	=AIR1/2.2	=AIR1/2.5
4	L-	L-	=AIR1/2.5
5	=AIR1/2.4	=AIR1/2.4	=AIR1/2.5
6	=AIR1/2.5	=AIR1/2.5	=AIR1/2.6
7	L+	L+	=AIR1/2.6
8	L-	L-	=AIR1/2.6
9	PE	PE	=AIR1/2.6

Tetra Pak Hoyer

Print date : @plotdate

Project: FRIGUS 600 PLC		Title: CONNETTORE AIR CONTROLLER J1 / AIR CONTROLLER J1 CONNECTOR	Id/rev.: 13020369	Dev.Func.: =TMBL	
Date: 30/09/02	Sign.: L.M.		Location	Global sheet: 30	Function sheet: 2

QUADRO QG MORSETTI MULTIPLI XI0 INPUT PLC						
NumI	NumM	NumO	Tipo	Costruttore	LIV.	Fg.Cat
I0.1	XI0.1	I0.1	DLD 25	WEIDMULLER	1/3	=MXP1/2.3
L+	XI0.1+	L+	DLD 25	WEIDMULLER	3/3	=MXP1/2.3
L-	XI0.1-	L-	DLD 25	WEIDMULLER	2/3	=MXP1/2.4

QUADRO QG MORSETTI MULTIPLI XI1						
NumI	NumM	NumO	Tipo	Costruttore	LIV.	Fg.Cat
I1.2	XI1.2	I1.2	DLD 25	WEIDMULLER	1/3	=EST1/3.2
L-	XI1.2-	L-	DLD 25	WEIDMULLER	2/3	=EST1/3.7
L+	XI1.2+	L+	DLD 25	WEIDMULLER	3/3	=EST1/3.2
I1.3	XI1.3	I1.3	DLD 25	WEIDMULLER	1/3	=EST1/3.3
L-	XI1.3-	L-	DLD 25	WEIDMULLER	2/3	=EST1/3.8
L+	XI1.3+	L+	DLD 25	WEIDMULLER	3/3	=EST1/3.3

QUADRO QG MORSETTI MULTIPLI XI2 INPUT PLC						
NumI	NumM	NumO	Tipo	Costruttore	LIV.	Fg.Cat
I2.0	XI2.0	I2.0	DLD 25	WEIDMULLER	1/3	=PSP/4.2
L-	XI2.0-	L-	DLD 25	WEIDMULLER	2/3	=PSP/4.2
L+	XI2.0+	L+	DLD 25	WEIDMULLER	3/3	=PSP/4.2
I2.1	XI2.1	I2.1	DLD 25	WEIDMULLER	1/3	=MM01/2.2
L-	XI2.1-	L-	DLD 25	WEIDMULLER	2/3	=MM01/2.1
L+	XI2.1+	L+	DLD 25	WEIDMULLER	3/3	=MM01/2.2
I2.2	XI2.2	I2.2	DLD 25	WEIDMULLER	1/3	=COL1/2.4
L-	XI2.2-	L-	DLD 25	WEIDMULLER	2/3	=COL1/2.7
L+	XI2.2+	L+	DLD 25	WEIDMULLER	3/3	=COL1/2.4
I2.3	XI2.3	I2.3	DLD 25	WEIDMULLER	1/3	=AIR1/1.6
L-	XI2.3-	L-	DLD 25	WEIDMULLER	2/3	=AIR1/1.2
L+	XI2.3+	L+	DLD 25	WEIDMULLER	3/3	=AIR1/1.6
I2.4	XI2.4	I2.4	DLD 25	WEIDMULLER	1/3	=MXP1/3.6
L-	XI2.4-	L-	DLD 25	WEIDMULLER	2/3	=MXP1/3.5
L+	XI2.4+	L+	DLD 25	WEIDMULLER	3/3	=MXP1/3.6
I2.5	XI2.5	I2.5	DLD 25	WEIDMULLER	1/3	=CIP1/1.5
L-	XI2.5-	L-	DLD 25	WEIDMULLER	2/3	=CIP1/1.4
L+	XI2.5+	L+	DLD 25	WEIDMULLER	3/3	=CIP1/1.5
I2.6	XI2.6	I2.6	DLD 25	WEIDMULLER	1/3	=EST1/3.4
L-	XI2.6-	L-	DLD 25	WEIDMULLER	2/3	=EST1/3.6
L+	XI2.6+	L+	DLD 25	WEIDMULLER	3/3	=EST1/3.4

Tetra Pak Hoyer

Print date : @plotdate

Project: FRIGUS 600 PLC		Title: MORSETTIERA XI0-2 *TERMINAL BLOCK XI0-2*	Id/rev.: 13020369
Date: 30/09/02	Sign.: L.M.		Location:

Dev.Func.: =TMBL

Global sheet: 31 Function sheet: 3

QUADRO QG
MORSETTI MULTIPLI XQ2
OUTPUT PLC

NumI	NumM	NumO	Tipo	Costruttore	LIV.	Fg.Cat
Q2.0	XQ2.0	Q2.0	DLD 2.5	WEIDMULLER	1/3	=PSP/4.3
L-	XQ2.0-	L-	DLD 2.5	WEIDMULLER	2/3	=PSP/4.3
L+	XQ2.0+	L+	DLD 2.5	WEIDMULLER	3/3	=PSP/4.4
Q2.1	XQ2.1	Q2.1	DLD 2.5	WEIDMULLER	1/3	=MM01/2.3
L-	XQ2.1-	L-	DLD 2.5	WEIDMULLER	2/3	=MM01/2.3
L+	XQ2.1+	L+	DLD 2.5	WEIDMULLER	3/3	=MM01/2.4
Q2.2	XQ2.2	Q2.2	DLD 2.5	WEIDMULLER	1/3	=COL1/2.5
L-	XQ2.2-	L-	DLD 2.5	WEIDMULLER	2/3	=COL1/2.5
L+	XQ2.2+	L+	DLD 2.5	WEIDMULLER	3/3	=COL1/2.6
Q2.3	XQ2.3	Q2.3	DLD 2.5	WEIDMULLER	1/3	=AIR1/1.7
L-	XQ2.3-	L-	DLD 2.5	WEIDMULLER	2/3	=AIR1/1.7
L+	XQ2.3+	L+	DLD 2.5	WEIDMULLER	3/3	=AIR1/1.8
Q2.4	XQ2.4	Q2.4	DLD 2.5	WEIDMULLER	1/3	=MXP1/3.7
L-	XQ2.4-	L-	DLD 2.5	WEIDMULLER	2/3	=MXP1/3.8
L+	XQ2.4+	L+	DLD 2.5	WEIDMULLER	3/3	=MXP1/3.7
Q2.5	XQ2.5	Q2.5	DLD 2.5	WEIDMULLER	1/3	=CIP1/1.6
L-	XQ2.5-	L-	DLD 2.5	WEIDMULLER	2/3	=CIP1/1.6
L+	XQ2.5+	L+	DLD 2.5	WEIDMULLER	3/3	=CIP1/1.7
Q2.6	XQ2.6	Q2.6	DLD 2.5	WEIDMULLER	1/3	=EST1/3.7
L-	XQ2.6-	L-	DLD 2.5	WEIDMULLER	2/3	=EST1/3.7
L+	XQ2.6+	L+	DLD 2.5	WEIDMULLER	3/3	=EST1/3.5

Tetra Pak Hoyer

Project: FRIGUS 600 PLC
Date: 30/09/02
Sign.: L.M.
Title: MORSETTIERA XQ2
TERMINAL BLOCK XQ2
Id/rev.: 13020369
Location:
Dev.Func.: =TMBL
Global sheet: 32
Function sheet: 4

Print date : @plotdate

Tetra Pak Hoyer

Project: FRIGUS 600 PLC		Title: RISERVA / *SPARE*	Id/rev.: 13020369
Date: 30/09/02	Sign.: L.M.		Location:

Dev.Func.: =TMBL

Global sheet: 33 Function sheet: 5

Print date : @plotdate

BRONKHORST HI-TEC

CALIBRATION CERTIFICATE

We herewith certify that the instrument mentioned below has been calibrated in accordance with the stated values and conditions. The calibration standards used are traceable to national standards of the Dutch Weights & Measures (NMi).

Identifications

	Calibrated Instrument	Calibration Standard
Type	Flow controller	Piston Prover
Serial number	M3201236C	80312
Model number	TPH-004F	FPP T-050-TD
Certificate no.	BHTG18/238630	BHTG09/171777

Conditions

Customer		Calibration	
Fluid	AiR	Fluid	AiR
Pressure	8..12 bar (g)	Pressure	8.0 bar (a)
Temperature	20 °C	Temperature	21.3 °C
Flow (*)	375 ln/h	Room temperature	21.3 °C
Output range	0 - 20 mA	Atm. pressure	1017 hPa

Results

Nominal Flow Setting	Calibrated Output Signal	Customer Flow(*)		Deviation
0.0 %	0.060 mA	0.0000	ln/h	0.3 %FS
25.0 %	5.000 mA	93.81	ln/h	0.0 %FS
50.0 %	10.000 mA	186.5	ln/h	0.3 %FS
75.0 %	15.000 mA	279.8	ln/h	0.4 %FS
100.0 %	20.000 mA	378.4	ln/h	-0.9 %FS

HOYER - M 3201236 C
Air Controller Calibration Values
E 6.0000E-02
F 5,1209E-02
G 1,8619E-05
H -3,8804E-08
FLOW

Notes

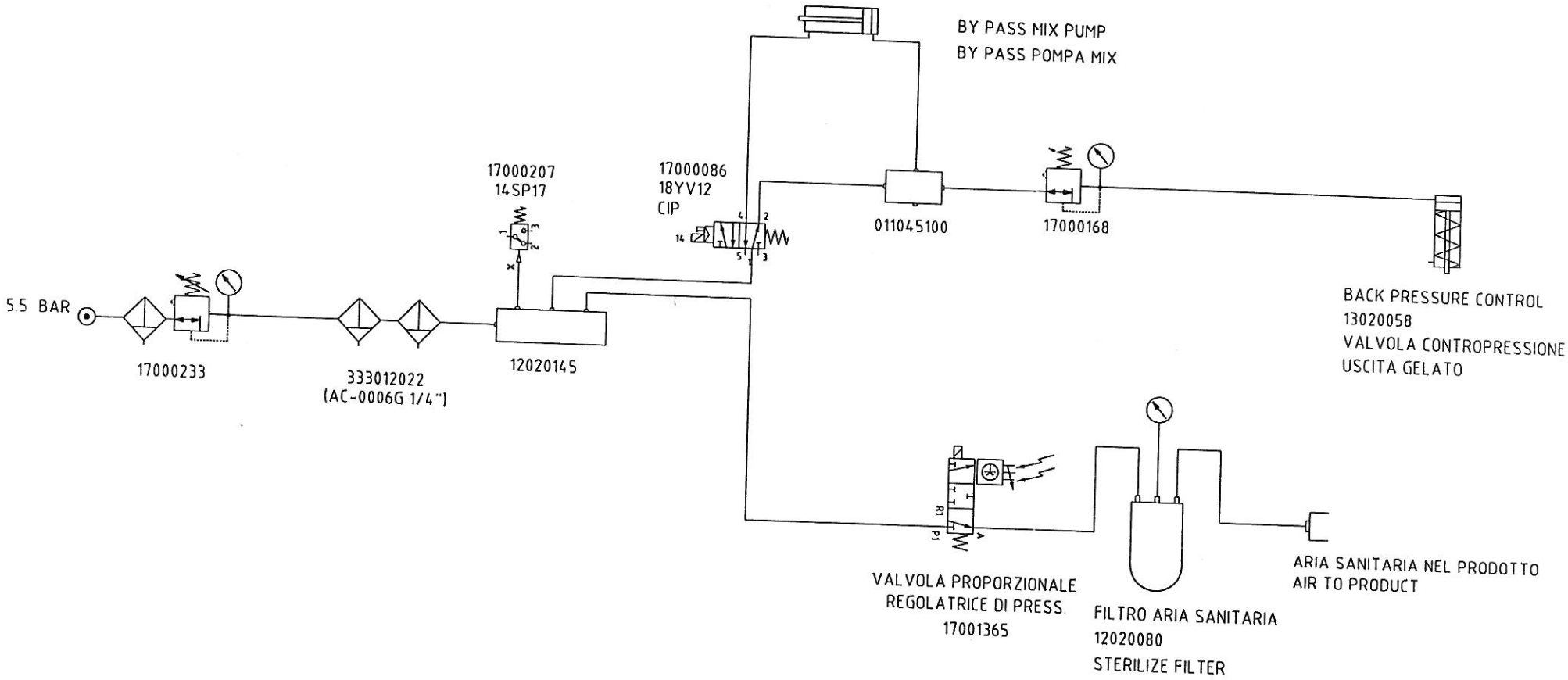
* Reference conditions of flow units: 0.00 °C, 1013.25 hPa (a).

Calibrator : Ha.M.

Date : 05-03-2003

Signed : .....

QC : .....



Tetra Pak
Hoyer

Macchina: FRIGUS 600 WITH PLC AND STD PUMP	Ordine	Dis. N.	FOGLIO 20
Denominazione: PNEUMATIC SCHEME	Esecutore P.Z.	CAD SPAC	
Cliente	Visto	Nome File 13020357	SEGUE
		Data 27.06.2001	